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The Question of Food Security

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Introduction

In March of 2012, after years of privileging the term 'food security', the FAO agreed to introduce the concept of 'food sovereignty' into its public deliberations. In 1996 at the Rome Food Summit, the international peasant coalition, La Vía Campesina, stated that 'food sovereignty is a necessary precondition of genuine food security'. Food sovereignty is about democratic control over national food policy and the right of people and communities to control how and what food is produced, and for whom. It was originally coined as a strategic concept to politicize the idea of 'food security', which originated in the UN system, but was appropriated by neo-liberalism. Under neo-liberalism it equated to the supply of food from world 'granaries' via transnational corporations. In contrast, food sovereignty encapsulates the view that nations should have the right to consume, rather than trade, what they produce. An important claim of the food sovereignty movement is that small farmers or peasants can 'feed the world and cool the planet'.

Under the neo-liberal regime, where WTO rules mandate liberalization of commodity trade and the reduction in farm protection across the state system, a substantial portion of the global South has become food dependent. In effect, countries no longer have sovereignty over food policy. While the EU and the US managed to protect farm subsidies via the WTO 'box system', Southern states, in particular, have discovered they were unable to protect their farm sectors from food imports from the Northern granaries that have been artificially cheapened via subsidies. Meanwhile, structural adjustment policies intensified the reduction in farmer support mechanisms such as rural credit and marketing boards (Patel, 2007). The principal consequence of this cheap food regime (Rosset, 2008) has been the displacement of small-holders, and a serious reduction in farming capacity, which was exposed during the 2007–2008 'global food crisis': indebted farmers were largely unable to respond by producing more food (Patnaik, 2008; GRAIN, 2012). The resulting food insecurity has refocused attention on the condition of the more than 40% of the world's population dependent on agriculture, and who produce over 50% of the world's food (ETC Group, 2009). It is this material reality, in addition to the global agrarian crisis exacerbated by ineffectual neo-liberal policies of market-led food security, that

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informs the shifting balance of forces in the FAO regarding the salience of (rights-based) 'food sovereignty' versus (trade-based) 'food security'.

The stand-off between 'food security' and 'food sovereignty' began to break down in the crisis conjuncture of the mid- to late 2000s, with rising food/energy prices, rising hunger rates, financial meltdown and recognition of wide-scale ecological degradation (Lawrence et al., 2010). During this period there was a series of important reports, as markers – the most important of which were: the Millennium Ecosystem Assessment (2005), the *Stern Review* (Stern, 2006), the IAASTD report (2009), the World Bank's *World Development Report* (2007) and the *World Food Summit Memorandum of Understanding* (FAO, 2008). While each had its own focus, all shared a common concern with the important link between a deteriorating environment and food insecurity. The UN and IAASTD Reports, in particular, underscored the centrality of agriculture to ecological stress – as problem and solution, respectively.

Introducing the 'environmentalist's paradox' the Millennium Ecosystem Assessment noted:

> 'Over the past 50 years, humans have changed ecosystems more rapidly and extensively than in any comparable period of time in human history, largely to meet rapidly growing demands for food, fresh water, timber, fiber, and fuel. This has resulted in a substantial and largely irreversible loss in the diversity of life on Earth… These problems, unless addressed, will substantially diminish the benefits that future generations obtain from ecosystems' (Millenium Ecosystem Assessment, 2005, p. 1).

Given that healthy ecosystems are essential to human life, the centrality of a sustainable form of agriculture to civilization is clear. And its centrality includes guaranteeing the right to food. Since neo-liberal governed markets have been shown to fall considerably short of their claim to provide global food security, there is now a growing scientific consensus that agro-ecological farming methods offer the most sustainable solution – in social and environmental terms (see Rosin et al., 2012). Small and medium-sized farms based on agro-biodiversity not only promise regeneration of natural processes (including sustaining soil and water health), but also sustain livelihoods for a considerable portion of the world's population, reducing pressure on jobless cities.

This is the approach recommended by the International Assessment of Agricultural Science and Technology for Development (IAASTD) in its report of 2008. This report, prepared by over 400 social and natural scientists and development practitioners, advocates a multifunctional role for agriculture in reducing poverty and social/gender inequality, stabilizing rural cultures, reversing environmental degradation, and reducing global warming. Stating that 'business as usual is no longer an option' in the face of multiple crises, the IAASTD questions the adequacy of an industrial–agricultural and transgenic-food approach to feeding the world, since markets fail to register the environmental and social harm arising from that model. Markets only feed people who possess the necessary purchasing power, and they are a minority of the world's population (Patel, 2007). Further, as global inequality deepens (George, 2010), more crop-land is use to grow animal feed and bio-fuels at the expense of staple grains (see also FAO, 2009). With respect to the current food regime, the IAASTD documents its unfavourable impacts on small farmers. It recommends ending subsidies for Northern surpluses and proposes financial rewards for environmental stewardship. It highlights the importance of national policy flexibil-

ity to balance the needs of poor consumers and small farmers (IAASTD, 2009, p. 10). Echoing the MEA, the Report recommends an integrative view of food, resource and nutritional security, emphasizing that reinventing agriculture as farming requires scientists (natural, social and health) to work with local farmers, governments and civil society organizations (IAASTD, 2009, pp. 9–10). These sentiments were also contained in the UK's Government Office for Science report *The Future of Food and Farming* (2011), where recommendations were made to contain consumer demand for resource-intensive foods and to improve the global system of food governance to achieve sustainable production outcomes.

Complementing the substantial literature on the greater overall productivity (and sustainability) of small-scale farming, an IAASTD contributor noted: a 'half-hectare plot in Thailand can grow 70 species of vegetables, fruits and herbs, providing far better nutrition and feeding more people than a half-hectare plot of high-yielding rice' (quoted in Leahy, 2008). Similarly, studies in Mexico found 'a 1.73 ha plot of land has to be planted with maize monoculture to produce as much food as one hectare planted with a mixture of maize, squash and beans. In addition, the maize-squash-bean polyculture produces up to 4 t per ha of dry matter for plowing into the soil, compared with 2 t in a maize monoculture' (Altieri and Toledo, 2011, p. 596). Several recent studies have concluded that the relative yields of organic/agro-ecological versus non-organic farming are sufficient to provision the current daily average consumption of calories across the world (Halberg et al., 2005; Pretty et al., 2006; Badgley and Perfecto, 2007; Altieri, 2010). Most notably, Catherine Badgley and colleagues examined 293 cases in a global data set finding that, on average, organic farming in the global North produces 92% of conventional agricultural yields, but in the global South organic farming produces 80% more than conventional agriculture (Badgley and Perfecto, 2007). Further, they found that sufficient food could be produced organically to feed the world, even without expanding farm land, and that leguminous cover crops could fix sufficient nitrogen to replace current applications of synthetic fertilizer (which, with over-use, undermine soil health). Organic fertilizer is cheap as it is produced on-farm (chemical fertilizer having risen in cost by 300% recently). And, since most inputs are on-farm and replenish soil and watersheds, organic/agro-ecological farming uses much less energy than industrial agriculture.

In order to strengthen and secure small farming, IAASTD recommends altering institutional arrangements to ensure agricultural multifunctionality, building trust and valuing farmer knowledge and natural and agricultural biodiversity, as well as seed exchange and common resource management systems (IAASTD, 2008, p. 4–5). IAASTD maps out a general strategy to strengthen food system resilience in the face of environmental crises – including promoting agro-ecological practices with 'triple bottom-line' goals: full-cost accounting to incorporate energy, health and environmental costs and, importantly, a rights-based framework rather than a market-centric organization of the agri-food system. The rights-based framework mirrors the food sovereignty principle of citizens consuming, rather than trading, their food. The UN Special Rapporteur on the Right to Food, Olivier De Schutter, advocates domestic production to reduce food dependency, noting there are 'approximately 500 million small-scale farmers in developing countries making them not only the vast majority of the world's farmers but, taking into account their families, responsible for the well-being of over two billion persons' (De Schutter, 2011, p. 13). Given the FAO's landmark decision to take food sovereignty seriously, it appears that there is a

discursive, if not an institutional, realignment underway in rethinking the meaning of – along with the mechanisms to promote and achieve – food security.

Articles in the Collection

The broader issue of global food insecurity – in particular its causes, consequences and the policy options to attempt to ameliorate it – has been a focus of scholarly attention for decades, but has recently had a resurgence with the acknowledgement that a host of new drivers (including 'land grabs', peak oil, peak phosphorus, freshwater constraints, along with climate change; see Cribb, 2010; Ingram et al., 2010; Lawrence et al., 2010; Cotula, 2012; McMichael, 2012) are combining to compromise attempts by nation states to feed their populations. At the XXIV Congress of the European Society for Rural Sociology (ESRS), held in Chania, Crete, in August 2011, a Working Group on Food Security discussed many of these 'drivers' and their impacts. This collection of articles is largely drawn from those delivered at the conference and presents a critical assessment of various local- national- and global-level concerns relating to food security.

Duncan and Barling examine the activities of the UN's Committee on World Food Security (CFS). They indicate that this body's attempt to incorporate the interests of civil society organizations (that is, both social movements and non-governmental organizations) is consistent with neo-liberal desires to widen participation in global food governance. Yet, the so-called Civil Society Mechanism (CSM) that the CFS has adopted is viewed as an innovative means of bringing new voices to the table and as having the potential to challenge some of the excesses of neo-liberalist thinking that continues to dominate public discourse about food security. Indeed, the overall legitimacy of the future activities of the CFS will, the authors argue, be based upon the extent to which civil society organizations can alter CFS policies in the face of wider, hegemonic views from wealthy countries relating to the necessity for the adoption of agro-industrial solutions to world food production/supply problems. Duncan and Barling claim that the CSM, while something of an experiment, is a 'politicizing, engaging and connecting' mechanism that has the potential to strengthen the influence, at the global level, of the very groups most affected by food insecurity.

The ways in which agri-food research is 'framed' has a direct bearing upon its likely impacts – in this case in relation to food security. Rivera-Ferre argues that the framing of current bio-scientific research is influenced by how 'development' is conceived, along with a view of the role agriculture should play in development. She identifies two mutually distinctive framings – an orthodox framing, which, in separating the bio-sciences from the social sciences, conceives of hunger in a narrow, technical way and views solutions similarly – that is, in terms of increased applications of high-tech agribusiness technologies and management regimes. In contrast, the alternative framing, which incorporates rather than marginalizes the social sciences, views agri-food systems as part of a wider political, social and environmental milieu. As such, triple bottom-line thinking, which promotes the desirability of sustainable development, can be readily embraced. As Rivera-Ferre acknowledges, the two approaches generate different questions about, and research programmes aimed at addressing, food security. The orthodox, or official, framing is one that supports industrial farming, monocultures, long food supply chains and the top-down transfer of knowledge. It has failed to improve global food security. The alternative framing is of an agro-ecological sort – one which endorses polycultures,

holistic thinking, short food supply chains and the co-production of knowledge. It is one, Rivera-Ferre argues, that has the potential to empower local-level communities to address wider power structures and to move toward a sustainable development pathway for agriculture.

Michael Carolan introduces the notion of 'food-print' to highlight the current inadequacies in assessments of food security. He develops a Food and Human Security Index (FHSI) that moves well-beyond notions of a population's access to calories. Incorporated in the FHSI are measures of well-being, nutrition, economic concentration within the agri-food industries, food dependency and sustainability. In applying the FHSI, Carolan reveals that an economically poor nation such as Costa Rica is more food secure than countries such as the US, Sweden, New Zealand and Canada. While this may appear counter-intuitive, Carolan points out that if we fail to account for such things as the state of the environment, which produces food, along with food independence and nature of the marketplace (competitive or monopolistic), we lose sight of the overall capacity of a nation's people to feed themselves, now and into the future. Importantly, his FHSI index is one that captures, and 'rewards' countries for, food sovereignty – the very ideal of La Via Campesina. Carolan provides provocative and critical assessment, one that argues for an alternative means of moving beyond the calorie-focused approach of assessing food security. In doing so, he reminds us that food intake is only correlated with the welfare of society up to a point, after which it begins to affect society negatively: 'more' food rather than the right foods, he argues, can actually create food insecurity. The FHSI index is a sober reminder that new thinking – about the environment, social well-being and food independence – needs to be undertaken if we are going to evolve a meaningful measure of 'food security'.

In the article by Alia Gana, the focus turns to the food protests that have occurred in Tunisia since 2008. Globally, food prices soared during the period 2006 and 2008, provoking street demonstrations and riots in countries such as Yemen, Guinea, Mexico, Morocco and Haiti and Tunisia (Pechlaner and Otero, 2010). While food prices and availability were not the only issues of concern to Tunisians, they were a crucial rallying point for the social protest movement that precipitated the collapse of the Ben Ali regime. In a nation where some 36% of family household expenditure is on food, food price increases would prove to be a significant factor in the mobilization against the government. Policies in Tunisia had favoured providing 'cheap' imported staples – something that undermined local producers and reduced the capacity of the nation to feed its own people. But when international food prices increased, and were passed on to consumers, the people could neither afford these foods, nor call upon local growers to supply foods that would substitute for the imports. Consumer anger resulted in protest, while a farmer protest movement called for land reform. Gana locates the cause of the problems faced by Tunisia, as well as by many Arab nations, in relation to the impacts of policies of the IMF and World Bank. She argues that a new form of structural change – one that allows for increased control of economic resources by famers at the local level – is needed if there is to be a truly democratic transition in Tunisia.

Stewart Lockie, Rebeka Tennent, Carmen Benares and David Carpenter ask the question of whether 'de-agrarianization' is an inevitable process in an uplands area of the Philippines. The authors conducted research in the upland area of Negros Occidental, a region dominated by small-holder production of sugar-cane, rice, corn, coconuts and tropical fruits. The farms are small, isolated and lacking in economic

resources. In a region where food insecurity combines with limited incomes from farming, there is considerable pressure for the removal of the least efficient producers and/or the adoption by farmers of various coping strategies (improving agricultural productivity, growing higher-value crops and working off the land). The authors found that farmers who adopted more agro-ecological approaches to farming (including organic production) were able to improve family livelihoods. Supplying local and regional markets provided for regular income while also allowing more food to be retained on-farm for family consumption. When cash and subsistence strategies were closely aligned, households benefited considerably. (This aside, there is a growing financial reliance upon remittances from family members who have left for paid work in the towns and cities.). The authors conclude that agro-ecology, in combination with greater market intelligence and access, and increased levels of formal education, can counter the forces leading to both 'de-peasantization' and to continued food insecurity. Re-peasantization, rather than de-peasantization, is a distinct possibility when new economic/political settings encourage producers to improve rural livelihoods.

The 'politics of re-peasantization' takes a slightly different focus in the paper by Elisa Da Via. She traces the attempts by farmers in France, Spain and Italy to coordinate efforts in maintaining a system of self-managed seed production and distribution. Farmer-to-farmer seed swaps, along with the agro-ecological knowledge regarding the best conditions for plant growth are, she argues, examples of de-commodified exchange, which stands in contradistinction to the system of intellectual property that underpins the standardized, corporate-based, agro-industrial model of farming. Various networks have arisen that foster and bolster farmer-based knowledge. These networks hold training workshops, seed fairs and farm visits, with the specific aims of selecting the best local varieties and of ensuring farmers understand the agronomic conditions most favourable for their growth. They develop databases of seeds, farmer-level seed banks and conduct demonstration days to assist growers understand the benefits of those seed varieties (including biodiversity benefits). For Da Via these activities are at the heart of the re-peasantization of European farming, where local-level producers are moving beyond EU regulations in asserting the right to farm in a manner that preserves agrarian culture and rural livelihoods, alongside biodiversity and biological resilience.

Behrooz Morvaridi explores the largely under-researched topic of the forms and intentions of philanthropic investment in agriculture. He is specifically interested in understanding the motivations of the Bill and Melinda Gates foundation in promoting the so-called 'New Green Revolution' in sub-Saharan Africa. Morvaridi argues that while it may appear to be overly cynical to doubt the desirability of forms of aid delivered by philanthropy, it is nevertheless necessary to examine the socio-political context in which that aid is provided. He argues that philanthropic activities conducted within global neo-liberalism have the explicit aim of drawing peasant producers into wider market relations and to foster the extension of corporate agribusiness. In sub-Saharan Africa, the endorsement of GM by Gates and others extends the corporate model of industrial farming – something that is inconsistent with improvements in local-level social justice, especially possibilities for a more equal wealth distribution. While GM is viewed by philanthropic and corporate capitalists as an essential mechanism to increase food production (and, so, reduce food insecurity), its extension throughout sub-Saharan Africa will do little to alter the causes of poverty and inequality. As such, philanthro-capitalists are addressing the symptoms

of hunger, not its structural bases, and their activities are not expected to deliver the sorts of outcomes that would lead to the alleviation of poverty, inequality and food insecurity among some of the poorest countries in Africa.

In the final article, Terry Marsden argues that the dominant approach to the framing of food insecurity contains assumptions about the indefinite supply of resources, the desirability of the increased applications of advanced technologies, and the importance of 'bio-economic' solutions to problems of hunger. This paradigm is one that embraces and endorses an older productivist logic, even if new terms such as 'sustainable intensification' are introduced to give legitimacy to the pursuit of bioscience. Marsden contrasts this with what he terms the 'eco-economic' paradigm. This is one in which ecological concerns are embraced within policies aimed at relocating agriculture as a central component of local and regional economic systems and communities. In this way, agriculture becomes place based and its governance can be of a more reflexive sort. Marsden considers that while the bio-economy is likely to remain entrenched in the lowland regions of Northern Europe, the eco-economy is gaining ground in upland regions – particularly in South-west England and Wales. Here, agriculture is responding to regional and city-based demands for sustainably produced foods, while also providing for enhanced biodiversity and amenity. He then examines the articulations between the two paradigms and shows how they are reconstituting space, albeit in a contested and contingent manner. This is a 'co-evolutionary' process, which, while not seeing the end of productivism, sees its excesses tempered. Marsden considers that we may be witnessing the growth of the 'ecological city region' – representing the re-ecologization of the spatial economy in which increasing public concern about the state of the environment, and concern about food production and quality, will ultimately alter regional agri-food trajectories. More reflexive and place-based forms of governance are a key to the geographic extension of agri-food multifunctionality and sustainability.

As noted earlier, this Special Issue has largely been compiled from papers delivered at the ESRS congress in Crete in August 2011. We thank all contributors to the food security workshop at that conference and to members of the audience for their insightful suggestions for improvements to the papers. We also thank the anonymous referees who provided formal comments on the papers included in this collection and to Joek Roex for final editing of all papers. Thanks also goes to Vaughan Higgins for suggesting that the conference presentations might form a special food security issue of IJSAF. Finally, Geoffrey Lawrence acknowledges financial support received from the Australian Research Council, from the University of Queensland, and from the Centre for Rural Research, Norway, which allowed his attendance at the ESRS congress.

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Renewal through Participation in Global Food Security Governance: Implementing the International Food Security and Nutrition Civil Society Mechanism to the Committee on World Food Security

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Abstract. The food commodity price rises from 2006 to 2008 engendered a period of political renewal and reform in the governance of global food security. The Committee on World Food Security (CFS) was designated as the main international forum dealing with food security and nutrition in 2009 as part of this reform. Through the CFS reform process, civil society organizations secured the right to co-ordinate autonomously their engagement in the Committee as official participants and are doing so through the International Food Security and Nutrition Civil Society Mechanism (CSM). The CSM is an innovative institutional form designed to allow a broad range of civil society organizations from different regions of the world and from diverse constituencies, notably those who face food insecurity on a regular basis, to participate in global food security governance. The challenges and complexities of setting up and operationalizing the CSM are presented and illustrated. These findings are considered in the context of the longer-term move towards widening participation in global governance, with a particular focus on the trajectory of civil society participation in food security governance. The broad neo-liberal logic, or embedded neo-liberalism, that underpins contemporary world politics provides boundaries within which the innovative CSM is being given shape through the political agency of the participating civil society organizations. The study concludes by suggesting that while the Civil Society Mechanism faces some internal challenges, these are not insurmountable, and that the CSM represents an effective politicizing, engaging and connecting model for food-focused civil society organization entering into global governance.

Introduction

The rise of food prices in 2006 through to 2008 heightened awareness of food insecurity and gave fresh political momentum to addressing world food security at a time

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when the number of hungry people had risen to over one billion. This renewed political interest in food security led to a flood of international and multilateral meetings, a flurry of declarations and statements, expert panels, the creation of new programmes and the reformation of old ones. One notable trend in this revived phase of global food security governance was an attempt at widening and strengthening the participation and engagement of civil society actors in international food security decision-making.

In what follows, the recent reforms of the Committee on World Food Security (CFS) – a forum in the United Nations System for review and follow-up of food security policies – are presented in the wider context of global governance and civil society participation. Inter-governmental agreement amongst the 127 member states that the CFS would become the main international forum dealing with food security and nutrition occurred in late 2009. A key element of the renewal of the CFS was the introduction of civil society organizations as official participants on the Committee. Civil society organizations achieved the right to facilitate their participation through an autonomous International Civil Society Mechanism (CSM). Their inclusion in the Committee and its activities presents opportunities for more meaningful and active engagement in the procedures and debates leading up to final decision-making in the CFS, while final voting authority remains with the nation states. The term 'civil society organizations' (CSOs) is used as an umbrella term to refer both to social movements and to non-governmental organizations (NGOs). NGOs are understood to be organizations that represent a specific issue or theme or the interests of certain social groups. Social movements are defined here as self-organized social actors with a shared identity that have come together to represent their own interests and – in the case of the CSM – are from the developing world and exist predominantly on the front line of food insecurity.

The reform of the CFS provides the opportunity for a detailed study of the challenges of widening participation in the international governance of food security and of turning political rhetoric into policy reality. Through its recent reform process, the CFS has supported new mechanisms and structures that are reshaping the way food security policy is debated and developed by changing who is engaged in the debate. By including civil society actors as official participants on the Committee, the CFS is championing a model of enhanced participation at the level of international policy-making, finding new ways to engage those civil society actors who have been located, previously, at the margins of official food security debates. The challenges of setting up, mobilizing and implementing workable procedures for the participation of a range of new constituencies in the CFS in meaningful ways are presented below.[1]

In the next section, global governance is conceptualized within a context of embedded neo-liberalism so as to mark the boundaries within which changes to the architecture of global food security governance are taking place. This framework allows scope for meaningful political agency that can shape the ways in which global governance is ordered at the international levels of policy direction. The widening of participation beyond nation states has been a longer-term feature of global governance as a conceptual approach to international politics. The application of this longer-term participatory move in global governance is detailed, particularly, in relation to the United Nations' institutions and to the governance of food security. In the case of the CFS, the widening of participation prior to 2009 is explained so as to provide a background to the more significant changes ushered in that year. The implemen-

tation of the CSM has not been an easy process. The complexities and challenges of this process are presented and include: finding methods for the co-ordination of the different voices; arriving at consensus positions; and balancing representation through participation.

Global Governance, Civil Society Participation and Food Security

Global governance emerged originally as a concept with a strong normative element as a means for moving beyond the self-interest of nation states, to engage wider societal actors in reaching co-operative solutions to shared global problems (Pattberg, 2006). The emergence of international regimes around environmental and conservation issues are examples of the growing co-operation evident in world politics over the second half of the twentieth century. However, within the global governance literature there is another approach that voices a strong critical perspective 'that analyses the current global governance debate as a hegemonic discourse' (Pattberg, 2006, p. 1), and asserts that global governance is in fact '*neoliberal* global governance, serving the freedom of capital to accumulate around the planet' (Overbeek, 2010, p. 702). Cerny describes this hegemonic discourse as one of 'embedded neoliberalism' which reflects not only an emerging neo-liberal consensus that has developed 'as market forces and transnational interpenetration constrain institutions and actors to behave in certain ways,' (Cerny, 2010, p. 148) but is also a political construction, given shape in the everyday world by political actors and interest groups seeking political legitimacy. Political agency still exists in this context but is often unable to move beyond neo-liberal terms of debate. Getting and maintaining the engagement of social movements in such bounded global governance processes and institutions are a key underlying tension facing the CSM.

The pursuit and maintenance of neo-liberal hegemony has been identified as a key motivating and rationalizing factor in world food security policy (McMichael, 2000; Busch and Bain, 2004; Peine and McMichael, 2005; Pechlaner and Otero, 2008; Lang et al., 2009; Lawrence et al., 2010). Since its introduction into global policy negotiations at the 1974 World Food Summit, food security policy has undergone a shift from global co-operation and increased production in the 1970s towards a focus on individual and household livelihoods throughout the 1980s (Sen, 1981; Maxwell, 1996; Maxwell and Slater, 2003; Mechlem, 2004; Shaw, 2007) and has been increasingly integrated into financial markets and international trading systems and rules in more recent decades (Wise and Murphy, 2012). The prevalence of neo-liberal approaches in the post-2007 food security policy responses is evident in the launch of donor and economic elite-led initiatives such as the G8's L'Aquila Food Security Initiative, which seeks to harmonize donor practices, encourages partnerships with vulnerable countries to implement food security plans, as well as to increase G8 commitments of financial and technical assistance (Prime Minister's Office Italy, 2012). The L'Aquila Initiative prompted the G20's request for the World Bank to act as trustee for the Global Agriculture Food Security Program (GAFSP) – a fund aimed at improving incomes and food security in the world's poorest countries through better co-ordinated public and private sector investment in agriculture (World Bank, 2012). The GAFSP has CSO advisors on its Steering Committee, reflecting the widening of participation in recent years. These initiatives, among others, emerged to fill an apparent leadership gap in the wake of the 2007 food price spikes. However, since this time, both the G8 and G20 have recognized, at least rhetorically, the UN's

Committee on World Food Security as the primary forum for policy discussion on food security at the global level.

Since its creation, the UN has promoted civil society participation in processes of dialogue, deliberation and mobilization (Cardoso, 2003; Willets, 2006). The participatory turn in global governance accelerated after the end of the cold war and with the launch of a series of World Summits and Conferences throughout the 1990s (e.g. World Food Summit, World Summit for Children, Rio Earth Summit, World Conference on Human Rights). At these meetings, citizens' organizations forwarded new ideas and proposals, negotiated, protested and exercised political pressure and, in doing so, created new public spaces (Cardoso, 2003). At this time, national-level NGOs started to emerge at the global level in greater numbers and sought to engage directly in inter-governmental deliberations and advocacy work. International NGOs who had been the main CSO actors in multilateral forums up to this point, also went through a process of transformation to better adapt to the new political climate by forming new global and transnational organizations (e.g., Oxfam, Third World Network, International Coalition for a Criminal Court). The private economic sector's representation was also strengthened during this time and their presence was much more marked (Hill, 2004).

Such engagement corresponded with a trend towards addressing multidimensional aspects of specific issues, illustrated by the themes of the World Summits (McKeon, 2009). These issues became sites where diverse actors with similar end goals came together to take advantage of lobbying opportunities, teach-ins and education, prototype global parliaments, trade fairs and media spectacles (Clark and Aydin, 2003, p. 4). Critics viewed this mix of activities as a medieval fair while others considered it as a corrective activity to the failings of traditional democratic institutions (Clark and Aydin, 2003, p. 4). Yet, they serve to illustrate the emerging collective power of civil society to shape the agenda and to influence policy-makers and public opinion on a global scale. As a response, discussion on a 'global civil society emerged' supported by the development and spread of new communication technologies and the increasingly global nature of problems (e.g., environment, women's rights, development). With this, and the increasingly globalized nature of politics, international meetings became increasingly politically important, prompting more NGOs to become involved and develop parallel NGO forums (for a review of this, see Clark and Aydin, 2003, p. 5). These trends also emerged in the international food security policy area. For example, the 1996 World Food Summit was mandated to encourage the participation of CSOs at national, regional and international levels in the Summit preparatory process. NGOs were invited to attend the World Food Summit as observers and to participate in an NGO meeting prior to the 22nd Session of the CFS. Over 800 people, representing more than 400 organizations attended the World Food Summit, and more than 100 CSO representatives participated as members of their government delegations (CFS, 1999, s. 5, p. 12). The World Food Summit Action Plan articulated the need for governments to work in partnership with 'all actors of civil society' (WFS, 1996, art. 14) to advance the plan and established that the CFS would be responsible for its monitoring and implementation. In the first CFS session after the World Food Summit, a discussion on broadened participation of civil society and other partners in the work on the CFS was added to the agenda (CFS, 1999, s. 5).

The rise of anti-globalization activism, made perhaps most evident through the protests co-ordinated in Seattle in 1999 against the WTO, shifting geo-politics, and

the spread of new communication technologies, also changed the way civil society operated. Civil society actors adopted new information and communication technologies to not only create global public opinions but also to share information, build networks and strategize at a global level. This began to define a new phase of the participatory turn, marked by the strengthening of like-minded coalitions of governments and civil society (e.g. International Criminal Court, Landmine Convention), as well as various forms of multi-stakeholder, private–public and public policy networks and partnerships (Hill, 2004).

In the 2000s the UN began a reform process under UN Secretary-General Kofi Annan. One outcome was the naming of a Panel of Eminent Persons on United Nations–Civil Society Relations, which produced the 2004 Cardoso Report. The report proposed involving civil society organizations more regularly in the General Assembly, extending dialogue between civil society and the Security Council and the greater engagement of civil society organizations in UN field-work. The Panel also recommended that a special fund be established to help civil society organizations in developing countries work more effectively with the UN (Cardoso, 2004). To illustrate the shifts in participation outlined above, and to highlight some of the emerging tensions, we turn to the reformed Committee on World Food Security and the associated but autonomous International Civil Society Mechanism and review ways in which civil society actors are co-ordinating participation in global food security governance.

The Reform of the Committee on World Food Security and Modes of Participation

The CFS, established as a result of the food crisis of the 1970s upon recommendation from the 1974 World Food Conference, serves as the forum in the United Nations system for review and follow-up of policies concerning world food security, including food production and physical and economic access to food (Shaw, 2007; CFS, 2009a). Its original mandate included reviewing current and prospective demand, supply and stock position for basic food-stuffs; periodically evaluating the adequacy of current and prospective stock levels in exporting and importing countries; and reviewing steps taken by governments to implement the International Undertaking on World Food Security. Historically, however, the CFS has played a relatively minor role in international politics and was generally ineffective and inactive due to a lack of interest and buy-in from member states and an insufficient budget (Shaw, 2007).

In October 2009, at the 35th Session of the Committee on World Food Security (CFS), the 127 member countries agreed to a wide-ranging reform with the aim of making the CFS the foremost inter-governmental and international platform dealing with food security and nutrition (CFS, 2009b). The renewal of the CFS took place amidst a wave of international activity organized under the banner of 'food security'. However, the seeds of reform had been planted well before.

A year after the World Food Summit, in an attempt to modernize the CFS's Terms of Reference and responding to changes in the institutional organization of the UN system,[2] the Committee amended its General Rules of the Organization. Under the amended rules, the members of the CFS remained those interested FAO or UN member states. However, reference was made to inviting 'relevant international organizations to participate in the work of the Committee and the preparation of meeting documents on matters within their respective mandates in collaboration with the

secretariat of the Committee' (CFS, 1997). At this time, CSOs attending the CFS had observer status, and their ability to engage in processes lay with the discretion of the Chair. Two years later, during the 25th Session (1999), the CFS made broadened participation of civil society and other partners a main agenda item. The background paper provided suggestions for broadening the participation of civil society organizations in the work of the CFS and the World Food Summit implementation process (CFS, 1999, s. 5). The proposals included enhanced information exchange, contributions to technical documents, participation in CFS meetings, and enhanced dialogue. It also provided possibilities for enhanced CSO engagement in the CFS, including having the Chair ask CSOs to appoint designated spokespersons to intervene in debates, grant CSOs the right to make one intervention per topic, and allow CSOs to present consolidated reports of their conclusions and findings on achievements and lessons learned.

CSOs were proving themselves to be useful allies to Committee members who, in the wake of the World Food Summit, had been tasked with monitoring the implementation of the resulting Plan of Action. This helped to pave the way for increased CSO participation in the Committee. Yet, beyond the role of observers, their engagement continued to be needs-based or subject to sympathetic Chairs. At the 32nd Session of the CFS, various stakeholders, including CSOs, were engaged in a dialogue on progress made towards attaining the World Food Summit Goals. At this point, some members of the CFS 'requested that options for continued engagement of multi-stakeholders in future years be discussed at the next Session of the CFS' (FAO, 2006, par. 31).

At the 33rd Session of the CFS (2007), the Secretariat provided background information on current practices of multi-stakeholder engagement and highlighted four potential options for their continued engagement including: interventions by observers, CSO reports on the World Food Summit Follow-Up to be presented at the CFS Sessions, multi-stakeholder dialogues with the Chair, and, Informal Panels (CFS, 2008/6, par. 3). The Committee requested the Secretariat to prepare a document outlining these and other possible options to be discussed at the 34th Session of the CFS (CFS, 2007, par. 31). The resulting paper Participation of Civil Society/Non-Governmental Organizations (CSOs/NGOs) listed best practices adopted in other FAO bodies and a suggestion that they could be applied to the CFS. These included allowing CSOs to organize side events, seeking CSO input into documents, encouraging CSO caucusing, permitting CSO presence during the drafting of outcomesm, promoting direct dialogue between governments and CSOs, and formalizing and communicating procedures for engagement (CFS, 2008/6, par. 18). Principles of participation were also outlined along with specific measures to improve interactions between the CFS and CSOs. However, the actual reform process proved much more radical than the Secretariat had envisioned. Comparing the Secretariat's paper on participation to the results of the reform process, one member of the CFS Bureau noted:

> 'There is a background document with the options and proposals that were put forth by the secretariat for the reform of the CFS. That was like the options that would be possible goals to get at, at the end of the reform process. Look at those options. They are so petty, they are so small. And you see this is what they were trying to achieve with the reform' (Interview, Rome, October 2011).

He went on to explain how pleased he was that the reforms had managed to surpass these initial suggestions.

> 'This could have started as bad and ended as bad in the usual "let's say we change something to keep doing what we always did". But at some point, the Chair being who she was, and that Contact Group being created, things got out of hand for FAO itself. So this was the fascination of the process, because the reform that I thought usually would come up… business as usual… it got out of hand, in a good way, and developed into a much stronger version of the CFS' (Interview, Rome, October 2011).

The reform of the CFS involved eight months of negotiation between the Committee's Bureau and an interim Contact Group, which included civil society representatives. Thus, from the very start of this phase, civil society participated in the reform process. However, their engagement was based on at least three key factors: the broader and longer-term participatory turn that had already infiltrated the FAO and the Committee; a history of lobbying on the part of CSOs; and a sympathetic Chair. As one Diplomat involved in the Bureau at that time explained in an interview:

> 'In the beginning of 2009… the new chair of the CFS… got a mandate to reform but they didn't know where to go or what to do, and she called that meeting… to propose to countries to create the contact group for the reform of the CFS… And in the end people decided to compose this loose Contact Group that would include people from civil society, and then the precedent was set and this Contract Group moved things away from the usual bureaucracy of FAO.'

When asked why CSOs were involved in the first place in this reform phase, it was explained:

> 'I think it came personally from… the Chair, who has personal convictions about this. So, you could raise lots of points of order on this. How could we group them? Based on what selection procedure? What is entitled to develop here?… But she went ahead and invited the delegations that were more or less involved but without criteria. But at least they were there, and it happened' (Interview, Rome, October 2011).

The renewed CFS comprises member governments, participants (including civil society organizations), UN bodies, international financial and trade institutions, international agriculture research organizations, the private sector and philanthropic foundations, and observers. These actors make up the Plenary, which is, in turn, supported by several key bodies. The Bureau is the executive arm of the CFS and is responsible for its administration. It is made up of a chairperson and representation is based regionally with members drawn from 12 member countries: two from Africa, Asia, Europe, Latin America and the Caribbean, Near East, and one from both North America and South-west Pacific. The Advisory Group assists the Bureau to advance the objectives of the CFS, particularly to ensure linkages with stakeholders at all levels to support two-way exchange of information. The Advisory Group is made from representatives from UN bodies as well as four civil society representatives, one representative from international agricultural research bodies, one representative for the private sector, and one representative from philanthropic bodies (see Figure 1). Presently, the private sector is lobbying to get an equal number of

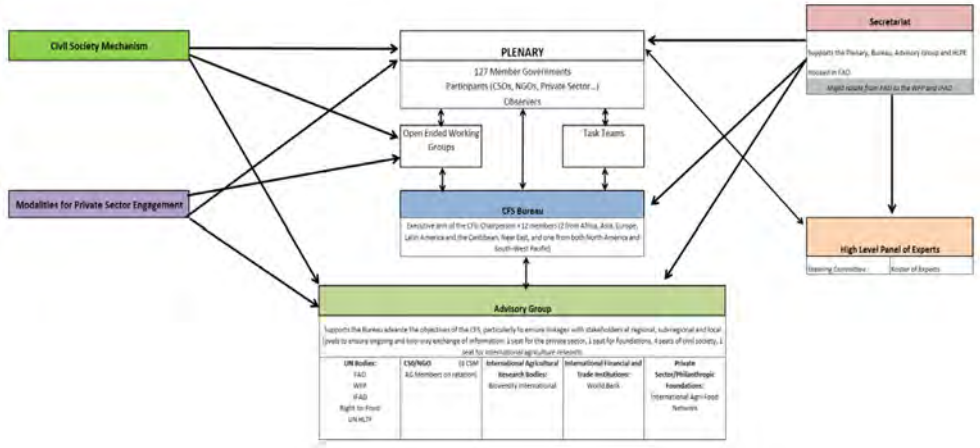

Figure 1. Structure of the Reformed Committee on World Food Security.
Source: Adapted from CFS, 2009a.

seats on the Advisory Group as civil society. Their attempts thus far have been unsuccessful.

Through the reform there has been a focus on intersessional activities, policy convergence and policy co-ordination, meaning that the CFS is to:

> '[p]rovide a platform for discussion and coordination to strengthen collaborative action among Governments, regional organizations, international organizations and agencies, NGOs, CSOs, food producers' organizations, private sector organizations, philanthropic organizations and other relevant stakeholders, in a manner that is in alignment with each country's specific context and needs' (CFS, 2009a, par. 5).

Central to the reform of the CFS has been the expansion of 'participation in CFS to ensure that voices of all relevant stakeholders are heard in the policy debate on food and agriculture' (CFS, 2009a, par. 2). Towards this end, through its reform, the CFS has sought to 'constitute the foremost inclusive international and intergovernmental platform for a broad range of committed stakeholders to work together in a coordinated manner and in support of country-led processes towards the elimination of hunger and ensuring food security and nutrition for all human beings' (CFS, 2009a, par. 4). As such, it embodies a unique model for widening the participation of civil society organizations at the global level, offering potential solutions to many of the concerns surrounding global governance, notably inclusivity, legitimacy (McKeon, 2011), accountability, transparency, legitimacy and representation.

The CSO observers, and more latterly participants, to the CFS have been diverse. Since 2005, international NGOs such as Action Aid have been actively engaged in every session of the CFS. Large networks such as the FoodFirst Information and Action Network (FIAN), the International Planning Committee for Food Security (IPC), and More and Better Campaign have been official observers and then participants in six of the past seven sessions of the CFS. Uncovering the participation of social movement actors in the CFS is a bit more complicated as they are often left off the official participant lists. This is because many participate as members of larger networks, like the IPC. Some larger movements have managed to gain accreditation

to the CFS. For example, members of La Via Campesina are listed in official CFS documents as having attended sessions in 2006, 2008, 2010 and 2011, but their members have often attended as members of the IPC, which is similar for the World Forum of Fish Harvest and Fish Workers. Since the reform process, many new NGOs have been accredited as participants, including the Action Group on Erosion, Technology and Concentration (ETC), Practical Action, and the Asian NGO Coalition for Agrarian Reform and Rural Development. However, many of the social movements still do not have the necessary credentials or capacity to register as participants through the FAO accreditation process and consequently they gain accreditation through the Civil Society Mechanism. Thus many of the social movement actors, including youth movements, pastoralists, fisher-folk, urban poor, and indigenous peoples fail to appear on official participant lists but rather fall under the CSM (more information on the make-up of the CSM is provided below).

The CFS offers an official space where an increasingly diverse group of actors can congregate. These actors have, over time, been able to secure greater and more meaningful involvement in planning, research, debate and policy-making. CSOs, as we will show, have created a mechanism to ensure that this engagement is coordinated and that the social actors, who have traditionally been on the perimeter of these processes, are not just brought in, but are leading processes of engagement.

Another reason why many CSOs have invested in the process, over other initiatives, is that the CFS maintains the UN principle of one country–one vote, which CSOs argue presents the most democratic option at present for multilateral decision-making, especially when key stakeholders are able to participate in the agenda setting, in discussions, and in policy negotiations. Furthermore, that voting is reserved for countries and is not extended to other stakeholders, perhaps counter-intuitively, serves to enhance accountability. CSOs were encouraged by some delegations to request voting status within the Committee, but decided that states have the responsibility of ensuring food security and thus decision-making must be reserved for states. The role non-state participants is thus to provide guidance and policy recommendations and to monitor states once decisions have been made.

International Food Security and Nutrition Civil Society Mechanism

Civil society participation in the CFS is managed through self-organized interaction. The reform document of the Committee on World Food Security invited civil society organizations to establish autonomously a global mechanism to facilitate their participation in the CFS (2009a). Several groups submitted proposals requesting leadership of the process but the successful proposal was one jointly written and submitted by the Governance Working Group of the International Planning Committee for Food Sovereignty (IPC), Oxfam and Action Aid International, with the support of a methodology group comprising reference people who had been involved in the reform process since the beginning.[3] Four drafts of the mechanism were circulated widely through established networks and made available online for input and comments. There was recognition of limitations to a fully consultative process given time, linguistic and financial restrictions; and the drafting committee sought to ensure transparency throughout the drafting process and consequently decisions taken on each comment were recorded and made publicly available online. The final draft was presented and approved at a consultation of civil society organizations in October 2010.

Through the CSM, CSOs have become involved in various aspects of the Committee on World Food Security, including as: members of the Advisory Group, CFS Task Teams and Open Ended Working Groups and, most obviously, in the CFS plenary discussions. In the CFS activities, the CSM has facilitated CSO proposals, suggestions and dissent, up to the point where nation states achieve consensus (or consensus minus one).

The Civil Society Mechanism builds on the extensive experience and networks of civil society organizations across a range of policy areas and from existing mechanisms for interaction between civil society including the International Planning Committee for Food Sovereignty (IPC), the Farmers' Forum and the Permanent Forum on Indigenous Issues. This history is not lost on those involved in the broader CFS process. At the first meeting of the Coordination Committee, one FAO representative acknowledged that:

> 'This meeting is historic, the fruit of many years of hard preparatory work, from social organizations comprized of many social groups and social movements and other movements who have been advocating and affecting change for many decades. The engagement of CSOs as participants in the CFS process builds on the collective experience of this group. Contributions to the World Food Summit, World Food Summit +5, development of the IPC, inception and adoption for the guidelines for the realization of the right to food' (Price, 2011).

This recognition of the history and knowledge of the process and actors involved has been fundamental to the ordering, structuring and functioning of the CSM over the first year of operation. At the same time, the CSM is an innovative mechanism that is adapting to the changing governance architecture of food security. As such, throughout the development and implementation of the CSM, there has been recognition that the process will not be perfect. What has been stressed is the need for transparency, to follow the established processes and to maximize communication (Civil Society Mechanism, 2010). Furthermore, the strategies of the civil society groups in the CFS provide instructive practices for other groups seeking to facilitate civil society engagement from a diverse membership in formal international policy institutions, where member states retain the key voting authority on final decision-making.

The CSM is open to all civil society organizations working on issues related to food security. It is made up of the general membership, a Coordination Committee, Working Groups[4] and a Secretariat. The Coordination Committee is up of 41 members from 11 constituencies and 17 subregions (see Table 1). These members are selected through processes established by representatives of the constituencies or subregions, in consultation with the CSO Advisory Group members (explained below). Small-scale farmers make up the largest constituency on the Coordination Committee as they represent the majority of hungry people in the world, as well as those who produce the largest proportion of the food in the world. Gender and geographic balance among the members on the Coordination Committee is a priority.

Key Challenges Facing the Civil Society Mechanism

The CSM presents a radical new mechanism for co-ordinating the effective participation of a diversity of actors in multilateral governance processes, but there have

Table 1. Constituencies and Regions within the CSM Coodination Committee.

Sub-Regions Total of 17 (1 member per sub-region)	
North America	South-east Asia
Central America and Caribbean	Central Asia
Andean Region	Oceania
Southern Cone	Southern Africa
Western Europe	West Africa
Eastern Europe	East Africa
West Asia	Central Africa
South Asia	North Africa
Pacifica	
Constituencies Total of 24 (2 members per constituency, small-holder farmers have 4)	
Agricultural and food workers	NGOs
Artisanal fisher-folk	Small-holder farmers
Consumers	Urban poor
Pastoralists	Women
Indigenous Peoples	Youth
Landless	

Source: Adapted from CFS (2010), with updated regions from communication with CSM Secretariat (May 2011).

been growing pains. In what follows, we present eight challenges faced by the CSM in its first two years of operation and highlight ways in which participants have sought to fix them. These challenges include: the initial primary focus on establishing structures and processes, leaving less time for work on content; establishing the Coordination Committee; balancing participation versus representation; addressing consensus while respecting diversity; establishing decision-making mechanisms and ensuring participants accepted shifts in the location of key decision-making in favour of efficiency; building trust amongst the different constituencies represented; overcoming language barriers; and, finally, ensuring the meaningful engagement of those most affected by food insecurity in these processes. These examples provide insight into the challenges raised by CSO participation in global food security governance but also serve to highlight how the diverse actors in food social movements co-ordinate and manage the expectations of their new status as official participants. This is not an exhaustive list of challenges. For example, the CSM also faces financial challenges, including raising enough money to finance the participation of civil society actors, and to support a small secretariat. We have sought to identify and focus upon challenges that the CSM has faced internally – allowing an understanding of how diverse civil society actors are collectively managing their participation in the Committee on World Food Security.

First, one challenge has been the initial focus on process and structure. Actors newly engaged in the CFS have identified the CSM's current focus on structure as restricting and have expressed this publically in CSM meetings. The CSM is a young and innovative mechanism and participants are conscious of the continuing need to develop, adapt and ameliorate its governance structure. However, the focus of CSM leadership on structure has led some participants to view it as dominating the agenda thus limiting the ability of the CSM to adequately address technical or political issues. As one participant, new to the process lamented during the 2011 consultation in advance of the 37th Session 'I feel like this is a waste of time. I came here to talk

about issues, about solutions, and they spent the whole meeting talking about how they will organize themselves. I don't have time for that.' (Interview, Rome, 2011).

One way the CFS has addressed these concerns is through the establishment of Working Groups. These groups were developed to promote cohesion between the work of the CFS and the CSM and to structure the work of the CSM. They are open to CSOs working on related topics. The CSM Working Groups aim to increase awareness and share information on related CFS processes, to provide a space for CSOs to dialogue on related issues, to ensure a space for CSOs to develop strong and well-articulated joint-positions, and to ensure CSO participants are present on the various CFS working groups and task teams.

Second, the development of the Coordination Committee has taken much longer than expected and, as the end of the second year approaches, 13 seats remain unfilled.[5] Reasons for this include lack of contacts or networks in specific regions and constituencies as well as failure of interested parties to undertake an appropriate selection process and to submit these processes to the Advisory Group members for approval. These challenges serve to highlight the difficulties of widening participation to include actors who previously stood outside the process or whose current struggles and focus are localized. Indeed, key groups that have been marginalized by, or worked outside of and/or against, these processes are now faced with the task of determining ways of moving into these circles (Peine and McMichael, 2005, p. 32). Central to this transitional process from outsiders to insiders is the development of trust, networks, new skills as well as working through issues of representation and legitimacy. At the same time, in other forums, and especially in local contexts, these actors continue to push and resist dominant governance structures, adding another layer of complexity.

One of the main functions of the Coordination Committee is to facilitate the participation of those in sub-regions and constituencies in the CFS. The Coordination Committee is not to be seen as a committee of people representing the views of their organization. Rather, they play a communicative and networking function: they are facilitators. This point has been very hard to convey to Coordination Committee members and others. NGO and CSO participants are politically, intellectually and emotionally tied to the positions of their organizations and to separate themselves from their values, as well as potential opportunities, and the mind-set of interest lobbying, is a real challenge. The Final Report of the Civil Society Consultation in advance of the 36th session (CSM, 2010, p. 8) tries to get at this point by stating:

> 'The Coordination Committee is the backbone of the CSM. One of the Coordination Committee's roles is to work hard to facilitate the participation of those in subregions and constituencies. In no way is the CC to be seen as a committee of people representing the views of their organization. Rather, they play a communicative and networking function.'

With respect to this, the CSM works to find points of agreement to forward united positions and statements that conform to the common good as agreed upon by way of deliberation and consensus by all participants. Second, the CSM accepts diversity, difference and disagreement. In instances where opinions differ, the various perspectives are presented as the CSM position.[6] At the same time, there is pressure to speak with a united voice. For example, at a plenary session of the 37th Session of the CFS (October 2011), the Chair encouraged civil society participants to speak with a unified voice. One government delegate noted that from his perspective, a united CSO

endorsement of a specific recommendation carries more weight than that of some member states. While there is recognition of the diversity of perspectives across civil society organizations represented at the CFS, there is also awareness of the political impact gained through united positions. Hence, CSOs, facilitated through the CSM, have worked to develop joint positions wherever possible. Arriving at a point of consensus often involves long discussions and processes of compromise on the part of all actors thereby moving them away from their original objectives. Chantal Mouffe (2000, p. 17) warns that often this process of consensus building can reflect 'a temporary result of a provisional hegemony, as a stabilization of power' and is a process that 'always entails some form of exclusion'. Thus, while these processes of deliberation and consensus building form a fundamental part of the CSM, and the UN decision-making process more broadly, they also inevitably result in a form of social exclusion where the ideas of some actors are left on the cutting room floor.

Coming to consensus has proved challenging not only for lack of shared approaches but also for lack of engagement. As noted above, the executive of the Civil Society Mechanism is a Coordination Committee with 41 members. A committee of that size, spanning the world, with varying levels of commitment, connectivity and three working languages has proven, not surprisingly, hard to manage, especially for a resource-poor Secretariat. Getting the Coordination Committee to come to consensus (note that in the structure of the CSM, silence is not taken as agreement) on issues in a timely fashion has meant frustration, delays and sometimes moving ahead without consensus as often the CSM is only given a few days to react to documents or prepare for meetings. Here again, the commitment to transparency and the development of strong relations of trust are key to the successful operation of the CSM.

In an attempt to address decision-making within the CSM, and responding to the challenges raised above, there has been a shift of power from the Coordination Committee to the Advisory Group members. It is the responsibility of these Advisory Group members to ensure that the views of civil society are heard and to facilitate two-way communication between the CSM and the CFS. With the launch of the CSM, it was decided that the four CSO Contact Group members, who had represented civil society throughout the CFS reform process, would become the interim CSO members on the CFS Advisory Group. These original CSO Advisory Group members were three male and one female representative from Le Réseau des organizations paysannes et de producteurs de l'Afrique de l'Ouest (ROPPA), the International Planning Committee for Food Sovereignty (IPC), Oxfam International, and the Mouvement International de la Jeunesse Agricole et Rurale Catholique (MIJARC). Under this arrangement they would serve for one year (2009–2010) and new focal points would be chosen from and by the Coordination Committee in 2011, once the Coordination Committee commenced its activities. However, at the Coordination Committee meeting in May 2011, it was decided that the CSO Advisory Group members would continue in their roles until October 2011. This was, in part, in recognition of their historic role in the process and because it was deemed important that the CSO Advisory Group members be able to work with the restrictions of limited time and resources, and be highly attuned to the politically sensitive nature of the work while maintaining a high degree of knowledge and political fluency. It also reflected challenges faced by the CSM in establishing the Coordination Committee. In turn, when the Northern NGO constituency Advisory Group member left their NGO to work for the CSM Secretariat the seat was filled by the female Southern

NGO Coordination Committee member providing more gender balance and Southern representation.

Whereas the first CSO Advisory Group members had legitimacy and trust based on their historical participation, in October 2011, eight new members were elected by and from the Coordination Committee for a period of two years on a rotational basis; with the acknowledgment that the eight CSO Advisory Group members will share responsibility and participate in the meetings. The newly elected Advisory Group members have legitimacy based on their being elected, however, they lack the historical experience and knowledge of their predecessors. They do represent a far more diverse set of interests (see Table 2) although, again, their function is not one of representation but rather facilitation.

With this diversity, language issues have come to the fore. While the previous CSO Advisory Group members were able to all work in a single language, this new group is having to work in three languages and with varying degrees of connectivity as some of the Advisory Group members live in areas where access to the Internet (the primary means of communication for the CSM) remains limited. For other CSO Advisory Group members, engaging in the work of the CSM during harvest periods is simply not possible. Despite these limitations, at their meetings in Rome in October 2011, the CSO Advisory Group members agreed to participate in one online meeting per month with more regular communication to be facilitated through email.

The CSO Advisory Group members, at least in practice, now exert a great deal of potential influence, because it is the group most likely to give final approval on focal point processes, on methodological issues and on key documents and positions. They also interact directly with the CFS, putting them at the junction of the CFS-CSM interface. Within an increasing participatory space, there is a political reality of having to make quick and informed decisions, which may undermine the deliberative goals of the CSM but which remain legitimate in so far as they have been given the authority to make these decisions through a deliberative process.

The linguistic challenges extend beyond spoken language to the ways in which different actors speak, and who they are speaking for. This is illustrated in the ten-

Table 2. Make-up of the Coordination Committee Advisory Group Members (as of April 2012).

Advisory Group Members 2010–2011	Advisory Group Members 2011–2013
NGO Coordination Committee Member (Oxfam then FoodFirst Information and Action Network (FIAN)) (male then female)	Indigenous Coordination Committee Member (2011–2012) (male)
Small-scale Farmer Coordination Committee Member (male)	Fisher-folk Coordination Committee Member (2011–2012) (female)
IPC Representative (female)	Pastoralist Coordination Committee Member (2011–2012) (male)
Youth Coordination Committee Member (male)	2 Youth Coordination Committee Members (2011–2012 and 2012–2013) (male and female)
	Agricultural Workers Coordination Member (2012–2013) (female)
	Small-scale Farmer Coordination Committee Member (2012–2013) (male)
	Latin American Coordination Committee Member (2012–2013) (female)

Source: Adapted from the Civil Society Mechanism web site <http://cso4cfs.org/2011/10/31/elected-4-new-cso-members-to-the-cfs-advisory-group>, accessed 31 Oct. 2011.

sion between social movements and NGOs. During the selection of the new CSO Advisory Group members there was a great deal of concern raised that the members be from social movements and not NGOs. If the CSM was to help the CFS ensure that the voices of those most affected by food security were included in discussion, it was fundamental that the social movements be present. A key actor in the CSM suggested that there is a fault-line that is promoted by very reflexive, Western NGO actors who are extremely concerned about repeating 'neo-colonial' mistakes, but that in their concern, they end up reifying those relations of power (Interview, London, March 2011). Along these lines, while there is a desire on the part of NGOs to be involved at the executive level, there is also recognition of the political need for those positions to be filled by social movement actors so that the CSM can better represent those most affected by food insecurity and also to increase the legitimacy of CSM positions.

Finally, while enhanced participation of CSOs in the CFS is important in so far as it can expand the scope of debate and provide alternative approaches to achieving food security, there is a risk that the participatory nature can become 'overly cognitivist or rationalistic and thus insufficiently egalitarian' by favouring the 'educated and the dispassionate' and excluding 'the many ways that many people communicate reasons outside of argumentation and formal debate, such as testimony, rhetoric, symbolic disruption, storytelling and cultural- and gender-specific styles of communication' (Bohman, 1999, p. 410). These challenges are constantly addressed and evaluated within the CSM and attempts are made to build awareness and make space for different modes of communication. Where this becomes most problematic is through the interaction of the CSM with the CFS: the CFS is an established and formal governance space that operates under formal UN procedures. Thus, while the CFS is in favour of including those most affected by food security, the organization structure, financial mechanisms and the political culture have yet to fully adapt to facilitate their involvement. Yet, while there is a goal to engage those most affected by food insecurity, there is also realism: it will not always be possible to involve those most affected. This is despite the desire to allow the voices from the social movements to be expressed alongside the more established and NGOs participants.

The reform of the CFS and the implementation of the CSM marks a clear shift and expansion in understandings of participation and, as shown above, presents a whole new set of complexities and challenges that are being addressed, through a variety of means, as they present themselves. These challenges are facing networks that have been expanded to incorporate actors who have been committed predominantly to deconstructing and contesting the logic of embedded neo-liberalism as it appears in food security policy, most notably through the advancement of a food sovereignty framework. The awareness by these social movement actors of their position within the framework of embedded neo-liberalism was illustrated by a leader of a farmers movement in West Africa stated at the 37th Session of the Committee on World Food Security (October 2011) at a policy roundtable on food price volatility:

> 'Instead of responding to the causes of our poverty and of price volatility, we have seen whole catalogues of projects and programmes financed in the name of the agricultural sector, billions of dollars are mobilized every year, but the truth is that more than half of the peasant families in the majority of our countries do not have access to money to buy a plough, a couple of oxen, a cart, or a donkey' (Coulibaly, 2011).

The approach to food security programming and policy critiqued above exemplifies the deep entrenchment of neo-liberalism within twenty-first century 'institutional behaviour, political processes and understandings of socio economic "realities"' (Cerny, 2008, p. 3). As noted above, the food security programme and agriculture policies have been transformed by and within this process. The farmers movement leader from West Africa also gave a personal reflection upon the process of neo-liberalism and its impact:

> 'About thirty years ago I was in school and we were told that it was better to produce for external markets… We were then told that the state was inefficient and that more space had to be given to the private sector. At the same time, our states were forced to go even more into debt in order to re-establish macroeconomic equilibrium. We were told that any support to peasant agriculture – deemed to be non-performing – had to be cut… Then we were told to become competitive according to the criteria of international financial institutions, and that our states were not allowed to protect us any longer. All custom tariffs have been dismantled and our markets have been liberalized, food products produced elsewhere have started dumping into our markets at low prices, making us even more vulnerable to price volatility… However, none of these 'solutions' that have been imposed on us moved us out of poverty. Worse, we became even more vulnerable. It is within this context that peasant agriculture is being asked to perform' (Coulibaly, 2011).

Indeed, these farmers and peasants, pastoralists and fisher-folk, are faced with balancing their approach, their knowledge and their ideologies not only with other civil society actors, which has been the focus of this article, but with nation states, the private sector, international financial institutions and the UN, many of which serve to maintain and strengthen the logic of neo-liberalism.

Conclusions

In line with trends in globalization, systems of global governance have been making space for the enhanced participation of non-state actors, including civil society actors. Leading the formalization of this process is the UN Committee on World Food Security that has made civil society organizations official participants on the Committee. Faced with this new role, CSOs are developing a unique mechanism for engaging with the CFS and with each other. The Civil Society Mechanism is in early stages of development and faces many challenges but, as this article shows, actors are finding unique ways of addressing these problems as they arise.

The political and social playing-fields within which these changes are taking placed are defined by embedded neo-liberalism. The embedded nature of neo-liberalism establishes the main boundaries of logic and operation, but the theory posits that neo-liberal hegemony is ever-changing, always contested and thus in a constant state of flux. It thus represents a hard barrier – but not an impassable barrier – for actors seeking to challenge its logic. Whether formally 'outside' actors prove more successful in their pursuits to change the system from the inside, as they continue to work on the outside, remains to be seen.

By opening up participation on the CFS to civil society actors, new opportunities to challenge the logic of embedded neo-liberalism are being created. While this has

the potential to expand the terms of debate, understandings of the problems and the scope of solutions, which we deem to be positive, the challenge for the CSM, will be finding a way to balance insider status with outsider objectives.

How well the reformed CFS is able to put into practice the values and mechanisms it has developed and supported is an important test not only of the value of the Committee, but also of civil society participation in global policy-making processes, and global governance more broadly. Notably, how the CFS incorporates and manages the participation of civil society, and how civil society organization manage their participation and retain a meaningful sense of agency, will be a litmus test for claims to legitimacy in the face of challenges from donor-based and wealthy country-led initiatives that seek to maintain neo-liberal hegemony and continue to forward agro-industrial solutions.

Finally, beyond the CFS, the CSM represents an effective organizing model for food social movements engaging in global governance processes; it is a politicizing, engaging and connecting mechanism. It actively seeks out and supports the engagement of those 'most affected by food security' and provides opportunities to hear alternative voices perhaps more connected to the realities on the ground. Its structure can also be replicated at various levels to support regional, national, local engagement and across sectors.

Notes

1. This article draws upon interview data and field-work conducted through observation of the United Nation Committee on World Food Security (CFS) and the International Civil Society Mechanism (CSM) between October 2010 and March 2012.
2. One such change was the replacement of the Committee on Food Aid Polices and Programmes by the Executive Board of the World Food Programme.
3. From interviews with staff at the CFS and FAO, we were told that the reason this proposal was chosen was because it extended beyond the interests of the co-ordinating organizations, had principles to ensure transparency and sought to be globally inclusive (May 2010). It was also the most sophisticated mechanism to be presented.
4. Working towards the 38th Session of the CFS (October 2012), Working Groups had been established on: land tenure; agricultural investment; the global strategic framework; gender; nutrition; price volatility; protracted crisis and conflict; monitoring and mapping; social protection; and climate change.
5. At the time of publication, the following positions remained unfilled: the two seats for the landless are not filled, the urban poor has one of two seats unfilled and the small-holder farmers have one of three seats empty. North Africa, Central Africa, South Africa, South-east Asia, Central Asia, Pacific and Oceania are also not filled but some do have focal points that are in the process of undergoing a legitimate selection process.
6. As a case in point, comments on the Zero Draft of the Global Strategic Framework were collected but given time restrictions and different opinions, the CSM submitted one paper containing the three different positions.

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Framing of Agri-food Research Affects the Analysis of Food Security: The Critical Role of the Social Sciences

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Abstract. In our knowledge society, science plays a key role in policy-making through the production of assessments that provide evidence-based information to decision-makers. In that manner, science has also gained significant political power. This is an enormous responsibility for scientists but also constitutes a dangerous situation, since different social discourses lead to different analyses of a given problem, and to different solutions with very different impacts. Generally, this is the case of agri-food assessments, including food security, where impacts are huge given the present situation of nearly 1,000 million people suffering from hunger. In agri-food sciences framing of the research is mainly determined by two factors: the linkages between science and the concept of development, and the role given to agriculture in society. In general, it is easy to find two different opposite types of framing, with different objects of study, methods and characteristics. One type, which I refer to as official framing, tends to separate social and natural sciences, is more simplistic in analysing the causes of hunger, of food price crises or other important issues affecting food security. This type of scientific assessment usually regards solutions as more technical rather than social and/or political, and aims to find a panacea that can provide solutions to a given problem, in this case hunger. On the other side we have scientific evaluations, here alternative framing, which tend to be inter/trans-disciplinary, with a higher participation of social sciences. In this case, analyses tend to conceive agri-food system as complex systems, problems are normally more political than technical, and solutions tend to be diverse, contextual to each social, cultural and environmental context. In this sense, to encourage a change in agri-food assessments that recognizes the role of social sciences in addressing food security, critical social scientists can facilitate the introduction of frameworks developed by sustainability scientists into agri-food science, including the study of agri-food systems as socio-ecological complex systems.

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Introduction

Agricultural and food policies have strong implications for the achievement of sustainability. Food security, depletion of fresh-water reserves, land-grabbing, the use of unsustainable energy sources, habitat loss or global health, together with the important bearing that poverty has on these issues, are all related to agriculture (McIntyre et al., 2009). The increasing importance of global food markets, energy and water scarcity or climate change suggests that the current difficulties are likely to increase.

In the knowledge society, policy-makers use scientific, expert-based assessments to assist them in the decision-making process. As Weingart (1999) points out, the science–policy nexus is a dialectical process of the scientification of politics/policy and the politicization of science. This places science in a privileged position in the political arena for a wider discussion about the role of science in modern societies and science as a source of power (see Mulkay, 1979; Aronowitz 1988). For simplicity, we can divide the decision-making process in agriculture into three main elements embedded in three interacting tiers (Figure 1): 1. scientific assessments (scientists and knowledge); 2. management (policy-makers), including institutions/governance, social systems and legislation; and 3. agricultural practices (stakeholders), related to production (including technologies), distribution and markets. These elements are all interconnected: assessments generally evaluate, and are conditioned by, agricultural practices to provide information to the management, which in turn affects agricultural practices. Thus, through adequate assessments, science can (and must) play an important role in achieving sustainability (McIntyre et al., 2009), offering policy-makers and society the required information to develop focused policies. In this article, I centre my reflections on the assessment element of agri-food policy design.

Nowadays the remarkable gap between the objectives of sustainability (including food security for all) and current agri-food practices suggests that in order to achieve the objective of sustainability, agri-food assessments might need to introduce some changes, as it has been the case for other scientific disciplines in the past. In environmental sciences, for instance, over-exploitation of natural resources and the resulting increase in the number of social conflicts pointed to a wide gap between resource

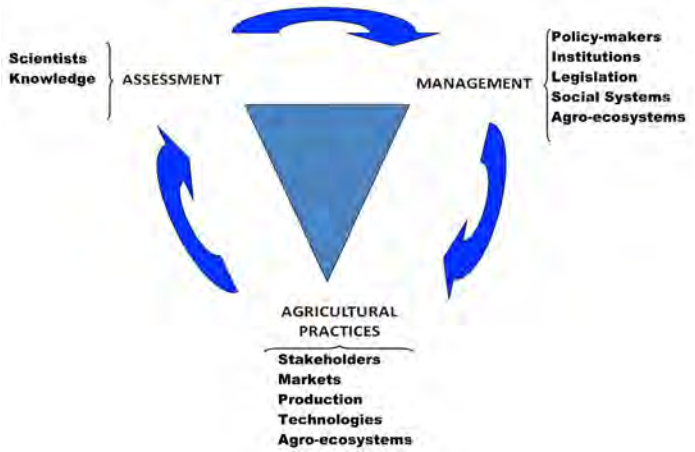

Figure 1. Relationships between assessment, management and agricultural practices.

management practices and the objectives of sustainability (Rammel et al., 2007). This prompted a fundamental paradigm shift (Kuhn, 1962) in environmental scientists who now recognize the intimate coupling between ecosystems and human well-being, evolving from the traditional view of people as external disrupters of ecosystems, to a focus on the dynamics of linked social (human)–ecological (environment) systems (SES). Social studies play a significant role in the assessment of environmental policies today. Such a paradigm change has so far not been adopted by agri-food related scientific disciplines and policy-making. Rather, dominant perspectives in agri-food sciences and international policy assume implicitly a predictable, causally driven agri-food system (Thompson and Scoones, 2009; Rivera-Ferre and Ortega-Cerdà, 2011). The emergence of sustainability science may favour this change.

Recent episodes of food crises have illustrated an important fact: the food system is not resilient but highly vulnerable. As a result, the number of under-nourished people after the sharp increase in food prices rose up to 1 billion in a short period of time. Following constructivist approaches, I will use the case of food security to illustrate how different social discourses result in different framings of agri-food research. Given the importance of food security worldwide, it is important to understand the existence of these framings, which result in different types of analysis that provide completely different solutions to the problem of hunger. Here, I will defend the need for a paradigm shift in agri-food sciences as an essential condition for achieving sustainability, emphasizing the role of critical social sciences in the process. In particular, I will use the example of food security to illustrate my arguments.

Framing Agri-food Research

As previously stated, assessment provides policy-makers with relevant information for the design of policies to secure a given objective – for instance, reducing hunger. However, knowledge creation, under a social constructivist perspective, is constructed in discourses that categorize the world and bring phenomena into view (Talja et al., 2005). Hence, assessments normally depend on researchers' world-views, values or paradigms which, in turn, affect the framing of their research (Kuhn, 1962) also in agricultural sciences (Woodhill and Röling, 1998; Fjelsted and Kristensen, 2002; Thompson and Scoones, 2009). At the same time, different framings result in different narratives. Framing is not used here as the social construction of a phenomenon by mass media or social movements or organizations, but as the mental models derived from a given discourse describing social-specific representations of information about reality, and frames contextualizing such mental models are embedded and give sense to it (Pahl-Wostl, 2007). Thus, framing of the problem is an essential step in the research process, and framing involves not just choices about which elements to highlight, but also subjective and value judgments (Beddoe et al., 2009; Leach et al., 2010). Given the important role of science during the policy-making process, framing does matter, since different policy responses may derive from it, as shown by O'Brien et al. (2007) in climate change research and Leach et al. (2010) in epidemics research. In the development of my argument, it is also important to understand the development of framings in sciences within the context offered by actor-network theory, which focuses on the processes through which technical entities transform into social constructs, and understand science as a process where pieces from the social, technical and textual come together and translate into a set of equally heterogeneous scientific constructs (Latour, 1987).

Thus, in agri-food systems different framings (and linked narratives) result in different assessments for a given problem with totally different approaches in addressing that problem, and different (if not opposing) results in the solutions proposed. To understand framing in food security research it is important to first understand how this process is affected by both the linkages between science and the concept of development, and the role given to agriculture in society.

The Role of Science in Society: Bio-capitalism and the Era of Development

Many development studies have analysed the birth of the concept of development and its implications in our society. This concept, which is widely accepted to be introduced in the public sphere with Truman's inaugural speech as President of the United States in 1949 (Escobar, 1994), had enormous implications for the role given to agriculture and agricultural sciences as a necessary tool to promote development in non-developed countries and societies. In a simple analysis of Truman's discourse, the number of times he used the words 'knowledge', 'science', 'techniques' and 'technology' are a good indicator of the importance that, given its potential capacity for unlimited growth, he gave to these 'tools' as elements that could promote the idea of development that he was launching to the world. Not by chance, even today the word science is always accompanied by the word technology (S&T), and research by the word development (R&D).

> 'More than half the people of the world are living in conditions approaching misery. Their food is inadequate. They are victims of disease. Their economic life is primitive and stagnant… For the first time in history, humanity possesses the *knowledge* and the skill to relieve the suffering of these people. The United States is pre-eminent among nations in the development of *industrial and scientific techniques*. The material resources which we can afford to use for the assistance of other peoples are limited. But our imponderable *resources in technical knowledge* are constantly growing and are inexhaustible. I believe that we should make available to peace-loving peoples the benefits of our store of *technical knowledge* in order to help them realize their aspirations for a better life… Greater production is the key to prosperity and peace. And *the key to greater production is a wider and more vigorous application of modern scientific and technical knowledge*' (Harry S. Truman, 20 January 1949, <http://www.bartleby.com/124/pres53.html>, para. 45ff.; emphasis added).

This new role given to agricultural sciences emphasized the importance of modern technology and knowledge as crucial elements to reduce hunger and poverty through greater production, favouring the instrumental function of science and the privatization of knowledge – that is, knowledge as one more productive force of capitalism. In that manner, the promotion of scientific and technical knowledge as tools to favour development worldwide can be framed within the process of accumulation founded on the exploitation of knowledge (but not only) known as bio-capitalism (Morini and Fumagalli, 2010). This is accompanied by the so-called privatization of bios, which in agriculture can be exemplified with the privatization of seeds (or more exactly, its material representation of life as information) (Rajan, 2003). The green revolution was one of the results, presented as a technological package that could provide the solution to hunger worldwide, i.e. the panacea that would solve

the food insecurity problem (Mann, 1997). Today, the same narrative can be found in the Alliance for a Green Revolution in Africa (AGRA; <http://www.agra-alliance.org/>). What does this mean for agri-food sciences? How does this affect the framing of the research, i.e. the analysis of a given problem and the proposal of solutions?

Agriculture and Society: The Role of the Agri-food System

Framing in agri-food research is also determined by the role that society gives to agri-food systems. Despite a risk of oversimplification, we could say that at present there exist two radical and opposed narratives about the role of agriculture in society: one has essentially an economic focus, while the other has a human rights perspective. The first narrative, which I call 'economic narrative', suggests that the main role of agriculture is to contribute to development through economic growth, which subsequently leads to an increase of social welfare (including nutrition improvement), while negative ecological impacts associated with agriculture have to be minimized through the development of new technologies. Thus, this narrative is in line with bio-capitalism and promotes market-centred policies. It is mainly supported by major governments, the private sector (agribusiness, large farmers) and some multilateral institutions. For instance, the FAO states that international agricultural policies should aim at raising levels of nutrition, increasing agricultural productivity, improving the lives of rural people, and contributing to the growth of the world economy (FAO, 2008). The new green economy proposals for agri-food and food security policies would derive from this narrative. The second narrative, which can be called 'human rights narrative', is promoted by some parts of civil society and small peasants' organizations and other multilateral institutions (e.g. United Nations Special Rapporteur on the Right to Food). According to them, the main goal of agriculture is to provide a healthy and culturally adequate food, through a democratization of the food system, the recognition of the role of peasants' livelihoods in sustainability, recognition of other forms of knowledge and promotion of bottom-up approaches. It is based on participation and enhances access rights, equity and social responsibility (UN, 2010). In this narrative, only people-centered policies can overcome the problems derived from the food system. One of the current policy proposals following this narrative to address the problem of hunger and rural poverty is that of food sovereignty (Vía Campesina, 1996; UN, 2010).

Thus, framing will be influenced both by the role of agriculture in society and by the role of science in society derived from the linkages between science and the concept of development under bio-capitalism. For instance, Bernal (1990), through the analysis of irrigation schemes in Sudan, found that agricultural research and development went hand in hand, the formulation of research problems and strategies of data collection being political, shaped by interests of scheme owners and managers.

Thompson and Scoones (2009) suggested different types of narratives that could be found in agricultural sciences: production–innovation, growth, agro-ecological and participatory. In fact, these narratives can be allocated to two opposite framings and, in line with Leach et al (2010) for epidemics research, we can call them alternative and official. Each of them has different characteristics in the research process, e.g. in the disciplines used for the assessment, in the objects of study or the methodologies used. Table 1 shows the characteristics of a typical assessment in agri-food sciences, based on these two framings. Under the official framing (here we could include the production–innovation and the growth narratives suggested by

Table 1. Agri-food assessments characteristics under different research framings.

		Alternative	Official
Object of study	*Agricultural systems*	Peasant agriculture	Industrial agriculture
	Seeds/breeds/ cultures	Multiple species/varieties + polyculture	Few species/varieties + monoculture
	Distribution	Short food supply chains	Long distribution–processing–storage (exports)
Methodology and research process	*Agri-food systems*	Complex socio-ecological systems/holistic	Simple systems or simplification processes
	Interdisciplinarity/ Transdisciplinarity	High	Null or very little. Fragmentation social–natural sciences
	Major scientific disciplines	Social and political sciences	Natural sciences
	Economic Science	Political economy/ecological economy	Classical economy/bioeconomy
	Type of knowledge	Traditional/ indigenous + formal knowledge (*Diálogo de saberes*)	Formal knowledge
	Participation	High	Small, null participation
	Production and knowledge transfer	Co-production of knowledge (science with people)	Top-down transfer of knowledge
Results	*Solutions*	Diverse	Panaceas
	Technologies	Appropriate technologies	Non-replicable technologies
Vision of science		Complex vision of science Constructionist approach	Instrumental vision of science Positivist approach
Policy responses		Address power structures, alternative development pathways, integrated response	Economic growth, sectorial responses

Thompson and Scoones (2009), problems related to agriculture are very often more technical than political and often only one discipline is in charge of performing agri-food analyses (disciplinary myopia). Actors in these narratives defend positivist and reductionist approaches of modern science. The main object of study is industrial agriculture, and technology has a prominent role in achieving sustainability in the food system, usually developed from top-down approaches. In this framing, classical economy has a prominent role, policies are market centred, and inefficient farmers are prone to disappear unless they modernize and enter into regional or international markets. For the analysis, this framing aims at simplifying agri-food systems in order to find unique and ubiquitous solutions to solve problems (i.e. panaceas). Under the framing of the agro-ecological alternatives and the participatory narratives suggested by Thompson and Scoones (2009), problems related to agriculture have a strong social and political component. Science is understood as one more element in society to contribute to the construction of discourses of different societal groups. The object of study is peasant agriculture, it calls for the recognition of different types of knowledge, technologies are normally context specific and participation is an essential component of the narrative, and thus, of the research process. One basis of this framing is the recognition of the complexity of agri-food systems.

Applying the Principles of Different Assessment to the Analysis of Hunger and Rural Poverty

Assessments normally start with the analysis of the causes of a given problem, in this case hunger: Why does hunger exist in the world? What is the nature of the

problem? (Answer: production–access.) Once these causes have been detected, potential solutions are provided, i.e. which policies and tools are required in order to reduce the number of hungry people in the world? Since the food security issues are subjected to different stressors (enduring and persistent long-running shifts) and shocks (transient disruptions), other questions that would need to be answered would include: At which temporal and spatial scale do we want to act? Both the diagnosis of a problem and solutions derived are determined by the framing of the problem. Following the two framings previously stated, alternative and official, we can define the main characteristics of assessments of hunger (analysis of causes and potential solutions) as a result of framing (Table 2).

Official Framing: Causes of Hunger and Potential Solutions

Normally, mainstream and official framing would suggest that the problem of hunger is due to a lack of productivity, and thus a technical problem, which can be more or less exacerbated by political reasons, but the underlying causes are mostly technical: more food needs to be produced. Thus, this framing tends to consider only one of the components of the food security concept: availability. This type of analysis

Table 2. Some causes of and solutions to hunger by different framings of the research.

Alternative	Official
Causes	
Structural unbalances among countries	
Concentration of power in the hands of few, mostly transnational corporations	Lack of access to food
Lack of access and control of resources to produce food	No property in land
Over-dimensioned international market under free-trade premises favouring dumping	Agricultural products are not in the international market
Lack of public rural and agricultural policies	
Imposition of policies from outside, as a result of structural adjustment programmes or free-trade agreements	
External debt	
	There is not enough food
	Low agricultural productivity
Ecological exploitation	Ecological exploitation
Solutions	
Increase countries' decision capacity	Classical economy measures, e.g. deepening into the elimination of the existing barriers to international markets
Distribution of power among actors and countries	
Favour participation of society (peasants, citizens) in decision-making	
'Genuine' agrarian reforms, which include concepts such as territory, and integral rural policies	Land reforms based on the market
Context-specific solutions to be developed	
Appropriate technologies developed for local contexts.	Technologies to increase the production of food (e.g. GMOs) that respect the environment, in line with the green growth or bio-economy proposals
Recognition of the traditional and indigenous knowledge in a more integrated management of the resources	Increasing role of formal knowledge (bio-capitalism)

tends to separate the problem of hunger from other social and ecological problems. It is normally reductionist in focus, more based in natural sciences disciplines, with a nearly insignificant participation of social sciences. From a social sciences perspective, there is a predominant role of classical economics analysis and use of modelling. Hence, it is stated that some underlying reasons for food insecurity are normally linked to market failure, such as low agricultural productivity, no property of land, or the difficulty to introduce agricultural products in international markets. Exceptionally, it can be associated with ecological depletion (OECD, 2008, World Bank, 2008). Therefore, the solutions required are mostly technical (OECD, 1999), and global (panaceas), not context specific. Resulting from this analysis, this framing assumes that solutions to be developed must be based on new technologies that increase food production without depletion of the environment, market-based agrarian reform, or the reduction of barriers to international trade. One recent example of policy responses under this framing was the 2007–2008 food crisis. This framing resulted in the proposal of policies based on the formula of more production, more technology (to increase productivity), and more international trade. Some attempts have been made to integrate the food security issue with other global policies, such as climate change, which in turn accept the complex characteristics of the agri-food system (Godfray et al., 2010) and the food security issue. However, important components of alternative framing, such as participation, are not yet considered.

Alternative Framing: Causes of Hunger and Potential Solutions

Assessments based on alternative framings would suggest that the causes of hunger and rural poverty are more political than technical or nature dependent. The analysis would have a stronger component of social sciences and a smaller participation of natural sciences and they follow a right-to-food discourse (Table 2). In fact, they would assess that enough food is produced today to feed 12 billion people (Ziegler, 2008) and, thus, would frame the research not only in the availability component of food security. In general, they would assess that some structural reasons (stressors), such as lack of access and control of the productive resources (land, water, seeds), an oversized international market, differences in terms of power among countries, or lack of public policies directed to agriculture and rural areas (Vía Campesina, 1996; FOEI, 2008; UN, 2010) could be identified as causes of hunger. Temporary reasons (shock) would also exist, such as adverse climate conditions. This suggests that in the food security issue, ecological, social and economic vulnerability to all the potential sources of incertitude are present, including vulnerability linked to actions, actors and outcomes (Ericksen, 2008). This analysis results in policy responses suggesting that to tackle the issue of food security, diverse set of policies are needed to reinforce the capacity of countries to decide their own policies, distribute the power and enhance participation of society, and peasants in particular. In places where productivity is low, they would suggest reinforcement of peasant agriculture, local traditional knowledge and development of appropriate technologies. This requires a diversity of policies at different scales and admitting that no panaceas exist. Solutions proposed would be contextual to different places: some would favour development of appropriate technologies and valorization of local traditional knowledge, others would opt for development of integral rural development policies.

An obvious question to ask is whether these two framings could be integrated to facilitate the policy-making process in an issue as important as food security, but

this is a matter of future research. Probably the two framings will have important contributions to make to the food security problem in different contexts. Technical solutions are important, but unless political issues are considered, they will only result in partial success, if not more damage. Yet the official framing has two important constraints: first, it is locked into its own past success, thus constraining the future; and second, it considers the food security problem from only one of its components, availability (sufficient food for all people at all times).

What seems clear is that since food security is a condition for sustainability, it is urgent to introduce changes in agri-food assessments favouring the understanding and potential solutions to this problem, including an enhanced role of social sciences and a real integration of social and natural sciences. But, what can critical social scientists do to achieve this objective?

Conceptual Changes that Need to Be Introduced into Agri-food Assessments

Promotion of sustainability is an open evolutionary process of improving the management of social–ecological systems through, among other things, better understanding and knowledge (Rammel et al., 2007). This is applicable to agri-food systems and, more specifically, to the issue of food security. One major problem in the food security analysis is that social sciences play a minor, if any, role in the official framing, and alternative framings are in a minority within this topic in mainstream research. But food security is a social issue, as are most agri-food related problems, and unless this is recognized and put into practice in the research process, progress in this topic will be irrelevant. Thus, critical and devoted social scientists have to prompt a change in agri-food sciences that may be able to lead to a major paradigm shift. Some efforts have been developed in the past (Busch and Lacy, 1983; Busch, 1984). Also, Kloppenburg (1991) suggested a deconstruction of social and natural sciences to favour the research of an emergent alternative agriculture. Yet, 30 years later we are still dealing with the same discussion. However, today we are probably at a crucial historical moment to introduce some changes. Recent events (2007–2008 food crisis, increasing droughts in several countries, revolts in some Arab countries) together with the other global crises (environmental and financial) may suggest that we are in a process of transformation of our societies, and could open a 'window of opportunity' (Gelcich et al., 2010) to bring changes into the food system with an increasing role of the social sciences. The food crisis, which joined the environmental and economical crises, can be viewed as an opportunity to redesign the agri-food system. We are at a turning point, in a transition process that requires different research strategies. Furthermore, two realities are converging that can favour the consideration of alternative framings within agri-food research. One is the emergence of sustainability science and its research tools, which by definition analyses socio-ecological complex systems through the combined action of both social and natural sciences. The second is the existence of a global organized civil society that has put at the centre of the food security (and other agri-food related) debate the human-right narrative, and is demanding an alternative framing of research. This civil society is led by small farmers' organizations grouped in the so-called La Vía Campesina, claiming the central role of peasant agriculture and peasants to reduce world hunger.

What Could Social Sciences Do to Favour Other Framings in Agri-food Research?

Critical sociologists argue that we should embrace complex visions that assume uncertainties, contradictions, and emergent properties arising from the parts (or actors) involved in a system (Morin, 1992). In the agri-food sciences, it is evident that social scientists introduce these elements into their research process and we need to expand this thinking to natural scientists too. There have been past efforts in rural sociology to promote changes that could favour alternative framings of agri-food research. Currently, the most straight-forward way to favour this expansion is the inclusion of agri-food science into the theoretical framework provided by sustainability science, which includes the recognition of agri-food systems as complex socio-ecological systems (SES). This change can be understood as conservative, simple and not a relevant change, but in fact can promote a major paradigm shift in agri-food sciences to introduce new elements in the research process, calling for a greater role of the social sciences. For instance, one intrinsic characteristic of SES is the ignorance condition. Recognition of ignorance brings many conceptual changes, as described by Rivera-Ferre and Ortega-Cerdà (2011), including changes in the governance of agri-food systems or the democratization of knowledge-base production, all requiring of social analysis. It can also facilitate the theoretical framework under which researchers perform vulnerability assessments of agri-food systems, and thus their capacity to adapt to changes. For instance, Turner et al. (2003) suggest that development of vulnerability analysis draws on three major components: entitlement (e.g. legal and customary rights to exercise command over food and other necessities of life), coping through diversity (diversity as an strategy to reduce risks) and resilience (global systems are not resilient, their adaptive capacity to surprises is small, contrary to local systems). In agriculture this is translated into strategies linked traditionally to alternative framings, including: analysis of access to resources (land, water, seeds) vs. control of resources in the hands of few (concentration); analysis of biodiversity vs. monoculture or homogenization; analysis of local, context-specific farming (traditional peasant agriculture) vs. long-distance farming (industrial, export-oriented agriculture).

If the objective of critical social scientists is to favour the recognition of alternative framings and enhance a shift in mainstream research, then they need to work together with scientists from other disciplines who are also interested in alternative framing of research, but also with people outside science working under different narratives, such as the human-right narrative previously described. The ideal would be to work with real practical experiences and proposals. For instance, if food sovereignty seems a reasonable policy proposal, then the academy should put efforts in analysing the proposal both to produce improvements and to demonstrate its viability, or not. Other actions aiming at introducing changes in agri-food research to favour alternative framings could include the following.

- Social scientists must make claim for the non-instrumental function of science. If Constanza (2008) calls for a 'science of happiness', we can call for a 'science of "buen vivir"', which should include the capacity to think critically, generate analysis and transmit concepts.
- Social scientists can contribute to analysis dismantling the myths of industrial agri-food systems, probing its inconsistencies, or showing the social impacts of such system, using the scientific method just as the environmental scientists did with the impacts on the environment.

- Propose and analyse alternatives for and with the society, e.g. using post-normal science premises (Funtowicz and Ravetz, 1990).
- Change attitudes and paradigms to favour a transition towards new framings.
- Promote changes in scientific institutions, since current structures do not favour the elements required to perform alternative framings.

One Example: Science for Majorities or Science for Minorities?

Today nearly 1,000 million people suffer from hunger and 80% of them live from agriculture, fisheries, pastoralism and recollection activities in rural areas (Sanchez et al., 2005). For that reason, there is a general consensus that in order to reduce hunger and poverty more investments in agriculture and agricultural research and agricultural knowledge are needed (World Bank, 2008; McIntyre et al., 2009), but… for which type of agriculture? Here a consensus does not exist while it is an important policy-making decision, since the targeted population and actors differ depending on which type of agriculture is the subject of 'development' and the mechanisms adopted to promote it. Clearly, the role given to agriculture in society will affect this decision, as well as the role of science linked to the concept of development. That is, it is conditioned by the framing of the research. For that reason, after recognizing that in a knowledge society science is also a source of power, it is important that scientists consider which power science is providing and to whom, which type of science shall be studied and with which objectives. Of course this is a subject dealing directly with ethical issues far beyond the objectives of this article, but it is interesting to exemplify one type of analysis that social scientists could perform in favour of alternative framings, in this case by dismantling myths linked to industrial agriculture.

Several data provided by the ETC Group and other organizations can give us some clues about the type of research presently performed in the agri-food system. In terms of research and development (R&D) investments in food and agriculture, 96% of them occur in industrialized countries, of which 80% is dedicated to research into the processing and distribution of food, not production (ETC Group, 2009). In terms of agricultural production, there is a clear bias towards the support of industrial agriculture and biotechnology against local, traditional or organic agricultural production. For instance, it is estimated that the agriculture and food biotechnology sector in Spain receives 60 times more support from public R&D investment than research in organic agriculture (€54.3 million vs. €0.9 million in 2008, according to Amigos de la Tierra, 2010). In the USA, the difference is approximately 42 times more in support to biotechnology against organic agriculture in 2001 ($210 million vs. $5 million; Wynen and Vanzetti, 2002). In this country, of all existing experimental farms, only 0.1% of land is dedicated to organic agriculture research. Quite probably, these differences would be even higher if private R&D funds were considered.

However, when we relate the type of agriculture funded by R&D investments with the type of agriculture practised by most peasants in the world, the direction of the arrows is opposite (Figure 2). According to the ETC Group, peasants, who cultivate using the local, traditional, peasant type of farming, represent almost half of the world population and they cultivate more than 70% of world food (Figure 3). Furthermore, 85% of food produced worldwide is consumed in the same ecological region (ETC Group, 2009). Thus, it seems that nowadays food is made by peasants to

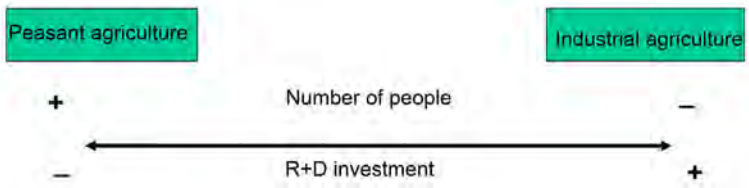

Figure 2. Funding of agricultural research by agricultural type and the number of people who practice it.

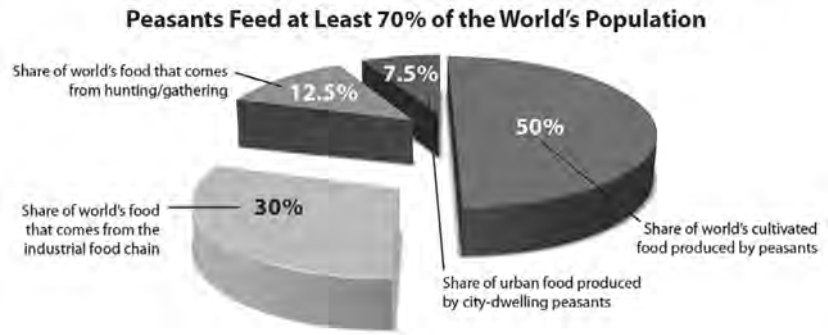

Figure 3. Share of world food by actors.
Source: ETC Group, 2009.

be eaten locally, but agricultural science is made for a type of farming that is not related to them. Thus, is our science a science for majorities or a science for minorities?

Conclusions

Framing of research, understood as the context in which mental models derived from a given discourse describing socially specific representations of information about reality are embedded and give sense to it, determine the assessment process of a given problem. In the case of agri-food research, and more specifically in the case of food security, framing is affected by both the role of agriculture in society and the role of science in society under the concept of development. As a result, two opposite framings may exist: alternative and official, with different research questions and approaches to address the problem of food security. Thus, analysis can be simplistic, when only one discipline or field of knowledge is used for the assessment, or it can be complex. The latter normally happens when inter- or trans-disciplinarity is at the basis of the assessment. As a result of these assessments, the solutions provided can be either simple, normally searching for a panacea to solve the problem of food security, or complex, enhancing the participation of actors and more adapted to the specific context in which the problem emerges and, thus, more diverse. To favour a paradigm shift in agri-food sciences that recognizes the role played by the social sciences in agri-food assessments for food security, social scientists can call for the recognition of agri-food systems as complex SES under the umbrella of sustainability sciences, and work together with those natural scientists willing to introduce

changes into their assessments. Important conceptual changes can be derived after recognition of agri-food systems as SES, with implications both at the scientific and al the policy levels.

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The Food and Human Security Index: Rethinking Food Security and 'Growth'

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Abstract. The goals of this article are multiple: to challenge conventional understandings of food security; to show that economic growth per se cannot be relied upon to adequately feed the world; to convince critics of economic growth to pay closer attention to issues related to food in their assessments of 'development'; and to up-end established beliefs around the so-called Global North–South divide while confronting the belief that the latter must follow in the food-prints of the former. The author introduces the Food and Human Security Index (FHSI) with these ends in mind. A FHSI score is calculated for 126 countries by looking at indicators of objective and subjective well-being, nutrition, ecological sustainability, food dependency, and food-system market concentration. The ranking of scores has some counter-intuitive placements, which ought to be reflected upon as new lines are drawn around food security in the twenty-first century.

Introduction

Literally hundreds of definitions of food security are scattered throughout the literature. For example, a review from 20 years ago, the last of its kind to be conducted, yielded almost two hundred (Smith, et al., 1992). In a policy context, however, the concept shows less mutability. Agri-food policies over the last 60 years are said to have been aimed at improving food security; at least, that is how they have been framed (Mooney and Hunt, 2009). What precisely these aims are and whether they reflect a genuine improvement in food security will be addressed shortly. My point is that a relatively straightforward outline of the term can be discerned from the stated and implied aims of food and agricultural policy since the middle of the last century. As described in some detail below, this outline is the cumulative effect of three foci: the calorie-ization of food security (1940s to the present); the neo-liberalization of food security (1970s to the present); and the empty calorie-ization of food security (1980s to the present). It is this conceptual outline of food security that is challenged in this article. Using this food security yard-stick, the last 60 years have been

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a resounding success. According to the Food and Agriculture Organization (FAO), for example, the global food system produces 17% more calories per person than it did 30 years ago, even after factoring in for the 70% population increase. Yet these 'gains' have come at tremendous cost to the environment, individual and societal well-being, human health, and the food sovereignty of nations (e.g. see Dixon and Broom, 2007; Wittman et al., 2010; Carolan, 2011; Sage, 2011).

After reviewing briefly the outline of food security embodied by conventional agri-food policy and practices, an alternative is offered with the introduction and elaboration of the Food and Human Security Index (FHSI). The FHSI takes into consideration indicators for the following states/conditions:

- individual and societal well-being;
- ecological sustainability;
- food dependency;
- nutritional well-being; and
- food-system market concentration.

An FHSI score is calculated for 126 countries, allowing in turn for the ranking of countries. The ranking has its share of counter-intuitive placements, which challenge conventional understandings of food security. The article concludes discussing important issues brought to light by the FHSI ranking as we think about food security in the context of the twenty-first century.

Food Security: A Brief History[1]

In 1941, President Roosevelt gave perhaps the most famous State of the Union address of the twentieth century. In this speech, Roosevelt spoke of 'four essential freedoms' that are shared 'everywhere in the world': freedom of speech, of worship, from want, and freedom from fear. The founding conference of the FAO of the United Nations (UN) in 1943 drew specifically from Roosevelt's Address when it set out 'to consider the goal of freedom from *want* in relation to food and agriculture' (FAO, 1943, p. 1). While not using the term 'food security' outright, the organizers get close, as the proceedings discuss the need to 'secure' a 'suitable supply of food' (p. 1). Characterized as freedom from want, we find here one of the earliest conceptual framings of food security: essentially, the absence of abject hunger.

Calorie-ization of Food Security

For a variety of reasons, this 'want' was viewed principally as the result of underproductivity, most notably in less affluent parts of the world (though farmers in affluent nations were also encouraged to intensify their operations or risk falling off the agricultural treadmill; Cochrane, 1993). The solution was simple: agricultural systems needed to produce more (and so was born what is referred to elsewhere as the productivist ideology – see Buttel, 2005). The green revolution represents the actualization of a policy and research agenda informed heavily by this calorie-ization of food security. The green revolution was enacted through a series of research and technology transfer initiatives that took place immediately following World War II and lasting into the 1970s. The primarily goal of these initiatives centred on the development of high-yield varieties of a handful of cereals, which also required the

expansion of the necessary irrigation infrastructures and input supply chains (fertilizer, pesticides, seeds, etc.).

Examples of the calorie-ization of food security are sprinkled throughout the literature (for additional examples, see Carolan, 2011, pp. 58–61). In a peer-reviewed article co-authored by a United States Department of Agriculture (USDA) plant scientist in the late 1990s, the green revolution is described as making a 'push toward food (i.e. *calorie* or energy) security' (Welsh and Graham, 1999, p. 9, my emphasis). More recently still, the USDA's *International Food Security Assessment 2011–21* (Shapouri et al., 2011, p. 2) explains in its methods section that the '[c]ommodities covered in this report include grains [which make up the vast majority of *calories* assessed], root crops, and 'other'… These three groups account for 100 percent of all *calories* consumed in the study countries and are expressed in grain equivalent. The conversion is based on *calorie* content' (my emphasis).

Yet, the calorie revolution was only the first of three cumulative foci in agri-food policy's alleged bid to enhance the food security of nations. Even die-hard proponents of productivism realized that astronomical increases in agricultural output could never feed the world if those calories were not efficiently allocated. And as the market has long been viewed as *the* mechanism for the efficient allocation of resources, a concerted push simultaneously took place in the mid- to late twentieth century (most notably from the 1970s to the present) to increase the integration of international markets for agricultural commodities. Complementing the earlier calorie-ization is the neo-liberalization of food security.

Neo-liberalization of Food Security

With the neo-liberalization of food security, countries were not all expected, nor were they even encouraged, to become self-sufficient in food production. Many were, in fact, aggressively instructed – with a variety of carrots and sticks – to abandon policies directed at such ends. Food security, as conventionally understood, has little to do with *farmer* security, especially when talking about small-holders in low-income countries. Quite often policies claiming to be in pursuit of the former have been detrimental to the latter, as hundreds of millions of small-scale peasant farmers have been pushed out of agriculture (Bello, 2008; Carolan, 2011). Former US Secretary of Agriculture John Block made just this point in 1986, proclaiming, 'The idea that developing countries should feed themselves is an anachronism from a bygone era. They could better ensure their food security by relying on US agricultural products, which are available in most cases at lower cost' (quoted in Bello, 2008, p. 452).

Faith in the market to continually deliver cheap calories to the world's hungry has been so great in recent decades that countries have been instructed to abandon long-standing practices of surplus storage. Many governments also abandoned policies that previously helped support a robust domestic agricultural sector, leading to the dismantling of marketing boards, the elimination of subsidies for things like seed and fertilizer, and the cancelling of government credit programmes for small-scale farmers. Numerous countries that were at one time net exporters and/or food self-sufficient thus experienced a significant decline in domestic production as their borders became flooded with cheap imports from high-income nations that continued to heavily subsidize their agricultural sectors. Millions of small-scale farmers, subject to this unfair competition, have thus had little choice but to abandon agriculture. While done in the name of food security, the actual outcomes of these policies

– whether in terms of farm incomes, human well-being, or national food sovereignty – suggest otherwise. The short-sightedness of such policies has been made particularly clear with the recent volatility in food prices. Given that low-income households spend close to (or in some cases more than) half of their disposable annual incomes on food, price increases of the magnitude witnessed in recent years have crippled many of the world's poor.

Between 1950 and 1970, low income nations went from being entirely food self-sufficient to accounting for almost half of the world grain imports (Friedmann, 1990, p. 20). Harriet Friedmann (1992) gives a thorough account of the growth of food dependency through an analysis of the global wheat trade, noting that before World War II no African, Latin American, or South Asian country imported the commodity. Now all countries within these regions rely to various degrees upon wheat imports. For example, whereas Nigeria was entirely food independent up through the 1960s, one quarter of its total earnings went to importing wheat by as early as 1983 (Jarosz, 2009).

Another level of added complexity is the effect that these neo-liberalizing trends had on the internal dynamics of the food supply chain. Prior to trade liberalization, national food chains were often short and involved locally grown, seasonally available products. Global market integration (typically) means increases in capital intensity as the task of moving food from farm to table becomes increasingly complex. During this process localism and seasonality are displaced as investments tend to focus on commodities for export and/or 'value added' processed foods (some of which may be for domestic consumption).

The neo-liberalization of food security also has meant the liberalization of finance, which has increased the rate of foreign direct investment (or FDI). FDI is an investment by a firm in one country into a business located in another, leading to the former owning a substantial, but not necessarily a majority, interest (Hawkes, 2005). FDI is one of the primary mechanisms by which companies enter new markets. The rise of FDI marks yet another evolution in agri-food policy's response to hunger – termed, here, the 'empty calorie-ization' of food security.

Empty Calorie-ization of Food Security

Between 1988 and 1997, food industry FDI increased from USD 743 million to USD 2.1 billion in Asia and from USD 222 million to USD 3.3 billion in Latin America; totals that far-and-away outstripped investments in agriculture in these regions. Food companies in the US generate revenue that is at least five times higher through FDI sales than through export sales (Rayner et al., 2007). Highly processed foods possess certain characteristics that make them ideal (from an investment perspective) for FDI. For example, relative to trade, FDI can be a cost-effective way for firms to reach foreign food markets. Exporting highly processed foods can be cost prohibitive as transport and storage costs relative to the value of the product are high. Producing these foods in the host country for domestic distribution avoids many such costs. FDI also optimizes the effectiveness of branding and promotional marketing allowing companies – such as Nestlé, Coca-Cola and McDonalds – to benefit from economies of scale in marketing and advertising. Investing in well-known domestic brands is also advantageous for firms by giving them instant ownership over a brand already known in regional and/or national markets (Hawkes, 2005).

The rise of FDI has unquestionably led to the spread of 'cheap' calories (Carolan, 2011). In Argentina, for example, 18% of all food expenditures in 1996 were on meals eaten outside the home, up from a mere 8% in 1970. This increase correlates strongly with an increase in FDI in restaurant (and coffee, doughnut, ice-cream, etc.) chains and processed foods in the country (Hawkes, 2005). In Brazil, growth in the sales of hamburgers, pre-made desserts, yoghurts, and flavoured milk averaged 27% between 1993 and 1997, compared with 5% for products such as vegetable oils, margarines, poultry and pork. In other words, dietary patterns – and thus consumer 'choice' – track remarkably close with FDI trends (Farina, 2001; Zimmerman, 2011). In the late 1990s and early 2000s, nearly three-quarters of all FDI into Mexico was directed at the production of processed foods. During this period sales of 'snacks' increased annually roughly 12%, while 'baked goods' saw a 55% increase (Hawkes, 2006). More remarkable still is the increase in carbonated soft-drink consumption in this country, which grew from 44 to 61 Kcal per capita per day between 1992 and 2000 (Arroyo et al., 2004). Consumption of Coca-Cola increased from 275 8oz servings per person per year in 1992 to 487 servings in 2002 (that is more than the per person average – 436 servings – recorded in the US at the time) (Hawkes, 2006).

While the general public might not link the rise of fast-food restaurant chains and processed foods to enhanced food security such links *are* made by proponents of recent FDI trends. Two examples: 'In my opinion, obesity is more the result of the success – not the failure – of the market. But on net, we are still better off' (Finkelstein and Zuckerman, 2008, p. 10); 'We suspect that most people are better off from the technological advances of mass food preparation, even if their weight has increased' (Cutler et al., 2003, p. 116).

Whether people and societies are indeed 'better off' is an empirical question that deserves closer scrutiny. The empirics, to bring us back to a point made earlier, depend in significant part on the food security yard-stick used. If our yard-stick is cheap – a.k.a. 'empty' and 'incorrectly priced' (Carolan, 2011) – calorie availability, then I might agree with the authors of the above statements. But do calories alone a secure food system make?

Pivoting in a New Direction

International bodies such as the FAO and the World Health Organization (WHO) track national-level data on, for example, the prevalence of underweight children under the age of five and proportion of population below minimal level of dietary energy consumption. Yet these data merely confirm what we already know: that incredibly impoverished countries are terribly food insecure. It also tells us absolutely nothing about the food situation in high-income countries, leaving untouched the assumption that affluent nations must be food secure by nature of their wealth. Take a country like the United States (US), which looks to be awash in calories. The US has its share of food deserts (Hendrickson et al., 2006; USDA, 2009), like any higher-income nation (Furey et al., 2001; Shaw, 2006). Yet the very term food *desert* denotes a space that is radically different from its surrounding environment. To therefore even suggest that the *entire* country could be food insecure is absurd. Or is it?

Conventional understandings of food security privilege affluent nations – they fail to ask fundamental questions such as 'are conventional food-related practices sustainable? And 'what levels of well-being do they help generate'? A UN-sponsored book titled *Food Security* recently remarked that 'the extent of hunger and food

insecurity [in the US] is much less severe than in the development world' (Dutta and Gundersen, 2007, p. 44). In the space of less than a sentence the affluent US is extoled while *the entire* 'developing' world is condemned on the basis of their respective levels of food security. Perhaps such pronouncements are empirically justified when food security is narrowly defined as, say, calories produced per capita. But would the statement still hold if we opened the definition up to variables that include such factors as individual and societal levels of well-being, diet, ecological sustainability, food dependence, and market concentration?

The Food and Human Security Index

The FHSI was developed to challenge conventional understandings of food security (e.g. the term 'human' in the index's title is a conceptual reminder that human welfare enhancement should be the ultimate goal of any food system). This macro-level index, which has been calculated for 126 countries, looks at indicators of individual and societal well-being, ecological sustainability, food dependency, nutritional well-being, and food-system market concentration. The FHSI is composed of national-level data for five indicator variables.

- *Life expectancy at birth*: indicator of individual and societal well-being.
- *Life satisfaction*: indicator of individual and societal well-being.
- *Total per capita water food-print as a percentage of total per capita renewable freshwater supply*: indicator of ecological sustainability and food dependency.
- *Daily per capita consumption of oils, fats and sugars*: indicator of individual and societal well-being, ecological sustainability, and nutritional well-being.
- *Supermarket concentration*: indicator of food-system market concentration.

This is not to suggest that quantitative macro-level indicators are the only – or even the best – way to measure food security levels across countries. Whether we like it or not, however, metrics matter. And what we measure affects what we do. Choosing to not think outside the food security box will only result in more of the same, which, while effective at enhancing global caloric output, has undermined many of the things that make our lives healthier, longer, happier, more sustainable, and, ultimately, more secure. That said, we should also be mindful of the limitations of national level metrics. Even if we could satisfactorily rank countries according to their levels of food and human security, we would not learn much from such an exercise without then following it up with a deeper analysis into *why* countries rank as they do. Unfortunately, space constraints restrict the amount of time that can be spent speaking to these important 'why' questions. The following discussion does, however, allow for some specifics to be covered while reviewing the indicators (and justifying their inclusion) making up the FHSI. Below, each indicator will be discussed, particularly its conceptual and empirical significance to food and human security.

Individual and Societal Well-being

Recall that the FAO's foundational principle of creating a freedom from want as it applies to food is directed at the achievement of deeper goals laid out by Roosevelt in his 1941 State of the Union Address during his discussion of the 'four essential freedoms'. The goal of these freedoms: human security and enhanced well-being. In

keeping with its original spirit, *genuine* food security must enhance well-being. The FHSI includes objective and subject measures directed toward this end.[2]

The 'objective' measure is a country's average life expectancy at birth. There is a rich literature documenting the links between food availability, accessibility, and affordability and individual and societal levels of health; at least up to a certain level, after which over-consumption can have a negative effect on life expectancies (Medez and Popkin, 2004; Monteverde et al, 2010). Dietary patterns and physical activity levels typically change as countries increase in affluence and as their populations urbanize – what is known as the nutrition transition. Medical innovation in disease treatment and improvements in infrastructure (e.g. the delivering of clean water and disposal of waste) are sufficient to offset the impact of less-than-ideal diets on life expectancy, up until a point. Well-being generated through a country's caloric affluence has a ceiling. Once the ceiling is reached, increases in per capita calorie consumption begin pulling down health indicators. As the epicentre of cheap calories, we are beginning to witness the effects of this in the US. While the overall life expectancy rate in the US is holding steady (for now), a new study shows that in hundreds of counties at least – most located in the South – life expectancy has fallen in recent years. These counties also have some of the highest obesity rates in the world, in addition to very high levels of (racial) inequality (Kulkarni, et al., 2011).

This helps explain the mixed relationship between life expectancy and economic growth. As detailed in Figure 1, life expectancy is strongly positively correlated to national affluence up to roughly USD 10 000 GDP per capita.[3] After this, the relationship flattens out considerably. And, as Figure 2 illustrates, beyond USD 20 000 GDP per capita the relationship washes out entirely. Perhaps this is due, at least in part, to the variability in dietary profiles among affluent nations, as some are consuming oils, fats, and sugars (as discussed shortly) at levels that could conceivably begin bringing down life expectancy rates.

The FHSI also includes a subjective well-being indicator – specifically, average reported levels of life satisfaction for each country (on a scale from 0 to 100). Clearly, life satisfaction is not going to be high when people are starving. But equally, while conventional economic theory assumes increased consumption (including consumption of food) is forever positively correlated with welfare, too much of a good thing is actually bad from a life-satisfaction standpoint.

A growing body of research indicates that after a certain point more choice is associated with decreased welfare, as measured by an increased risk of depression, stress, regret, and, when it comes to food, unhealthy dietary habits (Mishan, 1967; Kasser, 2002; Schwartz, 2004; Schor, 2005; Jackson, 2009). One study examined 7,865 young female adults (18 to 23 years of age) at the time of the initial survey (Ball et al., 2004). The same women were surveyed again four years later. Even after controlling for aspects of life such as current occupation, young women who were overweight or obese were more dissatisfied with work/career/study, family relationships, partner relationships, and social activities. The authors conclude that 'being overweight/obese may have a lasting effect on young women's life satisfaction and their future life aspirations' (Ball et al., 2004, p. 1019). Other studies point to strong links between body mass index (BMI) and depression and anxiety, regardless of gender (Schibner et al., 2009). (BMI is calculated as weight [kg]/height [m]^2 and among adults there are four categories: underweight [less than 18.5], normal weight [18.5–24.9], overweight [25–29.9], and obese [greater than 30].) Moreover, a poor diet appears to be positively correlated with decreased life satisfaction, even after controlling for BMI.

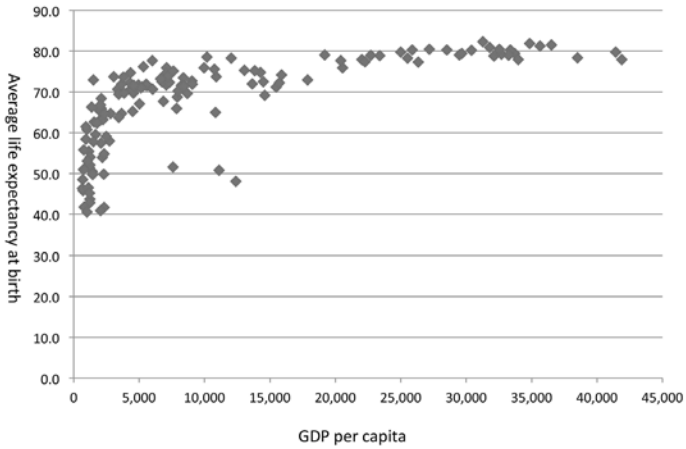

Figure 1. Relationship between life expectancy and GDP.

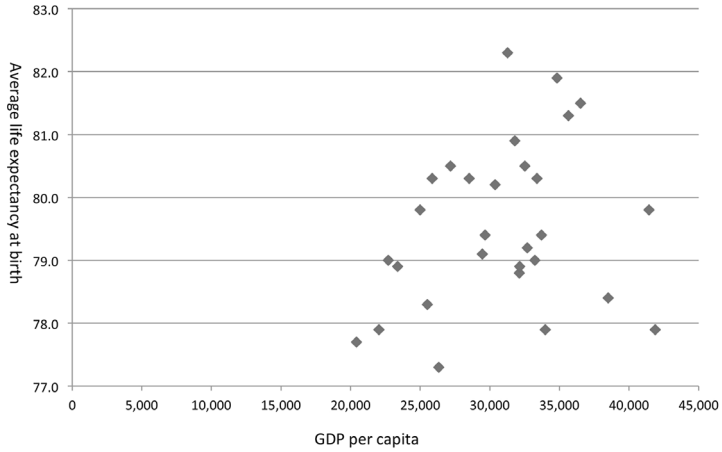

Figure 2. Relationship between life expectancy and countries with a GDP per capita of USD 20 000 and greater.

For instance, a strong positive association has been found between consumption of soft drinks and sugary food and risks for suicidal behaviours among adolescents in China (Pan et al., 2011). These findings have since been replicated in a study that looks at snack-food consumption more generally among Chinese adolescents (Wenga et al., 2012). It is with this research in mind that a third indicator of individual and societal well-being has been included in the FHSI – daily per capita consumption of oils, fats and sugars – which is discussed later when addressing issues related to nutritional well-being. As the above literature makes clear, excessive consumption of oils, fats and sugars negatively affects human welfare.

As with life expectancy, the relationship between life satisfaction and economic growth is varied, especially among countries with a GDP per capita greater than USD 10 000 (see Figure 3). One particularly striking aspect of Figure 3 is how some countries are able to produce high levels of life satisfaction among their citizens with

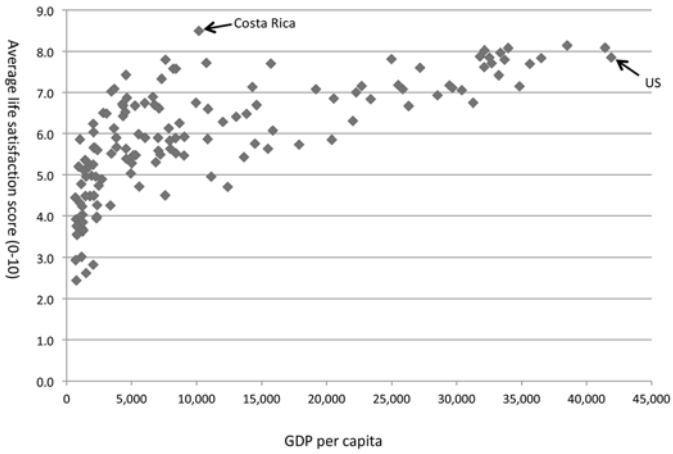

Figure 3. Relationship between life satisfaction and GDP per capita.

a fraction of the wealth found in other countries. For example, the average Costa Rican reports being considerably more satisfied than the average citizen of the US even though the former has *one fourth* of the latter's wealth. This point will be revisited in the Conclusion, when we learn about the mixed relationship that FHSI scores have with GDP per capita.

Sustainability

While the sociology of food and agriculture literature is rife with examples linking food-related practices and policies to ecological impacts, conventional understandings of food security are remarkably silent on the subject of sustainability. To be fair, scholars and practitioners have acknowledged the value of 'natural capital' and 'natural resource assets' when discussing such phenomena as regional or community food security (Bennett, 2001; Flora, 2010). Yet, when food security is measured and defined by international organizations like the FAO, ecological sustainability is given very little (if any) weight. From a long-term food security perspective, however, large ecological footprints are fundamentally unsustainable and therefore ought to be avoided. Even in the shorter term, an excessive ecological footprint for a country can suggest (among many other things) dietary patterns that can have a negative impact of both life expectancy and life satisfaction (which ties back to earlier-discussed indicators). We know, for example, that diets consisting of large amounts of highly processed foods come at tremendous cost to the environment in that 'value added' processing consumes significant amounts of energy, water, and other natural resources (Carolan, 2011). The same holds for diets high in animal fats/protein. The greater the per capita consumption of animal flesh (especially beef) the greater the diet's ecological footprint (D'Silva and Webster, 2010). It seems impossible to define a nation as 'food secure' when its food comes at great expense to the ecological productive base that makes agriculture possible.

The FHSI therefore includes two sustainability indicators. The one addressed in this subsection is that of total per capita water food-print as a percentage of total per capita renewable fresh water. The second indicator – daily per capita consumption

of oils, fats and sugars – will be elaborated upon shortly. The first ecological indicator looks at countries' total per capita water food-print as a percentage of their total per capita renewable fresh-water supplies (see Table 1).[4] It is calculated by taking a country's total virtual water food-print per capita and dividing it by the country's renewable fresh-water resources per capita. The former is the sum total of a country's 'green', 'blue', and 'grey' water footprints for domestic- and internationally sourced food. The green water food-print refers to the use of green water resources (such as rainwater that does not become run-off) that go towards the growing of crops. The blue water food-print denotes the utilization of water resources – surface and groundwater – along the supply chain of a product. And the grey water food-print represents the volume of fresh water required to assimilate and adequately dilute the load of pollutants that resulted from the production and processing of commodities (Hoekstra et al., 2011).

As indicated in Table 1, this calculation brings to light a remarkable variability between countries in terms of the sustainability of their respective water food-prints. For instance, Egypt's total per capita water food-print is more than *53 times* greater than its total per capita renewable domestic fresh water (as measured in cubic meters). In other words, Egyptians are consuming food, on a per capita basis, at a rate 53.7 times greater than what the country's fresh-water stores could provide were all its food grown domestically. The United Arab Emirates – to take another grossly unsustainable water food-print – has a total per capita water foodprint that is 49.5 times greater than what its domestic fresh-water sources could sustain. Compare this to Iceland. Their total water per capita foodprint is a mere 0.31% of their total per capita renewable fresh-water reserves. Or take, for another example, the US. While the US consumes more calories per capita than any other country, its total per capita water food-print as a percentage of total per capita renewable fresh water is roughly 28.8%. With this indicator, the US benefits considerably from the geophysical fact that it is water-rich, especially relative to countries in the Middle East who are water-poor. The US case is a good example for why two ecological indicators are included in the FHSI. According to this water food-print indicator, the US is operating well within its ecological limits. The unsustainability of the US food system is picked up, and the country is penalized accordingly, with the second ecological indicator, where daily per capita consumption of oils, fats and sugars are factored into the equation.

In an attempt to standardize the data the afore-mentioned water food-print percentages were ascribed a value. The rationale for this was twofold. First, if this was not done, countries such as Egypt would be unduly punished for their dependency on virtual water. It was also desirable to keep the values of each indicator close to a scale of zero to 100; otherwise there was the very real risk that one indicator would have disproportional influence in the final calculation of the FHSI. Countries with a percentage greater than 500 were given a score of a *negative* 25 (Egypt, for example, with a total water food-print 5,372% greater than its renewable fresh-water footprint, received such a score). These countries clearly need to be penalized, as it is inconceivable to label any country 'food secure' that consumes water via food at a rate that is at least five times greater than what its domestic renewable fresh-water sources would allow. Countries with a percentage between 201 and 500 were given a score of zero. Those with a percentage between 101 and 200 were given a score of 25. While possessing a total water food-print per capita greater than what their own renewable fresh-water capacity would allow, countries scoring 25 are at least close to consuming within their domestic water budget. Those countries with a percent-

Table 1. Total per capita water food-print as a percentage of total per capita renewable fresh water (top 20 bold).

Iceland	**0.310925**	Latvia	20.17891	Poland	87.11717
Guyana	**0.463958**	Austria	20.28971	Rwanda	88.35623
Suriname	**0.737291**	Vietnam	20.65173	Uganda	88.80038
Solomon Islands	**0.840152**	Argentina	21.24511	Mauritius	90.00616
Gabon	**1.255006**	Tajikistan	22.88096	Ukraine	92.79638
Congo, Rep.	**1.375145**	Switzerland	23.79939	Ghana	93.25655
Norway	**1.492844**	Philippines	24.21844	Benin	93.72615
New Zealand	**1.803913**	Mozambique	25.39705	Spain	95.20944
Peru	**1.832024**	Korea, Dem. Rep.	26.14901	Germany	96.39995
Chile	**2.055273**	Mongolia	28.80105	Iran, Islamic Rep.	99.8952
Canada	**2.235956**	United States	28.81734	Bangladesh	103.1803
Liberia	**2.27056**	Lithuania	29.23539	Chad	106.1975
Nicaragua	**2.592148**	Cote d'Ivoire	32.08335	Luxembourg	109.394
Colombia	**2.645574**	El Salvador	32.69854	Korea, Rep.	112.0642
Panama	**2.833502**	Japan	34.8435	Azerbaijan	113.8419
Belize	**3.328909**	Belarus	39.91698	Zimbabwe	116.409
Cen. African Rep	**3.635219**	Thailand	40.42675	Czech Republic	118.3407
Congo, Dem. Rep.	**3.908633**	Greece	41.2503	Belgium	127.3754
Costa Rica	**4.927414**	Macedonia, FYR	43.11556	South Africa	129.592
Fiji	**5.123461**	Cuba	44.89565	Denmark	131.2958
Sierra Leone	5.128947	Jamaica	45.78536	Botswana	163.9749
Russian Fed.	5.560977	Kazakhstan	46.07092	Lebanon	172.806
Myanmar	5.713543	China	46.62717	Morocco	183.7063
Finland	5.808745	UK	46.99359	Netherlands	189.1231
Ecuador	5.848269	Sri Lanka	47.76881	Uzbekistan	190.5102
Venezuela, RB	6.027668	Turkey	47.77913	Cape Verde	201.1132
Sweden	6.687868	Gambia, The	49.13131	Kenya	206.0383
Guinea	6.862971	Mali	49.223	Burkina Faso	216.345
Brazil	6.870289	Togo	49.79357	Antigua & Barbuda	233.4755
Cameroon	8.624576	Mexico	49.86648	Sudan	240.704
Honduras	8.959642	France	50.07557	Cyprus	298.3301
Madagascar	9.161266	Slovak Republic	50.66794	Hungary	364.6023
Australia	9.495994	Tanzania	52.25686	Pakistan	400.113
Malaysia	9.639907	Trinidad & Tobago	52.4241	Moldova	419.4376
Ireland	10.3169	Armenia	53.09702	Algeria	479.5854
Guinea-Bissau	10.89139	Senegal	53.16254	Tunisia	539.1999
Bolivia	11.07427	Burundi	57.50254	Syrian Arab Rep.	562.3369
Angola	11.91668	Dominican Rep.	59.13716	Barbados	596.4603
Guatemala	12.20631	Namibia	59.37643	Turkmenistan	792.6663
Cambodia	12.41807	Swaziland	60.22679	Yemen, Rep.	980.3836
Bosnia–Herzegovina	12.65526	Portugal	65.89199	Maldives	1348.921
Indonesia	12.78043	Lesotho	66.61771	Jordan	1380.964
Paraguay	12.92753	Italy	67.87557	Niger	1501.354
Uruguay	13.5924	Bulgaria	72.467	Malta	1635.169
Zambia	14.0694	Romania	75.14416	Saudi Arabia	1907.92
Georgia	15.09562	Ethiopia	77.24832	Libya	1985.424
Brunei Darussalam	15.29747	Haiti	77.43776	Mauritania	2104.172
Albania	15.87013	Comoros	78.40977	Israel	2162.802
Estonia	16.51885	India	81.01259	Bahamas, The	3089.918
Nepal	17.57755	Malawi	82.15477	United Arab Emir.	4949.472
Croatia	18.44257	Nigeria	85.739	Egypt, Arab Rep.	5372.204
Slovenia	18.68922				

age between 76 and 100 were given a score of 50; between 51 and 75, a score of 75; and between 26 and 50, a score of 100. Finally, those counties with a per capita water food-print of 25% or less were given a score of 125 (to not only reward but also to provide some symmetry to this measure as the low-end extends to negative 25).

Food Dependence

Trade dependency is also a variable worth discussing when thinking about genuine food security. For a variety of reasons that were discussed earlier, less affluent countries have been coerced into abandoning food independence for food dependence. Take the case of the Philippines. As Walden Bello (2008) notes, dictator Ferdinand Marcos had, remarkably, a better track record than either the World Bank or the International Monetary Fund (IMF) when it came to supporting policies that sought to improve the domestic food production capacity of the country. As Walden Bello (2008, p. 451) noted:

> 'To head off peasant discontent, the regime provided farmers with subsidized fertilizer and seeds, launched credit schemes, and built rural infrastructure. During the 14 years of the dictatorship, it was only during one year, 1973, that rice had to be imported owing to widespread damage wrought by typhoons. When Marcos fled the country in 1986, there were reported to be 900 000 metric tons of rice in government warehouses. Paradoxically, the next few years under the new democratic dispensation saw the gutting of government investment capacity. As in Mexico, the World Bank and IMF, working on behalf of international creditors, pressured the Corazon Aquino administration to make repayment of the $26 billion foreign debt a priority.'

The Washington Consensus, as it has come to be known, involves coercing less-affluent nations into abandoning the practice of surplus storage and any and all government support programmes directed specifically at small-holders (like those that provide often essential subsidies for fertilizer, seed and credit). If a country suffered crop failures, it was believed, they could always import whatever food they needed. The recent volatility in agricultural commodity markets has proved the folly of that assumption. Unfortunately, it was a lesson learned at the expense of the world's poor, as evidenced in 2009 when the world's hungry exceeded one billion.

Food dependence is a difficult concept to measure. There are data on agricultural trade calculated in terms of dollars and volume. Yet, the commodities included in these figures refer not only to food-stuffs but also agricultural commodities for industrial purposes and for bio-fuels. Moreover, the units of 'dollars' and 'volume' are problematic: as for the former, exchange value is not the same as use value; while in terms of the latter, 'volume traded' does not necessarily equal 'food volume' (e.g. although live animals are exported, the entire carcass is not consumed). It is also very difficult to discern, when looking at import/export data, between a country that is food independent and a country that is simply starving (e.g. both import very little food). The FAO does keep data on what they call the 'import dependency ratio' (IDR) of countries: IDR=imports/(production+imports–exports)×100. Yet this figure, too, is problematic. For instance, how the units (e.g. imports, production, and exports) are measured – volume or units of dollars – changes the outcome of the ratio. It is also clear that imported agricultural commodities are not always destined for domestic markets but may be re-exported to another country. This strategy is often used to work around trade sanctions and avoid certain trade barriers (for example, Firm X sends grain to India meant ultimately for re-exportation to Iran, as the country that Firm X resides within has a trade embargo with the Iranian government). Moreover, in light of the earlier discussion about FDI, we know that national dietary patterns can be shaped drastically through channels of foreign investment.

Yet these non-domestic fiscal food influences are missed by gross trade indicators. Fortunately, the FHSI is already employing an indicator that can double as a proxy for measuring food dependency: total per capita water food-print as a percentage of total per capita renewable fresh water. The value of this measure is its focus on *food consumed* (and the virtual water used through its life cycle), as opposed to, say, commodities imported, as many agricultural commodities never end up as (human) food.

Nutritional Well-being

We still need to distinguish between those countries that are not consuming enough, those that are consuming too much, and those that are consuming within parameters that are recommend by public health professionals. This brings us to the third indicator included in the FHSI: daily per capita consumption of oils, fats and sugars (as recorded and reported by the WHO).

Complete international data sets are hard to come by when looking for indicators of under- and over-nutrition. There are, as noted earlier, a number of indicators available that point to the *severe* under-consumption of food, like the prevalence of underweight children under the age of five and proportion of population below minimal level of dietary energy consumption. These statistics essentially break the world down into two categories: those nations who have absolutely nothing and those who have at least something – not a terribly useful distinction when trying to rank countries. Likewise, statistics are available which compare average BMI across countries. Yet, those data sets are woefully incomplete as not all countries compile these data. I am also well aware of the criticisms leveled at the BMI and of the tendency to place too much emphasis on it as proxy for individual health and well-being (see Guthman, 2011). What is required is a complete data set that provides an indicator of both under- and over-consumption; one that would not only highlight countries at both extremes but allow for distinctions to be made between countries that fall between these two ends. I ultimately settled on WHO data on the daily average per capita consumption of oils, fats and sugars.

The consumption of oils, fats and sugars are necessary for health up to a point, after which they begin to impact negatively upon health and well-being (Medez and Popkin, 2004). The Oxford University's British Heart Foundation Health Promotion Research Group recently published a report noting the deleterious effects of a high fat (specifically animal fat) diet. The study looked into the health implications of three diet scenarios: 'current diet trends', 'less meat' and 'fair less meat' (Friends of the Earth, 2010). 'Current diet trends' assume a diet where the level of meat and dairy consumed in UK remain the same – roughly 177.7 grams (6oz) of meat and 332.2 grams (11oz) of milk daily. The 'less meat' scenario would involve consuming 70 grams (2.5oz) of meat and 142 grams (5oz) of milk daily and more fruits and vegetables. Finally, the 'fair less meat' scenario assumes a *fair* distribution of animal protein across the UK of 31 grams (1.1oz) of meat and 57 grams (2oz) of milk daily and more fruits and vegetables. A 'less meat' diet was calculated to reduce UK government expenditures by GBP 0.85 billion annually: GBP 0.57 billion saved from a reduction in heart disease; GBP 0.07 billion from reduced stroke incidents; and GBP 0.20 billion from reduced cancer rates. More dramatic still, a 'fair less meat' diet was found to save British taxpayers GBP 1.20 billion annually: GBP 0.80 billion, GBP 0.10 billion and GBP 0.30 billion from reduced heart disease, strokes and cancer,

respectively. As this study makes clear, a diet high in animal fat – and indeed the same applies to high fat diets in general – comes at considerable expense to taxpayers (who shoulder the health-care expenses) as well as to the unhealthy individuals (who no doubt experience decreased well-being from being sick) (see also Weber and Matthews, 2008). In sum, there are sufficient reasons for penalizing a country if the average diet of its citizenry is too calorically rich. We might even have grounds for calling that nation food insecure.

Bad diets, to put it plainly, are also bad for the environment. As mentioned previously, this indicator, therefore, also serves as a proxy measure of ecological sustainability. Take the case of the US. A report by the USDA offers some insight into the amount of energy that goes into producing, processing, and transporting food in the US. The final tally is over 17 000 calories (as a unit of energy) on a per capita daily basis. Figure 4 breaks those energy units down according to specific food categories (Canning et al., 2010). Over half of those calories go toward the making of highly processed foods; a third into the making of animal products such as meat, eggs and milk; and a sixth into grains, fruits and vegetables. Eating well is less energy intensive than eating poorly (Bomford, 2011). Thus, countries whose citizens eat poorly ought to be penalized for it – not just for reasons of public health and individual well-being but also because diets high in oils, fats and sugars come with a sizeable environmental cost.

Figure 5 details the relationship between daily per capita consumption of oils, fats and sugars and the percentage of disposable income that is spent on food for countries with a GDP per capita greater than USD 15 000. The relationship is negative (its correlation coefficient is –0.435). While inexpensive food is a laudable goal of any food system we know from other analyses that there is a point when food becomes *too* cheap; a point when the externalized costs far exceed benefits (e.g., see Carolan, 2011). Figure 5 supports this literature, while further suggesting that it is only certain types of calories that get less expensive – namely, high fat, empty ones – and that these price reductions are not universality experienced across food types.

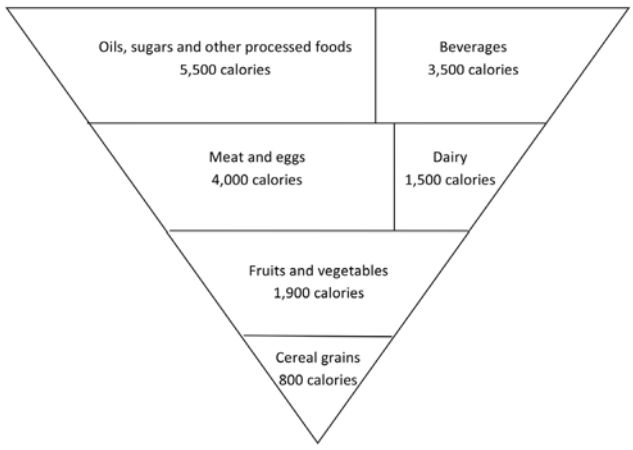

Figure 4. Break-down of the amount of energy (17 000+ calories per day per capita) consumed by the US food system.
Source: Based on Canning et al., 2010); Bomford, 2011; Carolan, 2012.

Prior to standardizing these data, which ultimately would allow cross-comparisons between countries, a couple assumptions had to be made. It was first necessary to establish what could be considered an 'optimal' average daily caloric intake. Individual differences in metabolic mechanisms and levels of activity (e.g. sedentary vs. active/manual labour) make this exceedingly difficult and inherently problematic. On average, infants and children (below 10 years of age) require fewer calories than adults. Females on average require fewer calories than males. And as adults age their caloric requirements gradually lesson. After carefully considering all the various metabolic demands (see Table 2), it would be reasonable to settle upon 2,500 as an optimal daily per capita caloric intake.

Next, an optimal daily per capita caloric range for oils, fats and sugars had to be calculated. The WHO recommends that no less than 15% and no more than 30% of

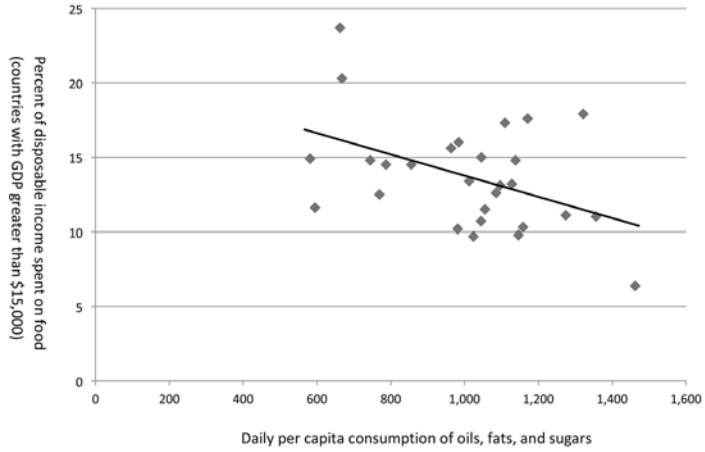

Figure 5. Relationship between daily per capita consumption of oils, fats, and sugars and percent of disposable income spent on food for countries with GDP per capita greater than USD 15 000.
Note: correlation coefficient = –0.435.

Table 2. USDA caloric intake guidelines.

Gender	Age (years)	Activity Level		
		Sedentary	Moderately active	Active
Child	2–3	1,000	1,000–1,400	1,000–1,400
Female	4–8	1,200	1,400–1,600	1,400–1,800
	9–13	1,600	1,600–2,000	1,800–2,200
	14–18	1,800	2,000	2,400
	19–30	2,000	2,000–2,200	2,400
	31–50	1,800	2,000	2,200
	51+	1,600	1,800	2,000–2,200
Male	4–8	1,400	1,400–1,600	1,600–2,000
	9–13	1,800	1,800–2,200	2,000–2,600
	14–18	2,200	2,400–2,800	2,800–3,200
	19–30	2,400	2,600–2,800	3,000
	31–50	2,200	2,400–2,600	2,800–3,000
	51+	2,000	2,200–2,400	2,400–2,800

Source: Adopted from USDA, 2005.

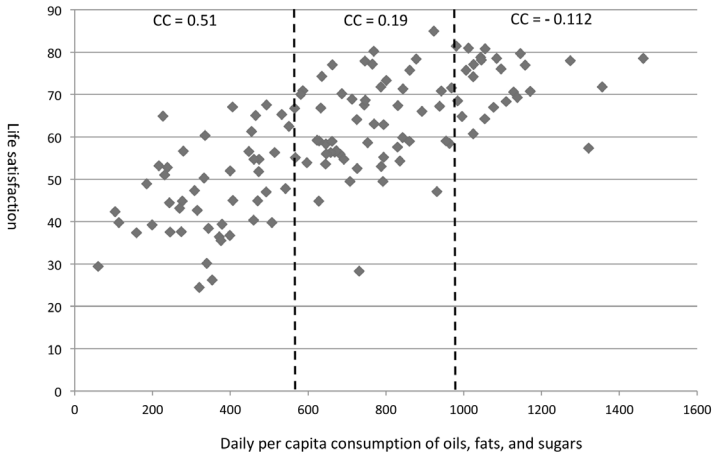

Figure 6. Relationship between daily per capita consumption of oils, fats, and sugars and life satisfaction.
Note: CC = correlation coefficient.

one's daily caloric intake come from fats. Based on a diet of 2,500 calories a day, that equates to no fewer than 375 calories and no more than 750 calories from fat. The WHO further recommends that no more than 10% of one's daily energy intake be derived from sugar. In other words, based on a daily diet of 2,500 calories, no more than 200 calories should come from sugars. Combining these figures we are left with an optimal oils, fats, and sugars daily caloric range of between 575 (375+200) and 950 (750+200). Figure 6 examines the relationship between daily per capita consumption for oils, fats and sugars and average life satisfaction. While the relationship between these two variables is fairly significant until 575 calories (correlation coefficient of 0.51), it flattens out considerably between 575 and 950 calories (correlation coefficient of 0.19), eventually turning *negative* after 950 calories (correlation coefficient of –0.112).

A method then had to be devised to compare countries that do not fall with the optimal range, at both the high and low ends. Calculating the low end was less problematic, as zero calories from oils, fats and sugars is an obvious base. But what top-end caloric figure would be comparable to a figure of zero? It could be argued that 2,000 calories per day from oils, fats, and sugars is a suitable top-end total. Admittedly, it is ultimately a normative judgement to make an assessment of whether individual and societal welfare is comparable between societies that consume zero and 2,000 calories daily from oils, fats and sugars.

The last step involved standardizing the data on a 100-point scale. Those countries that fell within the optimal range of between 575 and 950 calories received a score of 100. Among those that fell below, a calculation was made based upon their location between the low end of the optimal range (575 calories) and the base (zero calories). Thus, for instance, if a country had a daily per capita caloric oil, fat and sugar intake of 287.5 it received a 50%, whereas if that caloric figure was, say, 517.5 they received a 90% (the closer to the optimal range the higher/better the score). For countries above the optimal range, the calculation was made in relation to their location between the high end of the optimal range (950 calories) and the top (2,000 calories). Thus, for instance, if a country had a daily per capita caloric oil, fat and

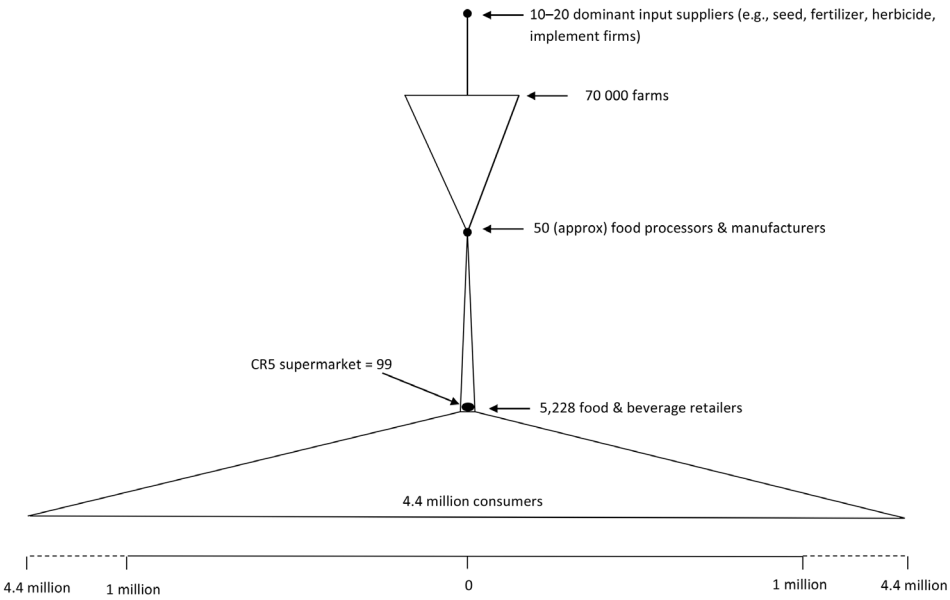

Figure 7. New Zealand food system 'hour-glass' (hanging by a thread).
Source: Compiled by author, with assistance from Paul Stock and Miranda Mirosa.

sugar intake of 1,475 it received a 50% (coincidently, the caloric intake for the US was 1,462, leaving it with percentage of 51.3), whereas if that caloric figure was 1,055 they received a 90% (again, the closer to the optimal range the higher/better the score).

Food System Concentration

The last index serves as a proxy for food-system concentration: supermarket concentration. More specific still, this index looks at the CR5 ratio (or five firm concentration ratio) for the retail food sector.[5] The CR5 reflects the sum of market shares of the top five firms for a given industry. A standard rule of thumb is that when the CR5 goes beyond 50%, that market can be taken to be highly concentrated. The 'hour-glass' metaphor is routinely evoked in the sociology of food and agriculture literature (Carolan, 2012). The hour-glass shape refers to the highly concentrated 'middle' that connects farms with consumers (Hendrickson et al., 2001). Wherever there is market concentration there is an increased risk of market distortion in the form of buyer and/or seller power, which can have a deleterious effect on food access and food security more generally (see Burch and Lawrence, 2007; Stringer and Le Heron, 2008; Smith et al., 2010). Agri-food market concentration is becoming increasingly pronounced, particularly among high-income countries. Take, for example, the case of New Zealand, as illustrated in Figure 7, which has one of the most concentrated supermarket sectors in the world (note also how I have extended the hour-glass metaphor by referring to it as *hanging by a thread* to refer to the highly concentrated input sector; Carolan, 2012).

Given the volume of their sales, large retail firms such as Walmart and Kroger, are dealing increasingly with a handful of very large packers, allowing them to by-pass the wholesale sector entirely. This not only cuts the 'middleman' out of the equation

but allows retail firms to exploit the buyer power held by the largest processing firms, who then pass the tighter margins on to producers. This helps explain the growing gap between what producers are paid and retail prices for those products. A study from 2004 calculated that the difference between the price paid to farmers and that paid by consumers increased by 149% between 1970 and 1998 (Marsh and Brester, 2004). Retail concentration can also negatively affect individuals at the other 'end' of the chain: namely, consumers. Supermarket concentration, particularly at the city or regional levels, has been linked to food deserts (Blanchard and Matthews, 2008), higher food prices (Richards and Pofahl, 2010), and reduced food choice (Hawkes, 2008).

Once food retail data were obtained it was necessary to establish what percentage of food sales are accounted for by supermarkets in each country. A number of countries in South America (Chile, for example) have significant levels of supermarket concentration (CR5 ratios of over 50). Yet if, say, only 50% of all food sales occur in a supermarket/retail context it would be somewhat misleading to treat that nation as identical to one where the figure is closer to 100%. CR5 ratios thus needed to be adjusted (standardized) in some instances to take into account these discrepancies. The goal was to arrive at a statistic that reflected a ratio of market concentration for each nation's *total* food sales (and not just its supermarket/retail sales). The top 10 countries (among the 126 analysed) with the highest CR5 supermarket ratio (as a factor of total food sales) are Australia (CR5=99), New Zealand (CR5=99), Finland (CR5=91), Norway (CR5=91), Sweden (CR5=91), Switzerland (CR5=85), Ireland (CR5=83), Slovenia (CR5=83), Denmark (CR5=82), and Iceland (CR5=81). The 'mirror' CR5 ratio was then added into FHSI to ensure this statistic was in line with previous indicators, as higher numbers are desirable (thus, for example, Australia and New Zealand each had a supermarket concentration score of 1 inserted into the Index).

Results and Discussion

FHSI scores were arrived at by adding the five afore-mentioned indicators and calculating their average. The results of this tabulation are contained in Table 3. The country topping the list is Costa Rica. Costa Rica has a higher life expectancy than that found in the US (78.5 versus 77.9). It also has the highest reported life satisfaction score of any country (85 out of 100). Its total water per capita food-print is a mere 4.9% of their total per capita renewable fresh-water reserves. The daily per capita consumption of oils, fats and sugars in Costa Rica is at the high end of the optimal range: 923 calories. And, its food retail sector proves to have relatively low levels of supermarkets concentration: CR5=20.

The remainder of this article will discuss the implications of the FHSI and the scores found in Table 3. This discussion will centre upon three points. Those points elaborate on how the FHSI challenges older North–South divisions, how it places into question conventional approaches to 'food security', and how its subsequent ranking of countries supports the argument that you cannot eat GDP.

Challenging older North–South Divisions

In 1980, ex-German Chancellor Willy Brandt chaired a commission that produced a report entitled *North–South: A Programme for Survival*. The report presents a world

Table 3. Final FHSI ranking (top 20 bolded).

Costa Rica	**77.69941**	Philippines	66.18093	Morocco	50.3491
Iceland	**76.9785**	Thailand	65.58672	Cyprus	49.7586
Finland	**76.82639**	Slovakia	65.58326	Madagascar	49.677
Ireland	**76.38799**	Belarus	65.40359	Togo	49.08168
Norway	**75.96306**	Turkey	65.32289	Congo, Dem. Rep.	48.92
Panama	**75.60614**	Sri Lanka	65.09939	Lebanon	48.71698
Australia	**75.23405**	Dominican Republic	64.45163	Haiti	48.712
New Zealand	**74.78275**	Cuba	64.02	Namibia	48.476
Slovenia	**74.48956**	Venezuela	63.419	Bangladesh	48.12083
Sweden	**74.24623**	China	62.02574	Nigeria	47.70454
Argentina	**74.23092**	Portugal	62.00208	Mali	47.67466
Colombia	**74.12041**	Guinea	61.554	Chad	45.79439
Guatemala	**73.8**	United States	61.54381	Algeria	45.51621
Nicaragua	**73.56197**	Italy	61.34197	South Africa	45.06294
Brazil	**73.4256**	Kazakhstan	61.26534	United Arab Emir.	45.02
Canada	**73.27342**	Romania	61.22323	Malta	44.98807
Chile	**73.23772**	Vietnam	60.619	Pakistan	44.12322
Paraguay	**72.99126**	Bulgaria	60.4792	Egypt	42.14337
Malaysia	**72.93622**	Trinidad & Tobago	59.82946	Uzbekistan	42.08304
Honduras	**72.92498**	Spain	58.5241	Ghana	42.00219
Croatia	72.8803	Central African Rep.	57.8	Tunisia	41.48529
Switzerland	72.68762	Poland	57.13814	Syria	41.44615
Bosnia–Herzegovina	71.70576	Tajikistan	56.50004	Jordan	41.35508
Lithuania	71.02415	Senegal	56.42497	Tanzania	41.22243
Peru	70.93786	Cameroon	56.01828	Botswana	41.13291
Uruguay	70.82868	Nepal	55.67337	Israel	41.01647
Ecuador	70.8148	Saudi Arabia	54.82	Hungary	40.7091
Mexico	70.55152	Netherlands	54.83722	Moldova	40.56666
Estonia	70.51097	Denmark	54.73759	Benin	38.90501
Austria	70.318	Mongolia	54.20514	Zimbabwe	38.83415
Indonesia	70.27923	Ukraine	54.14168	Uganda	38.53404
Latvia	70.26255	Sierra Leone	53.54083	Mauritania	37.54381
Japan	69.9647	India	53.48482	Azerbaijan	37.25394
Russia	69.73279	Czech Republic	53.24123	Sudan	36.806
Guyana	69.7025	Mozambique	53.20794	Malawi	36.592
United Kingdom	69.23483	Korea	53.19107	Burundi	32.66943
Jamaica	67.88	Iran	53.18516	Ethiopia	32.24761
Albania	67.66962	Angola	52.82819	Kenya	31.64347
El Salvador	67.62095	Cambodia	52.81402	Yemen	31.612
Bolivia	67.12047	Germany	52.45637	Rwanda	31.11954
France	66.77313	Zambia	51.11917	Burkina Faso	30.49701
Greece	66.43562	Armenia	50.94918	Niger	22.18942

with a clear dividing line between the rich, influential North and a poor, marginalized South that requires continual international assistance if it is to 'develop'. While the world is drastically different today when compared to 1980 the image of the Global South, as it is called, remains much the same (Williams et al., 2009). This is especially the case when talking about food security (see, for example, Milkias, 2010).

Yet, scholars of peasant/agro-ecology agriculture (such as Altieri, 2004) and international peasant movements like La Via Campesina (such as McMichael, 2006) know that a country's location in the South does not automatically destine it to the category of 'food insecure'. Likewise, scholars have been arguing with increasing intensity that high-income nations should not be assumed to be food secure merely on the basis of their being awash in cheap, fatty, sugary calories (see Carolan, 2011;

Guthman, 2011). The FHSI lends empirical support to each of these positions. It challenges old developmental battle lines between the 'leaders' of the North and the 'followers' (hoping to emulate the North) located in the South.

Questioning Conventional Approaches to 'Food Security'

The FHSI makes problematic the conventional calorie-ization understanding of food security. Calories, as already established, while important up until a point, do not have an endless positive correlation with individual and societal welfare. After a certain level of consumption more is not better. 'More' can actually push a country *back into* a state of food insecurity. Excessive caloric consumption is associated with poor health and an increase in health-care expenses. A poor diet is a risk factor for four of the six leading causes of deaths in the US: heart disease, cancer, stroke and diabetes. When combined with obesity, these diseases have been estimated to cost USD 556 billion per year (Wallinga et al., 2009). Health-care costs attributed to obesity extract roughly GBP 10 billion annually from British taxpayers, while the wider costs to society and business are estimated to be close to GBP 49.9 billion per year (Butland et al., 2007, p. 5). For Canada, a 2011 report places the total economic cost of overweight and obese individuals at approximately CAD 300 billion a year: CAD 127 billion in health care; CAD 72 billion in lost productivity due to total disability; CAD 49 billion in lost worker productivity due to higher rates of death; and CAD 43 billion in lost worker productivity due to the disability of active workers (Preidt, 2011). Fifty years ago, Americans spent over 17% of their income on food, while roughly 5% of national income was spent on health care. Today, those numbers are almost precisely the opposite. The average citizens of the US now spends less than 10% of their income on food, while the cost of their health-care tops 16% of national income. Similar trends have also been recorded for European Union (EU) countries (Carolan, 2011).

And *how* we go about producing all those cheap, empty calories cannot be sustained in the long run – a reality that further undermines the food security of many countries. In the US, avoidable annual food waste amounts to over 55 million metric tons – or nearly 29% of annual production – which if consumed could save at least 113 million metric tons of CO_2 equivalents from being emitted, annually (Stuart, 2009). The annual total cost of pesticides alone in the US, upon public health, the environment, and human communities, has been placed in the billions of dollars (Pimentel, 2005). Soil erosion, water pollution, climate change, and so forth are crucial to any discussion of both sustainability and food security.

What Can You Eat If Not GDP?

A wealth of peer-reviewed research has been published recently documenting empirically how after a certain point economic growth becomes unconnected – if not negatively related – to individual and societal indicators of well-being (see Jackson, 2009; Knight and Rosa, 2011; Dietz et al., 2012). Economist Herman Daly (1999) calls this 'uneconomic growth': growth that costs us more than the benefits we accrue from it. We can add the FHSI to this list of literature. Figure 8 plots the relationship between FHSI and GDP per capita. Taking all 126 countries collectively reveals a moderate positive relationship between FHSI and GDP per capita (a correlation coefficient of 0.359). Yet, something very interesting becomes apparent when we ex-

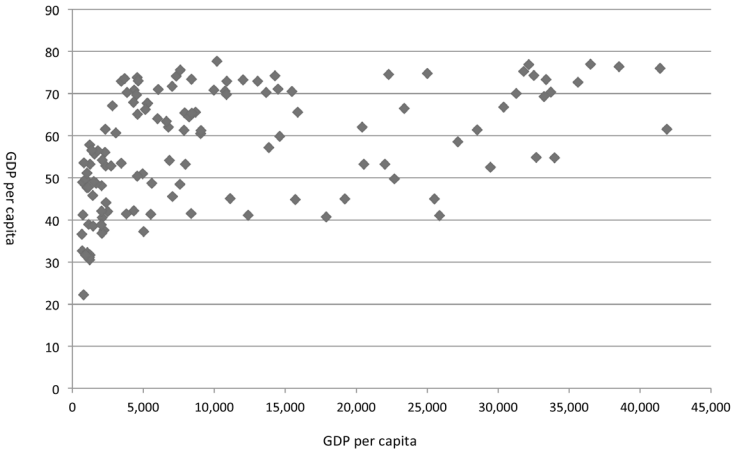

Figure 8. Relationship between FHSI and GDP per capita.

amine countries going from lowest GDP per capita to highest. Looking at countries with a GDP per capita of USD 10 000 or greater, the relationship begins to noticeably flatten out (a correlation coefficient of 0.164). Among countries with a GDP per capita of USD 30 000 or greater, the relationship is non-existent (a correlation coefficient 0.078). It is among countries with a GDP per capita of USD 35 000 or greater that the relationship becomes *negative*, in a significant way (a correlation coefficient –0.505).

So what can be eaten, if not GDP per capita? A growing body of research has examined how inequality negatively affects a society's ability to efficiently improve the welfare of its citizenry. Take some of the findings from Wilkinson's and Pickett's (2009) highly acclaimed *The Spirit Level*. According to these authors, more equal societies have fewer health and social problems, treat children better, treat women more equally, have a greater sense of collective responsibility, have lower levels of mental illnesses, and their business leaders are more likely to agree that their governments should co-operate with international environmental agreements (see also Wilkinson et al., 2010).

In light of this research FHSI scores were plotted against national levels of inequality (as measured by the genie coefficient). When all 126 countries were viewed collectively, a very weak negative relationship was found between the variables (correlation coefficient of –0.071). As lower-income countries were removed, however, the strength of that negative relationship grew significantly. Among countries with a GDP per capita of USD 20 000 or greater, the correlation coefficient was –0.285. Among countries with a GDP per capita of USD 25 000 or greater, the correlation coefficient was –0.426. Finally, among the highest income countries – namely, those with a GDP per capita of USD 35 000 or greater – the correlation coefficient was a remarkably robust *negative* 0.97. Inequality, it seems, has an eroding effect on a country's ability to have its population be (and feel) food secure.

As the FHSI is compiled using macro-level indicators it is difficult to understand fully its inverse relationship to inequality. Looking to the literature we know that more equal societies are, among other things, happier and have higher life expectancies than less equal societies (Wilkinson and Pickett, 2009). No doubt the FHSI is reflecting this. It is also known, from the agri-food literature, that inequality is detrimental to dietary health, fruit and vegetable consumption, and food security

more generally (Rose and Richards, 2004; Drewnowski and Darmon, 2005; Morton et al., 2005). Due to food policy and the structure of the food system in affluent nations there tends to be an inverse relationship between energy density (MJ/kg) and energy cost ($/MJ) (Carolan, 2011). In other words, energy-dense (nutrient-shallow) foods represent the lowest-cost option for many consumers in high-income counties. This offers a piece to the puzzle as to why the highest rates of obesity in affluent counties occur among population groups with the highest poverty rates and the least education (Drewnowski and Specter, 2004).

Conclusion

The FHSI up-ends conventional thinking as it pertains not only to food security but also to growth and prosperity. While space does not allow for such analyses here, an obvious next step would involve taking the ranking of the FHSI and conducting case-studies of some of the countries to assess the 'fit' of the index and to learn why some fared as they did. It would also be productive for future research to gain a better understanding of why inequality seems to impact FHSI indicators as it does, particularly among high-income countries.

Regardless of whether you actually think Costa Rica is more food secure than, say, Canada, Mexico, New Zealand, Sweden or the US, the FHSI is based on 'objective' indicators that cannot be summarily dismissed out of hand. Based on these indicators Costa Rica has accomplished something that is quite impressive, as have many other countries that have high FHSI scores. Gleaning lessons from those countries with high FHSI scores, as well as perhaps some suggestions on what to avoid (especially among countries with low FHSI scores and high GDP per capita), could prove fruitful as the issue of food security continues to grow in both its salience and importance.

Finally, a few words about the term 'food security', which I evoke with some hesitation. With scholars such as Wittman et al. (2010), I am highly critical of the direction in which we have been led in its name. Yet if we can keep in mind the term's roots, which extend at least as far back as to Roosevelt's 1941 State of the Union Address, the term itself is not the problem. The problem, rather, has been in its application. By employing the term, I am looking to recapture that original spirit of food security that has since been lost; a spirit, I might add, that also haunts certain movements that are presently critical of policies promoted in its name. In their position statement, *Food Sovereignty: A Future without Hunger*, La Via Campesina states that: 'Food sovereignty is the right of each nation to maintain and develop its own capacity to produce its basic foods respecting cultural and productive diversity. We have the right to produce our own food in our own territory. Food sovereignty is a precondition to *genuine food security*' (La Via Campesina, 1996, p. 1; my emphasis).

If genuine food security is premised on the enhancement of individual and societal well-being, ecological sustainability, food independence, nutritional well-being, and truly competitive (and socially and morally embedded) markets, then the FHSI may prove a useful tool for imagining and enacting new lines of thought around the concept. One of the strengths of the FHSI is that it embraces the very concerns that at present cause so many to be critical of 'food security' as currently understood. The FHSI does not provide any solutions to problems that ail us. But it is a reminder of issues that ought to be included in discussions about genuine food security and of the limitations of current practices and policies said to be directed towards that end.

Notes

1. Space constraints require that this section be kept short. A much longer history is being developed in a book manuscript tentatively entitled *Reclaiming Food Security*.
2. Data obtained from <http://www.happyplanetindex.org/public-data/files/hpi-2-0-results.xls>.
3. GDP per capita data obtained from <http://www.happyplanetindex.org/public-data/files/hpi-2-0-results.xls
4. Data come from <http://data.worldbank.org/indicator/ER.H2O.INTR.PC> and Mekonnen and Hoekstra, 2011 (<http://www.waterfootprint.org/?page=files/WaterStat-NationalWaterFootprints>).
5. Data obtained from Planet Retail, <http://www1.planetretail.net/>.

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The Rural and Agricultural Roots of the Tunisian Revolution: When Food Security Matters

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Abstract. Originating in rural areas, the popular uprising that led to the Tunisian revolution of 14 January 2011 has shed light on the growing social and regional disparities that have characterized development dynamics in Tunisia. While favouring the reallocation of resources to coastal areas to the detriment of interior and agricultural regions, liberalization processes since the late 1980s also fostered export-oriented agricultural development strategies, based on the promotion of large-scale agricultural enterprises and irrigated farming. As a result, imports of grains and animal feed have come to represent a growing source of commercial balance deficit and of financial pressure on public budgets, particularly since the food crisis of 2008. On the other hand, decreasing farm subsidies, higher production costs, growing farmers' indebtedness, have importantly reduced the reproduction capacity of a large fraction of farms, particularly in the rain-fed agriculture sector. As rural outmigration and non-farm employment opportunities have been declining, small farms have become survival spaces for jobless household members, increasing the pressure on family resources and exacerbating social frustrations. While rising food prices were not the only cause of recent uprisings in Tunisia, processes of agricultural restructuring during the past 20 years contributed importantly to fuel the revolutionary dynamics, thus giving a political dimension to food issues. As demonstrated by the rise of farmers' protest movement (land occupations, contestation of farmers unions, refusal to pay for irrigation water), structural change allowing for an increased control of economic resources by local farm producers is needed, but will fundamentally depend on the effectiveness of current process of 'democratic' transition in Tunisia.

Introduction

Driven mostly by aspirations for freedom, social justice and dignity, the popular uprisings in North Africa have shed light on the widespread social and political frustrations in the region, shattering the idyllic image of good students of the IMF and the World Bank that countries such as Tunisia, Morocco and Egypt enjoyed internationally (political stability, economic success and social progress, especially for Tunisia). While rising food prices and high unemployment fuelled the initial protests, these took rapidly a political turn, calling for the fall of the authoritarian regimes.

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What is commonly referred to as the 'Arab Spring'[1] has surprised most analysts around the world, including social scientists. However, it is possible to detect the signs of the social and popular explosion of recent months in the strong tensions and social conflicts that several countries of the region have experienced over the past four years. We can mention the riot of the mine-workers in south Tunisia in 2008, the numerous strikes in the manufacturing sector and the occupations of factories both in Tunisia and Egypt, the multiple mobilizations of peasants in Egypt, conflicts over water and land, and finally the food riots in Morocco, Egypt and Jordan after the explosion of food prices in 2007–2008. In addition, although the social actors and the mobilizations that prepared the popular uprisings of the last months are somewhat different according to country (protests started in rural areas in Tunisia and mostly in urban settings in Egypt and Morocco), however, many similarities can be observed in recent trajectories of the countries of the region. In this regard, it appears crucial to have a retrospective look at the deep causes of the 'Arab revolts' and to explore their links with development strategies put in place in these countries and with forms of their integration into the global economy.

In this context, the objectives of this article are threefold: 1. to explore some of the socio-economic dynamics that have contributed to the explosion of the popular revolts in the region, focusing mainly on the Tunisian example; 2. to identify more specifically their links with development strategies, which have undermined the capacity of national economies to secure food self-sufficiency and a continuing and affordable access to food for the population; 3. to assess the ways in which the Tunisian revolution and ongoing protest movements in rural areas are likely to influence future directions of agricultural development policies and to foster new approaches to food security. We argue that the popular uprising in the region, rather being a localized and punctual response against authoritarian regimes, has deep historical roots. The underlying sources of the revolutionary upsurge need in fact to be searched in the detrimental effects of IMF- and World Bank-inspired neo-liberal policies on people's capacity to secure decent work and livelihoods and should be interpreted in relation to the crisis of the globalization project and the world food system (McMichael, 2012). Drawing on a critical globalization studies perspective (Appelbaum and Robinson, 2005) and on food regimes analyses (Friedmann and McMichael, 1989; McMichael, 2005), the article suggests that while rising food prices were not the only cause of recent uprisings in Tunisia, processes of agricultural restructuring during the past 20 years contributed importantly to fueling the revolutionary dynamics, thus giving a political dimension to food issues. Following other authors, we argue that this political dimension needs to be reintroduced in approaches to food security (Patel and McMichael, 2009). As the rise of the farmers' protest movement demonstrates, structural change is needed to allow for an increased control of economic resources by local farm producers. However, this will depend fundamentally on the effectiveness of the current process of 'democratic' transition in Tunisia and, more particularly, on the capacity of civil society to exert pressure on the orientations of development policies.

Increasing Inequalities and Growing Unemployment

During the last 20 years, several countries of the region, such as Tunisia, Egypt and Morocco, have experienced major socio-economic transformations, linked firmly to their engagement in a process of economic liberalization and their opening up to the

world markets. As in other developing countries, trade liberalization and structural adjustment policies, led under the stewardship of the IMF and the World Bank, were expected to favour better resource allocation, foreign investment and technology transfer, and to have positive effects on growth, poverty alleviation and employment, especially through the promotion of labour-intensive industries (World Bank, 2000).

Initiated in Tunesia in the late 1980s and in Egypt in the early 1990s, structural adjustment policies led to a movement of large-scale privatization, liberalization of prices and trade and to significant cuts in public expenditures (lower consumption subsidies, reduction of public employment, etc.). The overall objective of these policy reforms was the gradual transformation of national economies from state-dominated to more market-driven ones (Guerrero, 2010). While reinforcing the orientation of their national economies towards exports (manufacturing industry, tourism, export-oriented agricultural production), they have exposed them to the fierce competition of the world markets (textile industry) and also have increased their dependency on staple food imports. In both countries, as well as in Morocco, the textile sector has been hard hit by the impact of the dismantling of the Multi-Fiber Agreement and resulted, particularly in Tunisia, in the destruction of thousands of jobs.

As a result of these development strategies based on the promotion of low-productivity economic sectors, which generate weak employment opportunities for qualified workers, both countries have been faced with a major crisis of employment, aggravated, especially in Tunisia, by a massive arrival of young graduates on the labour market. With declining public employment and international outmigration opportunities, unemployment rates have reached record levels in Egypt (30%), and slightly lower in Tunisia (20%), particularly among higher education graduates (Salehi-Isfahani, 2010).

As elsewhere, the contraction of wage-work opportunities resulting from structural adjustment programmes has been associated with the growth of the informal sector (McMichael, 2012). In fact, while public policies failed to integrate large economic segments of the work-force, a growing proportion of the active population, especially in poor areas, have relied increasingly on informal and even on illegal activities,[2] particularly in border regions (Algeria, Libya).[3] However, the informal sector was soon invested by groups connected to the political powers, who did not fail to see in illicit activities new sources of enrichment and who, favoured by widespread corruption involving members of the administration, ended up exercising their control over the sector's most lucrative activities. In doing so, they have deprived large fractions of the popular class of their unique source of income sources (Elbaz, 2009).

One major trend of the recent socio-economic dynamics in North Africa is the growing disparities in the distribution of wealth and the increase of poverty.[4] Processes of liberalization and the development of an offshore economic sector have contributed in fact to the enrichment of a new class of businessmen, which is strongly linked to political power, and which greatly benefited from the privatization of public enterprises and widespread corruption. As a result, social and income disparities have increased considerably,[5] with not only an aggravation of poverty rates, but also a severe decline of the living standards of the middle class, which had developed particularly in Tunisia previously (Ben Romdhane, 2011). And with the explosion of consumption needs, social frustrations have been growing, not only within the middle class, but especially among precarious groups, situated immediately above

the poverty line and which have been affected severely by the rising cost of living, mostly as a result of increasing prices of food staples and of decreasing subsidies for basic consumer products).

Growing Regional Disparities

With unemployment problems and increased social inequalities, growing regional disparities represent another underlying source of the recent popular uprisings in North Africa. As pointed out by several authors, one major trend of globalization processes is the phenomenon of spatial polarization at different scales, and the growing spatial inequalities between centre and periphery (Krugman, 1998; Vandermotten et al., 2010). This process of spatial polarization is even stronger in developing countries. First, the gap between the main urban areas and the rest of the country, particularly in terms of infrastructure and qualified labour remains important and is even widening (Vandermotten et al., 2010). Second, the spillover effects of the modern sector on the rest of the economy are limited, because this one is more integrated with the economies of the centre than with the local economy, and the profits are reinvested in core countries, hindering an accumulation of capital at the local level (Dixon and Boswell, 1996)

In Tunisia and in Morocco, for example, liberalization processes since the late 1980s have favoured the reallocation of resources to coastal areas – where tourist and laboor-intensive industrial activities are increasingly concentrated – to the detriment of inland and rural areas. In Egypt spatial differentiations increasingly take the form of a partition between the delta region, which is highly urbanized, and the Nile valley, where rural development has received only secondary attention from public policy as priority has been given to the treatment of urban problems, considered potentially explosive.

Despite major social achievements, human development indicators in Tunisia still indicate important gaps and even growing inequalities between, on the one hand, coastal and inland areas and, on the other, between urban and rural areas (living conditions, health, education and employment). It is precisely in the regions, which haven't benefited from economic development (mostly the Central West and the North-west) that social protests have started and have spread to the whole country later. Also it is worth recalling that in Tunisia, as in all North African countries, poverty remains most importantly rural.[6]

The Marginalization of Agriculture: Growing Food Dependency and the Undermining of Land-based Rights

In fact, although territorial policies geared towards reducing regional disparities and diversifying the rural economy through the promotion of industrial activities in rural areas have been put in place since the 1980s, job creation for rural inhabitants has remained very limited, while the share of rural household income generated from agriculture has been steadily decreasing. Today the agricultural sector accounts only for 11% of GDP and for 15% of total employment (against 20% for industrial activities and 50% for services). This important regression of the agricultural sector in rural employment appears to be closely related to the specific role that has been assigned to agriculture in development strategies. We can distinguish two main pe-

riods that illustrate Tunisia's shifting forms of integration into the global economy (Gana, 1998) and which are also profoundly linked to major transformations in the global food regime (McMichael, 2009; Holt-Giménez and Shattuck, 2011).

During a first period, which goes roughly from the 1960s to the mid-1980s, development objectives were focused on the necessity to provide the urban population with cheap food and to reduce labour costs as a way to promote the country's industrialization (this was part of a strategy of import substitution and most importantly a major component of the state-led modernization project). But while food self-sufficiency was proclaimed as the main objective of agricultural development, actually since the 1970s, foreign aid and agreements fostered growing imports of wheat, milk, and beef, originating from American and European food surpluses. This dynamic clearly corresponds to what Friedmann and McMichael (1989) have characterized as the second global food regime.[7] Under these circumstances, food consumption needs of both the urban and the rural population were to be increasingly satisfied through imports of basic food products at cheap prices from the international markets, thus relegating agricultural development to a secondary place. Shifts in consumption patterns towards diets including more animal proteins was fostered by the implementation of a compensation fund (Caisse Générale de Compensation), which subsidized mainly imported staple food. During this first period however, the social role of agriculture in maintaining the rural population in the countryside and its contribution to reducing rural outmigration continued to be recognized.

Starting in the late 1980s, the implementation of structural adjustment policies promoted new forms of integration into the global economy and implied a new role for the agricultural sector, conforming to the requirements of the emerging global food system.[8] This one aimed at reinforcing the contribution of agriculture to the global economic balance of the country, through promoting export-oriented farm production and expanding the irrigated sector. Structural adjustment resulted in major shifts in agricultural policies, with privatization of state farms, cuts in farm subsidies, farm price liberalization, the reorganization of the farm credit system, and the gradual privatization of food marketing networks. These policy changes, which expressed a shift from food self-sufficiency objectives to a food security approach based on an increased integration into the world food markets, fostered the reallocation of economic resources in favour of large-scale and corporate agricultural enterprises to the detriment of the family-farming sector and rain-fed agriculture (Gana, 1998). As a result, and despite the increase in agricultural exports (fruits and vegetables, sea food), imports of grains and animal feed have come to represent a growing source of commercial balance deficit (55% of the country's consumption needs in grains are imported, 100% of food needs in the poultry sector, and more than 40% of cattle feed). This dependency on external markets is now exerting a growing pressure on public budgets, particularly since the food crisis of 2008, undermining state capacity to subsidize food staples.

Cuts in farm subsidies, farm price liberalization and the reorganization of the agricultural credit system have significantly altered the economic environment of farming activities and have been manifest in major transformations in patterns of rural livelihoods. These transformations indicate a major break in the conditions defining household access to land, i.e. a weakening of land-rights based on family survival and a reconstitution of these rights in favour of those who can use farm land as a means of production (Gana, 1998). As a result of changing farm production

conditions and patterns of social reproduction, growing processes of differentiation (including within family farms) were to be observed. First, with decreasing farm subsidies and growing competition for land resources, the reproduction capacity of an important group of family farms has become increasingly dependent on the diversification of both farm and non-farm income sources. Diversification of farming systems involved importantly a shift from grain to horticulture and fruit production, based on irrigation. Second, processes of farm restructuring have been manifest in the increased marginalization (with respect to agricultural production, particularly of grain) of small landholders where farming is part of a livelihood strategy based on pluriactivity. With shifts towards low-input farm activities, survival strategies in this farm group have been increasingly based on off-farm wage labour of household members, indicating a progressive movement out of agriculture. While calling into question the utilization of land as a means of livelihood[9] and as a mechanism of social redistribution, these processes have challenged the role of the state as a mediating factor in processes of liberalization and commoditisation. Furthermore, as rural outmigration and non-farm employment opportunities have been declining, small farms have become survival spaces for jobless household members, increasing the pressure on family resources and exacerbating social frustrations in rural areas, where the movement of social protest has started.

Food Issues: A Political Dimension

It is this conjunction of processes, including growing social inequalities and corruption, that contributed to crystallizing social and political discontent. In fact, the popular uprising of January 2011, which rallied various groups of the population, including the middle class, rapidly made a political turn while calling for the overthrow of the rulers. If the Tunisian revolution is not only the consequence of rising food prices, the wave of revolts started nevertheless against a background of deteriorating social conditions and living standards. According to FAO (2011), global food prices reached a record high in January 2011, surpassing the levels reached during the 2007–2008 food crisis. As several analysts have shown, the extreme vulnerability to rising food prices of most countries of North Africa was undoubtedly a precipitating condition for social unrest (Bellemare, 2011; Breisinger et al., 2011; Lagi et al., 2011; World Bank, 2011). Impacts of the food crisis have been expressed in growing financial pressures on public budgets and cuts in food subsidies.[10] This had major consequences for household budgets, increasing the share of consumption expenditures devoted to food. In most countries of North Africa, the pressure on household budgets has been so important that the share of family expenditure on food is still very high: 35.8% in Tunisia, 38.8% in Egypt, 43.9% in Algeria (USDA, 2007). As mentioned above, the impacts of higher food prices was also felt in rural and farm households, as these rely importantly and increasingly on purchased food. The rapid decline of food auto-consumption practices among farm households and the undermining of local food supply systems, which reinforces the dependency on imported staple food, illustrates the 'increasingly central role that (global food systems are) playing in human survival and well-being' (Lagi et al., 2011).

A recent IFPRI report asserts that 'food security has deteriorated in most Arab countries, which is consistent with observed high food prices inflation' and that, particularly in Tunisia, 'more people… lacked money to buy enough food in 2010 [compared to] the previous year'. The diminishing capacity of the largest fraction of

the population to access staple food and, more generally, the increased inability of the state to hamper the erosion of household incomes has been no doubt an important factor in crystallizing social discontent in North Africa (Breisinger et al., 2011).

However, beyond the evidence that declining living standards and food security played a role in triggering social unrest, what is important to underline is that the popular uprising in North Africa has given a political dimension to food issues. In fact, by revealing the shortcomings of agricultural policies and their inability to tackle the social dimensions of development, the food crisis and its consequence has contributed to the disruption of the social contract on which the legitimacy of the Tunisian regime was based. This was reflected in the slogan 'Bread and water without dictatorship', which was chanted during the protest movement of January 2011. With this regard, the assertion that the food issue has taken a political dimension should not be understood in a restrictive way, i.e. that increases in food prices are likely to generate food riots and social unrest, but rather that they can lead, as was the case in Tunisia, to the rejection of the entire socio-political system. Another illustration of how the food issue has taken a political dimension is when former Tunisian President Ben Ali on 13 January decided to reduce the price of staples such as sugar, milk and bread. The offer wasn't enough to prevent the thousands of protesters who had gathered the day after in the capital, Tunis, to demand his ouster (Romm, 2011). The politicization of the protest movement indicates that people were making a direct link between political choices and development orientations and the deterioration of their living conditions. In people's mind a better access to food staples implied the overthrow of the dictator. As Lagi et al. (2011) point out, 'in food importing countries with widespread poverty, political organisations may be perceived to have a critical role in food security. Failure to provide security undermines the very reason for existence of the political system.'

As we will see in the following section, social protests and farmers' demands for structural reforms have amplified during the transition period, illustrating their aspirations for a radical break with the former regime and development policies.

Farmers' Protests in the Transition Period: A Reactivation of Class Struggle in the Countryside?

The profound transformations in the conditions of farmers' access to agricultural resources that have accompanied process of liberalization and state disengagement during the last two decades have favoured the rise of social tensions and conflicts in rural areas, particularly growing claims over land and water. Since the late 1980s, the transfer of farm co-operative to private companies has often been faced with a strong opposition from former co-operative workers, many of whom have lost their jobs and their livelihoods (Gana, 1998).

Similarly, decentralization and transfer of water management from state agencies to local user associations, rather than reinforcing farmer control over the resource, have favoured monopolizing by the most influential economic actors, while enhancing the capacity of local authorities to interfere in the allocation of water to the detriment of small farmers (Gana and Amrani, 2006; Gana, 2011).

The rising discontent in rural areas also originated from farmers' growing indebtedness. Many of them, particularly small farmers are subject to lawsuits for failing to repay bank loans and are under the threat of land expropriation.[11] The transfer of state-owned agricultural land to private investors, including members of families

allied to the regime, has continued to be the source of many tensions between, on the one hand, farm workers and, on the other, managers of large farm holdings and the agricultural administration. Although they had been rarely satisfied, protests over and claims on public farms have remained very much alive among peasants and farm workers in many areas.

Since 14 January, social protests have amplified in rural and agricultural areas, and appear in many ways to reactivate class struggle in the countryside. The following section is based on recent research conducted in the framework of the Tunisian Observatory of the Democratic transition, which existed in the follow-up of farmers' mobilizations during the transition period that led to the elections of the National Constituent Assembly of 23 October (Gana, 2011). Data collected[12] and interviews carried out with various farmers' groups show that multiple forms of collective action have taken place, seeking various objectives according to farming groups: access to resources (land claims, access to water and financial resources), better working conditions and remuneration, contestation of farmers unions and user associations, contestation of marketing conditions and pricing mechanisms, etc.

Right after 14 January, a large number of state farms (more than 100), which had been transferred to private investors, have been the target of attacks by organized groups, causing major damages and destruction. Several of these farms have been occupied by farm workers and landless peasants who are denouncing the privatization of state farms and are now asking the transition government to redistribute these farms in their favour (African Manager, 2011). Claims on state-owned farm land have amplified and a number of political parties have expressed their support to a project of agrarian reform that would improve access to land of small-holders and farm workers. Furthermore these protests are going so far as to call into question state ownership of agricultural land. Indeed, in many areas farmers are now demanding to get back the land of their ancestors, first confiscated by French colonists and nationalized by the state after independence. A number of families have undertaken steps to the recognition of their rights on state land, based on the presentation of old titles. Also punctual occupations of large farms by small-holders and agricultural workers aimed at hindering the performance of plowing tasks at the beginning of the cropping season have been reported. These various forms of actions are part of the will to exert pressure for the recognition of the right of the poor to a better access to land and are thus highly political. Farmers' protests over land have drawn attention to the long-ignored social consequences of privatization of state-owned farm land, which deprived numerous rural families from an important part of their livelihood. In addition to the land protest movement, farm workers, mostly employed on a seasonal basis, have organized numerous strikes and sit-ins, sometimes with the support of trade unions, to ask for better wages and better working conditions. Their actions seek also to consolidate the organization of farm workers within the framework of specific unions.

On the other hand, holders of corporate farms are getting organized into associations to defend their interests and are asking the transition government to protect their enterprises and to be compensated for the damages that a large number of them have had, as a result of several acts of violence and occupation. So far their demands have not been fulfilled. Protests have been staged also to contest the leaders of the farmers union, considered as being compromised with the former regime and not representative of their interests (Mestiri, 2011). Farmers have organized several demonstrations, in front of the government house in the capital, in order to demand

the resignation of the farmers union leaders and in many cases they have obtained satisfaction. This contestation movement has led recently to some farmers creating a new farmers union, seeking more autonomy vis-à vis the political power.

Mobilizations have also sought to denounce the problem of farmers' indebtedness, which led a number of small-holders to bankruptcy, and to exert pressure on the government to lift debts contracted by this category of farmers. Farmer protests and demonstrations are also related to pricing problems resulting from the privatization of grain collection. Contestation of new pricing mechanisms, based on the evaluation of the quality of grain, have conducted numerous farmers to refuse to sell their grain to private collectors and some farmers' groups are calling for the re-establishment of state monopoly over the commercialization of grains. Also horticulture and milk producers have organized several demonstrations and sit-ins, to protest against selling conditions imposed on them by the agro-industry.

Another form of protest, which has amplified over the past months, is the contestation of water users' association and the refusal of farmers to pay for irrigation water. Farmers, as well as rural households are asking for a free access to water and for the state to reengage in the management of water resources that had been transferred to water user associations, both for potable and irrigation water. Water related conflicts and mobilizations, which challenge state withdrawal from the management of water resources, express the rise of demands for a more equitable sharing of water resources and more generally for better living conditions in rural areas.

What these multiple forms of protests clearly reveal is the rise of social struggles in the countryside and a profound contestation of former state policies, but also a differentiation of farmer demands, according to the different social groups. Actually, there is a consensus among farmers that agricultural development should be given a renewed and increased attention in state policies, policies that farmers consider to have been biased in favour of the industrial and the touristic sectors. But what we also observe are the growing contradictions between, on the one hand, demands seeking structural reforms, particularly in land distribution among the different groups of farmers, as well as demands for the re-engagement of the state in the management of agricultural activities, and, on the other hand, resistance of the big farmers' group and the multiplication of actions aiming at creating the conditions for the reinforcement of private initiative and farmers' organizations in the management of agricultural activities.

It is of course too early to tell what will be the outcome of dynamics and mobilizations taking place in rural areas. In any case, the Tunisian revolution, which is still going on, has fostered a renewed attention on agricultural development, particularly with regard to social and food security issues. These issues not only have an important weight in the current political debate, but have already lead the transition government to engage a large consultation on food security issues and to elaborate a long-term investment programme in the grain production sector.

Also land protests and occupations of corporate farm enterprises have given voice to poor farm workers and small-holders and have contributed to put at the forefront of the political agenda the issue of resource allocation between the different categories of farmers. Evidence of this evolving approach to the land question is the reluctance of the transition government, at least before the 23 October elections, to satisfy the demands of corporate farms and the possible revision of the attribution criteria of state-owned land to take into consideration the needs of poor households.

The explosion of demands for social justice in rural areas have strongly influenced the political debate during the transition period and have been heavily instrumentalised by some political parties who have based their campaign on the idea that the solution to people's problems was conditioned by a radical change with the past. Whether or not these dynamics will translate in major shifts in development orientations for the agriculture sector will depend on the balance of power that can be created, on the one side between the various groups that constitute the farming population, on the other side between these various groups and the new political elite that emerged from recent elections. Preliminary analyses of the result of past elections, which made the Islamist 'Ennadha' the first party of the country, do not to reflect the main 'objective' causes that were at the origins of the popular uprisings in Tunisia.[13]

Future development orientations for the agricultural sector, which provides livelihoods for a large fraction of the population and plays a key in role the country's food security, will mainly depend on the capacity of civil society and farmers' groups to organize as autonomous forces capable of exerting a continuing pressure on the new transition government.

Conclusion

Several lessons can be drawn from the analysis of the relationship between food issues and the political crisis in Tunisia. First of all, although food issues were not the only cause of the Tunisian revolution, the background impact of soaring food prices and high level of food insecurity no doubt contributed to crystallize the movement of social protest that led to the fall of Ben Ali's regime. Second, policies that submit agricultural development exclusively to the requirements of the global market, without ensuring a certain level of self-sufficiency in basic food products, are unsustainable, as they have the potential not only to fuel protests or riots, but to generate a profound contestation of the ruling elites and the socio-political system. The sustained global trend of high food prices (rather than price volatility), confirmed by most prospect analyses, provides evidence for the declining ability of international food markets to secure the provision of food products at 'competitive' prices. While challenging the idea that food security can be ensured through global trade, this structural change in international food markets fundamentally calls into question the neo-liberal definition of food security, as referring mainly to 'a country's ability to finance imports of food through exports of other goods' (Mendoza, 2002; Lee, 2007).

Current dynamics, which undermine the capacity of national economies to secure access to food at affordable prices and their role in triggering recent uprisings in North Africa, contribute to rehabilitate a conceptualization of food security as depending mainly on local production of food, both at the level of the nation (food sovereignty)[14] and at the level of the household. The farmers' protest movement in Tunisia highlights the need for governments to address the social and food security dimension of agricultural development and call for structural reform in land resource allocation, for major transformations in the social and technical models of agricultural production (IAASTD, 2009), as well as for profound changes in the organisation of farm input and output markets, at various scales.

Finally, the lesson to be learned from the Tunisian case is the profound link between the way out of unsustainable development models and democracy. However, as the results of recent elections show, representative democracy is a necessary, but

not sufficient condition to pave the way for the democratization of the social organization of food production.

Notes

1. Anderson (2011) suggests that the notion of 'Arab Spring' needs to be demystified: 'the revolutions across these three countries (Tunisia, Egypt, Libya) reflected divergent economic grievances and social dynamics'.
2. A recent World Bank report evaluated the contribution of the informal sector at 38.2% of GDP and other studies estimated its share in the creation of non-agricultural employment to 40% (Gatti et al., 2011).
3. To the extent that informal and illegal activities allowed for the survival of the poor population and the supply of consumer goods at low prices, the state has turned a blind eye on the proliferation of informal sector, as a way to contain social tensions and maintain stability and political order.
4. Forty per cent of Egyptians live on less than $2 per day, while the richest 20% account for over half the country's wealth.
5. Ten per cent of Tunisians own one third of GDP against 30% of the poorest accessing less than 10% of GNP.
6. Forty per cent of the MENA region's total population is rural and 70% of the people who earn less than $1.25 a day are rural.
7. According to McMichael (2009, p. 141) 'the second food regime (1950s–70s) re-routed flows of (surplus) food from the United States to its informal empire of postcolonial states on strategic perimeters of the Cold War. Food aid subsidised wages, encouraging selective Third World industrialisation, and securing loyalty against communism and to imperial markets. "Development states" internalised the model of national agro-industrialisation, adopting Green Revolution technologies, and instituting land reform to dampen peasant unrest and extend market relations into the countryside.'
8. For McMichael, the neo-liberal world order gives rise to a third food regime. He uses the notion of 'corporate food regime', which defines 'a set of rules institutionalising corporate power in the world food system' (2009, p. 142).
9. In addition self-provisioning of food among farm households has significantly diminished. As Basis diets rely increasingly on purchased food originating to a large extent from global markets, farm households have become particularly vulnerable to food price increases.
10. According to Trego (2011), the share of public expenditure devoted to food subsidies in Egypt has dropped by half since the 1990s.
11. In June and July 2010, farmers in Regueb and Sidi Bouzid demonstrated outside the headquarters of the governorate against lawsuits brought against them by the BNA and expropriation procedures they were undergoing. Twenty indebted families whose assets were liquidated staged sit-ins on their land to oppose the expropriation. Subsequently, a protest outside the headquarters of the governorate was organized and brutally dispersed by police. These protests have had little media coverage (<http://observers.france24.com/fr/content/20100716-agriculteurs-tunisiens-manifestent-conserver-leurs-terres>).
12. The research was based on the review of a journalistic corpus (national and foreign press), individual interviews with farmers in four regions of Tunisia (Tunis, Cap Bon, Zaghouan, Bizerte), interviews with members and representatives of various agricultural and rural organizations (water user groups, producer associations) and with officials of agricultural services and rural development projects.
13. The Islamist party Ennadha (Renaissance) won 39% of the seats of the national constituent assembly elected on 23 October. This vote, which needs to be further analysed, no doubt expresses a deep rejection of former regime, but mainly the successful strategy of a political campaign drawing on a moral and religious discourse. Preliminary analyses of the geographical distribution of Ennadha voters show a North–South divide in the electoral weight of the Renaissance party, which obtains the largest share of votes in the south of the country, but also in the region of Kairouan (religious capital city of the country), and finally in the poor neighbourhoods of the big cities. In contrast, the North-west and the mid-West regions, which where home of the uprising in Tunisia, are those that give the lowest share of votes to the Islamist party.
14. Developed by the Via Campesina movement, the notion of food sovereignty is defined as 'the right of each nation to maintain and develop its own capacity to produce its basic foods respecting cultural and productive diversity. It is a precondition to genuine food security' (Via Campesina, 2006).

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Is De-agrarianization Inevitable? Subsistence, Food Security and Market Production in the Uplands of Negros Occidental, the Philippines

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Abstract. Market liberalization and agrarian reform have done little to reverse poverty in the uplands of Negros Occidental. The mean income of households participating in this research (n=347) was only marginally above the rural poverty line and virtually all relied on seasonal work and remittances from family members living elsewhere for household (and in many cases farm) reproduction. Combined with demographic pressure and competition for land, rural households face considerable pressure to reduce their livelihood dependence on agriculture. At the same time, this research shows that reconfigurations of the agro-ecological relations, exchange relations and social relations on which agriculture is based (reconfigurations that speak to politics and processes of re-peasantization) have significant potential to improve the livelihoods and food security of small farmers. Self-provisioning of farm inputs, access to markets organized according to alternative conventions, and formal education were all shown to be associated in different ways with improvements both to household income and to household food self-provisioning.

Introduction

Market-led development strategies have overwhelmingly failed to address rural poverty and stagnating agricultural productivity in the Philippines (Borras, 2007a). These failures are not simply a matter of misguided or poorly implemented economic policy. Philippine governments have pursued vigorous programmes of trade liberalization and structural adjustment in sectors dominated by small farmers and other small to medium-sized enterprises while simultaneously maintaining subsi-

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dies and protections to sectors dominated by landed elites and multinational corporations (Borras, 2007a). At the same time, programmes designed ostensibly to redress historic injustices and to promote small-holder agriculture (such as the Comprehensive Agrarian Reform Program) have been systematically manipulated by large land 'owners' to maintain or increase their control over land (Borras, 2007b; Bello et al., 2009). Uneven implementation and the tolerance of corruption have combined to amplify the negative social consequences of neo-liberal economic policy. In turn, deepening inequality in access to and control over land has contributed to the underdevelopment of those land resources and to the underdevelopment of agricultural labour as factors of production (Borras, 2007a).

It may not seem surprising, in light of the above, that many rural Filipinos have diversified their livelihood activities in order to reduce dependence on agriculture (Rigg, 2005, 2006). As in much of South-east Asia, the pressures of rising input costs, declining farm profitability and environmental degradation have combined with social, economic and cultural change more broadly to encourage de-agrarianization. Improved education and employment opportunities have promoted labour mobility just as have land shortages associated with the closing of land frontiers, population growth and the expropriation of land from small-holders (Rigg, 2006). In practice, economic diversification for many rural Filipinos has meant a growing dependence on remittances from family members working elsewhere to reproduce the household and, in many cases, the household's engagement in agriculture for either subsistence or market production (Borras, 2007a; Lukasiewicz, 2011).

According to McMichael (2006, 2009), dispossession of peasant[1] and family farmers is one of the principal mechanisms of capital accumulation in the neo-liberal age. Dispossession may occur in a variety of ways, from direct expropriation of resources to more general processes of structural adjustment and agro-industrialization. Drawing on Polanyi's concept of the 'double movement' (the idea that, throughout capitalist history, the commodification of land, labour and other resources by self-regulating markets has been checked by protectionist counter-movements), McMichael (2006) argues that the pre-eminent institutions for market regulation are no longer vested in the state but in a multilateral system that privileges the mobility and reproduction of money over the sustainability of social and environmental factors of production. Food, he argues, has become subject to a world price that bears little relationship to labour costs (nor, we would add, to localized interdependencies between subsistence production, non-commoditized exchange, and market production). As many have observed, dispossession of small-holders does not necessarily result in increased food production. There is considerable evidence globally that biodiverse, intensively managed small-holdings can outperform agro-industrial monocultures (Altieri and Toledo, 2011) and considerable evidence within the Philippines that expropriation of land often is associated with its 'conversion' to non-productive uses (Franco and Borras, 2007).

Van der Ploeg (2010) argues that, in response to these accumulation strategies, small farmers in both developing and developed countries are evolving new modes of peasant agriculture. He goes on to identify a number of ways in which – while reversing trends towards specialization and agro-industrialization – the new peasantries may be differentiated from traditional peasant agricultures. It is possible to assimilate these avenues of re-peasantization, we suggest, into three broad categories. First, the new peasantries reconfigure the *agro-ecological relations* on which the reproduction of rural households is based. Land acquires a significance that goes

beyond its ability to confer economic and political independence in a hostile world. As a source of natural capital and ecosystem services, land embodies for the new peasantries a notion of agriculture and agricultural sustainability as the dynamic co-productions of humans and nature. Second, the new peasantries reconfigure *exchange relations* in ways that readjust the balance of commodity and non-commodity production. This does not necessarily signal a retreat from market exchange but the de-commoditization, rather, of specific phases of the production process. Emphasis may thus shift from subsistence food production, as an end in its own right, to the self-provisioning of production inputs in order to decrease production costs while maintaining or increasing marketable surplus. Similarly, the new peasantries may consciously distance themselves from exploitative exchange relations within both local and global commodity chains by establishing or participating in alternative value chains. In doing so, the new peasantries extend their resistance to exploitation beyond traditional political spaces and into the spheres of production and exchange. Third, the new peasantries reconfigure the *social relations* of peasant agriculture beyond the spatial and political boundaries of 'the village'. The alternative to global commodity chains controlled by food empires is not a retreat to the local but to similarly extended networks of fellow farmers, activists, sympathetic scientists, consumer groups, etc.

Explicit in these processes of re-peasantization is the construction of new market relations and conventions (i.e. co-ordinating principles).[2] As Isakson (2009, p. 728) argues, it is reasonable to surmise that as peasant farmers engage in market production they would simultaneously take steps, where possible, to protect valued (agri) cultural practices; that is, to perform their own double movement. The possibility of new market relations and conventions redressing rural poverty has most visibly been taken up by alternative trade organizations such as Fair Trade (Lockie, 2008). However, taking up arguments from New Institutional Economics that the poor depend on market systems for their livelihoods but do not necessarily benefit from economic growth, a number of multilateral organizations and development agencies have also began to experiment with interventions designed to make market systems work better for the poor (Johnson, 2005; Tschumi and Hagan, 2008). The alternative to extreme neo-liberalism according to proponents of 'markets for the poor' (or M4P) is not welfare or the re-regulation of economic activity but the fostering of appropriate institutional arrangements (e.g. property rights) and the empowerment of the poor to develop their capacities as entrepreneurs, employees and consumers. While this appears to ignore the exploitative production relations evident in farmer dispossession, it does bear noting that the impacts of integration in global value chains chains are not evenly distributed either within or between production regions (Neilson and Pritchard, 2009).

In this article, we examine the interplay of small-holder production activities and market relations in six agricultural communities in the uplands of Negros Occidental, the Philippines. Farms in these localities are overwhelmingly small in scale, physically isolated, and lacking in capital and other assets. The article will discuss how movements in commodity and input prices have affected livelihood strategies and how engagement with a variety of local and global networks has affected livelihood outcomes. Drawing on the re-peasantization and M4P perspectives, this will be used to reflect on the types of market engagement that may assist the goal of poverty reduction within the study area.

Background and Methodology

The province of Negros Occidental covers an area of 792 607 hectares in the Western Visayas region of the Philippines. Of 2.6 million total residents in 2000, nearly one million were engaged primarily in agriculture (PPDO, 2004). At the same time, some 42% of families lived below the official poverty line (defined as the level of income necessary to meet basic needs including nutritional requirements) with this increasing to 50% in rural areas. On average, over half of family income was spent on food (PPDO, 2004). This is likely to have increased markedly during the world food crisis of 2008 when rice prices in local markets doubled. In 2003, about 35% of all children under seven were underweight while less than 3% were overweight (PPDO, 2004).

In terms of area, the two major forms of land use in Negros Occidental are sugarcane and rice production (160 725 and 113 350 hectares respectively in 2003). Other major crops include corn (44 502 ha), coconut (38 830 ha) and other fruits such as banana and mango. The livestock sector is dominated by small-scale chicken and egg production. Reflecting the national situation, Negros Occidental is a net rice importer although rice self-sufficiency increased from 65% to 84% between 2001 and 2003 as a consequence of Provincial investment in irrigation infrastructure. Accordingly, Negros Occidental's major imports are fertilizer and cement while its major exports are sugar and molasses. Small volumes of rice, muscovado sugar and bananas are also exported as organic and/or fair-trade products to larger domestic and international markets. Forest cover has increased from a low of less than 5% to about 10% (PPDO, 2004). Much of this is included in reserves such as the Northern Negros Forest Reserve, which was declared a protected area in 1996 and which all the communities involved in this research were based either within or in close proximity to.

Households were surveyed during the 2007 and 2008 dry seasons from the Barangays (the smallest administrative division in the Philippines) of Ilijan/Mailum, Canlusong, Patag, Sag-ang, Colonia Divinia and Yubo. Each barangay comprises a variable number of sitios, or smaller settlements, some of which are quite isolated from the rest of the barangay. Only one of the sites, Patag, was accessible by all-weather road. The logistics of collecting data in this context mitigated against a strict random sample. Following discussion with residents and barangay officials, households were selected on a purposeful basis to represent what was believed a typical mix both of livelihood strategies and of better and more marginal farmers. Following the sustainable livelihoods framework (DFID, 2001), data were collected on household structure and demographics, livelihood assets, livelihood activities, involvement in development and conservation activities, and livelihood outcomes from 347 households. Table 1 summarizes some of the basic characteristics of each site according to survey data.

Unlike some parts of the Philippines with histories of continual cultivation stretching back thousands of years, cultivation in the uplands of Negros Occidental reflects relatively recent waves of inter-provincial migration and social upheaval. These were driven largely by the expansion of the plantation sugar industry in the lowlands during the first half of the twentieth century, resistance to the exploitative and violent practices used by plantation owners to control workers, poverty and famine following the collapse in global sugar prices in the 1980s, legal and illegal logging, and movement into the uplands by landless people in search of cultivable land (Nagano, 2004; Goldoftas, 2006). Negros Occidental became a major theatre of operation for the Maoist New People's Army (NPA), and residents of the barangays surveyed included repatriated NPA fighters, anti-NPA cadres, non-participants who

Table 1. Site descriptions.

Description	Ilijan/ Mailum	Canlu-song	Patag	Sag-ang	Colonia Divinia	Yubo	Total
Households surveyed	61	35	61	63	64	63	347
Mean age of respondent	43	44	48	50	48	44	46
Female respondents (%)	67	49	43	35	50	37	46
Household size (mean)	5.6	5.2	4.8	4.7	5.4	5.7	5.2
Net household income (PHP, mean)	32206	39678	46058	38386	81672	43887	47945
Net income per capita (PHP, mean)	6,212	8,059	12685	9,932	16176	9,728	10719
Net agricultural income (PHP, mean)	19362	29114	32319	32969	58432	24191	33106
Contribution to net household income (%, mean)*:							
Fruit	18	33	20	21	12	23	21
Vegetables	16	7	36	11	4	13	17
Rice	19	17	2	1	15	0	13
Maize	9	3	10	15	0	6	8
Sugar-cane	32	31	46	39	29	13	35
Coffee	11	12	19	28	4	12	19
Income from preservation or restoration of native ecosystems (% of households)	39	37	44	46	8	43	36
Households reporting seasonal food insecurity (%)	97	97	85	96	97	100	95
Households with existing savings (%)	10	0	10	3	5	6	6
Households with existing debt (%)	53	67	54	35	70	48	54
Access to electricity (% of households)	75	31	70	54	50	0	48

Note: * Data on individual crop costs and income suggest that respondents tended to systematically overestimate net crop income and/or underestimate net household income.

had, at various times, migrated temporarily out of the area to avoid the conflict, and so on. Consequently, no survey participants identified themselves as *tumandok* (indigenous) while some 30% described themselves as migrants. Others were likely to have been only the second or third generation of their family born in the uplands. Colonia Divinia, for example, was established in 1937 by a religious sect. Landless workers and peasants were attracted to the colony by its peace and order as much as by the opportunity to clear and till land.

The majority of households in Ilijan/Mailum, Canlusong, Patag, Sag-ang and Yubo were beneficiaries of the Comprehensive Agrarian Reform Program (CARP), allocated approximately one hectare under a voluntary 'offer-to-sell' by the previous owner amortized over 30 years. This would suggest – in apparent contradiction to the observations above that upland forests had been settled and tilled by relatively recent migrants – that CARP had broken up and redistributed large landholdings to former workers or tenants. At face value, a more appropriate model of land distribution would have been simply to allocate formal title to those farming it. Throughout the Philippines, however, it has been common for private elites to assert rights over ostensibly public land regardless of whether they are actually occupying and/or using that land (Borras, 2006). Rather than confronting these elites, CARP generally has formalized their claims prior to purchasing and 'redistributing' land to benefi-

ciaries at full market value (Borras and Franco, 2005; Borras, 2006). In Canlusong, for example, a large tract of land had been titled in favour of the relatives of a past government official despite the land being declared forest land and part, therefore, of the public domain. In Colonia Divinia, meanwhile, much of the land had not been formally distributed at the time of this research as rights to title had been disputed and/or claimed by non-residents. Residents viewed these as 'land grabbers' who were using political and judicial networks, education and money to push small farmers off their 'traditional' land in order to establish sugar plantations.

Elsewhere, a major concern among residents and NGOs working in the area was the difficulty some CARP beneficiaries experienced in maintaining viable farms, particularly when confronted by events such as the death of a household head or unexpected medical expenses. Although no data were available on the extent of this phenomenon, it was believed that under such circumstances CARP beneficiaries were often forced to lease or sell land to wealthy non-residents who generally utilized the land for unproductive purposes such as the building of resorts or weekend retreats, breeding of fighting cocks, establishment of memorial parks, subdivision, etc. (the conversion of land to unproductive use being one of the strategies used by landed elites to avoid CARP). A small number of households included in the survey either leased part of their land out or, conversely, leased the land on which they farmed.

Households surveyed across the six barangays reported a mean of 5.2 resident household members and mean annual net incomes of PHP 10719 (approx USD 191) *per annum* for each resident household member; marginally above the rural poverty line calculated for interpretation of the 2000 census. Most households had at least one absent household member (a son or daughter), the majority of whom worked as agricultural labourers or domestic helpers within Negros Occidental. Major crops were rice, maize, fruit, vegetables and, to a lesser extent, coffee. Approximately 89% of coffee, 84% of fruit, 69% of vegetables, 43% of maize and 29% of rice was grown organically, primarily to reduce costs but also to improve soil health and access higher value markets for local, organic and/or fair trade produce. Only 5% of households reported having access to sufficient food year-round with most nominating a two to four month window of food insecurity in the wet season (the 'lean months') when little was available for harvest and off-farm employment opportunities in the sugar plantations were limited. Six percent of households had some cash savings but 54% were in debt. While 60% of respondents had not progressed past elementary school, interestingly, 46% of households nominated a female head to participate in the survey.

Commoditization and Exclusion

It is not hard to mount a case that global commodity trade has been hard on these households. As the summary above shows, households involved in this research were overwhelmingly poor; their subsistence and market production activities, even when combined with off-farm work, failing to provide year-round food security. Collapses in global commodity prices and/or access to markets have historically caused more acute food insecurity. This was particularly evident in the 1970s and 1980s when sugar prices crashed, generating widespread unemployment and famine. A study in 1982 reported malnutrition rates among children of 70% (Goldoftas, 2006). This encouraged more people to migrate into the mountains to establish small

farms where, as people say, 'you can always dig up root crops and have *something* to eat', no matter how unpalatable. Until the late 1990s, coffee was a major cash crop for many upland households. On sites too steep for other crops it could be interspersed with endemic timber and legume trees and on moderate slopes it could be intercropped with maize or vegetables. But when world coffee prices went into free fall as a result of massive expansion of production in Vietnam and Brazil, multinational buyers and processors did not simply lower the prices they offered upland Negrenese coffee growers, they by-passed them altogether, leaving only a small local market for low value 'native coffee'. The vast majority of coffee-trees throughout the study areas were abandoned, cut for charcoal or uprooted.

The experience of upland farmers with banana as a cash crop adds an interesting twist to these stories of boom and bust commodity cycles. Locally endemic banana varieties experience consistent demand in local markets, but more profitable export markets demand larger, more uniform and unblemished fruit. The introduction of more productive and marketable banana varieties from Mindanao in the 1990s resulted in the importation of diseases including bunchy top, moko (or bacterial wilt) and black sigatoka which farmers sought to control by burning all affected plants and fallowing the land for one year. At the peak of the disease outbreak in Sag-ang in 1997, most banana and all abaca (a relative of banana grown for fibre) production was wiped out. Previously, abaca had been the main source of livelihood after coffee, which, as noted above, was rapidly losing any meaningful market access at the same time. Based on data collected in 2008, it seems likely that the loss of each crop would have cost the average household in Sag-ang about a quarter of their annual net income. Banana production in Sag-ang recovered following the dispersal of some 10 000 banana plants by USAID, but abaca remains uncultivated.

It is perhaps not surprising, given these experiences with cash crops, that when asked which of their livelihood activities were most important to their food security, households nominated the cultivation of crops that could be used for household consumption irrespective of whether or not these were their major sources of income. This was especially pronounced in the case of rice, which many farmers grew at a net financial loss due to high levels of household consumption. Sugar-cane, by contrast, an entirely cash-crop, generated relatively high incomes for those households that grew it, presumably increasing their ability to purchase adequate quantities of other food. However, sugar-cane also required substantial investment in inputs, labour and transport, and had a history of catastrophic price volatility. Growing it entailed significant financial risk. Yet despite this tendency to regard subsistence activities as more reliable, it would be a mistake to discount the importance of non-subsistence activities to food security as not only did they add an element of diversification to households' livelihood strategies, as the next section will show there was also some evidence of positive relationships at the household level between subsistence and market production.

Livelihood Strategies in and outside the Market

Table 2 provides an overview of the major agricultural livelihood activities undertaken across the study area along with their relative contributions to household income and food supply. While there was considerable variation among individual households within each barangay, the general picture that emerges is one of grain crops (i.e. rice and maize) being grown both for subsistence and for market; fruit

and vegetable crops being grown predominantly as cash-crops but with some kept for self-consumption; and sugar-cane being grown entirely as a cash-crop on those lands both suitable for its production and close enough to transport infrastructure to get it to the central sugar mills. At first glance, coffee seems to fall somewhere between cereals and fruit and vegetables with nearly a quarter, on average, kept for self-consumption. In this case, a relatively small number of households grew coffee on a commercial basis (mostly in Patag, Sag-ang and Yubo where coffee accounted for 19%, 28% and 12% of net household income, respectively, for those households which sold it) while the majority of households maintained a low level of production primarily for their own use or for sale/exchange with neighbours.

In Patag, Sag-ang and Yubo, coffee growers were organized and were initiating strategies to improve bean quality and secure better market access. The strategies they developed, however, were very different. In Patag, coffee growers had organized themselves and thence petitioned the city government for assistance in accessing improved growing materials and arranging a supplier relationship with Nestlé (which processes instant coffee in Negros for the Philippine market). To date, they have had limited success with the establishment of improved coffee-trees and none in selling outside the low value local 'native coffee' market. In Sag-ang and Yubo, by contrast, coffee growers associations were established with the support of an NGO (the Negros Island Sustainable Agriculture and Rural Development Foundation, NISARD), which subsequently assisted them to improve bean quality through better management, harvesting and processing practices and to certify their beans as organic and fair trade. This, it was hoped, would open higher value export markets. Again, this has not yet eventuated. However, the improvement in quality, higher level of organization of growers, and collaboration with NGOs has enabled the growers to develop a premium local market for 'Negros Rainforest Coffee' that competes against the generally higher-status imported coffees. While more intensive management has increased the cost of production and basic processing (mostly due to increased labour) this has been offset by a doubling in the average price received. In turn, this has resulted in a similar net income per kilogram of coffee sold but higher returns overall due to increased productivity.

Increased income from the sale of coffee, or through the provision of labour to coffee growers, will have increased household capacity to purchase food. At the same time, households' ability to grow other cash and/or subsistence crops will not necessarily have been diminished (labour availability notwithstanding) due both to the growing characteristics of coffee-trees (either on land unsuitable for most other crops or on land suitable for intercropping) and to the use of improved management

Table 2. Contribution of major crops to household food supply and income.

	Rice	Maize	Fruit	Vegetables	Sugar-cane	Coffee
Number of producers	92	77	262	133	70	144
Mean percentage kept for self-consumption (%)	61	39	12	12	0	23
Costs as percentage of gross sales (%)*	61	43	12	22	52	9
Mean net income (PHP)	2,921	1,945	7,701	9,233	25 671	6,434
Mean contribution to net household income (%)	13	8	21	17	35	19

Note: * Excludes those producers who kept 100% for self-consumption.

practices as the basis for productivity improvements. The potential for cash and subsistence activities not only to coexist but to reinforce each other is also evident in the case of rice.

Table 3 shows correlations between the amount of rice (by weight) that those households growing it kept for their own consumption and a range of other household characteristics and production variables. These correlations are provided for the two barangays where rice cultivation was undertaken most intensely (Ilijan/Mailum and Colonia Divinia) in addition to all rice growing households surveyed, as the costs of growing rice for market varied considerably across the six barangays due to relative degrees of isolation and therefore costs of transport.

Table 3 suggests that the dominant livelihood strategies in which rice cultivation was embedded differed somewhat across the two main sites. However, it is important to start with what the two sites had in common; namely, very strong correlations between the amount of rice households kept for self-consumption, the total amount grown, and the investment they made in inputs and labour. At the same time, there were no significant correlations between the absolute amount of rice kept, by weight, and the relative amount of rice kept, by percentage of the harvested crop. Neither were there any significant correlations between the amount of rice households kept and either the number of people they needed to feed or their susceptibility to seasonal food insecurity. Even though many farmers regarded rice as so important to their food security that they were willing to grow it at a net financial loss (believing this to be cheaper than buying rice), it was actually the case that those households making most use of rice as a subsistence crop were not those disengaged from the commodity market but those that grew it most successfully. In other words, the more integrated households were in both up- and downstream commodity chains (that is, purchasing more inputs and selling more outputs), the more rice they grew and the greater their capacity to keep rice for their own use. Notably, the same trends were evident among maize-growing households.

In Colonia Divinia, households kept, on average, 87% of their rice harvest for self-consumption compared with only 55% in Ilijan/Mailum. Those Colonia Divin-

Table 3. Correlates of quantity of rice kept for household self-consumption (Pearson's r).

	Ilijan/Mailum n=35	Colonia Divinia n=32	Total Sample n=92
Number of resident household members	.051	.068	.112
Months experiencing food insecurity	–.003	–.101	–.110
Total household income	.200	**.713****	**.597****
Total non-agricultural income	.109	.316	**.209***
Total agricultural income	.160	**.709****	**.610****
Net rice income as a proportion of household income	.177	–.095	.093
Rice production land	.326	**.841****	**.719****
Total rice harvest	**.608****	**.917****	**.759****
Rice harvested per hectare	**.521****	.103	**.309****
Rice kept as percentage of crop	.177	.257	.188
Rice sold	**.444****	.280	**.385****
Rice production income	**.385***	**.405***	**.426****
Input expenses (including labour and transport)	**.439****	**.911****	**.808****

Notes: * $p < .05$; ** $p < .01$.

ia households that produced and kept a greater volume of rice tended to be those that devoted more land to its production but which also derived more income than their neighbours from other agricultural activities. By contrast, those Ilijan/Mailum households that produced and kept a greater volume of rice were those that were more productive – growing more rice per hectare rather than more hectares of rice – and which were subsequently also able to sell more rice in absolute terms, than their less productive neighbours. When the relative productivity per hectare among households is compared – either for individual barangays or for the six as a whole – a highly skewed distribution is evident. Fifteen households reported yields in excess of the provincial average of 3.9 tonnes per hectare (PPDO, 2004), but 57 reported yields lower than the survey mean of 2.6 tonnes per hectare and 17 reported yields lower than one tonne per hectare.

The major determinant of rice productivity appears to have been management skill rather than levels of input use. This is reflected in similar levels of productivity between organic and conventional rice-growers. As Table 4 shows, organic growers had very similar levels of productivity to conventional growers but substantially lower costs as synthetic inputs were substituted with management practices rather than with purchased biological inputs and/or labour. At a market price for unmilled palay (rice) of ten pesos per kilogram, organic growers, on average, achieved a net return approximately 30% higher than conventional growers. Allowing for a market premium of one peso per kilogram (offered to growers selling through various NGOs) this increased to over 50%.

The major rationale provided by farmers for organic production was cost reduction, followed by reduced exposure to agrichemicals and improved soil health. While access to higher value markets was not a particularly strong motivating factor, the incentive to sell generated by higher net returns was reflected in a propensity among organic growers to sell a greater proportion of their crop and for this subsequently to comprise a more substantial share of their household income. Households producing organic rice were thus less integrated in up-stream commodity chains (for fertilizers and other inputs) but more integrated in downstream commodity chains (for farm outputs).

Organic rice production was strongly associated with the availability of sustained technical and market assistance. Almost all the certified organic rice-growers involved in the study (23 certified out of 27 total organic rice producers) were situated

Table 4. Organic and conventional rice production and financial data.

	Organic (n=27)	Conventional (n=66)
Total rice harvest (tonnes)	1.6	1.6
Mean yield per hectare (tonnes)	2.5	2.6
Total income	8321	7130
Chemicals, fertilizers, seeds, etc.	641	2705
Labour	1715	1725
Milling, transport etc	652	1200
Total expenses	3103	5627
Costs as percentage of income (%)	37	79
Production cost per kg (Pesos)	2.0	3.8
Net income	5830	1674
Proportion net household income (%)	23	9
Percentage kept for self consumption (%)	47	66

in Ilijan/Mailum where they had been supported over a number of years by the NGO Broad Initiative for Negros Development (BIND) in varietal selection, organic production methods and marketing. Sixty percent of households in Ilijan/Mailum had participated in varietal selection training. They reported use of 19 distinct rice varieties in the year preceding interview, of which four were modern varieties bred by the International Rice Research Institite and similar institutions, three were traditional varieties (one Filipino and two Indian) and 12 were creolized farmer-bred varieties sourced and distributed by NGOs. The most popular variety across the entire survey area was a traditional Indian red rice, Badaji/Badahi. In light of the short cultivation history of the Negros uplands, the popularity of rice genetic material sourced from outside the study area may not seem surprising. However, it is worth noting that research conduced in areas with much longer cultivation histories has generated similar results. Carpenter's (2005, 2010) study on the Philippine island of Bohol, for example, found that farmers engaged in *in situ* conservation and breeding utilized 'fresh' genetic material whenever possible through exchange of traditional, modern and farmer-bred varieties. These farmers did not reject modern seed stock or breeding and conservation techniques but sought ongoing rights of access in order to maintain the spatial and temporal flows of genetic diversity and to recognize their own intellectual property (Zimmerer, 2003; Lockie and Carpenter, 2010).

In addition to organic production methods and the development of imported plant genetic resources, households were involved in several activities directly oriented to the use and conservation of biodiversity. The most widespread planned biodiversity management activities were those that focused on protection and rehabilitation of forested slopes, utilization of locally endemic plant varieties (mostly banana) and biosecurity. Approximately 49% of households were directly involved in the protection or restoration of natural ecosystems, with 36% receiving income for participation in tree planting and similar projects and 17% volunteering or working as forest guards; an activity that due to rugged topography, the presence of NPA and bandit groups within the mountains, and the potential for victimization by illegal loggers was generally considered to be important but dangerous.

A final survey result bears noting. Despite the variations described above in relation to agricultural productivity and associated livelihood and subsistence strategies, the strongest predictor of household income was the education level of the survey respondent. Households nominating a college graduate to participate in the interview averaged roughly double the total household income of households nominating a high school or elementary school graduate, and four times the income of households nominating someone with no formal education. This pattern was repeated for both agricultural and non-agricultural income. Barangay leaders and farmers interviewed following the survey generally believed that education was likely to improve farmers' ability to read the market and to deal with 'middlemen' while doubting that it made farms more productive by an order of magnitude. This interpretation is supported by evidence in the data that respondents with higher levels of education utilized inputs more efficiently and achieved higher returns on commodities sold despite what appear to be similar levels of productivity.

Discussion

Households in the uplands of Negros Occidental faced significant pressures to deagrarianize their livelihoods. Almost all of those surveyed reported seasonal food

insecurity and incomes at or below the level needed to meet basic needs. Despite relatively recent allocation of formal land titles, farm sizes were small and limited opportunities were available for agricultural labouring work in the wet season. Increasing agricultural productivity or pursuing higher value markets for organic produce are unlikely, by themselves, to resolve these issues. As one NGO representative working on organic agriculture and other livelihood projects in the study area argued in relation to organic rice production:

> 'The return on investment is higher than conventional. So if you are going to translate this, how are farmers able to spend their income? Is their income enough to feed their family? Let's say the average household is six persons, planting rice is not enough to feed the family… it cannot provide clothing… Diversification is the only answer to meet the basic needs of the family… So if your yield production increases that is good, but if it is only rice, I would object to the idea that it is enough to meet the needs of the family, because farm size doesn't increase. It decreases. The solution to the problem of perennial poverty is not organic agriculture.'

Nevertheless, considerable evidence was generated that reconfiguration of the agro-ecological, exchange and social relations of small-holder production can provide for demonstrable improvements in household livelihoods. Certification to organic standards was accompanied by improved product quality and crop profitability. A small number of organic farmers each bred, maintained and evaluated 10 or more distinct rice varieties that were disseminated among their peers and supported local agro-biodiversity. In doing so, these farmers entered and extended non-commoditized international networks dedicated to facilitating the preservation, evolution and flow of plant genetic material, plant breeding and production knowledge, and the development of organic and fair trade production standards.

With the exception of imports into the study area of farm inputs and the export of small volumes of fairly traded bananas and organic rice there was no engagement among upland farmers in global commodity chains. In the case of coffee, farmers had not chosen to distance themselves from an exploitative international market. They were excluded, rather, when buyers simply withdrew and the majority of coffee plantings were abandoned. By contrast, rice and maize producers integrated into local and regional markets tended to be more productive and to have more food for self-consumption than their peers who did not sell into these markets. Further, those rice and maize producers who replaced synthetic inputs with more management and labour intensive organic techniques reduced costs and associated risks while engaging more in downstream produce markets. An important feature of these markets was their institutionalization and regulation through NGOs that variously acted as market intermediaries buying and selling small-holder produce, organized opportunities for small-holders and others to trade, and developed and/or monitored compliance with organic and fair trade production standards. Each of these activities were aimed at embedding conventions for market exchange that were more beneficial to small farmers. What may have appeared to be relatively small financial incentives for farm households to participate in these particular markets made comparatively substantial differences to net crop returns.

Not every attempt to embed new conventions for the formal and informal governance of supply chains was immediately successful. Negros Rainforest Coffee producers, for example, did not achieve international supply chain access despite their

efforts, with assistance, to meet organic production and quality criteria. Nevertheless, techniques and conventions for the governance of supply chains developed at the international level were used effectively in this case to reconfigure and to establish new local value networks. The establishment of a new consumer market for local produce helped to create esteem within the local coffee industry and provided a basis on which to compete with imported coffee.

The 'markets for the poor' (M4P) project drawn from New Institutional Economics is open to criticism for largely ignoring the need for market and other reforms suggested both by these experiences and by local and global processes of dispossession. Working on the poor, or on local institutions, to develop their entrepreneurial capacities may fail to address more fundamental sources of poverty and inequality. Nevertheless, this case does suggest that capacity building, equally, should not be ignored. As noted above, households headed by college graduates generated incomes that were orders of magnitude greater than the incomes of households headed by those with no formal education. Further, productivity levels across farms were highly skewed despite remarkably uniform natural resource endowments between farms. Recognizing this variance in education and skills, both of the NGOs discussed above, NISARD and BIND, worked on household capacity building as a key plank of their projects to institutionalize alternative market conventions. Based on evidence of profitability and productivity gains arising from improved management skills, this market development and capacity building appears to have benefited producers. Additionally, this experience suggests that debates about the relative merits of supporting institutional and capacity development for either cash or subsistence crops potentially fail to recognize the close and at times positive relationships between cash and subsistence production within household livelihood strategies.

Conclusion

The trajectories of rural change identified by the re-peasantization and de-agrarianization literatures ought not to be seen as binary oppositions. Demographic pressure, finite land resources, competition for those resources from urban elites, and endemic poverty in the uplands of Negros Occidental certainly create a compelling case for the diversification of rural livelihoods. Such pressures have led some to conclude that small-holder agriculture across South-east Asia will eventually become a residual category of part-time farmers and neo-peasants within mixed landscapes dominated by agrarian entrepreneurs and non-agricultural businesses (Rigg, 2005). This begs a number of questions. Must diversification necessarily lead to the marginalization and/or continued impoverishment of small-holders? Is diversification the only solution to the problem of endemic rural poverty? Is entrepreneurialism incompatible with peasant-like modes of agriculture? We would suggest that the answer to all these questions is 'no'.

Other analysts have drawn attention to the struggles of new global peasant movements to contest their dispossession (McMichael, 2006) and to the reconfiguration of the agro-ecological, exchange and social relations through which alternatives to dispossession are operationalized (Van der Ploeg, 2010). Data reported here from the uplands of Negros Occidental show that agro-ecological production methods and alternative market conventions certainly can make a substantial difference to household livelihoods and to thus help break the cycle of low productivity and food

insecurity in which many small-holders find themselves; reducing, in the process, households' risk of indebtedness and forced landlessness.

At the same time, data reported here demonstrate that participation in formal education can greatly increase small-holders' ability to read markets, avoid exploitation in their dealings with others and, ultimately, generate income from their livelihood activities. While education is usually seen as a driver of labour mobility and rising life-style aspirations (Rigg, 2006), seasonal and permanent outmigration in search of work was the norm among upland households regardless of their participation in formal education. For the vast majority, labour migration helped to reproduce the household via remittances but did little to lift either resident or non-resident household members from poverty. Formal education provided opportunities for a small number of out-migrants to work in secure professional occupations. However, formal education also provided opportunities for a small number of residents to pursue small-holder farming as a chosen and comparatively profitable vocation.

Among upland farm households surveyed for this research, those households that most actively pursued income generation through participation in downstream markets (that is, those households with the most entrepreneurial orientations to their growth of staple crops) were also those who kept, by volume, the greatest quantity of food for self-consumption. Whether through increased dedication of available land to crops, increased investment in inputs (including self-provisioned biological inputs such as composts) or simply better management, these farmers were able to grow more food in total and to rely less on income from off-farm work while still providing for a greater share of their own household requirements. This was despite almost all households having access, as agrarian reform beneficiaries, to similar total landholdings. The interplay of subsistence and market production for small farmers was not a zero-sum game (see Isakson, 2009). However, all markets are not the same and the availability of markets organized according to alternative conventions such as organic certification was a strong incentive for many relatively more entrepreneurial households.

Notes

1. Drawing on Van der Ploeg's (2010) contention that the peasantry and peasant modes of agriculture should be seen as historically and spatially dynamic, the term peasant is used in this article to refer to farmers and farming operations that are relatively small in scale and that rely for their reproduction on a significant involvement in non-commoditized relations of production. The boundary, if there is one, between peasant and family farming is not debated or defined. While research in peasant studies is clearly relevant to Philippine small-holder farmers – and despite the presence in the Philippines of several NGOs and people's organizations that characterize themselves as representatives of the peasantry – small-holders rarely refer to themselves in these terms.
2. Conventions theory suggests that negotiations around particular notions of quality are central to the co-ordination of production–consumption networks or chains (Murdoch et al., 2000). The term 'convention' is used to encapsulate the formal and informal rules, norms, expectations, routines, etc. that make interaction within such networks comprehensible and predictable (Ponte and Gibbon, 2005). While agri-food scholars drawing on conventions theory often do so through application of a series of ideal types ('worlds of production') developed by conventions theorists, we are not concerned with doing so here and use the term in reference to values and principles used informally and formally (e.g. through standards and certification) to regulate and order commodity exchange.

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Seed Diversity, Farmers' Rights, and the Politics of Re-peasantization

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Abstract. Over the last decade, the practice of using and exchanging locally adapted seeds has become a focal site of grass-roots organizing in the rural areas of Europe, spear-headed by the mobilization of seed networks in different countries and regions. Countering the restrictive scope of existing seed regulations, these networks are composed of family farmers, collectives, farmers movements, researchers, agronomists, and non-governmental organizations that are actively engaged in the development of farmer-based seed systems as a source of both peasant autonomy and environmental sustainability. Within the context of a broader struggle to overcome the multiple crises of the agro-industrial model, the reproduction of farm-saved seeds is closely associated with the promotion of agro-ecological alternatives that enhance integration, resilience, and livelihood security. Correspondingly, the goal to diversify food and seed systems puts renewed emphasis on the role of peasant innovation and localized consumption in processes of agrarian transformation. Combining sustainable farming methods, participatory forms of knowledge and de-commodified circuits of exchange, these initiatives reassert the centrality of the social and ecological role of agriculture in Europe beyond the reductionism of market-based approaches to rural change.

Introduction

Over the last decade, the practice of using and exchanging locally adapted seeds has become a focal site of grass-roots organizing in the rural areas of Europe, spear-headed by the mobilization of seed networks in different countries and regions. The first network, Red de Semillas, was established in Spain in 1999, followed shortly thereafter by the creation of Rete Semi Rurali in Italy in 2001, and Réseau Semences Paysannes in France in 2003. Similar initiatives have also emerged in Austria (Arche Noah), Portugal (Colher Para Semear), Switzerland (Pro Specie Rara), Hungary (Védegylet/Protect the Future), Germany (IG Saatgut), Bulgaria (Agrolink), Romania (EcoRuralis) and Scotland (Scottish Crofting Federation) among others. Bringing together family farmers, collectives, farmers movements, researchers, agronomists, and non-governmental organizations, these networks are actively engaged in the development of on-farm seed management systems that allow producers to diver-

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sify their farming practices, reduce costs, and strengthen control over their resource base.

As an alternative to the multiple crises of the agro-industrial model, the reproduction of farm-saved seeds is closely associated with the promotion of agro-ecological practices aimed at recycling nutrients and energy on-farm, enhancing soil organic matter and biological activity, and optimizing interactions, integration and stability (Gliessman, 1998; Altieri and Toledo, 2011). Under highly variable climatic and market conditions, the use of different crops on the same farm, different cultivars of the same crop, and heterogeneous cultivars, reduces the risk of crop failure, generates sustained yields with lower costs and intake requirements, while also providing for more varied dietary and livelihood opportunities (Ceccarelli, 2009; Lockie and Carpenter, 2010; Altieri and Toledo, 2011). Correspondingly, the genetic heterogeneity of local landraces allows farmers to cope with fluctuating pest and disease pressures, and work in complex agro-ecosystems characterized by variation in soil qualities, topography, and water availability. As the product of diverse breeds produced and maintained by farmers over several cultivation cycles, local seeds are the vehicle of recombined genotypes and newly formed diversity that co-evolve with changing socio-cultural practices and needs (Visser, 2002; Chable et al., 2009).

Under the same rationale, the transition to agro-ecology puts renewed emphasis on the role of peasant innovation in processes of agrarian change (Altieri, 1995). More specifically, as a counterpoint to the privatization and specialization of agricultural research, the mobilization of seed networks provides an arena for farmers to work collectively at the dynamic management of agricultural biodiversity by means of shared experiences of participatory plant breeding, collaborative research, and farmer-to-farmer exchange. Reflecting the attempt to overcome the 'epistemic rift' (Schneider and McMichael, 2011) brought about by the commodification of agricultural nature and the displacement of food and seed production off-farm (Kloppenburg, 1988), these initiatives foster the development of a decentralized and participatory model of agricultural innovation based on a plurality of forms of knowledge that can be reciprocally accessed, exchanged and reproduced.

In a parallel development, the reproduction of locally adapted seeds and crop varieties enhances the ability of producers to access diversified circuits of distribution and consumption embedded in specific social, cultural and territorial contexts. Ranging from solidarity purchasing groups, community-supported agricultures and box schemes, to systems of direct sale and local market-places, these mechanisms of exchange 'unveil rather than obscure the economic, social, and environmental conditions of production' (Fonte, 2010, p. 9) by promoting shared values, direct social contacts, and short links and distances between producers and consumers. Premised on the articulation of shared notions of just price, quality, and trust that replace the need for external certification, the 'value' of local varieties becomes part of a political project centred on the socio-ecological reproduction of local economies and environments beyond the reductionism of market-based approaches to rural development.

Within the context of newly emerging grass-roots initiatives that seek to re-localize control over the organization of food production, distribution, and consumption, the mobilization of seed networks can be characterized as a concrete expression of the *practice* and *politics* of re-peasantization in the rural areas of Europe. On the one hand, the use of locally adapted seeds allows producers to sustain autonomously their resource base and engage in a mode of farming that is 'distinctively different' from entrepreneurial and capitalist agriculture (Van der Ploeg, 2010, p. 22). On

the other hand, by providing farmers with de-commodified forms of access to their means of reproduction, the mobilization of networks of seed and knowledge exchange promotes the active reconstitution of the 'peasant condition' (Van der Ploeg, 2008) as a collective political effort sustained by relations of reciprocity and co-operation. In this respect, the emergence of seed networks politicizes the relationship between peasant autonomy and agro-ecology beyond the level of the individual farm unit, thus redefining the social, cultural and ecological roles of farming and farmers' rights as a source of both food sovereignty and environmental sustainability.

The Politics of Re-peasantization

According to Jan Douwe van der Ploeg (2008, p. 155), the emergence of processes of re-peasantization constitutes a 'far reaching shift' that is currently reshaping the European countryside. As an alternative to the concentration of corporate power in the food system, and the consequent asphyxiating effects of direct dependency on industrial and financial capital, the reconstitution of the peasantry reflects a widespread struggle for autonomy and survival in a context of increasing rural marginalization and generalized economic depression. Specifically, Van der Ploeg defines the 'peasant condition', or 'principle', as the product of a set of strategies aimed at distantiating the unit of production from up-stream markets while linking it to diverse circuits of exchange and output markets.[1] These include the creation and development of a 'self-controlled resource base,' the 're-grounding' of farming in nature, and the promotion of labour intensification, craftsmanship, and multifunctionality.

The current transition to peasant-like ways of farming is thus closely associated with the mobilization of new forms of self-provisioning, knowledge, and labour that allow for increased self-organization and control over the production process. Within this framework, and in stark contrast with the dominant model of agro-industrialization, peasant farming is understood and practiced as a form of 'co-production' – premised upon 'the interaction, and mutual transformation of social and material resources which constantly differentiates and transforms agriculture' (Van der Ploeg, 2010, p. 13). Correspondingly, the promotion of 'self-provisioning' and lower-input techniques reasserts the centrality of local cultural repertoires, craftsmanship, and skill-oriented technologies in peasant-led patterns of innovation. Reconstituting the 'organic unity of mental and manual labor' in the process of production (Van der Ploeg, 2008, p. 154), this reskilling of farming practices is aimed at enhancing the 'reproductive value' of agriculture's resource base (McMichael, 2012, p. 115) such that autonomy is further enlarged.

To a large extent, the development of peasant alternatives is made possible by the mobilization of networks involved in the reproduction and distribution of locally adapted, farm-saved seeds. To be sure, the use of local varieties underpins the viability of peasant agriculture in so far as it allows producers to cut costs, diversify their farming practices, reduce dependency on agro-industries, and engage with the specificity of local ecosystems as the product of distinct, culturally mediated processes of socio-natural change (Swyngedouw, 2000; Castree, 2001). As both product and means of (re)production, local seeds embody a dual character that links both ends of the farming process (Kloppenburg, 1988, p. 10), and constitutes a fundamental component of peasant autonomy. By the same token, the ability of individual producers to access and sustain seed and genetic diversity on-farm is contingent

upon their participation in co-ordinated initiatives of farmer-to-farmer exchange and agro-ecological innovation. The development of self-managed seed systems is, in other words, mediated by the rise of interlinked networks that ensure the availability of dynamic flows of genetic material, knowledge, and resources through relations of reciprocity and de-commodified exchange.

The Spanish seed network, for example, is composed of 17 different regional subgroups that bring together small-holders, farmers organizations, technicians, consumers and researchers committed to the recovery, use and exchange of locally adapted seeds. The network is primarily involved in the co-ordination of local and regional seed fairs, training workshops, participatory plant-breeding events, and initiatives that facilitate the reproduction of farmer's knowledge associated with the selection and conservation of local varieties (Red de Semillas, 2008). Over the last nine years, Red de Semillas has held an annual meeting, the 'Fair of Cultivated Biodiversity,' in order to create a 'political space' for the shared use of agro-ecological knowledge and techniques developed by farmers, researchers, and seed curators within different regions and communities of Spain. Correspondingly, the network has participated actively in the development of databases, publications, farmer-based seed banks, and advocacy projects aimed at enhancing farmers' abilities to access, use and distribute local seeds.

Similarly, the French network consists of over 50 farmer and national organic agriculture organizations, as well as artisans, small-holders, seed producers, and farm-seed cleaners involved in the selection, breeding and multiplication of peasant varieties. In particular, the network offers a space for farmers to work collectively on the immediate *in situ* dynamic management of agricultural biodiversity, by co-ordinating initiatives of participatory plant breeding structured in different working groups per species (wheat, corn, vegetable, fruit and fodder) (Chable and Berthellot, 2006). Premised on the combination of experiential knowledge and new scientific approaches, these experiences of 'cognitive praxis' (Tovey, 2002, p. 5) foster the development of on-farm processes of selection and adaptation that allow producers to work independently from agro-industries and the expert systems (Corrado, 2008; Borras, 2009), while countering the subordination of breeding activities to corporate objectives.[2]

Parallel to the technical/political work undertaken in the fields, these networks have been at the forefront of regional, national and international campaigns aimed at legalizing the use and exchange of farmers' seeds beyond the restrictive scope of EU regulations. In this respect, the mobilization of everyday practices of re-peasantization is complemented by overt forms of political organizing, with small producers across Europe seeking formal recognition of their right to manage and reproduce biodiversity on farm.

Seed Regulations and Farmers' Rights

The production and marketing of seeds are strictly regulated in Europe by specific seed trade and variety protection laws. Each member state of the European Union is required to maintain a national catalogue of officially recognized varieties as a mandatory precondition for variety release and commercialization. In order to be legally registered nationally and in the EU Common Catalogue, varieties have to meet standards of distinctiveness, uniformity and stability (DUS) and undergo testing to prove their value for cultivation and use (VCU) over a minimum two-year period.[3]

These procedures interlock with the system of intellectual property rights protection as set up by the UPOV (International Union for the Protection of New Varieties of Plants) Act of 1991, and are often handled by the same government agencies and integrated into the same national legislation.[4]

The adoption of standard rules for seed testing and registration has become a constraint to the conservation and development of varieties appropriate for small-holder farming in ecologically diverse conditions (Vellvé, 1992; FAO, 2004). Indeed, the high levels of genetic homogeneity and stability required for registration are closely associated with the standardization of breeding techniques that are perfected in laboratories and at research stations under 'optimal' high-input conditions outside of farmers' control. The management of variety testing is often based on the extensive application of artificial fertilizer and pesticide inputs that conceal environmental variations in the trial and favour varieties with broad adaptability and yield stability even where this has no agronomic advantage (Louwaars, 2005, p. 5; Ceccarelli, 2009). The costs involved in the registration and certification process constitute a further vehicle of diversity loss in so far as both public and private breeders tend to submit for official release only those varieties that are likely to perform well in all test locations (Louwaars, 2007, p. 58). As a whole, the regulatory framework established in the EU has led to the development of a formal seed system dominated by genetically uniform varieties that are bred to maximize yields in homogenous landscapes (through the use of pesticides, fertilizers and irrigation), as well as to meet the increasing demands of industrialized harvesting, processing, and retailing operations (Veteläinen et al., 2009).

Significantly, the criteria that regulate the management and distribution of commercial seeds are also structuring the recently created market for organic seeds. The requirement to use organic seeds in organic production was first introduced by a European Council regulation (2092/91, *OJ*, L 198, 22 July, 1991, pp. 1–15) in 1991 and went into effect in January 2004, following the mandatory establishment of computerized databases for the registration of commercially available varieties in different countries (EC 1452/2003, *OJ*, L 206, 15 Aug. 2003, pp. 17–21). In practice, these regulations make it compulsory for organic farmers to use seeds from registered varieties that were reproduced for at least one generation under organic conditions. Paradoxically, the same rules prevent organic farmers from using locally adapted seeds that cannot be included in the national databases because they do not fit conventional standards of certification (IFOAM, 2011). Combined with the institution of plant variety protection regimes that severely restrict practices of on-farm seed saving, such provisions hamper the sustainable management of crop genetic resources rather than enhancing it. Indeed, by limiting the supply of organic seeds to the short-term propagation of commercially bred varieties under conditions of 'input substitution' (Rosset and Altieri, 1997), the implementation of mandatory standards curtails the range of genetic diversity available to farmers, while deepening the separation of farming and breeding activities. Within this context, the production and distribution of organic seeds is turned into a new 'high-value' market concentrated in the hands of few corporations, further eroding the ability of small-holders to autonomously reproduce their resource base.[5]

In reaction to these challenges, the institution of seed networks has become a means through which practices that are considered central to the promotion of ecologically embedded food systems as well as farmers' autonomy can gain political visibility and legal recognition. In this respect, the Italian network Rete Semi Rurali

has been actively involved in the formulation of legislative and ministerial proposals on the exchange of seeds and the recognition of collective rights on genetic resources, both at the regional and national level. Significantly, between 2001 and 2005 eight out of 18 regional administrations have adopted laws that protect local farmers' seeds and animal breeds as heritage of the region, allowing for the creation of separate catalogues for varieties at risk from genetic erosion. Following this trend, the network has further mobilized to call for the implementation of a Ministerial Decree that would move beyond the restrictive scope of current legislation on 'conservation varieties' in order to authorize the reproduction and commercialization of farmers' seeds (Bocci and Chable, 2009).[6] Correspondingly, the French network Réseau Semences Paysannes has mobilized against the implementation of the so-called 'Mandatory and Voluntary Contribution Scheme' in France, which entails the collection of royalties on seeds derived from certified ones. Since the adoption of UPOV 1991, the enforcement of plant breeder rights on farm-saved seeds has engendered staunch opposition in France, in so far as the practice of replanting and selecting varieties originally obtained from the market is still widespread among small farmers, accounting for 50% of self-pollinating crops (Kästler, 2005).

Over the last seven years, the transnational mobilization of seed networks has led to the creation of the 'European Coordination on Farmers' Seeds' aimed at developing common positions for the implementation of farmers' rights to save, use, exchange and sell farm-saved seeds in accordance with Articles 5, 6 and 9 of the International Treaty on Plant Genetic Resources for Food and Agriculture.[7] In this respect, the Coordination has been actively involved in the development of shared recommendations for the review of EU legislation on the marketing of seeds and plant propagating material, focusing on the revision of DUS criteria, as well as the protection of farmers' seeds from appropriation and genetic contamination. Correspondingly, as most of its members are affiliated with the transnational peasant movement La Via Campesina, the European Coordination has adopted the notion of 'food sovereignty' to frame its political actions and goals. Deployed to signify 'the right of people to continue being agriculturalists' and produce food that is appropriate to their unique cultural, social and ecological contexts, the concept of food sovereignty embodies a shared set of values sustained by moral economic conceptions of reciprocity, social justice, and collective rights (McMichael, 2008). This form of politics originates in the fields, and is exemplified by the multiple ways in which small-holders manage and reproduce agro-biodiversity as a fundamental component of their *peasant* way of farming.

La Verde, Spain

The goal to reproduce locally adapted seeds has characterized the work of the co-operative La Verde in Villamartín, Spain, for the last 24 years. La Verde was founded in 1987 when a group of day labourers – members of the SOC union – obtained three hectares of public land to grow food for self-sufficiency. Today, the co-operative brings together six families working on 14 hectares of land and sells the majority of its products directly through local markets and consumer associations. From the outset, La Verde adopted an agro-ecological mode of production as a way to secure a year round supply of fruit and vegetables, reduce costs, work independently from conventional markets, and counter the negative socio-environmental impacts of industrial farming (E. Perez, personal interview, Villamartín, 11 May 2011). For

the same reasons, and due to the lack of commercial varieties suited to organic agriculture, the use of local seeds for horticultural crops has become a core component of La Verde's farming practices. Over the years, the co-operative has developed the largest bank of farm-saved seeds in Spain, which currently supplies most organic small-holders in the region.

As pioneers of organic agriculture in Southern Andalucía, producers at La Verde maintain a 'holistic' approach that aims to distinguish itself from mainstream organics (cf. Guthman, 2004; Lockie et al., 2006; Luetchford and Pratt, 2011). Accordingly, to reduce dependence from all off-farm inputs – biological and synthetic – they enhance soil fertility through ecological processes of nutrient and energy recycling based on crop rotations, intercropping, fallowing, and the use of manure. Within this context, while distinct varieties from the same population are sowed at different times to disperse the risk of crop failure and extend the harvesting season, the diversification of land use through intercropping, flowering plants, and agroforestry is meant to encourage natural enemies of pests and reduce the incidence of weeds. In a similar vein, wild plants from the area are used as forage and green manures, losses are tolerated, and insect habitats are allowed to thrive as part of the farm's 'ecological infrastructure' (Scialabba et al., 2002; Luetchford and Pratt, 2011, p. 91).

In order to autonomously sustain the functional diversity of local resources, La Verde has developed an integrated system of on-farm selection, storage and multiplication of seeds. Building upon a range of cultivars collected from local smallholders and public seed banks, this system has evolved through different forms of farmer-to-farmer exchange, participatory breeding, and experimentation. Since the foundation of the co-operative, its producers have been actively involved in local and regional initiatives of seed exchange to ensure the free flow of genetic materials underlying the development of heterogeneous crops and locally appropriate varieties (see De Schutter, 2009). As new varieties are introduced in La Verde's seed bank, they undergo an initial phase of characterization and evaluation that precedes the reproduction of seeds in larger fields. In order to maintain specific traits of cross-pollinating varieties, they are planted in distant rows or partially covered at the time of flowering. Correspondingly, seeds are extracted at the end of the growing season from select fruits displaying desired characteristics in terms of size, shape, colour, plant vigor, and taste. This dynamic management of biodiversity is complemented by different methods of plant breeding and seed conservation that have allowed La Verde's producers to create, preserve and renew hundreds of varieties of horticultural crops.

Through these activities and its active participation in the Spanish seed network, La Verde has become an important hub of knowledge exchange and peasant innovation. Over the years, its members have turned it into a vibrant centre of agro-ecological training for young researchers and producers, hosting hundreds of visitors who join them to study and work, in addition to organizing workshops, talks, on-site visits, and participatory trials on the selection and management of farmers' seeds (Soriano et al., 1996). Working in collaboration with Red de Semillas and different research centres, the co-operative has also played a key role in the implementation of several experimental projects aimed at reintroducing traditional landraces in the fields and evaluate their potential for cultivation and exchange. This work has led to the production of new inventories that characterize each variety on the basis of morphological and agronomic descriptors and allow for the reproduction of knowledge associated with their use (Soriano et al., 1998).

Parallel to the development of an autonomous source of locally adapted seeds, La Verde has mobilized to sell its products through a diverse network of localized markets and consumer groups. Seeking to secure access to a system of distribution that circumvents corporate middlemen, the co-operative's members have built upon direct contacts with neighbours and local consumers, held meetings, sold produce at market stalls or through local shops, and linked up with other organic producers to create a marketing co-operative. At present, they supply several organic shops and purchasing groups on a weekly basis, in addition to distributing their seeds to small-holders and farmers groups all across Spain. In this way, La Verde is engaging in everyday practices of resistance that build upon seed autonomy and pave the way for alternative forms of production and consumption as *de facto* expressions of food sovereignty rights (Andersen and Winge, 2008).

Consorzio della Quarantina, Italy

The role played by crop genetic diversity in the development of sustainable farming methods is also exemplified by the experience of the Quarantina Consortium in the mountainous *hinterland* of the Genoa province. The Consortium was first established in 2000 by 20 Ligurian farmers committed to the preservation and reproduction of the Quarantina potato and other local varieties that were cultivated traditionally in the region. It has now grown to 480 members, including 60 producers, 60 shops and restaurants, and other affiliates such as consumer and solidarity-based purchasing groups. As a precondition for membership, all producers in the Consortium practice peasant agriculture, working on family-run farms for self-consumption or direct sale. Their produce is sold exclusively on-farm or to other members (shops and restaurants) following shared rules that allow for the development of an alternative market separate from conventional channels. Within this context, producers are guaranteed a fair price and a secure source of income, while distributors on the other end of the spectrum gain in visibility and reputation, in addition to a guaranteed supply of high-quality produce.

The evolution of this innovative system is rooted in a process of 'economic recovery' of old potato varieties that used to be widespread in the Ligurian Apennines up to the early 1960s. In order to recuperate their productivity, the rural historian and founder of the Consortium, Massimo Angelini, began by reconstructing the chain of production of seed potatoes, collecting local knowledge on where and how to plant them, as well as involving producers in the development of on-farm methods of seed selection and conservation. Through rigorous observation, experiential breeding practices, and the adoption of specific precautions against the spread of viruses or diseases, the Consortium was able to raise average yields from 1:2 to 1:10 over the course of few years, reaching an average per hectare production of 100–150 quintals. Perhaps more importantly, the adoption of techniques that are 'in the very hands of producers' (Massimo Angelini, personal interview, Genova, 15 June 2011) has allowed for increased self-organization and control over the production process, actively separating it from dependence on external expert and input markets.

With the aim to autonomously reproduce their resource base and market access, producers organize their work according to shared rules. These require that seed potatoes be grown at an altitude of at least 800–1,000 meters above sea level, where they are less vulnerable to diseases, and sold to other Consortium members in pre-established quantities and at given dates. Correspondingly, producers of 'consump-

tion' potatoes are required to give notification of their planting, growing and harvesting methods, to use common marketing strategies (i.e. the same label and bags), as well as to assess their potential yields and expected demand. All potatoes are sold at a pre-established price of €2 per kilo, which reflects a collective calculation of average annual costs, yields, and hours of farm work. By so doing, producers are able to closely monitor the quality of their seeds and final produce, as well as to operate in an alternative market premised on relations of transparency and a fair price.

The decision to sell at a guaranteed price is closely associated with the development of direct ties and participatory alliances between producers, distributors and consumers. In this respect, the Consortium has devised specific communication and marketing strategies that focus on direct sales and on-farm visits as an opportunity for local distributors and consumers to actively engage with local producers and their work. At the same time, the distribution of all produce at the local level has promoted the involvement of many small shops and restaurants as key players in the revitalization of rural areas. Seeking to develop an alternative market *vis-à-vis* the spread of big retailers, these strategies had a significant impact in a context where, as Massimo Angelini (personal interview, Genova, 15 June 2011) puts it, the 'presence or absence of small shops many times determines the viability of small towns'.

The Consortium's distinctive approach to the socio-ecological reproduction of local economies is also epitomized by the decision to work independently from external support and certification schemes. To be sure, rather than requesting that its members adhere to official forms of certification that would validate their products from the outside, the Consortium has opted for a system of auto-certification instead. Accordingly, producers are free to farm as they like as long as they are transparent about the methods they use. These usually consist of the use of manure, manual labour, crop rotation, and pieces of farm machinery on small plots of land. Hence, the Quarantina potato is but one among many local products grown and processed by the Consortium's members – other products include different varieties of garden vegetables, wheat, corn, rose syrup, and cheese. From the production of inputs to the organization of direct sales, producers are thus able to reduce costs without relying on a system of standards that 'mortifies the diversity of good farming practices' (Angelini, 2008) while empowering external players at the expense of local users.

A crucial component of this struggle for autonomy is the reproduction and exchange of locally adapted, farm-saved, seeds. To that end, the Consortium organizes a meeting once a year called 'Mandillo dei Semi', where producers from all over Italy can bring their seeds, plant cuttings, and home-made yeasts to share. Regularly attended by hundreds of participants, the event provides producers with an opportunity to not only swap their seeds, but also exchange the knowledge and experience associated with their work. Similarly, as an active member of the Italian seed network, the Consortium is committed to the promotion of different initiatives of peasant-led innovation, encouraging its members to attend meetings of farmer-to-farmer exchange and actively engage in the selection, description, and on-farm management of other varieties that were grown in their region before the introduction of commercial seeds.

Conclusion

The first *International Assessment of Agricultural Knowledge, Science, and Technology for Development* (IAASTD), published in 2008, concluded that hunger, social divisions,

and environmental destruction will increase in the near future unless there are fundamental changes in the ways agriculture is practiced (McIntyre et al., 2008). After three years of research sponsored by representatives of 60 governments, the World Bank, most UN agencies, and more than 50 non-governmental organizations, the report determined that biologically diverse 'agro-ecological' farming and grazing methods, especially those that are practiced by small-scale food producers, make agriculture more 'multifunctional' and capable of improving rural livelihoods. Accordingly, the IAASTD noted that, in order to sustain the ecological and cultural diversity of agriculture and food systems, farmers' roles in the selection and conservation of seeds and genetic resources should be enhanced. Issued in the midst of the global food, energy, climate and economic crises of the past several years, the report is part of a mounting body of evidence that increasing food security into the future requires investing in smallholder agriculture that reproduces the resource base on which it depends rather than relying on large-scale, energy-intensive, specialized monocultures (Perfecto and Vandermeer (2010); FAO, 2011; IFPRI, 2011).

The development of an alternative food system is predicated in no small part on the diversification of access to, and management of locally adapted seeds. Indeed, as a source of autonomy, genetic diversity, and technology transfer, seeds sit 'at a critical nexus where contemporary battles over the social, technical, and environmental conditions of production and consumption converge and are made manifest' (Kloppenburg, 2010, p. 368). The use of local seeds disrupts the dominant model of standardization and corporate control by allowing for increased access to a diversity of products and methods of production and innovation, as well as to a diversity of purposes and venues of exchange that underpin the articulated autonomy of local communities. As such, by enhancing the right of producers and consumers to participate in decisions concerning the organization of their own agricultural and food system, 'seeds and seed saving are the foundation of food sovereignty' (McMichael, 2010, p. 178).

The mobilization of seed networks in Europe underscores the growing involvement of local producers in the formulation of agro-ecological alternatives that enhance both food sovereignty and environmental sustainability. By engaging in initiatives of seed saving and exchange as an expression of farmers' rights, these networks politicize the 'technical-ecological content of agro-ecology' (Rosset et al., 2011) beyond the implementation of alternative farming practices. Within this framework, the goal is to reassert the centrality of farming as a source of social, cultural and ecological reproduction that can meet local needs in a sustainable and participatory way.

Notes

1. In particular, following Friedmann (1978, 1980), Van der Ploeg argues that what distinguishes peasant farming from entrepreneurial and capitalist farming is 'the partial integration into markets' (2010, p. 12), or 'the capacity to operate on the boundary that separates commodity from non-commodity circuits' (2008, p. 270). In other words, whereas agrarian entrepreneurs primarily develop their farming activities by engaging in market dependency and extended commodity flows (2010, p. 5), peasant farming is built upon resources that enter the process of production as use values, and are reproduced autonomously through agro-ecological practices, expanded knowledge and fine tuning of labour, and relations of reciprocity. In this respect, by focusing on the process of re-peasantization as an expression of 'rebellion' and 'multi-level resistance' (2010, p. 7) Van der Ploeg moves beyond capital-centric theorizations of the 'persistence of the peasantry' that frame the meaning of social reproduction within the terms of reference of the wage relation (McMichael 2008, p. 216; see also Amin and Vergopoulos,

1974; Lewontin, 1982). Within this framework, peasants are understood as 'disguised wage labour', indelibly tied to capitalist relations of production (Banaji, 1977; de Janvri and Garramon, 1977), or as 'wage labour equivalents', whose exploitation (by means of rent, debt, taxation, etc.) and reproduction (mediated by forms of household labour) perpetuate capital accumulation (Bernstein, 1994; Goodman and Redclift, 1982). Conversely, rather than focusing on the peasant condition as a symptom of failed modernization, or a problem for capital to resolve, Van der Ploeg conceptualizes the active reconstitution of peasant-like ways of farming as a widespread, articulated response to the crisis of social reproduction brought about by capitalist processes of agrarian restructuring.

2. Qualitative data on European seed networks were collected over the course of 2010–2011 through participant observation at public meetings, seed fairs, training workshops, participatory plant breeding and farmer-to-farmer exchange initiatives, as well as in-depth interviews with producers, researchers, consumers, and representatives from farmers' movements, NGOs, seed industries, and EU institutions.
3. As stated by Council Regulation No. 2100/94 (*OJ*, L227, 1 Sept. 1994, pp. 1–30), 'distinctiveness means that the variety is distinguishable by one or more characteristics that results from a particular genotype or combination of genotypes, from all other registered varieties. Uniformity implies that a group of plants of a given variety must exhibit only a limited amount of variation in its distinguishing characteristics. Stability requires that these distinguishing characteristics remain unchanged after repeated cycles of propagation.'
4. The International Convention for the Protection of New Varieties of Plants, developed under the auspices of the Union internationale pour la protection des obtentions végétales (UPOV), was initially adopted in 1961. It was revised in 1972 and, more substantially, in 1978 and 1991. It protects the rights of plant breeders provided they develop plant varieties that are new, distinct, uniform, and stable (art. 5(1)). Because of its requirement of uniformity and stability, the UPOV convention does not allow the protection of farmers' varieties, which are inherently unstable and in permanent evolution. The 1991 version strengthens the protection of original plant breeders' rights while it restricts the so-called 'farmer's privilege', removing the possibility for states to allow farmers to exchange or sell seeds saved from the harvest of protected varieties (De Schutter, 2009, p. 7).
5. Currently, a large share of the organic seeds sold in Europe is distributed by a handful of major seed companies based in the Netherlands. The multinational seed company Enza Zaden, for example, works through Vitalis and other subsidiaries in 14 different countries to breed, produce, and distribute organic vegetable seeds all the year round. Other major seed companies like Bejo and Rijk Zwaan have become important suppliers of organic seeds, based on a network of production stations all over the world. The European databases also include seeds offered by global seed companies such as Dupont through its subsidiary Pioneer, the French seed giant Limagrain through its subsidiaries Advanta Seeds and Nickersons, and the German KWS (GRAIN, 2008).
6. In partial recognition of the impact of seed laws on the management of plant genetic resources, in 1998 the European Council issued a new directive (98/95/EC, *OJ*, L 25, 1 Feb. 1999, pp. 1–26) to regulate the commercialization of locally adapted varieties threatened by genetic erosion, named 'conservation varieties'. This measure has been followed by the introduction of two directives providing guidelines for implementation with respect to agricultural crops (2008/62/EC, *OJ*, L 162, 21 June 2008, pp. 13–19) and vegetables (2009/145/EC, *OJ*, L 312, 27 Nov. 2009, pp. 44–54). The aim is to confer juridical legitimacy to these varieties, allowing them to be included in the national catalogues, as well as to create specific rules for the production and marketing of seeds. To date, however, while recognizing the limitations of the exclusive use of DUS requirements, these regulations restrict allowable varieties to those that fit the DUS criteria as much as possible, including very little derogation from the conventional certification procedure (Bocci, 2009; Chable et al., 2009). Only varieties deemed 'interesting' are accepted, and the term 'conservation' does not allow for the evolving character of landraces in the field, thus preventing producers from breeding and selecting them over time (Bocci et al., 2010). Additionally, the EU directive includes prescriptions that curtail the potential development of an alternative seed system by restricting the use and distribution of conservation varieties to limited quantities within narrowly defined 'areas of origin'. As such, these provisions fail to account for dynamic processes of seed exchange and adaptation within and beyond different regions, reflecting the attempt to apply the rules of conventional seed marketing to the much more variegated practices associated with the reproduction of agro-biodiversity (cf. Bertacchini, 2009; Bocci, 2009).
7. The International Treaty on Plant Genetic Resources for Food and Agriculture was adopted by the FAO Conference on 3 November 2001 and was ratified by the EU on 31 March 2004. Article 5 requires the Contracting Parties to promote and support farmers and local communities in managing and conserving their plant genetic resources. Under Article 6, the Contracting Parties committed to develop and maintain policy and legal measures aimed at fostering the development and maintenance of diverse farming systems and maximizing intra- and inter-specific variation of landraces. Article 9 recognizes the contribution of local and indigenous communities and farmers to the conservation and develop-

ment of plant genetic resources as a basis for food and agriculture production and places the responsibility for realizing Farmers' Rights on national governments (FAO, 2009).

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Capitalist Philanthropy and the New Green Revolution for Food Security

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Abstract. The aggressive promotion of a neo-liberal form of economic globalization has created super-rich capitalists in the South as well as the North, many of whom choose to invest some of their accumulated wealth in philanthropic ventures targeted at helping to reduce social problems, such as poverty, disease and food insecurity. The rich who have been actively involved in giving to charities and setting up philanthropic foundations – and who have developed a global reputation around this activity – are referred to here as capitalist philanthropists. While capitalist philanthropists' often-stated rationale for this activity is to help others benefit from their 'wealth creation', this form of philanthropy is both politically and ideologically committed to a market approach. In the case of agriculture, this means the modernization of agriculture through market-led forces of production and support for a strategy to restructure agriculture with implementation of new technologies, innovation and management techniques. What has become known as the New Green Revolution is delivered through partnerships between public, private and local institutions and small farmers with a particular focus on sub-Saharan Africa. The article critically examines why capitalist philanthropists give away significant portions of their wealth to projects and programmes that support agrarian change and food security. It considers the motivations for partnerships with private corporations through which they engage in this agenda. What are the political and ideological motivations of capitalist philanthropy? Is this kind of giving altruistic, for the good of society? Or do the origins of capitalist philanthropy determine 'giving' as market-led development and expansion of the market as the solution to food security?

Introduction

Theoretically, this article draws broadly on Gramsci's and Bourdieu's work and their conception of philanthropy. Gramsci vehemently believed that philanthropy was an instrument of hegemony by which the capitalist class maintained its control of the market, workers and peasants, and one that served to avert attention away from the malevolence of the rich and the concentration of wealth in the hands of the few. As in wider society, hegemony is realized within the field of civil society. In other words, philanthropic donations support the domination of politics by the power-

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ful and this is effectively reinforced through consensus rather than force (Gramsci, 1971). For Bourdieu (2001, p. 15) the 'gratuitous gift does not exist'. To all intents and purposes, the act of giving assumes either some form of reciprocal response or it is motivated by the status that it can generate. In this conception, philanthropic activities are consciously driven with specific identified goals and strategies, shaped by personal character and qualities, in the social field and its external relations with other fields, such as business, politics, religion and its grounding in the class system (Kidd, 1996). In Bourdieu's theoretical framework, capitalist philanthropists embody not only economic capital – that is, individual capitalists who are dominant actors in the economics field (such as Ford in the car industry, Rockefeller in the oil industry, and most recently Gates in computer technology), but also in the field of symbolic capital. The relationship is synergistic – philanthropists both use and gain symbolic capital through philanthropic activity: in other words, they convert economic capital into symbolic capital and symbolic capital functions to reproduce economic capital. The two fields of activities they are engaged in – capitalist activities for profit and philanthropy for not profit – are far from being separate and distinct but are related symbiotically one to another (Harvey et al., 2011).

What distinguishes symbolic capital from other types of capital is that it acts as a source of power to the field of participants through values, recognition, prestige and reputation. Symbolic capital provides the agent or philanthropist with influence, power, and hegemony within the relationship with the receiver. Their status, or symbolic capital, is often enhanced by the media and public relations agencies that they employ. In some instances the media presents philanthropists as having a form of celebrity status, thus generating free publicity for them. A good example is the media attention paid to Bill Gates and Warren Buffet when they announced their decisions to donate a large proportion of their wealth to charitable causes. Gates's philanthropic activities in health, such as the anti-malaria field, have gained him a global reputation for doing good for the well-being of humanity, further reinforcing his individual status and the status of associated corporate organizations. As a result, the Bill and Melinda Gates Foundation has been able to establish a philanthropic network that involves other rich capitalists and large corporations in new ventures that support specific kinds of investment in agriculture, such as the new green revolution in sub–Saharan Africa (SSA).[1] The new green revolution in SSA is reshaping social relations and transforming rural production by encouraging small farmers and peasants to become involved in a commodified market-place.

Capitalist Philanthropy and Agrarian Restructuring

Historically, the Rockefeller and Ford Foundations were among the first philanthropic institutions to support expansion of the market into rural areas of the global South by investing in agricultural research and development. Rockefeller established a research centre in Mexico in 1943 focused on wheat cultivation, followed by other international agriculture centres such as the Consultative Group on International Research Group (CGIAR), as vehicles for intensifying the 'Green Revolution' in Asian and Latin American countries. New seed varieties were produced by plant breeders working in these research institutions with funding and support from the philanthropic foundations. Increasing productivity through capital inputs, such as new seeds and fertilizers, was regarded as an alternative to land reform. The aim was to integrate peasants into the market as new consumers of capital inputs

that would improve their productivity in food crops (wheat, corn, rice) and support food security. From a political economy perspective the Green Revolution did not only exacerbate poverty and inequality in rural areas of the global South, but it also created environmental problems relating to losses in biodiversity, top-soil erosion, salinization, soil nutrient depletion, and reliance on pesticides. Peasants and small-holding farmers had limited access to credit to purchase capital inputs and technology, such as fertilizers, tractors, new seed varieties and irrigation systems. Many small-holding farmers became dependent on the sale of their labour off the farm to allow for food purchase. To be clear, the Green Revolution had never been regarded by those who managed it as 'primarily about helping peasants to produce more food but rather about creating a global food system in which peasant agriculture, widely regarded as backward and unproductive in the context of a modern market economy, was subordinated to a more commercial and capital-intensive mode of production' (Ross, 2003, p. 440). Large and small-holding farmers became increasingly reliant upon the agribusinesses that supplied inputs and controlled agriculture production and distribution.

The Green Revolution was a product of a carefully negotiated partnership between philanthropists and states and was designed to capitalize farming and expand the agribusiness market in an era of state-led development. Under neo-liberalism the notion of philanthropy is fundamentally different in that it is embedded in a concept of governance through partnerships that involve private sector interests and devolve power to non-state actors. The aim is to reduce the need for government intervention to eradicate food insecurity. That is, there is an assumption that involving non-state actors, such as private corporations, philanthropists and civil society organizations in food security can lead to more effective outcomes, through a 'sharing of responsibilities' (World Bank, 2008). The ideological motivation is to reduce the need for government intervention in food security by shifting aspects of governance to private sector interests.

While traditional philanthropists like Carnegie were motivated, in part, by their belief that giving would help protect capitalism from socialism, new capitalist philanthropists are more concerned with addressing the growing gap between the rich and the poor within the global marketplace. Buffet, for example, was 'amazed' to find out 'the degree of inequality that exists' (*Economist*, 2012). Engagement in philanthropic activity also serves to ease the conscience of capitalists who, to at least some degree, have built their wealth by trading on the gap between rich and poor. As such, the practice of helping others can also hinge on notions of self-transformation and status in the social corporate responsibility stakes – 'feed the poor, get a name' (Edward, 2010). In this context when the action of giving is not an act of 'duty' it lacks moral worth and value. This aligns with Polanyi's argument that what characterizes 'market society' (capitalism) is its social dis-embeddedness, in that morality and values tend to be excluded from consideration under a market economy: the aim is to produce what is profitable, not what is socially desirable.

Capitalist philanthropy also distinguishes itself from traditional philanthropy in its application of business principles and approaches to identify 'innovative' solutions to complex problems, such as food security. The new structures of capitalist philanthropy are considered unique in imbuing business principles into the non-profit sector to support social transformation, reflected in labels such as 'venture philanthropy' (Letts et al., 1997), 'entrepreneurial philanthropy' (Harvey et al., 2011), 'strategic philanthropy' (Sandfort, 2008), 'philanthrocapitalism' (Bishop, 2008), and

capitalist philanthropy. Some capitalist philanthropists (Bill Gates and Omidyar, for example) are directly involved in running their foundations and shaping how they fund projects within a market-based, knowledge-driven, and results-oriented, system. They aim to 'make profits and do good' at the same time. According to Bill Gates: 'to have a sustained and strategic impact, philanthropy must be conducted like business – with discipline, strategy and a strong focus on outcomes' (Wall Street Journal, 2011). Bill Gates believes strongly that he is 'working to give poor farmers business assistance through new tools and technology and access to market and capital. This approach has nothing to do with the old aid model of donors and recipients. This is about business and… investment' (Hultman, 2011).

Against this background, the Bill and Melinda Gates Foundation is supporting the implementation of the new green revolution in sub-Saharan Africa with the overarching goal to 'reduce hunger and poverty for millions of poor farm families' (Bill and Melinda Gates Foundation, 2011a).

Capitalist Philanthropy and the New Green Revolution

The changing geography of philanthropic partnerships within the corporate food regime is driving the African new green revolution, with the intention of capitalizing agriculture through innovation, new technology and genetically modified crops. The aim is to increase the productivity of small famers and therefore to reduce poverty, improve rural incomes and address the global food security problem. This approach is endorsed by the World Bank in its 2008 World Development Report on Agriculture, in which it supports philanthropic activities that encourage the inclusion of small-holders and rural workers into the market, as well as fostering partnerships that are used to make biotechnology products available to small-holders in areas where the private sector currently has little commercial interest. The World Bank acknowledges the value of biotechnology partnerships that link global and local actors and are facilitated by philanthropic foundations and organizations such as the Alliance for a Green Revolution in Africa (AGRA), which operates 14 such partnerships. AGRA was established and funded by the Gates and Rockefeller Foundations in 2006 and is also supported by the Rockerfeller Foundations Consultative Group on International Agricultural Research (CGIAR). Kofi Annan, the former secretary of the UN, was appointed as chairman and board members consist of representatives of the Bill and Melinda Gates Foundation and the Rockefeller Foundations. The World Bank promotes these kinds of partnership arrangements that 'reflect the rise of new philanthropists, such as the Gates Foundation[2] and foundations (Syngenta Foundation) associated with private biotechnology companies, that provide both new sources of private funding and access to research tools and technologies' (World Bank, 2008, p. 170). In other words, the kind of giving we associate with the Bill and Melinda Gates Foundation and other capitalist philanthropists is quite explicitly aimed at the expansion of the market economy in rural areas, based on an understanding that the development of capitalism or the market economy in SSA is 'incomplete' (Bernstein, 2010) and requires interventions that facilitate the commodification process.

The narrative used by AGRA, capitalist philanthropists, academics and private corporations that are involved in the new green revolution, identifies some of the key issues that afflict the rural poor and cause food insecurity in SSA. This includes a growing population, land issues relating to property rights, infertile land and lack

of capital to secure inputs resulting in a low yield per hectare compared with other regions of the world. Agriculture in SSA is dominated by 33 million small-holding farmers and peasants each cultivating less than two hectare of arable land. Some 66% of the population in SSA live on less than USD 1.25 a day. Land plots are getting smaller and increasingly fragmented because of population growth, and this situation could worsen as the population continues to grow (forecasts suggest the SSA population will grow from 790 million in 2005 to 1.8 billion by 2050). Many farmers do not have freehold rights to their land or other assets to use as collateral to access credit for the purchase of capital inputs such as fertilizers and new seeds. Several organizations, including AGRA and philanthropic foundations working in this area, claim that productivity has not kept pace with the growing population, resulting in worsening poverty, hunger and malnutrition. They see the solution as lying in increasing productivity through new technology, such as use of GM crops and new high-yield varieties, and modern farming management. This would represent a shift in the way farming is organized and practiced and would have major implications for rural social structure.

What distinguishes the new green revolution from its predecessor is the long-term intention to replace traditional seeds with new varieties, including genetically modified seeds, for which patent rights lie with the multinational corporation. One of AGRA's objectives is to ensure that poor farmers have access to high-yield seeds that can 'grow in drought, survive in a flood, saltwater and resist pests and disease' (Bill and Melinda Gates Foundation, 2011b). Over 100 new crop varieties are being developed and are being made available through the Africa Seed System Programme, launched in 2006, in which the Gates Foundation has invested heavily. The Gates Foundation's commitment to integrating small-holding farmers into the global market is evidenced by the Foundation's investment of USD 1.7 billion in agricultural programmes, the bulk of which are associated with AGRA. The new green revolution in SSA has been endorsed by UN as its focus is to support achievement of the Millennium Development Goals that deal with hunger and food security. Additionally, the New Partnership for Africa's Development is promoting the Green Revolution through the African Agricultural Development Programme. There are concerns, however, fuelled lessons from the earlier Asian green revolution, that 'the Gates and Rockefeller Foundations' admission into Africa is akin to that of a "Trojan Horse" paving the way for entry by transnational agrochemical, fertilizer and agricultural biotechnology companies to peddle their wares' (Dano, 2007:1).

Bill Gates is explicit about his support for agrarian capitalism:

> 'helping poor farming families is… the best way to fight poverty and hunger and feed a growing population… Yield per hectare is lower in Sub–Saharan Africa than other regions because the farmers do not have access to tools and techniques. By offering small farming families in Africa the modern technology, the least productive farms can come closer to the most productive' (quoted in AGRA, 2011).

This provides the context for some of the Gates Foundation's interventionist activities, undertaken in partnership with private biotechnology company support. The Gates Foundation promotes biotechnology research for six reasons (see Box 1).

The objective is to develop new agrarian structure framed around small-holder farmers in Africa accessing new seeds through finance, markets and technology transfer networks that cut across national borders and ecologies, facilitated by agro-

Box 1. Why the Gates Foundation funds research in crop biotechnology.

- Transgenic approaches offer unique and promising solutions to farmers facing difficult growing conditions.
- These approaches could help improve the health of millions.
- New varieties will be affordable to small farmers in the developing world.
- Scientific research shows no confirmed cases of harm to human health or to the environment.
- These crops offer direct benefits to people and the environment.
- Local involvement and farmer choice are project corner-stones.

Source: Bill and Melinda Gates Foundation, 2008, 2011a, 2011b.

dealers and micro-credit. To support delivery of this vision, AGRA has established 15 000 agro-dealer businesses, which are considered to be an essential part of the structure needed to sustain a private sector-led, market-oriented agricultural sector (AGRA, 2012). Rather than producers, farmers are constructed as 'discerning "customers" or "consumers", able to engage actively in markets and with the right provision, adopt new seed varieties to improve their productivity' (Scoones and Thompson, 2011). The idea is that setting farmers into the framework of agribusiness immerses them in the market and puts them on the route to higher incomes and sustainable livelihoods. Despite the current push to spread GM technology, only three countries in Africa have legal rights that allow the commercial planting of GM crops: South Africa, Burkina Faso and Egypt. However, since the first commercialization of GM crops in 1996, field-tests supported by companies involved in GM research and field-trial and development have been carried out in a number of African countries, including Tanzania, Kenya, Uganda, Malawi, Mali, Zimbabwe, Nigeria, Cameroon, Morocco, Senegal and Ghana, in readiness for a wider roll-out (Dano, 2007) .

The injection of capital into agriculture is considered to be positive even if it is at the expense of traditional practices. Perhaps one of the most controversial practical examples of this are market-led land deals, often referred to as 'land grabbing'. Land acquisitions – purchased through foreign direct investment for the purpose of large-scale agribusiness food production (rice, soya beans, maize), cultivation of bio-fuel crops, and other cash-crops for export from Africa to other countries – are seen as a key strategy for solving the agrarian question. Urgency for such land deals has been linked with food crises, food insecurity and the call for alternative energy sources. Ownership of large areas of fertile lands have been transferred to foreign investors, in some cases for up to 99 years (Zoomers, 2010). Governments, the World Bank, other global institutions and philanthropists, such as Bill Gates, support this neo-liberal model of commodification where land is an essential component of market liberalization. According to Bill Gates:

> 'Many of those land deals are beneficial, and it would be too bad if some were held back because of Western groups' ways of looking at things. Whenever somebody invests in Africa and actually builds infrastructure in Africa, they're the ones who are at risk. You can't take the infrastructure home! I'm not endorsing all these deals, but when capital is put into Africa, that's a good sign. Africa has to look at these things, but it shouldn't be viewed purely through Western eyes, because there's a real opportunity as the rest of the world looks to Africa' (quoted in Hultman, 2011).

Paradoxical as it may be, in SSA this form of transfer of property rights has a contrary effect on small-scale farmers and rural people, many of whom have been excluded

from land transactions and land acquisitions. McMichael (2012, p. 681) points out that land-grab 'sits uneasily with the "free market" rhetoric of neoliberal ideology', as it signals an interventionist approach to the restructuring of the current food regime. He argues that 'this "spatial fix" represents a short-term attempt to resolve the contradictions of rising agro-industrial costs on the one hand, and rising (food) costs of reproduction of labor on the other, but under conditions of agribusiness as usual that will only accelerate ecological and social contradictions' (McMichael, 2012, p. 684). Many land deals have been completed or are being negotiated with government or tribal leaders at the expense of local rural people and small-holding farmers, who have been forced to either undergo enclosure or move to more marginal lands. Effectively, this is a new form of privatization/enclosure. Despite the potential negative impacts on small-holders at risk of losing access to land and their main livelihoods, states have been keen to encourage foreign investment in land as part of rural development.

Many capitalist philanthropists are using the vehicle of partnerships with agribusinesses to implement agrarian programmes. In 2010 the Bill and Melinda Gates Foundation invested US$23 million in the multinational company Monsanto, one of the world largest producers of GM seeds, purchasing 500 000 shares. Gerald Steiner, Vice-president of Monsanto, values such partnerships for helping them to contribute to

> 'The Millennium Development Goal of halving the proportion of people suffering from hunger and poverty with urgency… I am encouraged by Feed the Future's endorsement of business-enabling policies, and by its support for public–private partnerships… Monsanto is engaged in a variety of public–private partnerships in markets around the world… One of our partnerships, Water Efficient Maize for Africa (WEMA)… is funded by the Bill and Melinda Gates and Howard G. Buffett Foundations. It is a groundbreaking effort for Monsanto, because it involves donating a gem of our technology pipeline – drought tolerance – along with our know-how in accelerated plant breeding. It represents a commitment to providing technology for the developing world at nearly the same time as in our major commercial markets. And we estimate it could result in new white maize varieties that yield between 20 percent and 35 percent more during moderate drought, enough to help many keep hunger at bay. This yield enhancement during moderate drought is projected to be enough to reduce risks so that farmers can invest in fertilizer. The combined use of improved seeds and fertilizer boost the harvest – and, therefore, farmers' incomes' (Steiner, 2010).

In addition, the Gates and Buffett Foundations have together given USD47 million of grants towards Monsanto's five-year project to develop water efficient maize varieties the small-scale farmers can afford. The Gates Foundation has also partnered with Cargill, an international producer and marketer of food, together with agricultural, financial and industrial products and services, on a venture to improve the incomes of cocoa farmers in West Africa. According to Cargill's web site, its partnership with the Gates Foundation equates to USD23 million in funding and this is supported by 'more than $17 million cash and in-kind support is being provided by private sector companies' (Cargill, 2011). These kinds of partnerships may be considered essential by philanthropists to support the commodification and marketization

of small-holding farmers and peasants. They also serve to increase the hold on agriculture in SSA by corporate global agribusiness chains. This is evidenced by the kind of projects and programmes they support and the actors with whom they partner. Monsanto and Cargill, two of the world's most aggressive agri-giants found their partnerships on philanthropy-based business interest.

Legitimizing through Hegemony

Capitalist philanthropists such as the Rockefeller and Gates Foundations have established a spatial operating sphere that has enabled them to harness the support of global governance institutions, research organisations and academics. Table 1 provides examples of the organizations and institutions that have received funding from the Gates Foundation, including universities, global governance institutions such the World Bank, FAO, various international agriculture and food organizations, and research institutions linked to the World Food Programme, such as the International Institute of Tropical Agriculture. The Gates Foundation also sponsors advocacy projects in the media and other public forums to publicize and promote the policy relevance of new technology for small farmers. For example, grants have been given to the International Development Research Centre to provide an advisory platform, USD 34.8 million was awarded to the One Campaign to promote agriculture, health and development in Africa, and USD 2.5 million was given to Oxford University to work on the policy relevance of research and to target dissemination and sponsorship in the mass media to raise the profile of the debate, including the *New York Times* and the *Guardian*'s International Development column (*Guardian*, 2012). In legitimizing capitalist philanthropy through their various activities, these organizations help to disseminate the priorities of the 'elite' capitalist philanthropists in public space and in so doing contribute to the building of the political agenda they support, which is, in other words, a neo-liberal consensus.

The Gates Foundation has funded numerous research projects that support an agrarian doctrine associated with the new green revolution and pro-poor GM crops. How ideas are constructed and disseminated by these institutions to popularize GM technology as a poverty reducing tool, in the Gramscian sense, demonstrates a perpetuation of cultural hegemony. For Gramsci, intellectuals played an important role in maintaining the fabric of capitalist society, through their pursuit of research and cultural practices that served the interests of the dominant group or class (Berman, 1983). Capitalist philanthropists like the Gates and Buffet have identified a hegemonic group of intellectuals who support their views of agrarian restructuring. One such is Robert Paarlberg, an Oxford professor who has undertaken research funded by the Rockefeller and Gates Foundations and who served on the Biotechnology Advisory Council of Monsanto. Paarlberg argues that the only option for overcoming the African food crisis is an African green revolution and the application of modern technology, such as new genetically engineered crop varieties to develop a 'modern, science-intensive, and highly capitalized agricultural system' similar to the one that has developed in the West (Paarlberg, 2010, p. 2). While he acknowledges the challenge of integrating GM crops into the small-farming system cannot be underestimated, he remains convinced that productivist farming (raising productivity levels above all else) is the key to progress. His book *Food Politics: What Everyone Needs to Know* (2010) has been criticized by a number of leading scholars,[3] who in a letter to the editor of Oxford University Press, provided detailed analysis and evidence

Table 1. Selected international grants awarded by the Gates Foundations to global institutions, universities and research institutions for work on food security since 2008.

Institution	Grants (USD)	Project
World Bank	19 999 748	Financial services for the poor to support small-holder access to finance
World Bank	30 000 000	To improve incomes and food security through public–private sector investments in agriculture and rural sector
World Bank	18 955 000	To add detailed agricultural modules to the World Bank's household survey panels in seven sub-Saharan African countries to provide a strong evidence base for policies, investments, and evaluation over time
FAO United Nations	6 569 304 5 053 663	To construct and apply a statistical framework and technology solutions for monitoring African agricultural production
Int. Institute of Tropical Agriculture	6 759 003	Promote scientific technologies for small-holding farmers in Kenya and Nigeria
Int. Centre for Tropical Agriculture	15 240 724	To provide accurate, information on soil resources and their management to support sound decision
Global Alliance for Improved Nutrition	120 485 736	To contribute to improved nutrition and access to food as part of Global Health Initiative
Int, Development Research Centre	40 000 000	Advocacy and public policy: to provide an advisory platform
One Campaign	34 810 364	Advocacy and public policy: to promote agriculture, health and development in Africa
Oxfam America	11 712 100	To strengthen African agricultural economics research and support nearly 300 African students pursuing master's degrees in a dozen African universities
Oxford University	1 390 190	To provide immediate relief to vulnerable communities affected by drought in Ethiopia
Oxford University	2 511 239	Advocacy and public policy: to promote policy relevant research and target media and communication
Oxford University	24 129 832	Nutrition programme
University of Pretoria	4 475 282	Agricultural development: to support policy research and to strengthen African agriculture
Oxford University	25 000 000	International Conference on Genomic Epidemiology of Malaria
Imperial College London	16 529 688	School-feeding programmes in Africa that promote local agriculture and benefit small-holding farmers
Harvard	1 474 392	To promote the benefit of science and technology for African agriculture by promoting discussion and dissemination in Africa
Inst. of Development Studies, UK	2 676 910	To support small-holder farmers in Africa and South Asia through impact planning and learning
Regional universities forum for capacity building in agriculture	12 730 748	To improve agricultural productivity and wealth creation for small-holding farmers in Eastern and Southern Africa by developing effective agricultural university: research and training
Cornell University	28 750 000	To develop new wheat varieties that are resistant to wheat rust, a disease that threatens up to 80% of African and Asian wheat varieties
University of Bristol	13 105 000	To research and develop a user-friendly low-cost water quality test
University of Greenwich	13 345 671	To support sustainable and equitable improvements to cassava value chains and markets in Ghana, Tanzania, Uganda, Nigeria and Malawi
Donald Danforth Plant Science Centre in St Louisa,	4 567 500	To develop bio-cassava seeds for use in Uganda, Kenya and Tanzania

Source: Web site of Bill and Melinda Gates Foundation and relevant institutions, accessed in October 2011.

of the failure of the author to meet 'widely accepted standards of scholarship' and for pursuing a single perspective on production that 'greatly downplays some of the most vital debates in food politics today – including the role of entitlement programs, the loss of biodiversity and other non-renewable natural resources, excessive use of fossil energy, agriculture's contributions to climate change, the impact of financial speculation on food price swings, and more' (Small Planet Institute, 2011).

According to Cox, the global institutions that work with capitalist philanthropists 'embody the rules which facilitate the expansion of hegemonic world orders; they are themselves the product of the hegemonic world order; they ideologically legitimate the norms of the world order; they co-opt the elites… and they absorb counter hegemonic ideas' (Cox, 1996, p. 62). This is evidenced by the work of international organizations such as FAO, Nuffield Council on Bioethics, World Bank and the International Food Policy Research Institute, as well as academics, who view GM as the main way agricultural productivity will be increased on small-holder farm lands (McGloughlin, 1999; Paarlberg, 2006). While highly controversial, the use of GM is increasingly being accepted as part of an overall strategy to achieve food security in the global South.

An Alternative Vision: Rights Rather than Generosity

Empirical evidence demonstrates that the success of GM technology is not as straightforward as often presented (Scoones, 2008). There is, in fact, strong resistance to GM crops in many countries in global South, including Europe, India, South Africa and Brazil by both national and transnational movements that opposed GM crops, including farmers groups, civil society and rights-based organizations. Scoones argues that, while GM technology has been applied in very different socio-conomic and institutional settings or agrarian contexts, in all cases where it has had some success commodification was already relatively well established and rich peasants and capitalist farmers were integrated into the market. In some locations where GM seeds have been offered, the seeds were too expensive for small or peasant farmers. The cost of acquiring technology for both individuals, in particular, and the global South, in general, is determined by the powerful multinational corporations that developed them and retain intellectual property or patent rights. The market is therefore monopolized by the likes of Monsanto, and Cargill, granting them control over production and prices in the global market. The contentious issue that has not been addressed by global governance institutions, namely the WTO, is the application of the Trade Related Aspects of Intellectual Property Rights (TRIPS) Agreement, which operates to give patent rights over genetic resources to multinational companies, and ignores the rights of poor farmers to access local resources, such as seeds (Morvaridi, 2008). By monopolizing the availability of seeds, companies are forcing farmers to rely on products that must be purchased in the marketplace. But this is a market-place that few can access.

The dependency of farmers on external seeds is one of the main concerns articulated in campaigns against GM. Scoones (2008) shows how campaigners in different countries have raised concerns in their opposition to GM, and in particular in relation to the *modus operandi* of Monsanto, while also drawing attention to more localized contentious issues. In so doing, opponents were challenging wider issues about multinational control of agricultural development. This constitutes a 'politicized movement of agrarians, including landless movements, seed savers… and

farmer/peasants threatened universally by declining public support, food support and land seizures for agro-industrial estates' (McMichael, 2010, p. 298). According to La Via Campesina,[4] the international peasants movement, the United Nations estimates that 75% of the world's plant genetic diversity has been lost as farmers have abandoned native seed for genetically-uniform varieties offered by corporations. La Via Campesina condemns this as a miss-appropriation of humanitarian aid for commercial ends and the privatization of food policies. In solidarity with the African peasants and farmers, La Via Campesina has criticized the Gates Foundation for its 'hegemonic influence on global agricultural development policy… The Foundation is helping to open new markets for Monsanto, which is already the largest seed company in the world' (Via Campesina, 2010).

Globalization challenges the assumption that civil society is confined merely to the national or local setting, by extending the spatial scale of the relationship between political struggle and contentious issues. Increasingly we find that when local issues are raised at the global level, farmers and peasants voice their concerns in global terms, demonstrating new alliances and new configurations of power. Many of these protest movements object to the intervention in rural development of external agencies, such as philanthropic foundations and multinational corporations. The actions of both states and non-state actors are increasingly subject to challenges from new alliances, such as transnational networks, operating outside the boundaries of the nation state (Morvaridi, 2008). In relation to food security, transnational protest networks are concerned that the work of capitalist philanthropists in agrarian reform is directly linked to multinational profit and advantage. Since 2010, the anti-GM movement in sub-Saharan Africa has been protesting against the Gates Foundation's investment, as a philanthropic organization, in multinational companies such as Monsanto and Cargill. Global protest movements and local protest movements are challenging the whole notion of whether new technology that is rarely grounded in local knowledge is in the interest of small-holding farmers and peasants and if it really can contribute to food security. In relation to seeds, small-holders promote the use of native seed varieties as the foundation of locally sustainable rural economies, that – through agro-biodiversity – can adapt to changing climates and environments. Food sovereignty movements have provided a forum for an alternative vision centred on the rights of peoples to define their own agricultural and food policy. The food sovereignty perspective provides an opportunity to refocus agriculture around questions of social and ecological sustainability (McMichael and Schneider, 2011, p. 120).

Conclusion

The main argument in this article has been that an important motivation for partnerships between capitalist philanthropists and private corporations is an ideological belief that food security can be achieved through the commodification of small farmers and peasants. The agency of these partnerships helps to increase the hold on agriculture by corporate global agribusiness as the suppliers of biotechnology products to small-holder farmers. The backing of major global institutions such as the World Bank for strategies like the new green revolution in SSA reinforces partnerships founded on philanthropy-based business interests as the delivery agents of agrarian change.

This form of hegemony necessitates some level of consensus in the construction of partnerships and opens a new space for capitalist philanthropy to exercise power and influence over agrarian reform. Institutionalizing a market-based approach and business sector model in respect of food security and, within this strategy, the promotion of new technologies like GM crops under the new green revolution in Africa, becomes a key strategy to address small farmers and peasants' insecurity and poverty. However, this is being controlled by large multinational corporations and a wealthy few, who are *unregulated* and *unaccountable*. Unlike individual wage-earner donations to charities, which tend to be driven by judgements about moral worth and social justice, capitalist philanthropists are more likely to base decisions about giving on an analysis of the benefits both to others and themselves in terms of power and influence, including the political and economic control of outcomes. While this may fit within a neo-liberal market approach to social justice, it is not clear how non-state actors such as philanthropists and civil society organizations can fulfil and be accountable for the state's responsibility for social justice as enshrined in human rights treaties. Given the range of actors involved in food security, it is no longer clear who the agents of justice are and who, therefore, has effective responsibility to protect the rights of small-holding farmers.

Notes

1. Thus far, 70 rich Americans have signed a 'Giving Pledge' through which they agreed to donate half of their wealth to philanthropic foundations either during their lifetime or through their wills. (The list and explanations why they give has been published online <http://www.givingpledge.org>.) Bill Gates and Warren Buffet between them have donated USD 62 billion of their wealth to help small farming and poverty reduction objectives. Other capitalist philanthropists include Peter Kellner (Czech Republic), Lee Kun Hee (Japan), Omidyar (USA), the founder of eBay, Richard Branson (UK), Azim Premji, an Indian software billionaire, the Hariri family (Lebanon), the Tata family (India), Carlos Slim Holu (Mexico), Miloud Chaabi (Morocco), just to name a few from both the global North as well as the global South.
2. The Bill and Melinda Gates Foundation was set up in 1994 with fortunes realized from Microsoft business and is now one of the biggest capitalist philanthropies.
3. Philip McMichael, Molly Anderson, John Gershman, Hans Herren, Frances Moore Lappé, Ivette Perfecto, Michel Pimbert responded in a joint letter to the editor of Oxford University Press raising concerns about Paalberg's scholarship.
4. Via Campesina is a global peasant movement representing small farmers, landless workers, fisher-folk, rural women, youth and indigenous peoples, with 150 member organizations from 70 countries on five continents.

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Third Natures? Reconstituting Space through Place-making Strategies for Sustainability

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Abstract. The recent rises in food prices represent the 'tip of the iceberg' and a 'canary in the mine' moment for world agriculture. They are underlain by a continuing race to the bottom and by speculative processes whereby systems of resource production and exploitation are continuing to rely upon 'infinite supply' assumptions and narrow technological solutions to world hunger. It is argued here that these conditions are leading to a dominant and aggregated policy framing that tends to marginalize diverse and place-based agro-ecological systems, through the creation of a renewed legitimacy for bio-economic, rather than eco-economic, solutions. Nevertheless, the current food crisis is also providing opportunities for more place-based and reflexive governance arrangements. This article outlines the relationships between these bio-economic, and alternative eco-economic, strategies and focuses on some of the key articulation mechanisms between the two paradigms. Of key importance here is understanding the reconstitution of space and state processes in these contested but innovative articulations.

Introduction: Towards Adaptive Capacity Building

The burgeoning critical agri-food literature has now reached an important stage in its maturity. The plethora of work on alternative food networks (see Goodman et al., 2011) has undoubtedly re-energized agri-food studies in ways that have again made it central to wider rural sociological debates. Some even argue (see Friedland et al., 2010) that this new phase – one of investigating how alternative movements are providing opposition to the dominant regime – has become a new defining moment for the twenty-first century rural sociological enterprise and, as such, is creating a vibrant and rich global network of scholars who are progressing this agenda. Indeed, the volume and sophistication of the work is impressive and potentially transformatory in a paradigmatic sense: an argument hotly contested, but one which is important to portray and progress (see Van der Ploeg and Marsden, 2008).

In contributing to this 'rebuilding' exercise through the lens of agri-food, the article aims to support this paradigmatic shift in three ways. First it will be argued that, at this particular juncture of the now well-documented crisis in the conventional regime of agri-food, we have to theoretically and conceptually readdress the complex distinctiveness of agri-food as a set of important 'third nature' arrangements,

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or what can be called 'patterned' hybridities. In short, the old modernist arrangements associated with the standard relationships between capital, nature and food are exploding. They are giving way to a range of more sophisticated 'third natures', whereby the relationships and transformations of nature are becoming at the same time both more complex, potentially irreversible, and potentially more empowering and sustainable. Third natures move on from the categories of first natures (raw, uncommodified) and second natures (commodified and adapted to the laws of capital accumulation; see Smith, 2007) in that they incorporate patterned forms of hybridity between the natural and the social. They can delve into the very reproductive and cellular structure of nature itself but can also be imaginatively mixed with human and social practices. As such they demonstrate a more variable re-calibration between ecology and 'the economy', mixing these in new and creative ways. These 'mixtures', as the discussion here outlines, are not totally fluid or contingent; they are fixed at least for a time by competing paradigms of theory, science and politics. In short, and under these third and more 'unruly' nature conditions (see Clark, 2011), we have to open the conceptual door to find ways for more articulation of alternative and robust forms of sustainable adaptive capacity building, even when these tendencies are under attack from corporatized neo-liberalism, which attempts to marginalize and fragment their legitimacy.

Second, after outlining some of these 'third nature' processes and oppositional expressions it is important, by adopting a modified transitions theory framework, to address the question of adaptive capacities with regard to shifting agri-food systems towards more sustainable and 'scaled up' adaptations (see Spaargaren et al., 2012). In doing this, it is argued that it is timely and critical – not least given the resource depletions with which twenty-first century society is increasingly contending – to explore conceptually as well as empirically the contestations in science, politics, economy and culture between the dominant regime and a vast variety of socio-technical niches. These are associated with agri-food, no doubt. But the important point now becomes to regard agri-food not so much as a separate or aggregated 'sector' but more as an embedded mobilizer of social nature, together with other key resource spheres (see Tucker et al., 2006). It is therefore necessary to build some important conceptual links and bridges between these key resource spheres, the different logics associated between what I have generally called the bio-economy and the eco-economy paradigms, the transition mechanisms and contestations that are mediating these logics and, indeed, their variable spatial expressions and configurations.

Such a conceptual process begins from a premise that it is important to create a more critically normative approach to sustainable adaptive capacity building (see Blay-Palmer, 2010). Indeed, I would argue that the established sub-discipline of rural sociology should be seen partly as a crusading force in wider interdisciplinary environmental and sustainability science debates (see Henrichs, 2010). This leads to the third contribution. We have to reintroduce two major distinctive features of both past, and indeed future agri-food landscapes. *These concern the distinctive and transcending role of the state and of space in the reconstitution of agri-food relations.* In the agri-food sector specifically we know that governments, at least since the 1930s, have felt obliged in the public interest to intervene directly in the fields of agriculture and food. They have – ever since – never been completely 'left to the market'. Moreover, as part of the distinctiveness of agrarian capitalism we can clearly note since the work of Marx and Kautsky that space, either as a set of land rights and/

or as bundles of ecological resources, is critical as both a condition and form of production and consumption. First, we consider some of the new landscape pressures that are colliding with the dominant conventional regime and also the dominant responses and framings that are currently being made to it. In the final section of the article, I discuss the prospect of developing a more reconstitutive and reflexive state and spatial intervention system that is attuned to the new sustainable place-making necessities that currently confront us.

The New Landscape Pressures and their Partial Responses

Since the food price hikes of 2007–2008 and the continuing volatilities in global food supply and demand, there has been a significant growth in policy reports and statements regarding the problems of global food security. This has rightly reinforced the UK's combined research councils (RCUK) decision to make this one of their 'grand challenges'. It has also recently led to a new synthesis published by the UK Government Office for Science, entitled *The Future of Food and Farming: Challenges and Choices for Global Sustainability* (Office for Science, 2011). It is not necessary to reiterate the main arguments as to why this is now a renewed and pressing international policy issue, but it is a good moment to begin to assess the general policy landscape and framing of the debates, given that, as I shall argue below, some significant gaps or missing links are emerging in the ways in which main arguments and solutions are being posed. One key question (see Horlings and Marsden, 2011) is why is it proving so difficult to arrest the twin problems of resource depletion and climate change vulnerabilities by developing more sustainable and 'place-based' agricultures? To answer this question we have to go beyond the rhetoric of many of the major reports now before us and address the more prosaic question of what are the obstacles to adaptive change within the agri-food sector and how can these be overcome? Once we identify these more clearly, it may be easier to see how we might begin to examine the potentialities and opportunities for adaptive changes, which could lead to both more sustainable *and* productive agri-food systems.

It is argued here that these opportunities and potentialities will have to be 'place based' and, as such, will not lend themselves to generic or globalized 'one size fits all' solutions associated with genomic technological fixes or generalized notions of 'sustainable intensification' (Office for Science, 2011, p. 35). One of the problems with most of the recent policy statements is that they have not addressed the issue of context-dependent sustainable 'place making'; and they have tended to assume, albeit with scattered attention to some selected case-studies of 'good practice', that the answers as well as the solutions to the current unsustainability of agri-food lie in addressing the aggregate problems rather than those that are more spatially specific. Agriculture will have to return to being what it was: a more embedded, connected and localized activity largely serving and being served by its city regions.

If one of the obstacles in our thinking about both the problems and solutions concerning unsustainable food lies with the dominant aggregated conceptualizations of the problems – a sort of 'ecological fallacy' – another is the failure to appreciate agri-*culture* as an interdependent and integrated component in complex human, cultural and ecological systems. For too long, and in the advanced world especially, we have tended to treat agriculture as a separate and independent sector both in policy and academic terms. This secular way of seeing agriculture is now coming back to haunt us, as we witness how it is inextricably linked to the wider ecologies and cultures

of place. It is being articulated constantly (not least by the now disbanded Sustainable Development Commissions' final statement [2010] on food policy; Sustainable Development Commission, 2011), for instance, that global agriculture accounts for about 70% of all fresh-water extracted for human use (via irrigation systems), and that the food system is a major source of land, forestry, fisheries and water degradation, with 15 out of the 24 world ecosystem services being degraded or used unsustainably (Millenium Ecosystem Assessment, 2005; Sustainable Development Commission, 2011). Livestock farming gets an even worse press in these debates, as it accounts for 40% of the UK citizens' agricultural water footprint and 57% of agriculture's carbon and methane emissions.

These kinds of aggregated and sectoralized statistics certainly indicate the size and proportional nature of the problem of the unsustainability of many conventional agricultural practices. But they should also indicate the inherent multifunctional role that agriculture *could play* in potentially adapting to these unsustainabilities. Such 'facts' about the negative contribution of conventional agricultures to the wider and severe problems of resource depletion and carbon emissions should serve as a significant wake-up call for scholars and policy-makers. They demonstrate the explicit interdependence and integrative potentials of agriculture to affect its wider ecologies and social systems in profound ways. As empirical evidence suggests from many parts of the world (see below), sustainable agricultural systems can provide far wider sets of positive social, economic and ecological benefits for more sustainable communities and regions. In this sense we should reject the assumption that agriculture necessarily is a 'declining industry' even if increased rates of urbanization and migration from the land are the norm in many developing parts of the world. In order to sustain these movements, more eco-economic systems of production and consumption will need to be created, implying a vast skill and social capital base. Hence any 'solutions' to these unsustainabilities will need to adopt a much more integrative, spatially based, approach. We can no longer divorce agricultures from the wider social and ecological spaces in which they are created, or from the complex interdependencies they help to sustain.

We urgently need to move beyond aggregated and sectoralized ecological fallacies in our attempts to deal with creating more sustainable, diverse and place-based agro-ecological systems. Whilst we should not lose sight of the macro, global picture, we also need to realize that in order to imagine and plan realistic alternatives it is necessary to adopt a more creative eco-economy paradigm which replaces, and indeed relocates, agriculture and its policies into the heart of regional and local systems of ecological, economic and community development. This was no more clearly exposed than in the 'Arab Spring' in the Middle East, where uprisings have been underlain by growing food and water shortages, price hikes, and fast-growing populations in countries such as Yemen and Syria. Saudi Arabia is actively purchasing land- and water rights elsewhere in order to cope with pending water and food shortages (Brown, 2011). Some regions of China are following this course of action, leading to internationalized 'land and resource grabbing' as palliatives to impending shortages. The irony is that the more governments and scholars recognize the need to make a transition in agri-food to low carbon alternatives, the greater the international 'race to the bottom' to fuel the agri-food 'growth machine'. Yet, as the saying often goes about charity, the solutions and priorities should start at home by re-calibrating and reframing more integrated and embedded notions of agri-food into regional and local systems.

The current food debate is dominated by aggregated and sectorialized 'bio-economical' solutions which still tend to side-step and deny the embedded nature of agri-food. This is a sort of active process of 'unknowing the known' and creates and maintains a set of key 'missing links' in the framing of policy debates. Underestimated are the social, cultural, political and spatially embedded aspects.

Socially, we have seen a large decrease in recent decades of agricultural employment, farm enterprises, and a loss of farmers' freedom with more dependency upon privately regulated global markets, retailers, privatized research and policy measures. This means that, just at the point when a sustainable transition is necessary in their agri-food systems, many local communities have lost or reduced the social and skill capacity to mobilize such changes. Rebuilding the social and knowledge/skill capacities to create sustainable alternatives becomes limited and in many cases constrained by generic technoscience solutions.

Culturally, 'the environment' has been reduced to a series of concerns about resource inputs, waste and pollution emissions, demoting cultural needs and non-anthropocentric values (reflected, for example, in the concept of wilderness) to monetary terms (as can be seen when these inputs are addressed as different packages of 'environmental goods and services'). The culture of 'agri-*culture*' itself, expressed in craftsmanship and a large variety of farming styles, has become more marginalized as the influence has become more dominant of external agencies such as privatized extension services and bio-economic scientific research.

Politically, a 'hygienic mode of regulation' has become dominant in agri-food in the form of bureaucratic forms of environmental safe-guards, risk management and instruments. Private and public forms of regulation have led to a schematization that creates new regulatory barriers to market entry for many smaller producers and processors. Such regulatory costs tend to stifle co-operative innovation and ecological knowledge sharing, whilst creating market barriers for smaller producers.

Spatially, agricultural production has been decoupled from space and place; this is visible in the form of more foot-loose production systems (such as 'mega-farms', internationalized food transport, 'lean' logisitics and traceability, and the deconstruction and fragmentation of food into different but standardized, value-added components). This gives the super-intensive producer, processor and corporate retailer the power to exchange their commodities worldwide, using globalized standards, and making many small farmers more vulnerable to global markets.

Towards a Sustainable Agri-food Eco-economy?

To address these 'missing links', we can postulate a process of 'real ecological modernization' and 'sustainable growth' that reinserts these key links and is embedded in the different contexts of space and place (Horlings and Marsden, 2011). Table 1 provides an overview of the differences between the dominant food paradigm (what we call the bio-economy) and a 'real' ecological modernization of agriculture (eco-economy); that is, one that overcomes both of the ecological fallacies mentioned above.

Overall it is useful to be explicit about the definitional status of the bio- and the eco-economy concepts. These have been further elaborated in a recent paper by Kitchen and Marsden (2011) in *Local Environment* around variations in weak and strong forms of ecological modernization (as both paradigms now espouse aspects of environmental sustainability). The bio-economic paradigm (see also Langeveld et

Table 1. Competing paradigms and pathways for ecological modernization in agri-food policy.

Dimensions	The dominant food paradigm: bio-economy	Real ecological modernization of agriculture: eco-economy
Economic regulation and control	Corporatization	Place-based-agri-food networks
	Productivity (yield) oriented	Integral approach between production of food and interdependent ecologies
	Aggregated framing of food crisis and its 'solutions'	Economic and ecological practices representing new and re-invented 'patterned hybridities'
	Maintenance of the cost-price squeeze for local producers; high levels of value-added profit margins in corporate retailing	Food security linked to multi-scalar networks of local and regional actions
Technological	Technology development as economically driven, and increasingly corporately controlled.	Technological generation as a demand-driven process
	Reduced role of the state in setting research and development agenda	Lay and indigenous knowledges can be absorbed into wider research and development base
Ecological	Ecological and genetic engineering (industrial ecology) designed to reduce externalities through 'sustainable intensification'.	Based on highly variable and both certified and non-certified agro-ecological principles linked to ecological space and place
	Lab based experimentations emphasis with field trials tending to exclude social or management behaviours and practices	Local knowledge creation and dissemination
		Emphasis on maintaining and enhancing food sovereignty for producers and consumers
Social-cultural	Dependency, scientification, rational man-nature relation, loss of farmers freedom/agricultural employment	Sovereignty
		Autonomy
		Synergy between society-nature
		Demand-driven research (mode 2 science)
		Labour and skills-intensive
Spatial	Globalized	Locally embedded in the community
	Export-oriented	Endogeneity
	Use of external resources	Use and reproduction of local resources
	Locational critieria for production footloose and/or associated with proximity of inputs. Shortages in inputs 'solved' by extending international corporate property rights	Locational criteria embedded in *terroir* and its multiple branding
Political	Top-down steering and regulation	Enabling policy
		Participatory approaches
	One-direction communication by extension services	Influence of communities in agri-food networks
	Power concentrated at multinationals and large retailers based upon notions of 'free-trade' and the minimization of 'state-aids'	Regional governance facilitating network and consortia development
		New innovation sharing and collaboration. Self-sufficiency in the context of fair trade

al., 2010) is an amalgam of science, economy and politics, which, as the OECD argue (2005, p. 22), is now:

> 'part of the economic activities which capture the latent value in biological processes and renewable bio-resources to produce improved health and sustainable growth and development. A second concept mentioned here, the bio-based economy, deals more narrowly with industrial applications: it is an economy that uses renewable bio-resources, efficient bio-processes and eco-industrial clusters to produce sustainable bio-products, jobs and income.'

Although this is a traditional economic view of the bio-economy, it is a paradigm that also fuses *particular* technoscientific and political dimensions of modernization and progress, which lend themselves to generic and aggregated solutions to the sustainability crisis (see Spaargaren, et al., 2012) as well as to the necessary transitions needed.

With 'eco-economy' a much stronger form of ecological modernization is envisaged whereby the social and ecological are far more embedded in place-based constructions of economic relations. It is an alternative and more diverse and fragmented arena, which can incorporate – but is broader than – agro-ecological or food-sovereignty practices. It partly develops its vibrancy by creating a more autonomous but also oppositional status to the bio-economic paradigm. It involves the rise of complex networks and webs of viable (and often multifunctional) businesses, which, added together, can potentially realign and spatially embed production/consumption chains capturing local and regional value between rural and urban spaces. A range of economic activities utilize ecological resources in more sustainable and ecologically efficient ways (for example, new renewable energy firms, agri-tourism, food processing and catering, and social enterprises), using and absorbing lay and indigenous knowledges. Importantly, these do not result in a net depletion of resources but, instead, provide cumulative net benefits that add value to rural and regional spaces in more integrated economic and ecologically (hybrid) ways (Kitchen and Marsden, 2009).

This incorporates an increasing and large variety of sustainable farm practices and systems based on agro-ecological principles, which take the form of 1. organic agriculture, 2. urban and peri-urban agriculture, 3. conservation agriculture or zero tillage, 4. low-input agriculture, 5. agroforestry, 6. aquaculture. However, the eco-economy does not just rely upon agro-ecological production, as it also incorporates processing, marketing and consumption practices, as well as making linkages with related land-based businesses (such as ecotourism, agroforestry and community-based renewable-energy schemes).

The question remains as to whether these practices can in fact 'feed the world'? Whilst we must recognize that 'solving' food security involves as much concern with allocation as it does with production, it is nevertheless important to ascertain if there is a basis of reliable and scientific evidence that suggests eco-economic practices and processes can contribute to food security as well as food sovereignty. And if there is, what are the impediments for mainstreaming these eco-economic processes? There are indications in the international literature that local-scale food systems are more sustainable because they have 'tight feedback loops', linking consumers, producers and ecological effects, enabling positive adaptive responses to negative effects (Sundkvist et al., 2005). This suggests that locally embedded food systems are more

resilient, and they do not necessarily deny meeting wider international and fairer trade commitments.

During the 2007 international Conference on Organic Agriculture and Food Security in Italy, it was stated that organic agriculture could produce sufficient food to feed humanity, on a global per capita basis (Scialabba, 2007). A recent FAO analysis, based on more than 50 cases in the USA and Europe, and just over a dozen studies in developing countries, showed that organic farms are more economically profitable, despite frequent yield decrease (Nemes, 2009). Higher outcomes are due to premium prices and predominantly lower production costs. These conclusions can also be drawn from studies in developing countries, but there *higher* yields combined with high premiums are the underlying cause for higher relative profitability.

A University of Essex survey of some 286 agro-ecological projects in 57 countries showed that sustainable agriculture has led to an average 93% increase in per-hectare food production (Pretty and Hine, 2001). The relative yield increases are greater at lower yields, indicating greater benefits for poor farmers and for those overlooked during recent decades of modern agricultural development.

Some of the most path-breaking examples of sustainable agriculture can be found in the developing countries of Africa, Asia and Latin America. The 'ensete' agroforestry system, for example, is a 5,000 year-old farm system practiced by the Gedeo people in the highlands of Southern Ethiopia (Kippie, 2002). The system is able to produce a large variety of products such as ensete, a high quality food, one of the best coffees of the world, honey, timber, and a superior race of highland sheep. The perennial cropping system has good resilience against droughts, thanks to the ensete plant, which captures water with its fan-shapes leaves and whose fibrous root-system also prevents erosion.

In Brazil, there are now some 15 million hectares under *plantio direto* (also called 'zero tillage'). Many of the Clubes Amigos da Terra, literally 'friends of the land clubs', have been closely involved in this transformation (see Pretty, 2003). Zero tillage means no mechanical soil disturbance, permanent soil cover, and judicious choice of crop rotations. In a few years the approach led to higher yields in crop production, decline in labour costs, a diversification into livestock as well as agro-processing, resulting in improved food security of small farmers.

In China, sustainable agricultural development is more government-led. There has been a rapid expansion of self-identified organic agricultural products in rural China, for example is the experiment in a Fushan village of 224 farm households. This has steadily derived benefits for the wider rural economy as well as the farms themselves (Lin, 2010). Analysis of the soils has shown improvements in the state of soil structure and nutrient composition due to the application of biogas residue. This also led to large reductions in fertilizer application and increases in crop yields.

From Ecological Fallacies to Real Sustainable Growth

There is enough evidence at a case-study level to question the legitimacy of the bio-economic paradigm as a possible answer to Malthusian predictions. Similarly, there is a need to question 'sustainable intensification', which Malthusians vibrantly articulate. However, this legitimacy will not be seriously challenged if the debates remain at the aggregated global level without critically confronting or transcending both the methodological problems of scale, diversity, context dependency and the

sanctity of generic (one-size-fits-all) technological solutions over more place-based technologies and knowledge systems.

Eco-economical approaches could 'feed the world', and thereby contribute to a 'real green revolution' – but this requires a more radical shift and the widening of debate amongst scientists and policy-makers about fostering new types of diverse and embedded agri-food eco-economies. This is a shift that many groups of urban consumers are now demanding. Indeed, the current economic recession and financial crisis, coupled with the growing food crisis, is giving further impetus to alternative agri-food movements. This involves rethinking established market mechanisms and organizations, more innovative institutional flexibility on a regional scale, interwoven with active farmers, consumers and wider civic society participation, along with a redirection and widening vector of science investments to take account of translating often isolated cases of good practice into mainstream agri-food movements.

It also needs to be recognized that the onset of bio-economic models can marginalize the capacities for eco-economies to flourish and to 'scale up' in particular places. The times are now urgent for this rethinking and debate, and the growing legitimacy of bio-economic solutions needs to critically inform more effectively why more and more people are going hungry, on the one hand, and becoming obese, on the other. In macro-economic and policy terms, these issues are now of such global and local concern that they will require national and international government bodies to actively incorporate agri-food security and sustainability into their foreign affairs and finance departments, rather than just their rural affairs or agricultural departments.

Towards Third Natures

The critical political economy of agri-food has tended to ignore, certainly to marginalize, nature in its framings of capitalist accumulation and appropriation. Whilst the alternative food agenda attempted to celebrate nature's distinctiveness as part of the analysis of alterity (see Goodman et al., 2011), it was conceptually difficult for political economists to absorb the complexities of social nature from within their own paradigm. As a result, nature was seen very much as outside of, or as a resistance to, full-fledged commodified relations. The post-structuralist turn, on the one hand, and the deepening sustainability crisis, on the other, has meant that more urgent attempts are needed to embrace a modified political economy of agri-food, which allows for the transformation, intervention and diversity of social nature to be conceptually incorporated. This has been pursued most effectively in the political-ecology literature (see Peet, et al., 2011; Perfecto, et al., 2010) and it is from this base that this following discussion draws most of its conceptual sustenance.

Boyd et al. (2001) and Smith (2007) have begun to explore the complex ways in which capital no longer commodifies nature but, instead, seeks to transform and intervene in it in ways that allow it to be harnessed for further rounds of capital accumulation. Mann and Dickenson (1978) and Henderson (1998) have given pioneering accounts of how 'second' nature emerges out of the distinctive features and disparities of labour and natural time associated with agricultural production and processing. It is the naturally 'awkward' character of agricultural production that has unleashed an historical series of attempts by science and capital to harness its inherent unruliness. This has occurred, first, through the attempts to remove small family farmers from the land by corporate capital and, second, by unleashing what

Goodman et al. (1987) call the arms-length appropriationism and substitutionism by agri-business through mechanical technologies and then biotechnologies. This tended to transform the agri-food labour process and governed it in ways that standardized and regularized commodities with some form of temporal consistency.

What is now clear is that this age of second nature is now insufficient (both conceptually and practically) for dealing with the continued vagaries of agri-food as a frustratingly unruly natural resource. Second-nature solutions lasted successfully and consistently for some time during the final 20 years of the twentieth century but they increasingly reached their limits, for a set of both internal and external reasons. Internally, the spasmodic and multiple food safety crises demonstrated that second nature, itself a scientifically and economic construction, could, as Ulrich Beck (1995) typified it, still 'hit back' or 'boomerang'. Much of the scholarship during the 1990s and 2000s has depicted this inherent and internal crisis of second nature and the labyrinthine ways in which the state and conventional technoscience attempted to assuage consumer and producers from one crisis after another (see Marsden et al., 2010). However, these internal pressures on the very unsustainability of second nature have indeed been externally challenged more radically by the wider and even less controllable 'landscape' pressures of global warming and resource depletion.

What both of these pressures have demonstrated is the inherent interconnectivity of what is described, here, as 'third natures'. The overall rise of environmental depletion and global warming, combined with the clear risks associated with 'second nature' foods, is transforming both the conventional and the alternative food systems in ways that force them to seek new 'more sustainable' third-nature solutions. This expresses itself through the differential and contested applications of the bio-economy and eco-economic pathways. These both display 'third nature' tendencies, albeit from different standpoints and definitions of scientific and spatial categories. What the contestations between them represent are new ways of patterning certain types of hybridities between the social and the natural. For instance, the bio-economy now espouses the need 'to be sustainable' and to be progressive as part of 'green growth' (OECD, 2011). This is seen as a particularly progressive form of sustainability for, as Carson (2007, p. 116) admits, 'the work of biological technologies will continue because the possibility of improved yields, increased near production, plentiful biofuels, and improved human health through new vaccines and replacement tissues are too scientifically, politically and economically enticing for humans to resist.'

Clearly, the bio-economy represents an important new third-nature assemblage not only to overcome the second- and first-nature obstacles to capital accumulation and appropriation, but also to do so while at the same time espousing progressive notions of sustainable development and ecological modernization. If technically it transforms nature itself by significantly manipulating natural reproductive processes in plants and animals, through largely privatized control over the techniques and practices that bring these about, more socially it can legitimate these processes by articulating that they are also reducing environmental externalities by a deeper control over nature through science. This is at the heart, for instance, of the new policy rhetoric around 'sustainable intensification'. Through the application of bioeconomym the question is no longer 'can science and capital overcome the distinctive natural features of food production processes?', but rather, 'how far can they manipulate the natural processes themselves such that they play by different rules which are socially as well as economically acceptable?' Under these conditions it is

not nature itself that provides the only technical barrier. Of equal significance is the social, political and ethical public acceptance of such processes.

Hence, a key component of the bio-economic third-nature experiment is the potential for it to create an alternative public oppositional status. In this sense, the rise of the eco-economy draws part of its nourishment from the bio-economy, for it sets itself in opposition to the very parameters around which bio-economic third natures are being produced. As can be seen from the examples noted earlier, these eco-economical alternatives become based upon a substantially different set of social and spatial nature parameters (Tables 1 and 2). They also relate to broader national and regional debates concerning multifunctional and sustainable rural development, as well as the recasting of urban–rural linkages and sustainable place making. As Table 3 summarizes, the eco-economy implies different and more disaggregated logics with regard to field and intervention science (over and above lab-based science), and provides a different emphasis upon place-based research and development, the role of local small and medium-sized companies (SMEs) and clustered developments (Van der Ploeg and Marsden, 2008). The emphasis is to innovate by means of recast-

Table 2. Key parameters.

Dimension	Bio-economy	Eco-economy
Ecological modernization	Weak	Strong
Geographical scale	Global, national and regional, increase of scale and miniaturizing as expressions of the de-coupling from local conditions	Regional and local, embedded in local environmental conditions
Economic model	Economic growth	Steady-state, small-scale economy
Time-scale	Short term, speeding up life cycles	Long term
Power	Corporate control	Citizens and consumer networks
Value-adding	Supply chain logistics	Value capture at local and regional level New networks
Science	Reductionism, biological engineering Aimed at interchangeable, composable parts for industrial production	Holistic approach, use of whole products.
Driving forces of regional development	Competition, clustering and socio-technical systems	Multi-functionality, networks and resilience
Environmental goal	Closed loops of energy, waste and minerals and eco-efficiency	Based on ecological conditions and natural processes
Social	No or limited connections with local communities	Embedded in local, social networks
Rural-urban linkages	Connected to metropolitan industries	Connected to rural-urban landscapes and consumer networks
Landscape	Eco-industrial sites, agroparks	Rural, agricultural services and leisure landscapes
Innovation	Knowledge spillovers between firms, technological innovation	Open innovation and ecology based
State influence	Hygienic-bureaucratic control	Facilitate bottom-up developments
Regional policies	Trade freeness, facilitate knowledge exchange & technical innovation, redistribution and congestion.	Multi-functional land-use, facilitate new interfaces, networks and rural-urban linkages

ing the relationships in social nature through reinventing first-nature principles in a third-nature context.

It is clear then from the arguments above that what we now witness as critical social scientists of agri-food is a highly 'third-natured' contested terrain in which radically different paradigms are competing for legitimacy over the control, not just over agri-food resources, but over the wider and more interconnected natural resource complex within which those resources sit (see Table 3). The social legitimacy of these different models with regard to their long-term sustainability prospects is becoming all the more central to their functioning as the overall crisis of resources and global warming acts out. The bio-economy thus needs to embrace progressive sustainability as a key goal if it is to find some form of legitimacy with consumers and the public. Similarly, as we have seen from the above analysis, if the eco-economy is to scale up or 'scale out', it needs the supportive facilitation and institutional legitimacy of national and regional governments.

Transition Mechanisms, Contestations and Spatial Configurations

As Table 3 depicts, a key dynamic in these processes of third natures becomes the particular and potential mechanisms by which the contestations between these opposing paradigms is acted out. What becomes significant here are the ways in which the different paradigms create the space for transitions to occur over time and space. I have listed here a set of key engagement concepts in this regard.

1. *Malliability*: the degree to which the dominant bio-economy is sufficiently flexible and malliable to external landscape pressures, on the one hand, and pressures to accommodate change from a range of socio-technical niches.
2. *Scalability*: as we see from some of the examples above, how capable are socio-technical niches of scaling up – given their diversity and context dependency?

Table 3. Adaptive capacity building: reconstituting urban–rural spatial relations.

Production Consumption Resource Spheres/ ARENA (Tucker et al 2006)	Landscapes/Regimes/ Socio-Technical niches	Transition mechanisms and contestations	Spatial expression configurations
Food/Fibre Transport (mobilities) Energy Household goods and services Waste Amenity services ICT	DYNAMICS Between contesting paradigms (e.g. Bio-economy, Eco-economy) DIFFERENT LOGICS R & D knowledges and innovation strategies DIFFERENT CORPORATE/SME Competitive strategies regarding ecological modernization	MALLEABILITY SCALABILITY REFLEXIVITY SPATIALITY ENDOGENEITY NOVELTY TRANSFERABILITY ADAPTIVE CAPACITY RESILIENCE (survival, restorative, adaptive) PATH CREATION/DEPENDENCE INTERDEPENDENCE	DOMINANT REGIME SPACES HYBRID SPACES CREATIVE ECO-ECONOMIC CLUSTERS COMMUNITY PLANNING DISPUTES AND ACTIONS NEIGHBOURHOOD POLICY – 'ACTION SPACES' PLACE-MAKING

Source: Marsden, 2011.

3. *Reflexivity*: how far will firms and governments become more reflexive in their understanding of the complexity surrounding real sustainable systems and the governance thereof? Can they create new forms of sustainable intervention using novel forms of eco-science?
4. *Spatiality, novelty and endogeneity*: how is diversity and context dependency to be more effectively articulated in ways that demonstrate more scientific and political authority? How can forms of endogeneity and self-sufficiency be mainstreamed without calls of state and regional protectionism?
5. *Transferability*: how can more effective mechanisms and meeting places be formed for the transfer of best practice? Can new diversified roadmaps be assembled that assist local actors in innovating?
6. *Adaptive capacities and resilience*: how can the lock-in tendencies of the bio-economy be countered by the creation of new forms of territorial capital (combinations of social, ecological and economic capitals)? By what means can local and regional eco-economies build restorative and adaptive forms of resilience? Can sustainable communities move from survivalist to adaptive forms of resilience through redefining their agri-food networks?
7. *Path creation rather than path dependence*: can localities and regions build path creation strategies through new agri-food networks: and, if they can how do they ensure that these become sustainable over time and space? Can new food spatial strategies help to build path-creation?
8. *Interdependence*: clearly agri-food mobilization needs to be linked to wider resource spheres such as transport and mobilities, energy, household goods and services, waste, amenity and ICT. How can more conducive and interdependent links be created and sustained between these sphere as part of broader sustainable place making?

Whilst these key and interlocking concepts are not meant to be exhaustive, they do represent some of the key lenses through which to explore the dynamics and dialectics that exist between the contested relations and patterned hybridities of the current bio- and eco-economies. Moreover, the degree to which these are problematized and spatialized will clearly affect the development and further potential of real sustainable development in the form of a more mainstreamed and diverse eco-economy. The degree to which they are studied, and enacted, will be a key feature of how successful regions and localities will become in building more sustainable and resilient food systems – food systems that interlock progressively with other sustainability resource fields (outlined in Table 3). Their mobilization and enactment will, of course, be different in different spaces – with some regions (such as much of the Dutch countryside as well as parts of Southern Portugal) enacting both models in tandem.

These articulations will have to be conditioned by a critically reflexive understanding of the territorial potentials and assets of the different spaces. In this sense, there are no generic models of sustainable progress but there are useful 'road maps' and pathways to establish based upon the redefinition of place-based assets and social and natural resources. These will depend partly upon a more engaging and interventionist form of sustainability science, which gives more regard to the differential politics and social ecology of place. In the last column in Table 3, we may be able to identify different spatial expressions of the interactions between the bio-economy and eco-economy, as these sets of parameters and concepts act out contingently.

It is important to recognize here that such spatial expressions should not be read simply as outcomes of the processes and parameters outlined and proposed here. Rather, they represent a set of spatial contingencies that, in themselves, can interlock, re-enforce or weaken the sets of transition mechanisms and contestations outlined above. Nevertheless, they do create new spatial routines and infrastructures (like new urban food hubs, or clusters of mega-farms) that could have long-term impacts on the degree of real sustainable spatial development. The important point to note is that the acting out of the parameters of transitions and contestations outlined above are having, and will have, profound implications for the reconstitution of both urban and rural spaces and their interrelationships. This leads us to consider what types of third-nature food-scapes might emerge.

Conclusion: Differential Spatial Expressions of the Bio- and Eco-economies – Towards Third-nature Foodscapes?

It is reasonable to assume, in Europe at least, that we will see the co-evolution of clusters of eco- and bio-economy in different regions. The slow and somewhat inertial reform of the CAP will also reinforce this co-evolution, with its continued attempts to preserve and protect some types of farming and food-scapes, at the same time as allowing some regions to progress the intensive bio-economic model. In parts of the UK and the Netherlands, for example, we observe the move towards 'mega-farm' developments, especially since the re-establishment of a renewed productivist logic following the food security crisis (Spaargaren et al., 2012). Whilst some of these still remain at the planning stage and are creating significant local and 'third nature' opposition, the process of intensification (for instance, in the dairy sector in the UK and in the pig and poultry sectors in the Netherlands) continues at a rapid pace. This follows the principles of the bio-economy and sustainable intensification and is likely to be a dominant political discourse in the lowland regions of Northern Europe. We should remember that these are regions that will be affected significantly by climate change, and especially water shortages, over the next 20 years.

In upland regions, however, the eco-economy is gaining a far stronger spatial grip. In South-west England and in Wales, for instance, eco-economical clusters are proliferating with the dominant regime, receding as it restructures itself around ever more concentrated processing and retailing outlets. A significant minority (up to 30% in Wales, see WRO, 2010) can be identified as multifunctional farms, providing a range of agricultural value-added, amenity, and environmental activities and income streams. Moreover, city-based and region-based food strategies, for cities such as Plymouth and Exeter and for Wales as a whole (see WAG, 2010) are gaining ground, and are linking more multifunctional and sustainable agricultures to new sustainable consumer and health agendas.

We see, then, a new co-evolutionary process acting out spatially and regionally in the UK and Netherlands, with diverging innovation and economic systems reinforcing both intensive and eco-economic models – and with the multilevel state also presiding over this spatial and sectoral divergence. Urban-based consumers and environmental amenity groups become a strong mediating force, linking food provision with health and well-being. This new insertion is beginning to affect other key actors such as retailers and value-added processors in rural areas. In some ways these trends are recreating the concept of the ecological city region (Forman, 2008). Forman (2008) argues that through both economic and new ecological awareness

(that is, third-nature thinking) what we are witnessing now in many parts of the North and the South are sets of dynamic city regions, situated in their wider hinterland contexts, associated with climate change (mitigation and adaptation, biodiversity loss and partial restoration, watershed and amenity concerns). Clearly, many of the articulation mechanisms outlined above are now acting out, not just sectorally, across the food, energy, and transport fields – but also in a reconstituted 'city region' context. This again re-ecologizes the spatial economy and brings in food as a key mobilizing force for reconstituting these spatial relations.

The divergence of agri-food developmental pathways is not new (see Morgan et al., 2006). What is new is that the eco-economic initiatives (and those associated with the potentially more malleable bio-economy) are both expanding and deepening their grip on different spatial scales. This is giving all the more vibrancy to the growing consumer and public consciousness about the unsustainability of current socio-ecological conditions.

A key and final question, here, concerns the role of the state and its policies (or non-policies) with regard to these co-evolutionary processes of bio-economy and eco-economy. At international and many nation-state levels there had been much discussion about the continued neo-liberal state and its role in stimulating the bio-economy, corporatization and financialization (Lawrence et al., 2010; McMichael, 2011). This is a very active and transcending governance process, which continues to 'unknow the known' in the sense that it continues to apply the ecological fallacies mentioned above to the new and pervasive landscape pressures the world now faces. In short, it creates a dominant and aggregated policy discourse, which then attempts to marginalize eco-economical niches.

At the same time, we have begun to articulate this in the UK – for instance, around the debates concerning agricultural and agri-food multifunctionality (see Marsden and Sonnino, 2008) – while witnessing the fragmented but nevertheless significant development of local, regional and city-regional policy formation. This represents a new form of reflexive governance in that it is attempting to embrace the complexities of the current state of unsustainability through a new set of flexible spatial and integrative categories. Hence, the recognition of the growing salience of the ecological city region (as with Forman, 2008) is being matched by new levels of political and civic activity at that scale with regard to sustainable agri-food movements. In the UK most of the major cities now have some form of 'food strategy' – be it formed around food charters (Brighton), food councils (Bristol), or the development of new types of food hubs and trusts (Plymouth, Exeter, Stroud, see Sonnino, 2011).

Over the past five years place-based regional, city-region and in some cases small town and village networks of reflexive governance have demonstrated how innovations can be made to bolster and articulate collectively the above-mentioned transition mechanisms. These movements exemplify the challenges of the dimensions identified concerning scalability, transferability, resilience, path creation, and dependence. These new reflexive arrangements are potential vehicles for more-effective and reflexive institutional building around what might be called 'niche amplification'. In some ways they are 'interstitial communities' (Wright, 2001) in the sense that they are often formed and developed outside of the main governance institutions. However, the degree to which the latter are, indeed, malleable for these institutional communities to be scaled up, or mainstreamed is a key contingent question for further research. As they mature they are creating new and innovative place-based communities of practice, which can, in turn, lead to scalability and more

effective institution building. Perhaps the most well-documented of the evolutionary processes concerns the development of the Toronto food council. As Friedmann (2010, p. 168) argues in a seminal piece called 'scaling up':

> 'I understand the Toronto community of food practice to include more than networks among individuals, and more than their skilful access to institutional resources. It also includes the specific functions of a municipal government body, the Toronto Food Policy Council, and a vibrant network of non-governmental food security organizations, especially the largest, FoodShare. These organizations have provided strategic resources, as well as opportunities to experiment and learn from others' experiments, to the diverse individuals who move through them, usually leaving behind new projects and ideas. These institutions are unique in linking a wide range of top-down and bottom-up initiatives that emerge and evolve within and across a range of 'sectors' – public, voluntary (NGO), and market.'

New institution building based upon vibrant but diverse communities of practice becomes a key dimension of scalability in place-based sustainability initiatives, both related to food and other key resource areas (see Marsden et al., 2010). Indeed, they seem to cluster in some areas and not in others, and so a key undertaking is to understand conceptually and empirically the evolutionary dynamics of this eco-economic clustering.

Reflexive governance forms, and associated institution building, re-enforce a new innovative spatiality of alternatives to the dominant agri-food regime by embedding and anchoring their communities of practice in and through space. In this sense they are harbingers of a new agri-food, and more widely sustainable, form of place making and connectivity. In the Toronto city region, for instance, FoodShare links with over 200 agricultural suppliers, connecting them to food outlets in the city. Food events are held bringing together over 400 suppliers, restauranteurs, chefs and procurement bodies. Place making and governance are still highly significant factors in the alternative food movements. But, the way they are being reconstructed around new patterned hybridities of ecology and economy represents a key element in current agri-food innovation and sustainability.

In many respects, conventional agri-food policies and governance structures – especially those at the supra- and national levels of EU and UK governance – are not catching up with or understanding the vibrancy of these interstitial innovations in reflexive governance. Traditional agricultural policy is still sectoral in nature, top down, and takes, by and large, a (supply chain) commodity approach rather than one of (complex and configurative) 'place making'. It also attacks and attempts to marginalize any hint of co-operation between local producers and processors (see EFRA, 2011). In the UK, for instance, despite the real need for a reintegration of planning, rural and agricultural policies at the national level are part of a conventional system. This is one based upon an unhappy mix of neo-liberalism and market interventions, which support food processing, retailing and catering oligopolies and continue an active process of 'unknowing'. The growing crisis in food security in this context is creating a chaotic 'neo-productivism' ever more reliant upon the bio-economy and contradictory notions of 'sustainable intensification'. In these circumstances, we need to focus our attention for the development of real agro-ecological and sustainable alternatives in the agri-food sphere at least partly at the city and regional levels. These conclusions suggest the need for an ambitious comparative

research effort on the part of scholars of agri-food, such that a stronger research base can counter the singularity and ecological fallacies associated with the bio-economic paradigm.

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Meat Safety: A Brief Review on Concerns Common to Science and Consumers

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Abstract. Meat safety is a multidimensional concept, and there are reasons to believe there is an information asymmetry between consumers, producers and safety authorities along the supply chain. Within this framework, this article puts together consumer concerns about meat safety, the current scientific evidence and the existing legal framework in the EU, trying to unveil possible fields for quality differentiating strategies. As such, this article does not add new data to the food safety or consumer issues fields. Rather, it allows a new perspective by associating two different research areas.

Assessing the reported consumer concerns regarding meat, it is not possible to define one specific worry as more prevalent or frequent. Still, the presence of drug residues in meat is a concern often shared by consumers of several types of meat in many different European countries. Interestingly, it is also an open scientific question. Research on the association between the presence of anti-bacterial residues in meat and microbial resistance is frequent. However, there is still no consensus on this subject. Still, even in the absence of such a consensus, it is a relevant issue for meat production, public health and consumer interest.

Regarding the EU legal framework, the food safety legislation has accompanied scientific development, even acting preventively in questions without scientific consensus, as in the case of the use of anti-bacterials as a feed additive. Nevertheless, even if the use of anti-bacterials in food animals is covered by several legal documents, it is still a concern for consumers. This suggests that some consumers may be interested in meat products that relieve their distrust. Therefore, there may be grounds for the development of a differention strategy, aiming at segments willing to pay premiums for meat with increased guarantee of anti-bacterial residue control.

Introduction

Over the last decades within the European Union (EU) consumer concerns about food have slowly shifted from food security to food safety. As food availability is no

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longer a concern within European borders, consumers became more interested in and alert to the safety and other characteristics of their food. In this context, the last two decades have witnessed impressive changes in consumers' perceptions of food safety in general and meat safety in particular.

However, meat safety is a complex concept, as there are many hazards and challenges to be considered. Hazards include microbial pathogens, resistance to anti-bacterials,[1] food additives, chemical residue and other possible contaminants, to name a few (Knowles et al., 2007). Meat safety challenges involve traceability issues, pathogen and chemical residue detection problems, regulatory issues, addressing consumer concerns, etc. (Sofos, 2008). Moreover, meat safety must be regarded as an increasingly global matter due to the increase of meat consumption around the world, exposing higher numbers of consumers to potential hazards.

In view of such diversity of hazards and challenges there are reasons to believe there is an information asymmetry between consumers, producers and safety authorities along the supply chain (Loader and Hobbs, 1999). Producers, sellers and safety authorities have more and better information about the potential hazards and the dimension of risk associated with the consumption of a given food product. The asymmetry can be associated with the (intentional or not) unavailability of information for consumers, but also with differences between scientific evidence and consumers' perception (Miles et al., 2004; Yeung and Morris, 2001b). This information asymmetry is even more relevant if meat safety is regarded not only as an individual, private matter (the guarantee that a piece of meat will not result in illness) but also a public health matter, as it is when one considers public health issues as those related with drug residues and resistance to anti-bacterials.

Even so, food poisoning in the sense that some food products will make one ill in an individual and immediate sense is no longer a present concern for most consumers. Most of the time, consumers trust their food will not make them ill, and do not even consider the possibility that food available for purchase can have deleterious effects for their health. Scientific developments in the food safety field, together with the evolution of European food safety laws and enforcement as well as food safety communication, have played a role in consumers' ability to gain and maintain such trust.

Nevertheless, food safety concerns have assumed new proportions since the 1980s, as several food scares in Europe have taken unprecedented dimension, particularly when food products of animal origin are considered. One can remember cases like BSE, dioxin residues, E. coli, etc. (Knowles et al., 2007). This increased impact derives not only from (now global) media coverage, but also from the diffuse (and therefore frightening) hazardous effects associated with these issues. For most consumers the health consequences related with these food scares were most certainly hard to fully comprehend. However, regarding that some of these health conditions may be lethal they were always most likely perceived as very severe.

In such context, whatever the attitudes consumers have towards food safety they might have major influence over their consumption options. If food safety concerns are present at the shopping decision moment, consumers may choose to buy a substitute product, as it occurred during the BSE crisis (for data on the substitution of beef consumption for other meats, see Lloyd et al., 2001). If such behaviour becomes generalized it will have obvious consequences for the replaced product market share.

Moreover, consumers are known to make irrational choices and have irrational concerns and preferences under certain circumstances, namely those related with

their safety, over-estimating some risks that are unlikely to occur and under-estimating others. Even when information and transparency are abundant, often consumers seem not to be able, or interested in, processing that information properly (Verbeke et al., 2007). It is therefore an objective of this article to go through the evolution of consumer concerns and perceptions regarding meat and meat products in recent years, and also whether concerns relating to meat consumption actually meet safety hazards mentioned in the scientific literature, or if they represent problems of information asymmetry between consumers and scientific evidence.

In this perspective, an overview of recent literature about consumer concerns on meat safety enables the shedding of light on the issues that are more frequent and common throughout European consumers. It should be particularly interesting to verify whether there are concerns common to consumers in different countries, with different backgrounds and consumption habits. An exhaustive literature review was not the authors' objective, and there is no intention to entail any sort of meta-analysis of the research published around this issue. The focus is centered rather on trying to understand whether there are expressed consumer concerns on food safety that have links with the food safety issues addressed by the scientific literature and the existing EU legal framework.

Finally, this article also intends to make an association between consumers' perceptions and concerns about meat safety, the scientific evidence surrounding this food product and the existing legal framework, trying to unveil possible fields for quality differentiating strategies. As such, although the article represents no new contribution or new research on either the food safety field or consumer issues, it aims at putting together two research areas usually not combined. Therefore, the unquestionable speculative character assumed here is nevertheless compensated by the unveiling of the not commonly investigated connections between these two fields. In order to analyse such connections, this article is organized as follows: Section 2 includes a review of European consumer meat-safety concerns; Section 3 is dedicated to an analysis of the scientific evidence supporting consumer concerns about anti-bacterial residues in meat; Section 4 will then examine the EU's specific legal framework on anti-bacterial and other residues in meat; Section 5 concludes by getting together consumer concerns, the European legal framework and potential quality differentiating strategies.

European Consumer Concerns about Meat Safety: A Brief Review

Generally within the EU, public policies have been able to act ahead in preventing food safety hazards (embracing the EU's precautionary principle among other aspects) although there are known cases of reactive (as opposed to preventive) legal acts. BSE is probably the most noticeable example, as the establishing of new regulatory institutions and legislation were triggered by this food scare (Knowles et al., 2007).

Still, in spite of the entire legislative body, and all the European institutions associated with its enforcement, meat safety has been described to be a concern to many European consumers. Many examples of such stated concerns can be found across the literature. Glitsch (2000) and Henson and Northen (2000) report concerns related with beef, poultry and pork safety among German, Irish, Italian, Spanish, Swedish and British consumers; McCarthy (2000) found that 55% of the surveyed Irish consumers were concerned about the safety of meat consumption; Yeung and

Morris (2001a) describe concerns about poultry safety in the UK; Cicia and Colantuoni (2010), in a meta-analysis, detected the increasing importance of meat attributes such as safety among European consumers; Angulo and Gil (2007) found loss of confidence in meat products in Spain, and that beef was considered the most risky food product among the surveyed consumers.

These reported concerns may be a problem for food markets in Europe (de Jonge et al., 2004; Angulo and Gil, 2007; Savadori et al., 2007), as purchase likelihood is strongly correlated with risk perception (de Jonge et al., 2004; Yeung and Morris, 2001b). For example, the beef market instability caused by BSE was strong enough to actually be acknowledged by the EU in Regulation 1760/2000 (*OJ*, L 204, 11 Aug. 2000, pp. 1–10).

Yet, food safety is not a permanently present concern for many consumers, either during food purchasing or consumption. On the contrary, it seems that it is mostly taken for granted as an inherent product attribute that most consider non-negotiable (Angulo and Gil, 2007; Verbeke et al., 2007). Regarding the type of research often done in this field, however, consumer concerns usually emerge upon questioning. Therefore, they may not reflect ideas present while shopping, which can generate inconsistencies between research data and market data. The meat sector has faced periods of great pressure, partly as a consequence of several food scares of recent years such as BSE in beef (Gracia and Albisu, 2001; Beaumond et al., 2006), dioxins in poultry and pigs or Salmonella outbreaks in poultry (Knowles et al., 2007). Additionally, foot and mouth disease and avian influenza also had influence on European consumers' buying behaviour, although they pose no threat to human health (Knowles et al., 2007). One could therefore suspect that concerns about such issues would appear at the top of the European consumers' rankings when asked about food safety risks and concerns.

However, more recent data seem somewhat conflicting, at least when BSE is considered. A *Eurobarometer* report (European Commission, 2006) mentions that 50% of consumers still express some concern about this disease. Similar values were obtained by O'Donovan and McCarthy (2002) in Ireland. On the other hand, there are results showing that the level of concern of BSE was no greater than other safety issues (Henson and Northen, 2000; Verbeke et al., 2010). Perhaps as time goes by following a given food scare, more consumers tend to disregard such occurrence, progressively regaining some trust and recovering old consumption patterns (Knowles et al., 2007).

As such, there are numerous other safety issues regarded as a concern by consumers. Whatever specific hazard is mentioned first depends on the meat product considered, on the relevance food safety issues are having in society (and in media in particular) in that given period, and also on demographic factors, previous experience and risk perception, among others (Buzby, 2001; Gracia and Albisu, 2001 Angulo and Gil, 2007; Sofos, 2008). Nevertheless, apart from the already mentioned concerns about food hazards related specifically with recent scares, there are issues more commonly referred to by consumers without specifying a meat product or geographic region.

One such issue is the presence of drug residues in meat. Veterinary drug residues such as antibiotics are frequently stated as central among the concerns about meat safety expressed by some segments of European consumers (Verbeke et al., 2007).[2] Several specific examples can be quoted from the literature. For example, Henson and Northen (2000) report high levels of concern among consumers from six Euro-

pean countries about antibiotic residues. Such concerns were often ranked second in several of these countries, right after concerns about hormone residues. O'Donovan and McCarthy (2002) found antibiotics to be among the top concerns of Irish meat consumers.

Verbeke and Vackier (2004) found several segments of Belgian consumers to be worried about antibiotics in fresh meat, and those concerns were ranked first when compared to other meat safety risks (namely dioxins, BSE and harmful bacteria). Miles et al. (2004) found more than 50% of the surveyed UK consumers to be extremely worried about the use of antibiotics in animal production. Krystallis and Arvanitoyannis (2006) describe a cluster of Greek consumers particularly concerned about meat chemical safety (i.e. its content in antibiotics and hormones).

Concerns about this specific chemical hazard are also mentioned in reports about consumer's perceptions about poultry meat (Glitsch, 2000; Yeung and Morris, 2001) and pork meat (Glitsch, 2000). Mørkbak et al. (2010) estimated a positive willingness to pay among Danish consumers for pork produced under tighter rules regarding the use of antibiotics. Finally, a European survey points out the same conclusion, stating that 68% of European consumers are 'very worried' or 'fairly worried' about 'residues in meat like antibiotics or hormones' (European Commission, 2006).

In Portugal, during focus groups conducted in 2009 aiming at proper scenario design for a stated preference survey (Viegas et al., 2011), antibiotic residues in meat were often spontaneously referred to as a beef safety concern for many participants. The same reactions were also found in a series of focus group meetings in Spain (Carlos et al., 2005) and in research in the UK (Miles and Frewer, 2001).

As mentioned above, hormone residues are also a concern for some segments of European consumers (O'Donovan and McCarthy, 2002; Miles et al., 2004; Tonsor et al., 2005; European Commission, 2006; Knowles et al., 2007), which may seem contradictory considering that the use of substances with hormonal action in farm animals is prohibited within the EU (with legally defined exceptions, see Council Directive 96/22/EC, *OJ*, L 7, 10 Jan. 1996, p. 9) (Reig and Toldrá, 2008). These concerns about chemical hazards such as the presence of antibiotics or hormones in meat may be justified by the 'unknown' factor, i.e. consumers have less knowledge about such hazards and consider them to be more unnatural and unfamiliar to them, thus attributing them a higher risk (Yeung and Morris, 2001; Miles et al., 2004).

Another meat safety issue of concern to consumers is microbiological safety. More specific references are related to the presence of pathogenic micro-organisms like Salmonella or *Escherichia coli* (namely VTEC O157:H7) (Miles and Frewer, 2001; O'Donovan and McCarthy, 2002; Beaumond et al., 2006). These microbiological risks are more commonly associated with poultry meat, where in fact Salmonella and Campylobacter are the commonest food-borne bacteria (Glitsch, 2000; Yeung and Morris, 2001), and with pork meat (Glitsch, 2000).

However, there seems to be a somewhat lower level of concern about microbiological risks, even if these are considered the main food hazards for the public among the scientific community (Miles et al., 2004). Low concern about this issue may have several sources. First, there have been no recent widespread food scares related with microbiological hazards in meat. Furthermore, most meat poisoning situations due to pathogenic micro-organisms that do occur are localized (in the sense that they affect few people in a given location) and somewhat benign, and do not reach the media as a problem for society in general.

Also emerging in the literature about food safety concerns are GMOs. There are several reports of a very strong mistrust from European consumers about food products that include GMOs (Bredahl, 2003; Burton et al., 2001; Costa-Font et al., 2008; for a meta-analysis on this subject, see Dannenberg, 2009). However, this is not an issue arising very often when meat safety is considered. It is possible that feeding cattle with GMOs is something most consumers do not consider or even have much knowledge about.

Going through the reviewed information related to meat consumers' concerns, it is not possible to define one specific concern as absolutely more prevalent or frequent. The main concerns manifested by consumers depend, for example, on the type of meat under survey. Nevertheless, a safety issue that often emerges as one of the top worries for European consumers is the presence of drug residues such as antibiotics in meat. This particular hazard shows up as a concern shared by consumers of several types of meat and in many different European countries. Therefore, the following section analyses some of the scientific literature on why this issue is relevant in terms of meat production, public and animal health.

Are Anti-bacterial Residues in Meat a Concern?

Meat safety faces uncountable challenges in today's globalized markets. Sofos (2008) and Nørrung and Buncic (2008) elect Campylobacter and Salmonella as the most common pathogens affecting meat safety. Besides these and other microbiological hazards, technological hazards (those related with genetic modification) or contaminant-related hazards (pesticides and drugs) (Yeung and Morris, 2001; Knowles et al., 200) are widely described and debated in the literature concerning meat safety. Within this broad spectrum of hazards and challenges, it is only comprehensible that consumers are uncertain and concerned about meat safety.

Nevertheless, the presence of drug residues such as anti-bacterials in meat does emerge as a somewhat consistent and persistent concern in the literature on consumer perceptions, referred across different countries and regarding different types of meat. At the same time, research on anti-bacterial residues in meat and meat products and microbial resistance is frequent when literature on food safety, veterinary medicine, environmental safety or public health is reviewed. Moreover, as it will be seen further ahead, this issue has been subject to extensive legal regulation.

This problem is multi-faceted not only in terms of its origin, but also concerning the consequences, as it has implications for public health, animal health, the environment, biodiversity, and also for global markets, societies and policy-makers. As will be described, the emergence of bacterial resistance to anti-bacterials has great implications for the availability of efficient tools to fight human infections on a global level. Also, the environmental consequences go far beyond the local consequences of pollution due to animal production. Finally, economic and social aspects should be taken into consideration, namely those related to livestock producers, the pharmaceutical industry, international trade, and consumers. This means that whatever regulatory measures are taken (based or not in scientific evidence), there are many (and potentially conflicting) points of view to be considered.

An exhaustive description of the occurrence of anti-bacterial residue, of the mechanisms of microbial resistance or of control measures is beyond the scope of this review. The main focus will be on exposing why this issue is important in terms of meat production, public health and consumer interest.

In livestock production, anti-bacterials can be used for three purposes: therapeutics, prophylaxis and growth promotion (Sarmah et al., 2006; Azevedo et al., 2010). Growth promotion effects are generally obtained through the application of sub-therapeutic doses of anti-bacterials as feed additives (Doyle and Erickson, 2006; Silbergeld et al., 2008) and it is more frequent in poultry and pig production than in beef production. It can be said that the use of such anti-bacterials is beneficial as it improves the conversion rate (among other possible effects), thus improving profitability (Azevedo et al., 2010).

Whatever the application purposes, anti-bacterial residues reach the environment. The most common paths include animal product residues, waste disposal, soil, water and food crop contamination, etc. Environmental contamination occurs mainly because animals excrete high proportions of active forms of the supplied anti-bacterials, which is an effect also present when sub-therapeutic doses are used (Sarmah et al., 2006; Silbergeld et al., 2008). Finally, consumers can have direct contact with these residues either through environmental exposure or through the ingestion of contaminated food products. Exposure can translate into direct effects at an individual level, such as allergic reactions, carcinogenic effects, digestive problems, etc. (Reig and Toldrá, 2008; Azevedo et al., 2010).

Even more significant, however, are the indirect consequences of anti-bacterial residues, which raise important public health issues. The World Health Organization (WHO) and the European Food Safety Agency (EFSA), as well as many research reports, consider that microbial resistance to anti-bacterials is one of the more serious and emerging problems in public health across the world (Doyle and Erickson, 2006; Reig and Toldrá, 2008; Hugas and Liebana, 2009).

The most serious consequence of microbial resistance is the decrease in the useful life of anti-bacterials for combating human or animal diseases (Silbergeld et al., 2008; Sofos, 2008). This can be verified through increased frequencies of treatment failures and increased severity of infections, as well as the occurrence of infections that would not have occurred otherwise (Angulo et al., 2004). This becomes even more serious when it is remembered that no new molecules have been developed recently. There are therefore no new alternatives to those already subject to microbial resistance (Acar and Moulin, 2006; Azevedo et al., 2010).

Resistance can be acquired through a long evolutionary process of responding to environmental pressures that cannot be avoided (intrinsic resistance) (Doyle and Erickson, 2006). Microbial agents can also develop cross-resistance mechanisms, meaning they can become resistant to several antibacterials (especially, but not only, if these agents have similar actions) (Acar and Moulin, 2006).

However, besides the development of intrinsic resistance, there is a more concerning phenomenon of acquired resistance. These acquired resistance mechanisms are developed much faster than the intrinsic resistance phenomenon, and the exposure of bacteria to sub-lethal (or sub-therapeutic) concentrations of anti-bacterials is a particularly effective way of selecting resistant strains (Silbergeld et al., 2008).

Several sources claim that the usage of anti-bacterials in livestock is a major driving force for the selection of resistant micro-organisms, as well as the transmission of zoonotic and commensal microbial agents from animal populations to humans (Angulo et al., 2004; Silbergeld et al., 2008; Azevedo et al., 2010). The livestock sector is the largest user of anti-bacterials worldwide (Sarmah et al., 2006; Silbergeld et al., 2008) potentiating the transmission of genes and mechanisms associated with resistance (Phillips et al., 2004; Sarmah et al., 2006).

Selective pressure often interacts within the environment, animal and human populations, amplifying the resistance phenomenon and the spreading through different species, with the help of fast and efficient bacterial reproduction (Acar and Moulin, 2006). It is not possible to measure the impact of these selective mechanisms on resistant microbial species in human populations, but there is undoubtedly a catalytic effect, potentiated by the intensity of livestock production and the consequent intensive use of anti-bacterials (Silbergeld et al., 2008; Azevedo et al., 2010).

Multiple research claims to have established a causal relationship between (subtherapeutic or other) anti-bacterial administration in livestock and the growing incidence of anti-bacterial resistance in human medicine (Angulo et al., 2004). For example, Silbergeld et al. (2008) refer to consistent temporal relationships between the introduction of anti-bacterials into livestock production use and increases in the prevalence of resistant microorganisms, among other evidence.

However, other authors claim that insufficient evidence has been found to prove that relationship beyond doubt (Phillips et al., 2004; Smith et al., 2005; Presi et al., 2009). Similarly, some authors argue that meat and meat products can act as a vehicle for the spread of bacterial resistance to various anti-bacterials, besides spreading anti-bacterial residues, although there is also no consensus on this subject (Phillips et al., 2004; Presi et al., 2009). Finally, it must also be remembered that incorrect use of anti-bacterials is as serious in human medicine as in livestock production, which cannot therefore be the only sector to blame for resistance emergence (Sarmah et al., 2006; Azevedo et al., 2010).

Measures such as a worldwide ban of non-therapeutic use of anti-bacterials (Silbergeld et al., 2008) or the establishment of precise guidelines for the prudent use of anti-bacterials in veterinary medicine as defined by the World Organisation for Animal Health (OIE) (Acar and Moulin, 2006) have been suggested, but not without controversy (Smith et al., 2005). The WHO also has a global strategy for the containment of anti-bacterial resistance (WHO, 2001). The application or evaluation of such measures and guidelines are nevertheless beyond the scope of this article. However, the specific regulatory measures that have been put in place to deal with this issue in the European Union are worth analysing. This will be done in the following section.

European Union Legal Framework on Anti-bacterial and Other Residues in Meat

Quality management systems for food safety are based in public legislation and in private standards, both having the Codex Alimentarius as background. Although it is not the objective of this article to thoroughly describe any of these private quality systems, brief reference should be made.

Private quality management systems have been developed mostly by the food distribution sector and generally include the food safety legal requirements, while trying to complement them. Some examples within the EU include GLOBALG.A.P. (G.A.P. – Good Agricultural Practice; formerly EUREPGAP – Euro-Retailer Produce Working Group), BRC (British Retail Consortium), IFS (International Food Standard), EFSIS (European Food Safety Inspection Service) and GFSI (Global Food Safety Initiative). These systems are business-to-business management systems that can include one or several standards, such as good agricultural practices, HACCP, ISO, etc. Therefore, they are not directly visible to consumers.

Regarding the public legislation, the EU has an impressive body of legal documents that relate to food safety. In broad terms, there is general food safety legisla-

tion, applicable to all kinds of food, and there is more specific legislation directed towards specific products. Specific food and feed law covers (among many other subjects) food residues and contaminants.

To fully understand and explain the implications of such legal and institutional framework would be an overwhelming task. Thus, to make an exhaustive review of all the legal documents concerning this issue is not the goal of this article. Moreover, no technical legal analysis is pretended, as it would exceed the authors' specific competences.

The objective is therefore to simply list the legal documents that regulate and control the use of antibacterial drugs in meat production as well as the presence of drug residues in meat products throughout the EU. This food safety issue was recognized by the EU, the WHO and the Codex Alimentarius as a growing (but still non-consensual) concern, because of the possible existence of a link between antibacterial residues in meat and the development of microbial resistance, therefore justifying the need for proper regulation.

The review aims not so much at technical legal aspects, but at trying to present an organized and summarized version of the most relevant legislation (Table 1). More importantly, this review intends to understand if there are links between these documents and consumer confidence or concerns.

Table 1. Most relevant legislation regulating and controlling the use of anti-bacterial drugs in meat production, as well as the presence of drug residues in meat products throughout the EU.

Regulation (EC) No. 470/2009	• Describes the procedures to evaluate the safety of residues of pharmacologically active substances in accordance with human safety requirements. • Establishes a maximum residue level (MRL) for pharmacologically active substances used in veterinary medicinal products for each relevant food product (eggs, meat, milk, etc.) for each relevant species. • Annexes include all the pharmacologically active substances with marketing authorization used in veterinary medicinal products, according to their MRL status. • The administration of veterinary medicinal products containing pharmacologically active substances included in Annex IV (such as nitrofurans) to food producing animals is prohibited within the EU.
Council Directive 96/22/EC	• Prohibits the use of beta-agonists and other substances with hormonal or thyrostatic action in livestock farming, once it is acknowledged that their action may be dangerous for consumers and may also affect the quality of food-stuffs of animal origin. In no case can an animal to which one of these substances has been applied enter the food chain.
Council Directive 96/23/EC	• Establishes the measures that EU Member States should take to monitor substances and their residues in both live animals and animal products. • Defines measures to monitor the substances and groups of residues such as substances with anabolic effect and unauthorized substances, veterinary drugs and contaminants.
Directive 2001/82/EC	• Regulates the prescription and distribution of veterinary medicinal products intended for use in food-producing animals. • Defines the withdrawal period as the period necessary to protect public health, between the last administration of a veterinary medical product to animals and the production of food-stuffs from such animals.

Sources: Regulation (EC) No. 470/2009, *OJ*, L 152, 16 June 2009, pp. 11–22; Council Directive 96/22/EC, *OJ*, L 125, 23 May 1996, p. 3–9; Council Directive 96/23/EC, *OJ*, L 125, 23 May 1996, pp. 10–32; Directive 2001/82/EC, *OJ*, L 311, 28 Nov. 2001, pp. 1–66.

It can be suggested that this link between consumers and the legal framework surrounding food products is intended by the EU, as the general food law (Regulation (EC) No. 178/2002, *OJ*, L 31, 1 Feb. 2002, pp. 1–24) establishes objectives for the protection of consumer interests and tries to ensure that consumer confidence is secured. Therefore, it could be expected that the following legal documents go towards addressing consumer worries.

With regard to the particular subject of this article, it can also be said that food safety legislation has accompanied closely the scientific development in the food safety area. Even in questions still not subject to scientific consensus, the EU has acted preventively, based on the precautionary principle, as in the case of the use of anti-bacterials as a feed additive.

Taking now the consumer point of view, the above-described legal framework might also have been implemented in order to address public perceptions, concerns and fears. The control of the use of anti-bacterials and hormones in food animals is covered extensively by several legal documents. Moreover, this ensures complete transparency of all the implemented mechanisms and procedures.

However, as the review shows, this is still very much a present concern for meat consumers across Europe. The difficulty inherent in the effective communication of such a complex technical issue may be a reason for such concerns to exist in spite of a seemingly transparent regulatory framework. Furthermore, the existence of asymmetric information implies that consumers have inferior knowledge compared to retailers, producers and authorities regarding the safety of the meat they are consuming. It can be suggested that consumer consciousness regarding this asymmetry is a reason for their stated concerns.

Hence, consumers may also face difficulties trusting the existing enforcement mechanisms in situations so distant from their daily livelihood. Also, as most consumers do not have contact with animal and food production, their natural ignorance may also be translated into distrust and legitimate concern.

This article's conclusions will therefore attempt at pulling together consumer concerns, scientific evidence and the European legal framework. The existence of such concerns in spite of all the legal and institutional mechanisms suggests that consumers may therefore be willing to choose meat products that relieve their distrust, thus representing a possibility for the development of the quality differentiating strategies that will also be suggested.

Conclusions

European consumer concern about beef safety has changed over the last two decades. Such changes are due not only to transformations in Western societies in terms of food availability, ethical awareness and health concerns, but also more recently to some food scares of previously unseen proportions. The growing media coverage and globalization of food markets have influenced the dimension and impact of these scares.

Some of the major food scares that occurred in Europe since the 1980s were related to different types of meat, namely BSE in beef, dioxins in pork and poultry, etc. Consumers therefore express concerns about meat safety (such as BSE, anti-bacterial and hormone residues, GMOs, etc.) although they are often discordant in subject and proportion with scientific evidence or legal impositions. For example, the concerns about the presence of hormone residues in meat seem somewhat disproportionate,

as the use within the EU of substances with hormonal action is prohibited in farm animals. Also, the same legal criteria apply to products originating in third countries and there have been no scares related to this issue. It is therefore not easy to reason the origin of consumer concerns on this issue. But wherever they come from, they represent at least a miscommunication issue for the EU.

Moreover, although several sources argue that some of the most serious meat safety issues involve microbial agents (such as Campylobacter, Salmonella spp. and verocytotoxigenic E. coli infections) (for a detailed review on this issue, see Nørrung and Buncic, 2008), consumers do not seem to have the same perception (Miles and Frewer, 2001).

This different perception may emerge from several facts already described, namely the absence of significant or widespread food scares relating to meat and microbial agents. Moreover, the legal framework in place has no doubt a major role in guaranteeing as far as possible the microbiological safety of meat products throughout the entire chain, contributing to the absence of such outbreaks.

There is, however, an issue where evidence and worries expressed by the scientific community may be more closely related to consumer concerns: anti-bacterial residues in meat. This potential hazard is mentioned by many consumers in several European countries as being part of their preoccupations about meat safety. Moreover, it is probably one of the few hazards mentioned in association with different types of meat, be it beef, poultry or pork.

It is very interesting to verify that one of the concerns consumers state about meat safety is actually an open scientific question pointed out in the literature as a real problem, even if the real scientific reasoning and proof on this issue is beyond the knowledge or comprehension of most consumers. In addition, the safety guarantees of anti-bacterial residues control may be a field where the European legal and institutional framework has not met consumer concern, whether by technical, legal or communicational reasons.

As such, anti-bacterial residues in meat seem to be an area where consumer concern, scientific evidence and legal framework seem to share common grounds in the need to establish new strategies. However, it can be suggested that the unsolved scientific questions around this issue will probably remain open for quite some time, as it represents a complex scientific issue, due to difficulties related with establishing causal relationships. Moreover, it can also be noted that the legal framework for meat production is already extensive, and that new legislation on issues still to gather scientific consensus would probably raise many conflicts.

Within this context, a market strategy could be proposed in the shape of a user-oriented quality differentiating strategy for meat, aiming at consumer segments willing to pay premiums for meat with increased guarantees concerning anti-bacterial residue control. It is known that some consumer segments are already willing to pay for differentiated meat with characteristics associated with increased safety.

Preferences for beef with quality labels such as Protected Designation of Origin (PDO) or other guaranteed origin schemes are often mentioned as being related to a perception of increased meat safety (Gracia and Albisu, 2001; Verbeke et al., 2007). This can be verified, for example, in Portugal, where Aguiar Fontes et al. (2008) found that consumers seem to associate PDO beef to safer beef. Free-range or organic meat and other meat products with certified production methods are also associated with safety guarantees (Henson and Northen, 2000; Yeung and Morris, 2001; O'Donovan

and McCarthy, 2002; Krystallis and Arvanitoyannis, 2006) although there is no evidence that organic food is safer than conventional products (Sofos, 2008).

Quality strategies involving guaranteed traceability are also among those preferred by consumers when it comes to additional safety guarantees (Krystallis and Arvanitoyannis, 2006; Verbeke et al., 2007). Quality differentiating strategies may therefore be a potential route for assessing very specific consumer concerns (such as those manifested for anti-bacterial residues in meat) and thus explore new niche markets.

Thus, efforts can be suggested in order to promote preventive health and animal-welfare management in meat production systems. These should allow a more efficient and rational use of anti-bacterials, which is a characteristic consumers associate with safer and higher quality meat.

Technical specifications of such quality differentiating strategies are not part of the objectives of this article and the limits to such differentiation strategy must be recognized. However, preventive plans applied together with certification schemes guaranteeing a sound usage of anti-bacterials could create a market niche for such meat products, providing producers with incentives to supply meat according to standards above those legally imposed by the EU.

There may be an attractive market for such meat products because they would supply an instrument to extract the implied value of food safety related to control of anti-bacterial residues. However, it must be stressed that such certification schemes must be associated with higher production costs, which represents necessarily higher prices for consumers. These higher prices, together with well-known income effects on demand often translate into small niche market shares.

As such, the expected quantities produced and consumed would always be small. From a public health perspective, the effect would therefore be negligible. Thus, if a global public health problem is assumed to be associated with the usage of anti-bacterials in meat production, it must also be assumed that there are no sufficient incentives for the market to be a solution. This issue would most likely need to be considered a public affair and the competent authorities would need to take the matter into their own hands.

Nevertheless, there are certification schemes across Europe that include food safety specifications (namely those already related to HACCP), which represent an increased benefit to producers and retailers. As some consumers may be willing to pay more for such meat products, they may provide some support to specific meat production sectors. Therefore, there may be market segments to be explored and opportunities to be seized for different product variants associated with higher levels of food safety related to anti-bacterial residues.

Notes

1. It should also be noted that the reference to anti-bacterials includes antibiotics, sulphonamides and quinolones, and that this chosen definition is in accordance with the one used across the legal documents currently in force within the EU. It is also important to stress that, for the EU, the definition of residue includes not only substances with pharmacological effects, but also their metabolites or other substances transmitted to animal products that are likely to be harmful to human health.
2. In the context of consumer concern, the term antibiotic is more often applied instead of anti-bacterial, which is probably more accurate in a scientific context. Nevertheless, the term antibiotic will be used whenever it is applied in the referred literature.
3. Codex Alimentarius is a code of practice based on scientific evidence, established by the Food and Agriculture Organisation of the United Nations (FAO) and the WHO. Its goals are to protect consumers

and to facilitate international trade. It has no mandatory aspects, but it does act as a basis for many legal standards, including European ones.

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