

Sustaining local food webs: insights from Kenya and the UK

PATRICK MULVANY and BEN MURPHY

This paper is a contribution to the contested discourse about how healthy food supplies can be secured for future generations. It argues that the small-scale food providers who currently supply the local food webs that nourish more than 70 per cent of the world's population can provide for the growing urban and world population, building on their skills and knowledge. The food webs they serve are productive, resilient, and healthy, connecting food providers and consumers locally. Local food webs are a cornerstone for the model of food provision, in the framework of food sovereignty, that should be prioritized in order to secure our future food. The paper sets out to demonstrate the value and challenges of local, resilient, biodiverse, and productive food systems that would benefit from greater support and compliant policies. It uses examples from Kenya and the UK to demonstrate how productive local food systems can improve small-scale family farming and reduce hunger, in contrast to industrial agricultural systems. Consumer surveys and mapping local food webs demonstrate the value that consumers place in local food production and markets, both in Kenya and the UK. The article concludes with recommendations for how to support local food webs.

Keywords: food webs, local food production and food sovereignty, agricultural biodiversity, consumer surveys, sustainable agriculture

We will strengthen our interconnecting rural urban food webs [and] shorten distances between food provider and consumer (Forum for People's Food Sovereignty Now! Rome, 2009).

LOCAL PRODUCTION PROVIDES FOOD for more than 70 per cent of people around the world, and secures a livelihood for well over 2 billion people (ETC Group, 2009; see Box 1). The distance between producer and consumer is for most people geographically and culturally short – with food and labour shared between families, neighbours, villages, and nearby towns. Processing and marketing may take place on the farm, grazing land or shoreline, in a local market, or through local businesses, in a system

Patrick Mulvany (patrick.mulvany@kamayoq.org) was formerly the chair of the UK Food Group and the Senior Policy Adviser to Practical Action. He is currently an independent consultant working for Kamayoq. Ben Murphy (ben@jarrco.info) was a Policy Researcher at Practical Action and subsequently worked with the organization's projects in Southern Africa. He is currently the Programme Development Manager for JarRco Consulting, an Ethiopian development research organization based in Addis Ababa.

© Practical Action Publishing, 2015, www.practicalactionpublishing.org
<http://dx.doi.org/10.3362/2046-1887.2015.009>, ISSN: 2046-1879 (print) 2046-1887 (online)

Box 1 Local food: the numbers

Eighty-five per cent of the world's food is grown and consumed – if not within the '100 mile diet' – within national borders and/or the same eco-regional zone. Most of this food is grown from peasant-bred seed which does not need the industrial agribusiness chain's synthetic fertilizers. Peasants breed and nurture 40 livestock species and almost 8,000 breeds. Peasants also breed 5,000 domesticated crops and have donated more than 1.9 million plant varieties to the world's gene banks. Small-scale artisanal fishers harvest and protect more than 15,000 freshwater species and many more in coastal fisheries. The work of peasants and pastoralists in maintaining soil fertility is 18 times more valuable than the synthetic fertilizers provided by the seven largest corporations.

There are 1.5 billion peasants on 380 million farms; 800 million more cultivating urban gardens; 410 million gathering the hidden harvest of our forests and savannahs; 190 million pastoralists; and well over 100 million artisanal fishers. At least 370 million of these are indigenous peoples. Together these small-scale food providers and their families make up almost half the world's population and they grow at least 70 per cent of the world's food. Better than anyone else, they feed the hungry. If we are to eat in 2050 we will need all of them and all of their diversity.

Source: ETC Group (2009)

of interdependence and mutual reward, with up to a fivefold increase in added value for the local economy, according to research in the UK (Simms, 2007).

The knowledge and expertise of those closest to local ecologies is used in growing crops and vegetables, raising livestock, and catching fish and processing them, and is passed down from generation to generation. Control over the whole process of producing and providing nutritious food is held at the level of small-scale food providers, enabling them to produce the food needed by their families and communities, with surpluses for a wider market, while making viable livelihoods from their labour and protecting their local environment. Despite feeding and employing so many, local food production became increasingly eclipsed in industrial economies, in the second half of the 20th century, by another model of production. In many developing countries – where agriculture remains the principal activity of the rural population – under global pressure for the industrialization of agriculture, livestock, and fisheries, food provision for local consumption was being largely ignored by governments, policy-makers, the private sector, and donors in favour of the production and export of food and non-food commodities.

At the other end of that food chain in wealthy economies, the mass marketing of perennially available 'new' and 'cheaper' foods in all locations, from large conurbations to rural villages, has nearly eclipsed local food production. Knowledge, understanding, and skills for environmentally sound, biodiverse, and nutritionally rich food production have been lost, and many of the remaining small-scale food providers are bound into unprofitable, unequal, and unsustainable relationships with corporate buyers. The industrial food chain, starting on intensive commercial farms and their outgrowers, intensive and inhumane livestock factories, and rapacious industrial fishing vessels and ending in supermarkets, provides only about 30 per cent of the food consumed globally, and it uses some 70 per cent of

the productive resources with significant negative environmental impacts. Yet it is inordinately profitable for the handful of corporations that provide inputs and that control markets (and related transport, processing, and distribution), agricultural research, the most productive land and waters, patents and other restrictive property rights and technologies on plant and animal species, and which also have strong lobbying powers over national governments (ETC Group, 2009).

The commercial success of global agribusiness has created social costs, among others, across the span of its activities: for small-scale producers and their families – many of whom are marginalized to the point that they cannot feed themselves; and consumers, more than 1 billion of whom, living in developed countries and, increasingly, in emerging economies, are obese (IFAD, 2002). With so much food already produced locally, the quantity provided through the industrial system far exceeds the extra demand and the required calorie intake of those able to buy it. With the emphasis on profit, people are encouraged to consume more, leading to a doubling of obesity prevalence worldwide between 1980 and 2008 and a pandemic of type 2 diabetes (WHO, 2011).

It is the imperatives of the global food industry that have brought about this incongruous situation. For most of the last 50 years, this shift from local to global control, from the food and livelihood needs of the many to the profit of the few, has passed almost by stealth. In recent years, however, various events and projections have shaken perceptions about the sustainability of, and equity in, the provision of the food on our plates (De Schutter, 2009).

The global food price crisis in 2008 exposed the fragility of the global food system; landgrabs for agrofuels and other commodities, increasing oil prices, speculative trading on food prices, and drought in grain-producing countries combined to increase the price of food commodities to the highest level since the 1980s. The food price crisis also exposed the ‘losers’ built into the system, as price increases in grain, wheat, and many other food products led to increasing difficulties for the poorest who are trapped by the food chain. Greater understanding about climate change, population growth, falling water supplies, and peak oil, phosphorus and land availability, along with famines in Africa and increasing obesity worldwide, have further awakened consciousness around the world that the global food system is dysfunctional (Mulvany and Ensor, 2011).

Solutions from small-scale food providers

Concern is growing about how to secure future food supplies. There are competing narratives. For agribusiness, meeting this challenge entails acquiring new production sites, often in developing countries, co-opting more farmers into market chains, and the intensification of production through increased application of synthetic products (see Box 3).

Millions of small-scale food providers and the organizations working with them are well aware, however, of the inequities and damages caused by the industrial model. They see a greater extension of agribusiness as deepening their marginalization

into poverty and worsening their environment impacts, further undermining the natural resources that food production relies on.

In order to eradicate hunger now and meet the food needs of a further 2 billion people by 2050, they are calling for a re-evaluation of where the food that feeds most people in the world comes from, the local knowledge and expertise that makes this possible, the ways in which the environment can be preserved through more biodiverse and ecological farming techniques, and the hardships faced by the numerous and varied actors in local food webs (See Box 2).

The ability of small-scale producers within local food webs to produce adequate, nutritious food while preserving the natural environment has received high-level recognition. The former UN Special Rapporteur for the Right to Food released a

Box 2 Local food and food sovereignty

Local food systems are valued in the food sovereignty policy framework, which defines the vision of small-scale food providers – peasants/family farmers, pastoralists, artisanal fishers, indigenous peoples, landless peoples, rural workers, migrants, pastoralists, forest communities, women, youth, consumers, and environmental and urban movements. At the Nyéléni 2007: Forum for Food Sovereignty that was held in Mali, more than 500 representatives from over 80 countries agreed that food sovereignty represented the principles of a food system which:

1. *Focuses on food for people*, putting the right to food at the centre of food, agriculture, livestock, and fisheries policies, and rejects the proposition that food is just another commodity or component for international agribusiness.
2. *Values food providers* and respects their rights, and rejects those policies, actions, and programmes that undervalue them, threaten their livelihoods, and eliminate them.
3. *Localizes food systems*, bringing food providers and consumers closer together, and rejects governance structures, agreements, and practices that depend on and promote unsustainable and inequitable international trade and give power to remote and unaccountable corporations.
4. *Puts control locally* over territory, land, grazing, water, seeds, livestock, and fish populations, and rejects the privatization of natural resources through laws, commercial contracts, and intellectual property rights regimes.
5. *Builds knowledge and skills* that conserve, develop, and manage localized food production and harvesting systems; and rejects technologies that undermine, threaten, or contaminate these, e.g. genetic engineering.
6. *Works with nature* in diverse, agroecological production and harvesting methods that maximize ecosystem functions and improve resilience and adaptation, especially in the face of climate change, and rejects energy-intensive industrialized methods which damage the environment and contribute to global warming.

In order to achieve this, local, small-scale food providers and consumers, and their organizations, must be at the centre of decision-making on food issues. Control over territory, land, grazing, water, seeds, livestock, and fish populations is placed in the hands of local food providers and respects their rights. Producing food in harmony with the ecology has high (often family) labour requirements but minimizes use of other external inputs (irrigation water, chemicals, seeds) and maximizes: the use of local knowledge and innovation systems; the diversity of locally adapted seeds and breeds used for food; and ecosystem functions provided by a wide range of agricultural biodiversity, which support plants and animals and provide environmental services, within biocultural landscapes.

Source: Nyéléni (2007); UK Food Group (2010)

Box 3 The agro-industrial model

The antithesis of local food webs is the industrial model of commodity production. Industrialized production of crops, livestock, and fish, and the associated processing, global distribution, and retailing of these commodities, operates on a scale that dwarfs the barter and exchange systems, farmers' markets, and community-supported family farms in Africa and Europe. Industrial monocrops are intensively farmed on areas of land tens or hundreds of times larger than the typical family farm, using high volumes of chemical inputs and compliant seeds, and techniques to minimize labour on the farm often with scant regard to environmental or human health. Similarly, livestock factories using mainly imported feed and with poor animal welfare standards are a hallmark of the industrial system. The outputs are commodities – foodstuffs, animal feed, horticultural products, agrofuels, and biomass – usually transported over large distances as part of national and international supply chains. Industrialized production is based on a perverse system of economic rewards which benefit a few corporations at the expense of the livelihoods of most farmers and the food needs of the majority. It can be applied at different scales. In the 1960s–70s the so-called 'Green Revolution' introduced industrial-style production methods at smaller scales, generating yield increases of food commodities (wheat, rice, maize) but at costs of sustainability, the environment, and livelihoods.

The environmental legacy of this production system – destroyed agricultural biodiversity and eroded soils, depleted and contaminated water supplies – undermines the natural resources upon which agriculture relies. In addition, the carbon used in, and generated by, the industrial commodity food chain is a major contributor to climate change.

Source: UK Food Group (2010)

report detailing how agroecology, practised by small-scale food providers, can help to raise productivity, reduce rural poverty, improve nutrition, adapt to climate change, and protect agricultural biodiversity and related ecosystem functions building on the best local agricultural practices. In the report, the central role of small-scale food producers in providing local food is clear:

Agroecology is highly knowledge-intensive, based on techniques that are not delivered top-down but developed on the basis of farmers' knowledge and experimentation. ... The participation of farmers is vital for the success of agroecological practices. So far, agroecology has been developed by grassroots organizations and NGOs, and it has spread through farmer field schools and farmers' movements, such as the Campesino a Campesino movement in Central America. Experience with agroecological techniques is growing everyday within peasant networks (De Schutter, 2011).

This paper sets out to demonstrate the value and challenges of local, resilient, biodiverse, ecological, and productive food systems that would benefit from greater support and compliant policies. It uses examples from Kenya and the UK to demonstrate how productive local food systems can improve small-scale family farming and reduce hunger, in contrast to industrial agricultural systems. In Kenya, agribusinesses own much of the high potential land available and small-scale producers are pushed to the margins. Nevertheless, the examples from Kenya show how local food webs are key to food provision for the majority. In England an exercise in the

mapping of local food webs demonstrates the value that interdependent local food actors bring to six regions of the country.

Kenya

Family farming is the basis for modern food provision in Africa, today and tomorrow. It ... generates food and well-being for the majority of the population and the wealth of the region, and conserves its natural resources. It can ensure employment for young people within their territories, thus promoting social peace and attenuating migration. Innovative family farming, backed by appropriate research, supportive investments and adequate protection, can out-perform industrial commodity production. It provides the basis for the food sovereignty of communities, countries and sub-regions of Africa (europAfrica 2013).

Over two-thirds of the population are involved in agriculture in Kenya, growing, herding, and fishing for food that serves a strong domestic demand for national produce. Much has been made of the country's exports of tea, sisal, coffee, sugar, and horticultural products by those primarily interested in GDP growth. But it is the work of the majority – the small, family-run farms in both rural and peri-urban areas – that protects the food sovereignty of Kenya, meeting food needs and providing a living for the bulk of the population while conserving the local environment. Small-scale farmers, especially women, supply 80 per cent of the food consumed in Kenya's urban areas, and up to 65 per cent of total food production is bartered, exchanged, and consumed within the country – often outside of the formal economy, yet linked strongly to culture and tradition (Muchiri and Kamau, 2011).

Kenya's small-scale food producers face threats – drought, disease, insecurity – which combine periodically to severely undermine food systems and livelihoods and result in severe, but sometimes temporary, undernutrition of a large proportion of the population, including in rural areas. For example, droughts in 2008, coupled with post-election violence, reduced the country's food supply and sharply increased food insecurity as farmers, particularly in the Rift Valley, were forced to abandon their crops. Food shortages open the way for greater imports and food dumping, particularly of wheat, rice, maize, and sugar products, which undercut local costs of production. Part of the problem is that local farmers, who have been neglected for years by agricultural policies, are now encouraged to produce for export markets, and are pushed towards greater use of fertilizers, pesticides, and so-called 'improved' seeds in the often unrealized expectation of increasing yields and incomes. Yet the history of commercial agriculture in Kenya shows it has benefited the few and put great strains on the natural environment even in the most productive areas.

Despite these pressures, the traditional food webs in Kenya operate well not only for sharing food, but also in spreading techniques and technologies that can help farmers retain their food sovereignty and prosper. Smallholder farming takes place across Kenya, with families producing food in ways largely determined by the local conditions of the country's varied climate, topography, and ecology. Only 15–17 per cent of land is classed as fully fertile and receiving good rainfall. These areas, close

to the east coast, around the central highlands, and by Lake Victoria in the west, are inhabited by the bulk of the population, yet here the intensive export-driven farms own the largest land areas with the best access to infrastructure (IAASTD, 2009). From the highly cramped high potential areas, out across the remaining semi-arid and arid lands, smallholder farmers grow crops, artisanal fishers work on the lakes and coastline, and pastoralists roam with herds of livestock. Most food producers with land practise mixed farming of arable production and animal keeping and their farming is determined by local conditions. In contrast to the industrial farms, 89 per cent of farmers own less than 3 ha of land, with 47 per cent living on farms of less than 0.6 ha (Gitu, 2006).

Smallholders' food provision

The smallholders in Kenya produce enough, on average, for their own needs and share and barter among friends and neighbours, a system which has enabled rural communities to be largely self-sufficient since the country's independence in the 1960s. Maize – the most popular staple crop – is grown by nearly all farmers with land, and potatoes and plantain are produced to buffer any deficits in maize production. A household will typically use the seeds that they have saved or acquired locally from neighbours or local seed fairs, and this exchange helps to preserve indigenous varieties and foster agricultural biodiversity – a lifeline in the eastern areas where the return to using traditional seeds sourced from other parts of the country has provided alternative varieties for use in drought periods. Crops are grown using no (or very little) chemical inputs and the harvests of grain and vegetables are swapped along with meat products between households.

Food is not produced or exchanged in isolation from the social and cultural context of the community, but sits at the heart of a wider network of groups and organizations set up to share support. Most farmers are part of a local social institution – such as self-help groups, women's associations, pensioners clubs, or kinship groups – and these organizations often pool their resources in merry-go-round credit schemes and training sessions (Onduru et al., 2002). Labour is sourced locally when households require extra hands for particular tasks or during busy periods. By meeting their own food and support needs through networks, rural communities overcome some of the 'bottlenecks to food security', which 'include farmers' inability to access food crop research findings, demotivated extension workers, tribal clashes and displacement, illiteracy, and rudimentary farming methods' (Gitu, 2006).

Smallholders' produce is also welcomed nationally. Farmers that are able to sell their surplus on to other markets are the largest contributors to Kenya's domestic food supply, playing an important role in feeding the rest of the population. Subsistence farmers and pastoralists own 90 per cent of the 10 million beef cattle in Kenya; 80 per cent of milk produced comes from the cattle of the smallholders, mainly in the Rift Valley and the central, eastern, coastal, and western provinces. Surplus production is collected by traders and taken to markets in urban areas for sale.

Nairobi has many large wholesale markets, including Gikomba, Kibera, Wakulima, and Kangemi, and many smaller markets, shops, and vendors around the capital. Gikomba market started as an informal place where people could meet and exchange goods; now it is the largest market in Kenya and serves 1 million people daily – one-quarter of the capital's population. It is an extremely busy hub of formal and informal traders, household buyers, and hoteliers, passing through from five o'clock in the morning when the market receives its fresh stock. Nearly all food products on sale are produced in Kenya's rural and peri-urban areas, with only 1 per cent coming from imports or food dumping. Food processing and storage is available for the preparation of fresh produce into saleable items, with butchers and slaughterhouses on site for livestock, and scaling and preparation of fish – mainly tilapia, from Kisumu – also available.

The popularity of Gikomba and the variety of food vendors occupying it, and other markets, reflects a high demand and preference for domestically produced food. 'Indigenous foodstuffs constitute an important dimension of the informal economy. These foods include vegetables, sweet potatoes, fruits, bananas, cereals, legumes, fish and meat. ... Some informal markets are well known for specializing in one particular type of food' (Kinyanjui, 2010). The outlets themselves are seen as part of the socio-economic context of Kenya. In a survey of consumers in Nairobi, all but the very highest income bracket preferred to shop at traditional outlets because, as well as being cheaper and easier to access, the shops also offered other services, such as credit (see Table 1). Out of 40 retailers surveyed, all had given credit and 75 per cent had an average of KSH1,280 (US\$13) loaned to four different people (Ayieko et al., 2005).

The movement of food between surplus and deficit areas is a key characteristic of the Kenyan food system, used to diversify food intake and for livelihood income. For example, 'maize is produced primarily in the medium and high potential areas of the Rift Valley Province. It finds its way to distance deficit areas of north eastern, eastern and coast provinces and the urban centres' (Gitu, 2006). However, this

Table 1 Where people shop in Nairobi

| Outlet type | Food type | | | | |
|------------------------------------|--|---------|-------|-------------|---------------|
| | Any food item | Staples | Dairy | Meat or egg | Fresh produce |
| | <i>(% of HH purchasing at least one item from this outlet in the last month)</i> | | | | |
| Large supermarket | 28 | 26 | 11 | 5 | 6 |
| Small supermarket (not a chain) | 32 | 28 | 5 | 2 | 3 |
| Duka (shop) | 90 | 84 | 63 | 58 | 3 |
| Open air market | 83 | 48 | 0 | 24 | 72 |
| Hawker | 25 | 3 | 17 | 2 | 8 |
| Kiosk | 66 | 20 | 12 | 16 | 56 |
| Butcher | 97 | 0 | 0 | 87 | 0 |

Source: Ayieko et al. (2005)

system does not function perfectly and has contributed to the escalation of famines in the past, as food supplies have stacked up in areas of high market opportunity and not reached the deficit areas, despite, in some cases, those going hungry having the money to buy food. This 'artificial shortage of food' is exacerbated by 'the combination of lack of information, impassable road network and movement control of grains' (ibid.). The balance between food and sale crops can be difficult for farmers to maintain because of their inequitable position in markets and pressure to grow cash crops, meaning some are net maize sellers at harvest time, and net buyers only a few months later (Stephens and Barrett, 2006).

Pastoralist networks

Kenya's other significant food producing group, the nomadic pastoralists making up 25 per cent of the population, lead a far more self-contained food and production system, but are vital for meeting food needs of a large part of the population living outside the most productive zones. Pastoralists travel with their herds of cattle, goats, camels, and sheep between grazing and watering points across the vast northern arid and semi-arid areas. Livestock are intrinsically linked to their way of life, and have been for centuries, holding a strong cultural significance prized higher than their economic value. Their frequent travel allows the finely balanced ecology of the pastures to re-grow and re-charge after use, although the slow onset of climate change is forcing pastoralists to travel further for water and pasture. Prolonged dry spells can seriously diminish their herd. Pastoralists derive their predominantly meat and milk diet from their livestock, which also provide leather as well as wool and hair used for making cloth. They also grow short-season millet and sorghum and catch fish in Lake Turkana. Before the opening of livestock markets in northern rural areas in recent decades, exchange in the pastoralist system operated nearly exclusively outside the monetary system. Pastoralists relied solely on trading and bartering in livestock and without use of the Kenyan currency. Groups regularly trade between themselves for more livestock and information, and with the sedentary population for external goods, such as maize. Given the nature of their nomadic lifestyles, their relationships with others have to be dynamic and able to cope with their need to travel in search of pasture. As such, the pastoralist networks are as important for the exchange of information, and must balance 'knowledge of pasture, rainfall, disease, political insecurity and national boundaries with access to markets and infrastructure' (Watson and van Binsbergen, 2008). Some pastoralist groups in Africa have developed 'highly sophisticated long-distance trade networks, mak[ing] use of them to pass information about both market conditions and forage resources' (Blench, 2001). The pastoralists' self-contained system is largely in place today, and cattle remain intrinsic to their social as well as economic activity. Yet, since Kenya's first periodic livestock market opened in Samburu district in 1991, they have gradually allowed part of their activity to become integrated into wider markets, and their produce now reaches a larger spectrum of people in Kenya and abroad (Kibue, 2007). Groups are increasingly taking their livestock to formal local market points that offer

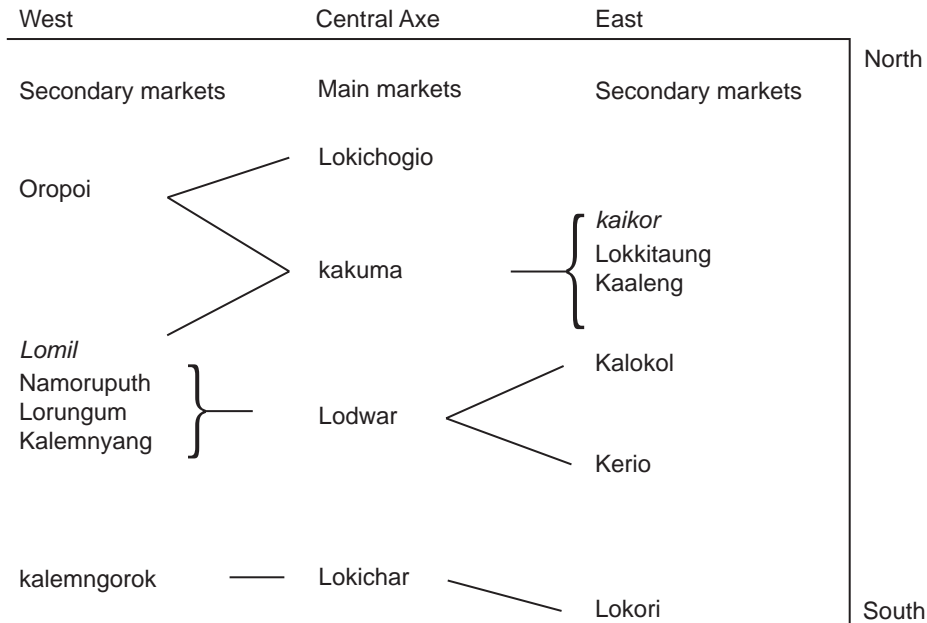


Figure 1 Livestock market links in Turkana, Kenya
 Source: Watson and van Binsbergen (2008)

processing, sale, and buying opportunities, from which the meat often makes its way to more centralized markets, and eventually the consumer.

The formal market chain for pastoralist produce in the northwest district of Turkana has been mapped (Watson and van Binsbergen, 2008; see Figure 1). Pastoralists have most contact with the 12 smaller markets spread throughout the district – such as Oropoi and Lomil in the west, and Kerio in the east, where they take their livestock for slaughter. Goat is the most commonly slaughtered animal, while killing of camel and bulls is reserved for the wealthiest families. The meat is then taken to Turkana’s primary markets, Lodwar, Lokichogio, and Kakuma, which sit along the main central roadway passing from north to south; and to one market across the border in Uganda. The majority of the produce is sold at these markets where there is a high demand from the local population, and stays within the district, yet just under a third is transported on to the cities of Nairobi, Eldoret, and Kitale, for sale in the markets serving hotels and households.

Building on local networks: Farmer Field Schools

The local networks that foster local food production in Kenya – whether through seed fairs, women’s groups, or livestock exchanges – are designed to spread knowledge and skills in order to share food and income opportunities. These networks are now being built upon to enable farmers to tackle the range of threats they face. Over 8,000 Kenyan farmers are developing their own solutions through

Farmer Field Schools, and participating with other schools in the exchange of their findings. The approach was first developed by FAO in Indonesia in response to rice pests, but it is now used in Kenya and other African countries to deal with a wider range of problems through techniques such as soil productivity improvement, conservation agriculture, control of surface runoff, water harvesting, and improved irrigation. Their model has great importance. In Kenya's 283 Farmer Field Schools, men and women meet on their own land at the start of the season to trial and test different methods over the course of a growing season with the support of a facilitator – usually an extension worker or alumni of other farmer schools. The farmers mainly work on solutions to tackle the three most common environmental threats to cereal production, namely: the parasitic striga weed, stem borers (moth larvae that eat into maize and sorghum in particular, weakening or killing the plant), and poor soil fertility, using, for example, the innovative Push-Pull technology (Neondo, 2011, ICIPE, n.d.).

The Farmer Field Schools are the main conduit for sharing ecological approaches to food provision in Kenya, but, although growing, they are fewer in number compared with the farmer associations focused and organized around commodity chains, rather than food systems as a whole or on specific issues. Commercial farming groups are also aping the farmer organizations by acting as collectives and thereby increasing their lobbying power within government. The Farmer Field Schools face issues of sustaining the funding needed to initiate new schools. However, the success of the resulting yield increases in Kenya suggests the possibility for schools to become self-financed by the farmer groups themselves (IAASTD, 2009). The schools represent value for money, despite the high cost of the activities for the initial farmers; the focus on the sharing between farmers ensures that information and techniques are dispersed and modified widely.

The future of Kenya's local food webs

In the next 10 years, small-scale farmers and local food webs will continue to play a large, if not greater role, in providing most of the food in Kenya. They have historically provided for most rural households and are now feeding the ever-increasing urban populations too. They are also the only empowering structures for farmers who would otherwise be almost totally marginalized from official attention. But their efforts currently go unrewarded and do not prevent farmers from falling into hunger for at least part of the year. In Kenya, food insecurity has occurred without any decline in the general supply of food. In other words, food production per person can increase and yet more people still go hungry. This is basically due to the other intervening variables such as food distribution patterns as well as national policies and subsidies (Gitu, 2006). When hunger is present, proposals to encourage smallholder farmers to engage in global and national 'opportunities for profitable commercial agriculture ... and intensive farming' are inappropriate (Omiti et al., 2008). The production of commodity goods already puts pressure on farmers to use their land for crops they cannot consume, and the emphasis on the high-value

food markets is recognized as diverting food away from places where there is hunger (a perversion that local food webs help to relieve by swapping food between families and neighbours). Furthermore, as Kenyan farmers will increasingly need to adapt their practices and livelihoods with the onset of climate change over the coming decades, only approaches that strengthen their ability to make changes and protect their local ecology can be deemed appropriate.

The existing food webs must be encouraged to flourish and the barriers that prevent them from doing so removed. Support to promote wider exchange of the abundant traditional knowledge in Kenya can be achieved by bringing farmers together at seed fairs, farmer schools, livestock chains, and other producer groups. These groups are excellent forums for combining local expertise on the ecology, climate, farming techniques, and markets across regions, and also with more formal information providers, such as research institutions, extension workers, NGOs, and the private sector. Working with farmers has already proved to be a success in Kenya, but only with increased support will they be able to protect their food sovereignty into the future.

England

In 1998, proposals for the opening of a new large supermarket in a community in Suffolk, East Anglia, led to a research project assessing the local food networks in the area. It highlighted the importance and interdependence of food producers, wholesalers, and outlets to the town of Saxmundham and other towns and villages in the surrounding area. In doing so, the research found that local shops were already providing the food that people wanted and needed, but also that 67 of the 81 local retailers expected to go out of business if a new supermarket was introduced to the area (CPRE, 1998). Planning permission for the store was finally refused and the initial research led to a series of reports mapping local food webs – from small, often family-run farms to greengrocers, farmers' markets, or cafés – in locations across England including Totnes, Sheffield, Birstall, Hastings, Kenilworth, and Knutsford (see Box 4). Each report explores the contribution to the economic, environmental, and social setting of the locality, and the series identifies common threats and opportunities that define the shape of England's local food webs. While only a small representation of the local food webs in England, they documented the unique characteristics of a model of food production, supply, and sale, often overlooked, and formed the pilot stages of a larger research project, covering 13 more locations, published in 2012 (CPRE, 2012).

The benefits of local food webs

In each area covered by the research, the local food web is powered by a demand for local food and a desire to support local production and trade. The inhabitants in Totnes, South Devon, for example, 'recognize that the strong network of small independent shops and producers in the area provides local jobs, and that the great

Box 4 Methodology of local food web mapping

The pilot project to map six local food webs in England was organized and overseen by the Campaign to Protect Rural England (CPRE), with local volunteer groups adapting the standardized methodology to their context. The core study area consisted of a 2.5 mile radius from a central point – in most cases the town centre – sitting within a 30-mile local food supply zone. The approach taken was to:

- identify outlets selling locally sourced food and interview as many as possible, to identify economic, social, and environmental impacts of their business and their main local suppliers;
- interview a minimum of 100 shoppers on attitudes to local food and purchasing habits; and
- interview all businesses in a sample of the supply chains of seven main product types: meat, processed meat, dairy, eggs, fruit, vegetables, and preserves.

Regional co-ordinators recruited teams of local volunteers, who carried out the following tasks: organizing public launch meetings; identifying food outlets selling local food; interviewing outlets, shoppers, and producer businesses; running public participatory workshops for local people; verifying findings and planning actions with local people; and case study research. In each case, the empirical research was carried out with considerable success, and more than half the local outlets identified were interviewed in most cases. Interviewing shoppers and suppliers proved more difficult. With the exception of Birstall, nearly doubling the interviewee count, and Totnes, which came close to meeting the 100, the others managed to capture about a third of the intended target. Supply chain interviewing proved more difficult and variable. Most studies captured around 10 per cent of the total businesses identified.

CPRE staff and volunteers collated and analysed statistical and qualitative data (mainly answers to open questions) across the reports. Qualitative findings were drawn from comments corroborated by several interviewees (usually five or more) and ideally cross-referenced to comments from other surveys and workshops. In general, greater weight is given to businesses, as a much higher percentage of the total population was interviewed compared with shoppers. From these data the six reports were compiled and the methodology has evolved for a further 12 studies.

diversity of shops in the town offers variety and range'. In Birstall, Leicestershire, 'the overwhelming majority of shoppers interviewed – over 80 per cent – saw supporting local farmers, producers, and retailers as one of the main reasons they either bought or would buy local food'. In fulfilling these demands, a multitude and variety of businesses – from family-run farms to butchers, bakers and green-grocers, as well as numerous delicatessens, pubs, markets, cafés, bars, restaurants, and sandwich shops – bring great benefits to their local economies.

It also contributes to an improved local environment. All of the reports identified a number of farms that are practising organic or low chemical input agriculture, and many protect the natural landscape and wildlife in the production of food. Over half the farmers producing for Totnes provided wildlife refuges such as beetle banks, trees and hedgerows, and species-rich pasture. The areas surrounding Sheffield are part of a local conservation scheme, the Peak District Environmental Quality Mark. In Hastings, East Sussex, home to the largest beach-launched fishing fleet in the UK, the fish market at Rock-a-Nore achieved its Marine Stewardship Council certificate, a national award, in 2005 for the sustainability of its sole, mackerel, and herring

fisheries using wide mesh nets, which do not catch smaller fish that are still growing and breeding. These practices were valued by consumers interviewed. The produce is sold in many local organic shops.

Getting this food to the shops, via processors, involves a significant reduction in 'food miles'. It was beyond the scope of the study to capture the carbon footprint of food produce through a lifecycle analysis; however, the level and distance of transport within the food webs is far lower than the more centralized system of the supermarkets. Mapping of the Totnes region (CPRE 2011c) identified over 160 producers directly supplying a wide range of predominantly fresh (i.e. not processed) produce into the town from within 30 miles, with many located only five to ten miles away. More than 50 per cent of outlets surveyed reported that half to over three-quarters of their produce is locally sourced. The mapping in Knutsford, Cheshire, identified over 100 businesses supplying the town with a wide range of produce – eggs, meat, vegetables, fruit, apple juice, and beer, as well as cheese, honey, and chutney. Again, the large majority of retailers screened in Knutsford directly source their produce from within a 30-mile radius. In all of the areas, farms that sell directly to the consumer reduce the amount of food that has travelled unnecessarily, whether produced far away, sent outside the area for processing, or stored at a regional distribution depot.

The production models found in local food webs are unique in their proximity to the end consumers, and the interaction they encourage between the public, the environment, and the provenance of their food. Community supported agriculture (CSA) schemes are running in three of the six food webs (with Sheffield hosting five), attracting a membership of people wanting to buy local produce and willing to contribute to its production. At the Canalside CSA near Kenilworth, Warwickshire, over 100 members buy into a share of the organic vegetable harvest, and volunteer to help throughout the year with planting, collecting, construction, teaching, and general maintenance on the farm. The remainder of the harvest goes to local independent food retailers in the nearby towns. As part of its vision, Canalside supports other like-minded projects, hosting visits for groups looking to set up CSAs and mentoring a new CSA forming in the area. The Sheffield Food Plan, backed by the Council and the National Health Service (NHS), has a vision for a greater number of community food growing schemes in the coming year. Around the other locations in the study, there were good examples of private farms opening up to the public by selling on site, providing farm walks for schools, and offering skills training such as in sustainable living and wildlife conservation for those wanting to practise ecological techniques in their farm or garden (CPRE, 2011a).

Innovative production/consumer schemes are matched by a return of the social function of businesses lost to the large retailers. Local food sales reach in the millions of pounds per year and employ hundreds of people in outlets and suppliers. The Sheffield network supports employment for around 2,200 people, Hastings nearly 800 people; in Totnes, a much smaller locality, 1,000 people work in the local food system – 10 per cent of the residents in employment. In addition to their formal monetary contribution to the regional economy, nearly all of the businesses in pilot studies across the regions also support an array of local charities and causes, medical services, and sports clubs.

Rather than competing ruthlessly, the actors in local food webs are interdependent and, in many places, are members of local business communities. Businesses buy from and sell to each other to 'support fellow local tradespeople, farmers and suppliers'. Suppliers too are conscious of this reciprocal relationship: 'It's symbiotic: continuing a relationship with our shops is better for shops and better for us'. In Kenilworth, for example, many refer to their membership of and support for the Chamber of Trade, and praise the town's website as a great tool to promote local businesses. 'There is a real desire for business people to work together for the benefit of Kenilworth as a whole'. A significant number also advertise other local businesses as well as local events in their windows.

Box 5 Key Findings from local food web mapping in Sheffield

- Production of local food supports the viability and diversity of farming in the area and helps shape and maintain the character of the local countryside. Over 90 local shops and other food outlets are servicing public demand for locally sourced, fresh, high quality food, and are supported by a short supply chain.
- Local producers supply food directly to outlets in Sheffield from within 30 miles, reducing food miles and related pollution.
- There are several examples of strong community food enterprises which increase access to locally produced fresh food and offer schools, disadvantaged groups, and the wider public the opportunity to learn and to engage with food production and the land. Many outlets contribute to their community by offering extra support, particularly to the elderly and disabled; nine in ten support local good causes.
- Local food outlets provide valuable local jobs with potentially over 800 jobs at outlets in the study area and a further 1,400 at local suppliers.
- Local food sales in the area of Sheffield studied amount potentially to £6 m–16 m per annum.

The sense of community is passed on to the public. Shops and cafés are seen by the customers interviewed in many areas of the study as social hubs, places for people to 'meet up, talk and exchange news and views', and 'talk about their health problems'. Staff are recognized as being helpful and knowledgeable about the products they are selling, and valued for going beyond a standard retail service to lending a 'listening ear to people'. In Sheffield, over half the outlets offer various forms of informal and practical support to their customers, including deliveries to older and disabled customers, help with carrying heavy shopping, and wider support for their welfare. Nearly half of outlets interviewed in Birstall offer some form of delivery, a service replicated across all the food webs, in some instances without charge.

Challenges and barriers

Ubiquitous across all the food webs surveyed is the competition faced from supermarkets, which influence the ways in which food is produced, distributed, and marketed to consumers throughout England. Each actor in local food webs is affected; farmers, food processing businesses, and the businesses which service them

Box 6 Recommendations to strengthen the local food web

In order to protect the local food networks, the report series produced a number of suggestions (CPRE, 2011b). Some of the recommendations deal with locally specific issues, such as retail development plans in the face of proposals for new supermarkets, but many are relevant across the country.

How local authorities can help

The local food web depends ultimately on local demand. The public sector, including local education authorities, schools, and hospitals, can contribute to stimulating demand. They can strongly support small and local producers by developing more sustainable procurement. Public procurement officers can increase opportunities for small local producers by:

- setting specifications for the freshness, seasonality, and frequency of delivery of produce;
- strong retail policies to promote retail diversity and control the scale and location of new large-scale food stores; and
- splitting larger contracts into lots, for example into product groups or by distribution area.

How businesses can help

Shopper surveys showed that lack of clear labelling prevented people buying more local food. Outlets could highlight local produce by:

- ensuring genuinely local produce is better defined (for example reared, grown, processed within 30 miles) to build shopper confidence;
- establishing a local section in store;
- using on-shelf signs;
- developing a 'local to ...' brand with on-product stickers or signs; and
- using a blackboard to list local, seasonal products and the distance they have travelled.

How the community and individuals can help

- Spread spending across a range of outlets and support those that stock high levels of local food, especially your local farm shops.
- If there is no shop nearby selling local produce, seek out a local box scheme (see the local food directory).
- Ask outlets serving food where it comes from and how it is produced: each time you ask it makes businesses think about their buying policy.
- Give shops feedback to help them improve and ask your local supermarket to stock more local lines.
- Contact your local planning authority and local councillors to bring the findings in this report to their attention. Ask them to show strong support for your local food web in their policies, including supporting a farmers' market in your area.

Source: CPRE (2011b)

may struggle to compete. In some of the locations studied, infrastructure, such as the availability of small abattoirs and processing plants, has been lost or moved further away, increasing the transport costs for local producers. Higher costs, and the inability to access the same economies of scale, result in the most apparent difference to consumers between locally produced and marketed food and supermarket produce: higher prices. Despite many consumers expressing that they are willing to pay more for local food, retailers in nearly all areas studied reported that it is hard to stay competitive with supermarkets, particularly when they battle to have the

lowest prices. In certain areas of Sheffield where there is a higher level of deprivation, fast food outlets are more prevalent than local or even fresh food. These areas were found to have a low awareness of and access to local foods despite the range on offer in the city. However, Totnes seems to have generated a commitment to local food across all income ranges, and findings from later research in Burnley, Shrewsbury, and Darlington show local markets do cater for a broad section of society.

The marketability of local produce has other problems in reaching wider audiences. In many of the areas, the seasonality of produce puts food providers at a disadvantage to supermarkets, which can stock a wide range of products throughout the year, sourced internationally. In some areas, there is a perceived lack in the availability of local food, and most customers interviewed believed it is often difficult to identify local food in shops because of the absence of clear labelling.

Box 7 Other local food networks and schemes in England

Bristol Food Network

The Bristol Food Network aims to link people and groups working on local food issues in the Bristol area. Forum for the Future are currently applying for Lottery funding on behalf of the Network to enable this work to develop, supported by Bristol City Council, the Green Capital Momentum Group and the Health Service. The Bristol Food Network includes several hundred professionals, volunteers, groups, and projects working on local food issues in this area, who subscribe to the Bristol Local Food update newsletter. www.bristolfoodnetwork.org

FoodMapper

FoodMapper is an innovative digital mapping tool which is used to map all the community growing spaces in Somerset. Users add their knowledge of local allotments, community gardens, and school growing projects as well as initiatives such as food cooperatives, local food retail outlets, and markets. Demand for land can also be plotted and an open source base layer aids mapping and the search for access to land, showing farm names and locations of schools and churches and other publicly owned land that could be used as a growing patch. Local food producers can also be mapped. www.foodmapper.org.uk

Making Local Food Work

Making Local Food Work, a project that ended in 2014, helped people to take ownership of their food and where it comes from by providing advice and support to community food enterprises across England. Making Local Food Work worked with community food enterprises across England with some of the challenging aspects of running a business. They had a team of expert mentors and specialists to help local food projects with a range of issues, including developing a business plan and marketing strategy, putting in place a legal structure and governance arrangement, and ensuring compliance with the latest legislation. www.makinglocalfoodwork.co.uk

Buy local and seasonal

Sustain: the alliance for better food and farming has developed projects and resources for promoting local food. Seasonal food can offer better taste and be more affordable, while local food can provide freshness, reduce food miles, offer benefits to local farmers and communities, and help reconnect consumers with where their food comes from. Confidence in the environmental quality of the food bought can be increased by getting to know personally the farmers that supply the food, and finding out about the methods they use and the standards they work to. Some small farms, for example, operate to high standards but cannot afford the time or money needed to join an official accreditation scheme. Farmers' markets are bringing these producers closer to consumers in many places. www.sustainweb.org/sustainablefood/eat_the_seasons/

Conclusions

Pouring money into agriculture will not be sufficient; what is most important is to take steps that facilitate the transition towards a low-carbon, resource-preserving type of agriculture that benefits the poorest farmers. This will not happen by chance. It can only happen by design, through strategies and programmes backed by strong political will, and informed by a right-to-food approach (De Schutter, 2011).

The common discourse surrounding global food supply has been that Europe and other affluent regions have managed to overcome needless hunger through industrialization and that Africa needs to emulate this, even though the evidence shows the industrialized system to be unsustainable. The cracks in this narrative, however, are now well open, and it is apparent even to defenders of the industrial food system that the current model will not be adequate for the future (Calza Bini and Boccaleoni, 2010).

The local food systems in Kenya and England are an alternative model to this. The community supported agriculture schemes in England and local food networks in Kenya all help ensure that the local economy is strengthened, good food is provided, and far less fossil fuel products are used, reducing volatility to oil prices and reducing carbon emissions.

By serving their local areas first, each small-scale food provider presents a counterbalance to the reach of the global food industry. In both countries, and many more in Europe (e.g. FAAN, 2010; Nyéléni Europe, 2012) and Africa (europAfrica, 2013; ROPPA et al., 2011), these actions support campaigns and resistance movements, not with parochial concerns, but with an understanding of how their situation fits into wider challenges of eradicating hunger, protecting the environment, and reducing the gap between the rich and the poor. Those within the food webs realize the value of food in addressing these issues. They are calling not only for a reorientation of agricultural values and practices, but are also demonstrating that their model is productive, fair, beneficial, and essential. When their production, processing, and consumption can be supported at a local level, the rewards are as follows:

Economic benefits for the local area

By retaining the whole process of food production within the local area, a greater number of actors are involved and economic reward portioned out across these short food supply chains. Money earned is put back into the local economy, with improvements for businesses and facilities locally, defending local jobs. Local food webs are smaller economic systems with greater familiarity and understanding between different actors. In England, this leads to a determination to 'buy local' among businesses and consumers, whereas in Africa, the informal food systems operate using trust. In Kenya, the support structures, such as the financial merry-go-round schemes are evidence of an alternative financial imperative that prioritizes collective progress over hard competition.

Greater conservation of local ecology and wider environmental benefits

Food producers and consumers have greater responsibility for their natural surroundings as they rely upon them for the sustainability of their livelihood and food supply and for the jobs of young people and new entrants into farming. Unlike the export producers, who may move locations once an area is degraded and uneconomic, it is a lot harder for small, family-run farms to do this, and abandoning the family farm may mean moving to an urban area and out of an agricultural livelihood. Pastoralist groups have shown great perseverance and application of generational knowledge to continue to farm in Kenya's arid and semi-arid areas rather than move to the already overcrowded high potential areas. Local organizations and businesses in England have created labelling initiatives to help preserve the natural environment and beauty of their areas.

Local control over food quality, quantity, and supply

Local control over food supply allows for protection of the food web and catalyses new initiatives. The ability and the power of local decision-making protects farming livelihoods and the environment, while at the same time creating new schemes to renovate markets, engaging new and existing consumers, providing future jobs in the food system, and living sustainably. When female entrepreneurs take control of the food supply they are better at creating a functioning informal economy that provides nutrition for those beyond their locality in urban areas.

Preservation of relevant knowledge and expertise

Knowledge is used at each level of the food web; from the best ways of working with local soils, geology, weather patterns, seeds, and wider agricultural biodiversity, to the preferences of customers. As shown in the Farmer Field Schools in Kenya, this knowledge can be built upon with farmers to overcome challenges rather than imposing top-down solutions. Where farmers do not have knowledge of how their produce is marketed, this reduces their control over the market and makes them reliant on the pricing of buyers.

Reduced reliance on, or vulnerability to, outside factors

The accumulation of the above factors leads to food systems that can reliably feed the local area, and wider populations, with nutritious food. As such, the justification for food dumping in developing countries is removed and reliance on super-markets is reduced in both developed and developing countries. Production with fewer external chemical inputs and with less fossil fuel use reduces vulnerability to oil price fluctuation.

The value and strength of local food webs, developed in the framework of food sovereignty, is that they continue, in the face of pressures from the globalizing food system, to feed the majority of the population while preserving the environment.

They have endured by developing support and information services throughout the food web despite decades of underinvestment. They have proved their viability but deserve greater support and recognition from governments, such as support for: the operation of local food webs; young people, apprentices, and new entrants in the local food economy; producer-led and relevant R&D, especially for biodiverse, ecological production; independent markets, including farmers' markets; and locally sourced procurement of food for public institutions.

Such support for small-scale food providers would contribute towards fulfilling the right to food and local control over the food system – food sovereignty – and it would also reduce hunger. It would stem the degradation of natural resources, allowing for more productive food systems and enabling them to adapt better to climate change, while also mitigating it by reducing emissions of greenhouse gases. Greater support for local production would improve the resilience of local economies and communities and improve health. But, at the least, supporting what is already being done locally to meet local food needs in the long term, rather than supporting what currently provides the best short-term returns to industrial concerns and government revenues, would provide a more sustainable food system. Local food webs provide the model that should be prioritized in order to secure our future food.

Acknowledgements

This paper is based on *Sustaining Local Food Webs* (Murphy, 2015), a book produced for the campaign 'europAfrica: Towards Food Sovereignty' (www.europAfrica.info), which connected African regional farmers' platforms and a coalition of European civil society organizations, including the UK Food Group, working to a common agenda. The information from Kenya was contributed by the Eastern Africa Farmers' Federation (EAFF), the campaign's Kenyan partner.

References

- Ayieko, M.W., Tschirley, D.L. and Mathenge, M.W. (2005) 'Fresh fruit and vegetable consumption patterns and supply chain systems in urban Kenya: implications for policy and investment priorities', Working Paper 16, Kenya: Tegemeo Institute of Agricultural Policy and Development.
- Blench, R. (2001) *'You Can't Go Home Again': Pastoralism in the New Millennium* [pdf], London: Overseas Development Institute <www.odi.org.uk/sites/odi.org.uk/files/odi-assets/publications-opinion-files/6329.pdf> [accessed 15 November 2013].
- Calza Bini, E. and Boccaleoni, S. (eds) (2010) *Food Sovereignty: A Common Challenge in Africa and in Europe – Agricultural Policies and Regional Integration for Family Farming* [pdf], Rome: europAfrica Campaign <www.csa-be.org/IMG/pdf_pubbeuropAfrica_eng_low.pdf> [accessed 15 November 2013].
- Campaign to Protect Rural England (CPRE) (1998) *Food Webs: A Report on Local Food Networks in East Suffolk which Demonstrates the Importance of Local Shops and Services to Rural Communities* [pdf], CPRE: London <www.cpre.org.uk/resources/farming-and-food/local-foods/item/1915-food-webs> [accessed 9 August 2013].

CPRE (2011a) *From Field to Fork: Sheffield. Mapping the Local Food Web* [pdf], CPRE: London <www.cpre.org.uk/resources/farming-and-food/local-foods/item/2043from-field-to-fork-sheffield> [accessed 4 December 2013].

CPRE (2011b) 'From field to fork: mapping the local food web' [online], CPRE: London <www.cpre.org.uk/what-we-do/farming-and-food/local-foods/update/item/2896-localfood-is-recipe-for-economic-success> [accessed 9 August 2013].

CPRE (2011c) *From Field to Fork: Totnes* [pdf], London: CPRE <www.cpre.org.uk/resources/farming-and-food/local-foods/item/download/527> [accessed 4 December 2013].

CPRE (2012) 'Local foods' [online] <www.cpre.org.uk/resources/farming-and-food/local-foods> [accessed 4 December 2013].

De Schutter, O. (2009) 'The right to food and the political economy of hunger' [online], 26th McDougall Memorial Lecture, Rome, 18 November <[ftp://ftp.fao.org/docrep/fao/meeting/018/k6518e.pdf](http://ftp.fao.org/docrep/fao/meeting/018/k6518e.pdf)> [accessed 9 August 2013].

De Schutter, O. (2011) 'Agroecology and the right to food' [online], presented at the 16th Session of the United Nations Human Rights Council, 8 March [A/HRC/16/49] <www.srfood.org/en/report-agroecology-and-the-right-to-food> [accessed 15 November 2013].

ETC Group (2009) *Who Will Feed Us? Questions for the Food and Climate Crises* [pdf], Communiqué Issue 102 <www.etcgroup.org/sites/www.etcgroup.org/files/ETC_Who_Will_Feed_Us.pdf> [accessed 9 August 2013].

europAfrica (2013) *Family Farmers for Sustainable Food Systems: A Synthesis of Reports by African Farmers' Regional Networks on Models of Food Production, Consumption and Markets* [pdf] <www.ukfg.org.uk/pdfs/FamilyFarmersForSustainableFoodSystems_2013_en.pdf> [accessed 10 October 2013].

Facilitating Alternative Agro-food Networks (FAAN) (2010) *Local Food Systems in Europe: Case Studies from Five Countries and What They Imply for Policy and Practice* [pdf], FAAN <www.faanweb.eu/sites/faanweb.eu/files/FAAN_Booklet_PRINT.pdf> [accessed 9 August 2013].

Gitu, K.W. (2006) *Agricultural Development and Food Security in Sub-Saharan Africa (SSA): Building a Case for more Support: The Case of Kenya* [pdf], Working Paper No. 3, Policy Assistance Unit, FAO Subregional Office for East and Southern Africa, Rome: FAO <ftp://ftp.fao.org/docrep/fao/009/a0782e/a0782e00.pdf> [accessed 5 May 2015].

IAASTD, McIntyre, B.D., Herren, H.R., Wakhungu, J. and Watson, R.T. (eds) (2009) *Agriculture at a Crossroads: Global Report* [pdf], Washington, DC: International Assessment of Agricultural Knowledge, Science and Technology for Development, United Nations Environment Programme <www.unep.org/dewa/agassessment/reports/IAASTD/EN/Agriculture%20at%20a%20Crossroads_Global%20Report%20%28English%29.pdf> [accessed 9 August 2013].

ICIPE (no date) 'Push-pull: A novel farming system for ending hunger and poverty in sub-Saharan Africa' [online], International Centre for Insect Physiology and Ecology <www.push-pull.net/works.shtml> [accessed 15 November 2013].

International Fund for Agricultural Development (IFAD) (2002) 'The rural poor', in *World Poverty Report 2001*, pp. 15–70, Rome: IFAD.

Kibue, M. (2007) *Learning to Set Up a Fair Trade Livestock Marketing Chain from Maasai Pastoralists to Consumers in Nairobi, Kenya* [pdf] <www.future-agricultures.org/farmerfirst/files/T2c_Kibue.pdf> [accessed 1 August 2011].

Kinyanjui, M.N. (2010) 'Social relations and associations in the informal sector in Kenya' [online], Social Policy and Development Programme – Paper No. 43, Geneva: United Nations

Research Institute for Social Development <www.unrisd.org/publications/pp-kinyanjui> [accessed 5 May 2015].

Muchiri, S. and Kamau, M. (2011) 'Models of production', study paper for Eastern African Farmers Federation (EAFF), Nairobi.

Mulvany, P. and Ensor, J. (2011) 'Changing a dysfunctional food system: towards ecological food provision in the framework of food sovereignty', *Food Chain* 1(1): 34–51 <<http://dx.doi.org/10.3362/2046-1887.2011.004>>.

Murphy, B. (ed.) (2015) *Sustaining Local Food Webs*, Rugby, UK: Practical Action Publishing <<http://dx.doi.org/10.3362/9781780448800.001>>.

Neondo, H. (2011) *New Approaches to an Old Technology Prepare Farmers in Readiness to the Impacts of Climate Change* [pdf], Africa Science News Service <www.icipe.org/images/stories/pdf/news_and_events/2011/new_approaches_to_old_technology.pdf> [accessed 18 October 2013].

Nyéleni (2007) 'Declaration and synthesis reports of "Nyéleni 2007: Forum for Food Sovereignty"' [online] <www.nyeleni.org> [accessed 9 August 2013].

Nyéleni Europe (2012) 'Synthesis report and action plan' [online], Forum for Food Sovereignty, 16–21 August 2011, Krems/Austria <www.nyelenieurope.net/en/download> [accessed 9 August 2013].

Omiti, J., Otieno, D., McCulloch, E. and Nyanamba, T. (2008) 'Strategies to promote market-oriented smallholder agriculture in developing countries: a case of Kenya' [online], in *AAAE Conference Proceedings (2007)*, pp. 259–64 <<http://purl.umn.edu/52105>>.

Onduru, D.D., Gachimbi, L., De Jager, A., Gachini, G.N., Maina, F. and Muchena, F.N. (2002) 'Smallholder farming and rural livelihoods of central Kenya: a baseline survey of Kiambu District', INMASP Report No. 6.

ROPPA, EAFF and PROPAC (2011) 'Agricultural investment strengthening family farming and sustainable food systems in Africa', Synthesis Report of the African Farmer Workshop, Yaounde, Cameroon, 4–5 May [online] <www.europafrika.info/en/publications/agricultural-investment-strengthening-family-farming-and-sustainable-food-systems-in-africa> [accessed 9 August 2013].

Simms, A.M. (2007) *Tescopoly: How One Shop Came Out on Top and Why It Matters*, London: Constable.

Stephens, E.C. and Barrett, C.B. (2006) *Incomplete Credit Markets and Commodity Marketing Behavior*, Cornell University Working Paper, Ithaca, NY: Cornell University.

UK Food Group (UKFG) (2010) *Securing Future Food: Towards Ecological Food Provision* [pdf], UKFG <www.ukfg.org.uk/pdfs/Securing_future_food.pdf> [accessed 9 August 2013].

Watson, D.J. and van Binsbergen J. (2008) *Livestock Market Access and Opportunities in Turkana, Kenya*, ILRI Research Report 3, Nairobi, Kenya: International Livestock Research Institute.

World Health Organization (WHO) (2011) *Global Status Report on Noncommunicable Diseases 2010* [pdf], Geneva: WHO <www.who.int/nmh/publications/ncd_report2010/en/> [accessed 11 October 2013].