

Food: From Commodity to Commons

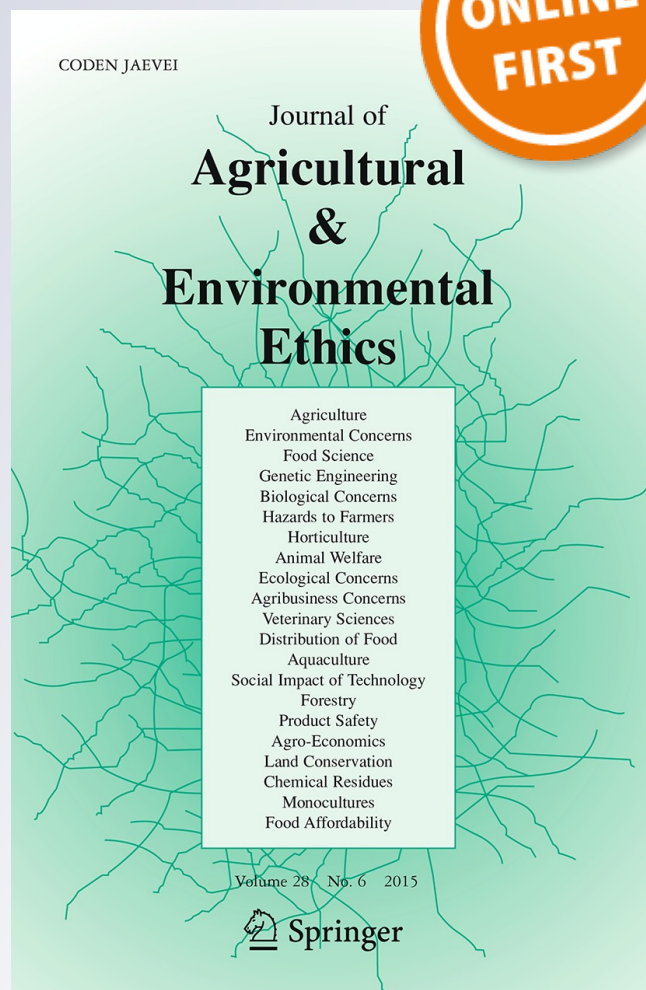
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Food: From Commodity to Commons

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Abstract Our food and farming system is not socially, economically or ecologically sustainable. Many of the ills are a result of market competition driving specialization and linear production models, externalizing costs for environmental, social and cultural degradation. Some propose that market mechanisms should be used to correct this; improved consumer choice, internalization of costs and compensation to farmers for public goods. What we eat is determined by the path taken by our ancestors, by commercialization and fierce competition, fossil fuels and demographic development. Based on those, governments and the food industry are the choice architects who determine what we eat; consumer choice plays a marginal role. Using market mechanisms to internalize cost and compensate farmers for public goods has been proposed for decades but little progress has been made. There are also many practical, ethical and theoretical objections to such a system. The market is not a good master for a sustainable food system. Instead we need to find new ways of managing the food system based on food as a right and farming as a management system of the planet Earth. The solutions should be based on relocation of food production and de-commodification of food and our symbionts, the plants and animals we eat.

Keywords Food · Ecosystem services · Consumer choice · Markets · Commodification

Introduction

The aim of this article is to demonstrate which are the main factors that determine how we farm and what we eat. In particular, it discusses the effects of commercialization of farming and the food system and why a food system managed

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by free trade and unlimited competition can not be sustainable. Finally, it looks for opportunities to reform the system in order to make it equitable and sustainable.

Instant noodles are a very popular fast food in Indonesia (Fabiosa 2011), the fourth most populous country in the world. The population consumed a staggering 14 billion packages of instant wheat noodles in 2012, despite that wheat can't be produced in Indonesia (World Instant Noodle Association 2014). The history of wheat in Indonesia began in 1969 when the United States extended food aid in the form of wheat flour and wheat. It now imports some 7 million tons of wheat and wheat flour, almost 30 kg per person, the cost of which far outweighs its total agriculture development budget (Jakarta Post 2013). The story about noodles in Indonesia is only one example, albeit somewhat extreme, of how the global food system is organized. Food consumption has no direct link to local agriculture and food production is organized in the same way as industrial assembly lines, with parts being delivered from all over the globe to be assembled as a hamburger or organic tropical fruit yoghurt.

The large scale introduction of chemical fertilizers, pesticides and fossil fuel based mechanization allowed some farmers to specialize in crop production, often in monocultures. Other could specialize in livestock buying from the crop farmers; in the same way as most crop farmers stopped having animals, many livestock farmers quit cropping. For instance in 1900, three quarters of farms in the United States had dairy cows and hogs, while by 2005 only one farm in twenty had either hogs or dairy cows (USDA 2013). Similar developments are seen in other parts of the world; the number of Romanian pig producers declined by 90 % within between 2003 and 2009 (Mathias 2012).

Not only farms are specializing, whole regions and countries do as well. The brutal transformation of whole landscapes into sugar plantations based on slavery in Latin America in the seventeenth and eighteenth century was a starting point for this new global order. Sugar production and trade were important drivers for colonization and slavery and the cause of wars between sugar trading nations in the nineteenth century. Sugar fuelled the British Empire for more than a century. Barbados became the most densely populated and productive place in the English-speaking world, and by the late 1600s, eighty percent of the island was planted with sugar cane (Mintz 1985). This model of large scale transformation of huge tracts into commercial farming was repeated in the grasslands of North and South America during colonization and can now be studied in the conversion of Borneo and Sumatra into palm oil plantations (Koh and Wilcove 2008). European chickens or Chinese pigs are, to a very large extent, fed soy protein from Latin America much of it from the Cerrado, the Amazon or the Pampa, landscapes which are totally reshaped by agro-business. Endless fields with soybeans and maize and the corresponding industrial livestock farms with millions of chicken and pigs or hundred thousand cattle are the most extreme examples of the modern agriculture model. But the model is gradually conquering all farms and our whole food chain.

In Europe almost hundred million hectares of farm land has been abandoned the last fifty years (FAOSTAT 2014) and countries which could be almost self-sufficient of food, such as Sweden, import increasing quantities of foods, not only exotic crops or luxuries. Even more worrying is that in the late 1960s developed and

developing countries were more or less producing their own foods, but in 2009, many more developing countries had become net importers of food. Sub-Saharan Africa went from a 14 % surplus of calories to a thirteen percent deficit (FAO 2012). That almost a billion people don't have enough to eat, while even more eat too much and huge quantities of food is simply wasted also shows that the food and farming system is socially unsustainable.

Even if farmland, in a narrow sense, makes up slightly more than one third of the land area of the planet (FAOSTAT 2014), farming is the major determining factor for more than half of the biological production of the land. Ellis and Ramankutty (2008) identify 18 anthropogenic biomes and only 3 biomes that could be considered 'wildlands', most of them barren, permafrost or sparsely forested. More than half the world's land and primary biological production is within farmed landscapes. The agricultural landscape is home to a significant part of the world's bio-diversity, it is the major consumer of freshwater, and it is involved in global scale manipulations of the nitrogen, carbon, methane and phosphorus cycles (WRI 2005; Steffen et al. 2015). As such farming is the most significant human management system of the planet and our future as humans on the planet will largely rest upon how we manage the farmscape. How and what we eat is therefore also strongly linked to how we manage the planet (Rundgren 2013).

Around the year 2000, consumer spending on food ranged from a high of 55 % of total household expenditures in Indonesia to a low of 7 % in the United States (Regmi and Gehlhar 2005). This is the result of both a drastic increase in peoples' incomes and sharp fall in the prices of farm produce. At the end of World War I, a sample basket of staple food items cost what an average American would earn in 10 h of work. By 1995, that cost had dropped to less than two hours (Plunkett Research Ltd 2013). To earn enough to buy a kg of wheat a laborer in Sweden had to work thirty times longer in 1930 than in the year 2000 (Larsson 2009). Food is thus cheap in the industrial world, very cheap, in a historical perspective.

Cheap food allows growing numbers to eat meat, fresh vegetables and fruits all year round, something most people could only dream of a few generations back—and something many people in the world can only still dream of. In average, people live longer, are taller, and are generally healthier than in the agrarian societies of the eighteenth and nineteenth centuries. But the current food system has also produced obesity, allergies and other diseases, while at the same time destroying the environment. A major reason for that food is cheap is that many of the costs of producing and consuming it are externalized (Pretty et al 2005; World Bank 2007). Farmers and food industry let someone else—nature, other people, future generations, tax payers—foot the bill for climate change, for the loss of biodiversity, for eutrophication, for nitrates and pesticides in our groundwaters or even for losing the water or the soil altogether. Hence, cheap food is not so cheap.

It is no longer very controversial to question the direction our food system has taken. The European Union's Standing Committee on Agricultural Research (European Commission 2011) states that a radical change in food consumption and production in Europe is necessary to make the European food system more resilient, and the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD 2009), clarifies that 'business as usual is

not an option'. But we will only be able to find new ways if we understand the factors that determine how we farm, what we grow and what we eat.

Most of the public debate on food focuses on the technical aspects of food production and farming, such as use of genetically modified organisms and chemical fertilizers, and their benefits and drawbacks. But the technical aspects of farming are only part of the problem, or part of the solution. Other commentaries discuss lifestyle and consumption patterns, waste and meat consumption in particular. This adds perspective, but the food system is an ecological, social and economic system and needs to be viewed as such in all its complexity. The different parts of the system interact and reflect each the others. The straight rows of endless monocultures in Mato Grosso are reflected in pig factories, in the assembly lines of food industries, the aisles of the supermarket, the fast food restaurant checkouts and the lanes of the highways full of lorries bringing goods into them (Meyer von Bremen and Rundgren 2012).

The Mega Drivers of the Food System

I propose that three main drivers, 'mega drivers', have shaped agriculture over the last centuries: (1) the commercialization of the entire food system, (2) the use of energy and applied technology (be it in the form of machinery or nitrogen fertilizers) to replace animate labor and processes, and (3) demographic changes, such as population growth, demographic transition and urbanization (Rundgren 2014).

Regarding the first mega driver, the commercialization of food and all resources linked to food production, plants, animals, land and knowledge has changed both us and the food we eat in a profound way. In most human societies the distribution of the most important foods was done outside the market and was strictly regulated. Gifts, taxes, rents, tribute and sharing were important channels for food distribution (Mazoyer and Roudart 2006; Polanyi 1944). Markets were mainly for selling surpluses which were not distributed in other ways and for luxury produce. The market has now become the main conductor of the whole food system, from farm to fork. By and large, farms and food production in most part of the world are now fully commercialized, fully integrated in national markets, which in turn are increasingly integrated in global markets. When the process has reached its completion, farmers sell everything and eat nothing from their own turf.

The regeneration of productive forces, including labor and the knowledge needed, was engraved in the memes of earlier farming communities. This is in absolute contrast to the entrepreneurial approach farmers are encouraged to apply today. As farmers become integrated into the market economy, they no longer reproduce and regenerate their production factors. They buy their seeds and breeds in the market; they feel that they don't have to take care of the reproduction of the soil, because they can compensate for this by buying chemical fertilizers in sacks. They don't have to take care of the balance between nature and what humans take away. The commercialization of farming also includes the privatization of land,

water, and nature as private property and the life of the land, our symbiotic crops and animals have become commodities (Rundgren 2014).

Commercialization also changed consumption in a profound way as well. Cooking and eating were for a long time mostly social activities done within the household or in the community, with the work being done without pay and for no costs. Parallel to farming, cooking and eating have become commercialized and acquired a total different meaning and role in society (Fernández-Armesto 2001).

The second mega driver concerns the large-scale extraction of fossil fuels. Before this was possible, human society was largely locked into a biomass economy. This changed when profitable uses of fossil fuel, in particular mineral coal, were introduced. Fossil fuels represent some 80 % of all energy supplies today (IEA 2014). Modern farming uses energy in many different forms: diesel for tractors and pumps; electricity for pumps, coolers, fans and indoor machinery, such as milking machines, etc. Fertilizers also represent a big energy use; 90 % of the production costs of nitrogen fertilizers, 30 % of phosphorus fertilizers and 15 % of potassium fertilizers are for energy (US CRS 2004).

The whole food chain consumes around 16 % of the total energy use in the United States. The USDA estimates that delivering the average American's 2000 calorie diet requires nearly 32,000 calories of energy inputs. Farm operations in the United States consume only 14 % of the total energy used in the food chain, while handling, processing and retail on the one hand and preparation on the other, use more or less equal shares of the rest. More than a quarter of the energy, 28 %, in the food chain in United States is used in households and 18 % in the food service sector, restaurants, cafés and catering (Canning et al. 2010).

When energy prices rise, agriculture prices follow suit. Increased energy prices influence food prices through at least four mechanisms. Higher energy prices make production, at all stages, more expensive; it becomes more interesting to produce biofuels, thereby reducing food production leading to higher prices; it will increase transport, handling, processing and storage (e.g. cooling) costs that are directly reflected in food prices; and competition will be reduced in the food sector as increased transport costs reduce global competitive pressures (Rundgren 2013).

Besides commercialization and the use of energy, growing populations and what and how they consume constitutes the third megadriver that influences farming and what we eat. The world population has increased from 1 billion at the beginning of the nineteenth century to 7 billion at the end of 2011. Feeding a growing population is challenging, but so far farmers have managed to keep pace with population growth. This has been accomplished with a combination of plowing more land and by intensification of cropping practices. Between 1700 and 1993 there was an 11 fold increase in population but arable land only increased 5.5 times (Trewavas 2001). Farming practices change as a result of population growth and other economic factors; Boserup (2005) made the observation that soil fertility may be a result of the use of intensive methods of cultivation rather than the other way round.

History has been written in cities and power has resided there, so this might give us a distorted view of the importance of cities. In 1800, just three percent of the world's population lived in cities, by 1900, this had increased to ten percent. In 2008, the world's urban population exceeded its rural population for the first time in

human history (Satterthwaite et al. 2010). It is not only the number of people living in cities that have changed, the cities themselves have changed. The average size of the 100 largest cities increased from 2 million inhabitants in 1950 to 6.3 million inhabitants in the year 2000 (Satterthwaite et al. 2010). Urbanization has a profound impact on farming as cities demand food, provide a market for farmers and attract labor. It also change food habits as urbanites have access (if they can afford it) to a higher diversity of foods and they eat more processed food and eat more out of home.

In all countries, the share of farmers in the population is decreasing. In the richest countries, farmers and farm workers are less than two percent of the workforce. In the poorest countries, farmers and farm workers still exceed two-thirds of the population (Wenzlau 2014). Driving through Mato Grosso in Brazil or the Corn Belt in the USA it is ironic to see that the most successful farm areas are largely 'dead'. Farms have modernized, specialized and mechanized and there are fewer people needed. Food processing and distribution has also been rationalized so there are very few job in those trades in rural areas. The end result is that there are very few people left in those highly productive agricultural landscapes (Meyer von Bremen and Rundgren 2012). Even food itself is scarce; twenty percent of rural counties in the United States are considered 'food deserts', where people have to drive more than 10 miles to get their food, which is often expensive and of low quality (Treuhaft and Karpyn 2010).

These three megatrends are mutually reinforcing. Any of them alone would not produce the changes that can be observed today. For example, the application of energy and mechanization in farming, in particular the use of fossil fuels, has increased productivity per agriculture worker tremendously which meant that the share of population engaged in farming dropped steeply. While the agricultural labor force in England was halved between 1952 and 1972 energy use tripled (Bayliss-Smith 1982). Without commercialization of farming there would be little incentive to mechanize and use chemical fertilizers, as both pre-suppose market driven farming. And without urbanization there would be little development of markets for agriculture products. Urbanization has been made possible with modern transport technology and globalized markets, without these, it is simply not possible to solve the logistics of megacities. And as a consequence, the ecological link between the city and the surrounding land has all but disappeared—at least for food and farming.

Farmers are forced by competition to increase productivity, and the increased productivity leads to lower prices. Vanguard farmers will constantly develop and improve and mostly increase in size, at the expense of their less successful colleagues. Larger farms are not normally more productive per area unit, but they do have lower costs of production (USDA 2013). They will establish a new level of costs and prices each time racking up the notch for the minimum efficiency needed to stay in business (Cochrane 1993).

Every third minute a container of dairy products—mostly milk powder—is shipped from New Zealand (Fonterra 2015). This country, with four and a half million inhabitants, accounts for a little over two percent of total world milk production but has about one-third of the global cross-border trade in dairy products,

because it exports 95 % of the production (DCANZ 2015). The dairy industry is totally dominated by Fonterra, a farmers' cooperative which collects around nine tenths of New Zealand's milk production. Their fortnightly auctions are followed—sleeplessly—by dairy farmers all over the world as it is there the 'world market price' is set. It is a stark expression of the profound effects of globalization and markets that the conditions in one country that produce just a fraction of global milk production determines the market price for the rest.

Historically, agriculture was seen as a low tech sector, where cheap labor represents a comparative advantage. But today, low labor cost no longer constitutes a comparative advantage in crops which are easily mechanized, such as the main staples (Rundgren 2014). The energy content in one barrel of oil corresponds to the energy of 25,000 h of human work, that is, 14 persons toiling round the year with normal Western labour standards (Rundgren 2013). Low prices for staple crops, produced with the massive use of fossil fuels, makes it virtually impossible for small farms to accumulate capital to mechanize production, which is why more than 80 % of the farmers in sub-Saharan Africa and around half of the farmers in Asia and Latin America still farm manually. Such farmers would have to devote *all* their monetary income from farming over a whole life to upgrade to ox-plowing (Mazoyer and Roudart 2006). Mathias (2012) concludes that for many traditional livestock keepers, the long-term prospects are depressing; "their livestock threatens to turn from a multipurpose asset into a financial liability, driving them into continuous investment and a debt spiral".

The Myth of Consumer Choice

The dominant economic doctrine is that the market is the best conductor of an increasing part of human life. This also includes a view in which consumers shape how production is organised and where policy-makers take a back seat and declares that 'the market' or 'consumers' will rule. While many policy makers in Sweden have spoken up organic food, humanely produced food, local, artisanal food or simply Swedish food, policies have to a minor extent been put in place to support these. Politicians say that it is the consumer that will decide which food they should buy and therefore which farming system there should be in Sweden, if any (Westberg 2014).

The view that consumers direct the food system, historically or today, has little foundation. Our palates have been shaped over centuries to like some things and dislike others. The mere difference in local foods and food preferences is proof not of how different from each other we are, but how well we adapt to what is available, or could be produced. If we were Inuit we liked caribou, seal meat and fat and if we were Swedes we liked herring and cheese. The humid tropics never developed a *prosciutto* ham or hard cured cheese, as the conditions for making those do not exist in such a climate. *Chuños* (a kind of freeze-dried potatoes) fit well in the Andean climate, but would never appear in Ireland. Ecological conditions in a wider sense thus determined what people in different places could eat and they made virtue out of necessity by liking what there was (Rundgren 2014).

Today, our food choices are by and large determined by the economy instead of ecology, and the economy is mastered by 'the market'. But does it mean that the consumer rule; are they the masters of the food system? And will consumers guide producers into more benign production methods?

Benjamin Lundy, a Quaker, opened a store in Baltimore 1826 which sold only goods obtained by labor from free people (Nuermberger 1942). This is an early example of ethical marketing which continued up to the end of slavery in the United States in 1865. Ethical marketing based on voluntary standards and certification has spread in a rapid pace the last decades, as a result of converging—and interacting—trends. These trends include an emphasis on the market and consumer choice to achieve ethical, economic, environmental or social goals; government de-regulation and the associated increase in self-regulation of industries; and stiff global competition, making differentiation in the market an essential strategy to escape 'commodity hell' (Busch 2011; Rundgren 2014).

When you buy a cup of coffee for €2 the farmer gets a few cents for the coffee in that cup. If you buy a cup of organic and fair trade coffee the farmer will get a cent more. The farmer's income will increase, perhaps by an impressive 20–25 %. Looked at from another perspective, however, you spend an extra 50 cents to increase the farmer's income by 1 or 2 cents.¹ This begs the question of how efficient the market mechanism is in transforming consumers' willingness to pay for the direct or indirect benefits of a product into an increase in producers' income.

Fair trade has grown a lot in recent years. Its idea is to use the normal market, but to tilt the rules in favor of small and poor producers. However, the relationship is still very unequal. Buyers in the North dictate most of the conditions. Their view of what is fair and just is what is codified; as are their definitions of quality rules. There are no codes of practices for the supermarkets to follow, they can and sometimes do mark up fair trade products as much as they want. The consumers who buy the products are also not subject to any commitments—they can buy or not buy on a whim. The producers are mainly objects in the marketing of fair trade, in much the same way as the fake Grandma is on a biscuit-maker's packaging (Wright 2009).

Many of the objectives of fair trade could equally and more efficiently be addressed by political measures. For example in Ghana, the Cocoa Board sets a fixed national price. This guarantees the price for *all* cocoa farmers. In addition, the government has established a stabilization fund, which provides a three year pot of funds to be drawn upon by the Cocoa Board to ensure that the fixed price is met when world prices decline. In effect, the government does the same as the fair trade organizations try to do—but with more clout and more reach. For a long time the fair trade price was actually below the public price in Ghana (Natural Resource Institute 2013).

When asked questions, most people stress the importance of animal welfare or social justice, but when acting as consumers few act according to these stated preferences (Pirscher 2013, see also this issue). Some believe that this 'market

¹ These are back-of-the-envelope calculations, based on prices of a cup of coffee in several European countries and the coffee prices the last years. The price of a cup of coffee and the grower prices vary considerably. But the main lines are the same.

failure' should be corrected by better information, which is a pre-condition for a well-functioning market. However the discrepancy between *citizen* preferences and actual *consumer* behavior is not primarily a result of too little information. After all, you must be immune to information to not know that many vegetables are harvested by badly paid, mainly illegal, immigrants in many parts of Europe and North America. As humans we adapt ourselves to different situations, and when we go into consumer mode, we play that role well.

Some schools in Sweden began buying organic potatoes as early as in the 1980s (Geber 1987). In 2006, the Swedish government adopted a goal that 25 % of all publically procured food should be organic. The municipalities of Borlänge, Lund and Södertälje have reached above 40 % and in total 27 municipalities and 8 counties have reached this official target. Malmö and Uppsala have set the goal that all publically procured food should be organic, even if they still have a way to go; Malmö reached 38.7 % in 2012 (Ekomatcentrum 2013). This demonstrates that political action can often be more effective than appealing to consumers' willingness to pay. After all, *consumers* in Malmö don't buy more than perhaps six to seven percent organic food, while the same people as *citizens* gladly support children and the elderly getting one hundred percent organic. Research in Europe also shows that in the cases where 'the market' has chosen more animal or environmental friendly products, this has mostly been the result of pressure groups 'convincing' the major actors in agri-business to make changes. "It is easier to convince five buying directors than five million consumers" according to Stef Aerts (2013).

It is a good thing to make educated and ethical consumer choices. It is not only a good thing—it is our responsibility, even if the effects are small. Movements that promote ethical food choices can raise awareness and influence policies; in many cases it makes more sense to have those choices made politically (Karlsson 2013). Governments could prohibit, or impose prohibitive fees on chemical pesticides; they can pass stringent environmental legislation or carbon taxes; and they could ban factory farming, if they so wished. Ultimately, it was not the marketing of slavery-free goods that freed the slaves—it took a devastating civil war to abolish slavery in the United States.

The Choice Architects

Our food system is shaped by the mega drivers and by governments and industry directly and indirectly. Most of their actions reinforce the mega drivers, but some government interventions are there to counterbalance the effects of the mega drivers. Armies on the March or in trenches provided a development field for logistics, food processing and not the least mass catering, which also served the masses in the rapidly growing cities. Cwiertka (2007) studied the food in Japanese canteens and observed that the menus in modern day Tokyo are made up of dishes that are luxury versions of those served in the Imperial Japanese Army and Navy half a century earlier.

New food safety standards and procedures have mostly been introduced in response to public outrage or scandals. While well intended, the regulations put in place by governments to deal with food safety, environment, hygiene or disease are often disproportionately hard for small producers, be it farmers or food processors. In this way governments can contribute considerably to further concentration in the food system. For example, in response to an oil contamination scandal in 1998, the Indian government imposed rules that every oil mill must have its own laboratory and chemist, which led to a million small mills closing down according to Shiva (2005). At this moment a battle over raw, unpasteurized, milk is raging in many countries, with governments trying to ban it.

Governments also control the food production with subsidies. Public support to the farm sector average some 20 % of total farm income in the member countries of the Organization of Economic Cooperation and Development or roughly one percent of GDP (OECD 2014). Clearly the conditions attached to this support play a determining role for how farming develops. When I discuss with other farmers and advisors what to do with our newly bought farm, the starting point is rarely, 'what do consumers want'; almost all of them start the discussion from how we should maximize the public support.

Governments shape food trade in more ways than through subsidies, tariffs and food standards. Until 1880 groceries were sold, under questionable hygienic conditions, from more than 9000 market stalls in 20 markets in Berlin. The state redirected this to specialist and grocery stores as well as to a central market. It also invested in a road and railroad network to facilitate transport into the city (Segers et al. 2009). The architecture of these central markets, such as *Les Halles* in Paris, says something of their huge importance and symbolic meaning. Other government interventions are in the form of nutritional recommendations and food in public canteens.

Also in countries where the free market doctrine prevails in theory, there are many aspects of food and farming which are not left to the vagaries of the market. Food and farming remain, together with energy, labor and housing, some of the most regulated parts of the economy in many countries. Many of the regulations and subsidies are questioned. Still, they are there because the free market doesn't work. Or rather, the market works as it should according to the text book, but people don't like the result of its workings.

The food industry and retail sector have also played a profound role in shaping the food system, including how farmers produce. The introduction of steel roller mills and white wheat flour can serve as an example. Until the nineteenth century, bakers obtained their yeast from beer brewers. A separate production of yeast started first in the mid 1800s. Meanwhile, steel roller mills developed in Budapest which allowed the mass production of white wheat flour, which wasn't really possible with stone mills (Horsford 1875). With stone-milling the oils of the wheat germ was set free in the flour and caused it to go rancid if stored for a longer period of time. Whole wheat flour was thus milled daily and households and bakers bought small quantities from local mills to have fresh flour. The white wheat flour didn't contain the germ and could be stored for a long time. Aided by steamships, railroads and canal networks big mills could both source grain and sell flour over a

dramatically bigger area than before (Klement 2014). In a few decades small mills closed down and in a later stage the same forces led to the concentration of baking into huge factories. Industrial bread was born. Also farmers were affected in many ways. Local grain producers had to compete with imports. Soft wheats, good for stone milling, were replaced by hard wheats suited for the steel roller mills. The hard Turkey Red wheat brought to America by Russian immigrants became a major export commodity (Englund 2013). Similarly, the new industrial baking processes needed wheat with certain qualities in order to work well. Only much later did anybody question if these improved technical properties were detrimental to the nutritional quality of wheat.

The concentration in the agriculture input sector and global food trade as well as the increasing concentration in retail in catering is well documented and not expanded upon here. Just three examples: (1) The global commercial seed market in 2009 was worth US\$27 billion, with the top ten companies having three quarters of the market. Three of them controlled more than half of the market and one, Monsanto, now controls more than one-quarter of the commercial seed market (ETC 2011). (2) The top ten food and beverage firms control an estimated 28 % of the global market. The top five breweries have around 50 % of the market while the top ten wine marketers have around 16 % of the market (Inglis and Giimlin 2009). (3) In 1992, the top five supermarket chains in the United States had a market share of less than 20 %; by 1999, that share had increased to one third and in 2012 the four largest retailers sold more than half of the groceries (Food and Water Watch 2013).

There is a symbiotic relationship between big food industries and the big retailers. The food industry has packaged food with attractive branding and backs it up with commercials. Bigger shops can store more items and shops designed for self service by the consumer fits much better in this world of pre-packaged food. In addition, big food processors offer big clients favorable terms of purchase. As supermarket chains became bigger and more powerful, they also started to dictate conditions for the food industry, and their demands drove small food processors out of business in a similar way that the big food processors helped to drive small shops out of business. Strict quality requirements, demand for bigger volumes and strict business conditions for supply security, penalties for failure and slow payments and other practices by retailers and food industry alike affect farmers. Those conditions favor those who can invest in their production, in cooling, trucks, toilets, protective gear for workers etc. Farmers who cannot upgrade their production are marginalized (Rundgren 2014).

When standing in front of a supermarket shelf, or sitting at a table reading a restaurant menu, there are many choices; a supermarket may carry up to 50,000 food items (Food Marketing Institute 2015). However, a very large part of food items are variations made out of the 'Big Five'—wheat, maize, palm oil, sugar and soybeans—and they are produced by a handful large companies, which source the raw materials from a few selected key locations. Clearly, governments, agriculture input providers, the food industry and retailers are the real shapers of the food system, the 'choice architects' and their decisions shape what consumers can and cannot buy. The often stated 'the customer is king' is a myth.

Why Internalizing Costs Doesn't Work

Another way of using market mechanisms for correcting the failures of the food system which often is promoted is to ensure that external costs such as pollution are internalized (by means of taxes, fees or alike) into the cost of the products and that public goods produced by farmers should be compensated for (payment for ecosystem services is promoted by organizations such as the WWF, UNEP, the OECD and the European Union). For example, the external costs of farming in Great Britain were estimated by Pretty et al. (2005) to be some £1.5 billion, corresponding to £265 per hectare. These calculations were conservative and only included proven costs; e.g. they did not include any costs for the health effects of pesticides in food. The *European Nitrogen Assessment* (European Science Foundation 2013) estimated the cost of environmental damage related to nitrogen effects from agriculture in the EU-27 at €20–€150 billion per year. This was compared with a benefit of N-fertilizer for farmers of €10–€100 billion per year (with considerable uncertainty about long-term effects). The World Bank (2007) estimated in 2007 that 350,000 people are killed by pesticides annually and the United Nations Environment Programme (UNEP 2012) estimated that the costs of injury—lost work days, medical treatments, and patient hospitalization—from pesticide poisonings, in Sub-Saharan Africa, amounted to US\$4.4 billion in 2005. At present, we let someone else—nature, other people, future generations, tax payers—foot the bill for how we farm. While the *Polluter Pay Principle* is embraced by all the OECD countries, and has been part of the European Union's policies since 1975 (Barde 1994), no country applies it to farming—on the contrary.²

Paying farmers for public goods is more developed. Farmers in the European Union and the United States are paid for environmental services such as protecting landscapes and water sources and maintaining or restoring biodiversity. The United States pays US\$1.7 billion annually for 31 million acres in the Conservation Reserve Program (USDA 2011). There are, however, problems with, and unintended side effects of, payments for ecosystem services.

Instead of making our food production more environmentally benign the payments for environmental services tend to make some farmers specialize in providing environmental services and produce little food, while others focus on maximizing production. In 2003 more than ten percent of England's agricultural land was enrolled in long-term contracts between the government and farmers to provide environmental services. There was a high uptake of the elements of the programs that didn't require fundamental changes to farming practices. But, in intensively farmed areas the uptake was low, as the incentives were not sufficient to persuade farmers to make more demanding changes (Dobbs and Pretty 2008). The same can be seen in the uptake of organic farming based on subsidies, which in some countries is very high in remote areas with low production potential. For example, in Sweden, the high agriculture potential county of Scania had 6 %

² The few examples of fees on pesticides or fertilizers are exceptions, and mostly on a level of little significance.

organic farmland, while the Northern county of Jämtland, with low agriculture potential had 34 % of its farmland under organic management (Jordbruksverket 2014). This should not come as a surprise as it follows the logic of comparative advantage in the market place.

A new scenario is emerging where farmers in developing countries can sell their services as carbon farmers to governments and companies in developed countries. Farmers in the Scolel'te project in Chiapas in Mexico reportedly sell carbon sequestration, in the soil and in vegetation, for between US\$300 and US\$1800 per farm, a considerable sum for households with the average income of US\$1000 (World Bank 2007).³ This is promoted as a business replacement for development aid or a way to compensate farmers of developing countries for the distorting subsidies that their competitors in developed countries receive. However, these payments can also be viewed as a new frontier of exploitation, built on inequality (Nord 2014) where rich countries use the land in developing countries as a 'dumping' ground for their waste (by offsetting emissions) or for providing biodiversity. Examples can be found when communal land is appropriated by private owners who see an economic opportunity in selling these environmental services. The Land Matrix database (2015), which tracks foreign investments in land, lists 14 cases of foreign investments in 'conservation' on more than 3 million hectares as of 15 March 2015.

There are no indications that the market for ecosystem services will be based on any of the scientific calculations that are made to show the value of these services (de Groot et al 2012). The payments to farmers for providing public goods will not reflect the value of the public good but the compensation the farmer needs to make the required effort—which may be considerably higher or lower than the value of the services themselves. This can be seen in the price for carbon credits, which has no relationship to the cost of climate change. The value of carbon markets worldwide dropped 38 % in 2013 to US\$52.9 billion. The EU Emissions Trading Scheme, which accounts for 94 % of the world's carbon market value, recorded a price fall by almost US\$18 per ton over the 2 years 2012 and 2013 (Global Energy Initiative 2014).

Natural resources must be separated from their surroundings in order to create a market for them. Western Australia now has legal space for separate ownership of the carbon in soils (State of Western Australia 2005). But this separation is in contrast with the nature of ecosystems, where things are interdependent and networked. A recent governmental study on ecosystem services in Sweden concludes that monetary valuation is not reliable or is completely unsuitable for complex situations that involve numerous ecosystem services, such as soil formation, water regulation and pollination (Statens Offentliga Utredningar 2013). This, in a nutshell, is farming. In a complex system such as farming, the internalization of all social and environmental costs and compensation for ecosystem services would only be possible with very extensive and detailed governmental regulations, as it is the state that has to 'make' these markets. The European Union's agri-environmental program is but a small step in this direction,

³ This seems to be a very high reward compared to other cases.

but already has very convoluted rules. Such a system would probably still be neither fair, nor efficient, and would, in many ways, represent a control of farms more severe than under Soviet rule.

One can question the benefits of valuing ecosystem services in monetary terms, especially as the most valuable of these services have unlimited value and no known alternative. Only some ecosystem services will have monetary prices implying that those without a price have no value. But there is also the question of how we perceive nature. It seems that we increasingly confuse 'value' and monetary values, and there is a case for us avoiding underwriting this confusion by assigning prices for 'natural capital' or selling 'ecosystem services'.

For all the reasons above, using market mechanisms as a main strategy for regulating externalities and integrating the value of nature into food is mistaken both on theoretical, ethical and practical grounds. This doesn't exclude that economic incentives and disincentives can play *some* role in guiding the behavior of actors in the food system, towards less damaging and more benign practices.

Food as a Right and the Food Systems as a Commons

The capitalist market economy transforms everything involved in food production into commodities. It converts land, forest, humans, animals and food to real estate, ecosystem services, labor, burgers and calories. In the end, everything is reduced to the universal measure of value—money, a process which also turns nature into a commodity to be consumed. Even cooking and eating are increasingly commoditized and have long lost any relationship with the surrounding landscape. We don't experience the landscape we eat anymore. We don't see the farmer or the animals, we don't see the hedgerow, or the hedgerow has already been taken down. The act of eating, binding us together since we became humans, has rapidly become an individualized intake of prescribed or preferred diets, with convenience food heated in the microwave oven as the ultimate manifestation (Fernández-Armesto 2001).

Overall, we need to explore other ways of managing the food system. Access to food should be an inalienable right. This was already agreed by world leaders in the Universal Declaration of Human Rights in 1948. At the 2009 World Summit on Food Security in Rome, world leaders agreed on 'the right of everyone to have access to safe, sufficient and nutritious food'. The constitution of Kenya, approved by a popular referendum in 2010, states that every person has the right "to be free from hunger and to have adequate food of acceptable quality" and mandates the State to respect, protect, promote and fulfill that right. In 2011 there were at least twenty-four countries in which the right to food was explicitly recognized, many of them in Latin America (United Nations 2013).

The challenge of feeding a growing population is formidable, but managing the planet's ecosystem is an even bigger challenge. The way we farm has an enormous impact on the planet's ecosystems and human agricultural ecosystems must be seen as planetary ecosystems (Ellis and Ramankutty 2008). This has profound implications for agricultural policy for it means that 'managing the planet' is an equally important task of the farming system as the task of supplying food. Yet, the

food and farming system is increasingly managed by signals from ‘the market’, which do not include the signals from these ecosystems: of the species threatened by extinction and the loss of biodiversity, of pollution and of greenhouse gas emissions. The market signals also don’t include the feelings of the animals ill-treated in our service. On the contrary, modern day farming has removed much of the land husbandry and stewardship which was previously an integral part of a regenerative farming system. It is not realistic that ‘the market’ will take care of managing the planet. It is also not desirable, as the Earth is our common home and responsibility and should be managed as such.

The rethinking of food as a right, of farming as a management system of the planet and the food system as a commons will lead us to develop new institutions that complement the roles of the market and the state. This does not rule out markets as one of several mechanisms for food distribution, but it rejects market hegemony over our food supplies, and the doctrine that market forces are the best way of allocating food-producing resources such as land, water, knowledge and seeds.

We can still see in times of disaster, war or disturbance that societies rapidly shun the market as the main mechanism for distribution, and public or community control over food are the preferred ways of ensuring proper (that means somewhat equal) sharing. When the Soviet Union collapsed, farming in many parts of the fallen empire reverted to self-sufficiency. During Soviet times Armenian producers had supplied the Union with brandy, grapes and fruits, but when the Union crumbled and war broke with Azerbaijan, people ripped out the vines to grow wheat (Rundgren 2011). Commercialization in reverse could also be observed in Argentina during the economic crisis 2001 and presently in Euro debt ridden Greece (Babington and Papadimas 2012), or in Detroit where urban farms for self-sufficiency are being established on the ruins of the automotive industrial culture (Deemer 2010).

In the *Sand County Almanac*, conservationist and writer Aldo Leopold (1989) calls for a land ethic (using ‘land’ as a proxy for ‘nature’) that puts the interest of the network of life that is nature ahead of the self-interest of the individuals and humanity: “We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect.” The food system is a life support system and should be based on the principles of living systems, not on the perceived efficiency of the industrial model. We should instead see the plants and animals we eat as our symbionts, companions, for which we have responsibility. This perspective would provide a stable foundation for how we manage animals, a compromise between veganism and exploitation. I am convinced that we need the partnership with our symbionts in order to manage the planet well, notwithstanding their importance for our diet. An ethics of care could form one of the pillars for how we maintain, continue and repair our world so that we can live in it as well as possible. This reemphasizes the relations that exist between all living things. Grounding our food in the environment and in regenerative processes will not ensure we have good and wholesome food, but we will certainly be closer when we have embedded our food system in an ecological framework rather than in the economic framework. Trade or exchange in food will most probably also take place in such a future. But it will be oriented to

ecological and nutritional needs, as was originally the case, and not based on bringing in food from somewhere else because it is five percent cheaper.

As long as we see eating as just a way of feeding the body with nutrients, we miss the point. Eating is what binds us together with each other and with nature. Cooking and food preparation such as baking bread, brewing, making cheese and canning links eating with farming and is equally important. Through cooking we can become co-producers, break the division of producers and consumers and take more responsibility for our lives.

“We can never do merely one thing” is a basic tenet of ecology ascribed to the ecologist Garret Hardin (1963). It applies not only to ecology but to any system. It is certainly true when we talk about food and farming. Few things are so interconnected with each other and the rest of society and nature. Only when there is harmony between the system in which we live in and the ethics we promote can they both come to fruition. The principles for food production, the kind of social and economic system and the kind of nature stewardship will have to be mutually supportive and be built on similar foundations. One of the breeding grounds for regenerative production and consumption are systems whereby consumers and producers cooperate in the farm and food chain, a kind of co-production based on the land as a commons, possibly making categories such as producer and consumer redundant (Rundgren 2014).

Political actions, of many kinds, are needed. Some should be oriented to limit the harm produced by the current system, such as bans on pesticides and harmful practices or reallocating resources. Others should target the development of alternatives. This can range from re-allocating research funds from industrial farming models to regenerative farming, to revising tax codes to stimulate the numbers of people engaged in farming and facilitating emerging new economic relations. New institutions need to be created, or old one revitalized, for management of the food system, some of them might be organized by people directly, others by local or central government.

My biggest fear is that farmer-philosopher Fred Kirschenmann (1995) might be right when he wonders if “we don’t like being tied to the soil’s limits because they remind us of our own limits”. In the long term I don’t think we have a lot of choice. An increasing scarcity of key resources will make the choice for us. But the ride will be easier if we halt the depletion of resources and the degradation of nature and build a regenerative food system now, before we are faced with the possibility of worrying whether we will get any food at all before going to bed.

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