SNEB Selected Sample Resources:

Food as a Commons Food Justice and Equitable Possibilities within a Sustainable Food System

1. Gemmill-Herren B, L Baker and PA Daniles (2021). True Cost Accounting of Food. Balancing the Scale Routledge Press Routledge Studies in Food, Society and the Environment 316 pp SBN 9780367506858 https://www.routledge.com/True-Cost-Accounting-for-Food-Balancing-the-Scale/Gemmill-Herren-Baker-Daniels/p/book/9780367506858#
2. Harvie, J. (2019). Early lessons from The Food Commons: A New Economic Whole System Approach for Regional Food. JAFSCD Vol 9 # A (Proceedings from the Place-Based Food Systems Conference) https://doi.org/10.5304/jafscd.2019.091.045
3. IPES-Food & ETC Group, (2021). A Long Food Movement: Transforming food systems by 2045. Executive Summary http://www.ipes-food.org/_img/upload/files/LFMExecSummaryEN.pdf
4. Quilligan, J. Public Goods vs Common Goods (2011) https://wiki.p2pfoundation.net/Public_Goods_vs_Common_Goods
5. Vivero-Pol, JL (2013). Food as a Commons Not a Commodity. The United Nations: Our World University https://ourworld.unu.edu/en/why-food-should-be-a-commons-not-a-commodity
6. Vivero-Pol, JL (2013). Food as a Commons: Reframing the Narrative of the Food System (April 23). *SSRN*: https://ssrn.com/abstract=2255447 or http://dx.doi.org/10.2139/ssrn.2255447
7. Vivero-Pol, JL. (2017) Food as Commons or Commodity? Exploring the Links between Normative Valuations and Agency in Food Transition. *Sustainability*, *9*, 442. https://doi.org/10.3390/su9030442
8. Vivero-Pol, JL., T. Ferrando, O. DeSchutter, and U. Mattei, Eds., (2019). Routledge Handbook of Food as a Commons 424 pp. 9780367628567. https://www.routledge.com/Routledge-Handbook-of-Food-as-a-Commons/Vivero-Pol-Ferrando-Schutter-Mattei/p/book/9780367628567 (Note-Chapters 1 and 24 are in the public domain.)

Agriculture and Food: Historically Black Colleges and the Role of Keeping and Sharing Food & Cultural Knowledge in the Community Commons

9. Burton, N., and R. Lombard (2019). Creole Feast: Fifteen Master Chefs of New Orleans Reveal Their Secrets University of New Orleans Press ISBN 160801150X
10. Palmer, Z (2016) "The Story of New Orleans Creole Cooking: The Black Hand in the Pot" https://dillard.edu/raycharles/black-hand-in-the-pot.php
11. Palmer, Z (2019). Recipes and Remembrances of Fair Dillard: 1869-2019. Univ of Louisiana Press at Lafayette ISBN 1946160474.

Food as a Commons: Economics Perspectives

12. Costanza, R., J. Erickson, J. Farley and I. Kubiszewski, Eds. (2020). Sustainable Well-Being Futures: A Research and Action Agenda for Ecological Economics. Cheltenham, UK, Edward Elgar
13. Farley, J., R. Costanza, G. Flomenhoft and D. Kirk (2015). "The Vermont Common Assets Trust: An institution for sustainable, just and efficient resource allocation." Ecological Economics 109(0): 71-79.
14. Farley, J., A. Schmitt Filho, M. Burke and M. Farr (2015). "Extending market allocation to ecosystem services: Moral and practical implications on a full and unequal planet." Ecological Economics 117: 244-252. (Uses problems with the commodification of food to argue that we should not attempt market allocation for ecosystem services).
15. Raworth, K. (2017) Doughnut Economics. Seven Ways to Think Like a 21st-Century Economist. Chelsea Green Publishing. White River Junction, Vermont 309 pp
16. Raworth, K. (2018) A Healthy Economy Should Be Designed to Thrive, Not Grow. Ted Talk. 15.53 minutes https://www.youtube.com/watch?v=Rhcrbcg8HBw

Food as a commons: Reframing the narrative of the food system

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Summary
Our body compulsory demands food, water and air to keep its vital functions and yet their economic nature is rather diverse with food mostly considered a private good, water suffering an accelerated privatization process and air so far considered a global common good. Food has evolved from a common good and local resource to a national asset and then to a transnational commodity as the commodification process is rather completed nowadays. Cultivated food is fully privatized and this consideration means that human beings can eat food as long as they have money to but it or means to produce it. With the dominant no money-no food rationality, hunger still prevails in a world of abundance. In order to provide a sound foundation for the transition towards sustainable food systems, the very nature of food as a pure private good is contested and subsequently reversed in this paper, proposing a re-conceptualisation of food as a common good, a necessary narrative for the redesign of the dominating agro-industrial food system that merely sees food as a tradable commodity. This aspirational transition shall lead us to a more sustainable, fairer and farmer-centred food system. The idea of the commons is applied to food, deconstructing food as a pure private good and reconstructing it as an impure commons that can be better produced and distributed by a hybrid tri-centric governance system compounded by market rules, public regulations and collective actions. Several food-related elements are already considered as common goods (i.e. fish stocks, wild fruits, cuisine recipes, agricultural knowledge, food safety regulations and unpatented genetic resources) as well as food's implications (hunger eradication) and benefits (public health and good nutrition). Should food and be consider as a commons, the implications for the governance of the global food system would be enormous, with examples ranging from placing food outside the framework agreements dealing with pure private goods, banning financial speculation on food commodities or preparing international binding agreements to govern the production, distribution and access of food to every human being.

1.- Introduction: the multiple dimensions of food

What is common to many is taken least care of, for all men have greater regard for what is their own than for what they possess in common with others (Aristotle)

What does food mean for human societies in the XXI century? A difficult question with no straightforward response, although there seems to be some common features that accompany the definition throughout societies. Food is clearly a *basic human need* as our body demands food energy to keep its vital functions and that is why it is included at the very bottom of Maslow's hierarchy of needs (Maslow, 1943). Additionally, none can deny the importance of food as a foundational *pillar of culture and civilizations* (Fraser & Rimas, 2011; Diamond, 1997). Everything having to do with food such as its collection, capture, cultivation, preparation and consumption represents a cultural act (Montanori, 2006). In modern times, most human needs have been framed as legitimate rights to which citizens can aspire, and which society at large has an obligation to respect and provide for. Those rights in turn became the legitimate and legal framework for political and social action in modern nation-states (Stavenhagen, 2003), and hence food was also considered *a human right* recognized under international law. The right to food protects the right of all human beings to feed themselves in dignity, either by producing their food or by purchasing it, as enshrined in Article 25 of the Universal Declaration of Human Rights (United Nations, 1948) and the Article 11 of the International Covenant on Economic, Social and Cultural Rights (United Nations, 1966). The latter Covenant, a binding agreement, also stipulates the fundamental right of everyone to be free from hunger and details what States individually and collectively must do to fulfill this obligation.

But, food dimensions do not stop here, as food is also *a commodity*, and the food industry is one of the biggest areas of economic activity worldwide, representing around 10% of the global gross domestic product (Forbes, 2007) and being one of the major and more consistent contributors to growth of all economies. The food industry, which comprises farming, food and beverage production, distribution, retail and catering, was valued between $4 and $5.7 trillion in 2008-09 (Alpen Capital, 2011; USDA, 2009) and it is expected to increase to $7 trillion by 2014 (IMAP, 2011 citing data mining private companies such as Datamonitor and Euromonitor). The global food import bill for 2011 alone was an astonishing $1.3 trillion and international agricultural prices will remain significantly higher than pre-crisis levels for at least the next decade (Wise & Murphy, 2012).

Wal-Mart, a food retailer, used to be the biggest private company in the world, now being displaced to the third position, with gross benefits and actives that clearly surpass most of sovereign states. As a commodity, food trade is regulated by the WTO framework, an international institution not bound by the UN Charter and thus with less legal constraints to respect, protect and fulfill the human rights. Moreover, the food industry is subject to a concentration process that is leading to a system where just a few dominant and too-big-to-fall transnational companies are getting a decisive hand in all steps of the food chain, from the farm to the table (ETC Group, 2009; Clapp & Fuchs, 2009; Weis, 2007). Although the top ten packaged food companies only account for 15.2% of worldwide sales, only three companies account for 40% of beverage market (Alexander et al., 2011), 10 companies control more than 90% of agrochemical sales worldwide (ETC Group, 2008) and the top three seed firms currently control 70% of transgenic plant patents (Howard, 2009). Moreover, the largest firms are increasingly networked through agreements to cross-license transgenic seed traits, and GMOs link patented seeds with patented agro-chemicals (roundup-ready traits).

There has been an almost complete commodification and marketization of the food production system, with globalization exacerbating the widening of food chains. That means more food miles, reduced food options to those that are able to cope with transport hurdles and stay attractive to customer and all-the-year presence of seasonally produced foods. Food travels a lot in order to yield profit for the intermediaries or “coyotes” as they are called in Latin America (Murray, 2007). On the way, we lose or waste one third of all the food produced every year, what roughly means 1.3 billion tonnes of food per year, enough to feed 600 out of the 868 million hungry people we have in 2012 (Stuart, 2009, FAO, 2011).

This reduction of food dimensions to the one of a commodity explains to many authors the very roots of the failure of the global food system, a system that produces food in excess to adequately feed the whole planet but it is not capable of guaranteeing equitable food access to everybody by simply using the market rules (Magdoff, 2012).

2.- The unsuccessful food system is evolving

Since the outbreak of a global financial crisis in 2008, accompanied by extraordinary commodity price spikes, growing financial speculation in food commodities and massive land-grabbing deals between transnational companies and land-rich but least-developed countries, food and hunger are definitely high on the global agenda. Developments around food, climate, energy and finance in the last two decades have pushed questions on food security and nutrition back into the centre stage of development. More and more, it seems evident the prevailing food system must be reinvented as it has failed to fulfil its basic goals: feeding people in a sustainable manner and avoiding hunger. The persistence of high levels of hunger and malnutrition as well as the dramatic growth in the incidence of overweight and obesity are clear examples of how the conventional industrialised food systems are operating mainly to maximize the profit of food enterprises instead of maximizing the nutrition and health benefits food provide to all of us. Globally speaking, we eat badly, produce food in a rather unsustainable manner and consider food merely as a commodity, neglecting its dimensions as a human right, a basic human need or a major pillar of cultural identification. More than half the world eats in ways that damage their health, and hunger and obesity are at the forefront of contemporary debates. Obesity and diet-related chronic diseases and undernutrition collectively affect an estimated 2.3 billion people globally, about one third of the world's population (GAIN, 2013). There is a need to bring unconventional and radical perspectives into the debate on possible solutions. This is all the more urgent because food production is increasingly threatened by climate change, globally stagnant crop yields, diminishing water, soil and agro-biodiversity resources, and the current energy and economic crises. The superb IAASTD report concluded that unless agriculture and the way society engages with food are fundamentally changed, it will not be possible to feed the projected 9 billion world population, ensure equity and sustain the planet (IAASTD, 2009). A similar view is shared

Despite years of international anti-hunger efforts, rising gross national incomes and per capita food availability, the number of hungry people has been reduced at a very slow pace since 2000 (only 49 million in 12 years, what means 4 million hungry people less per year) and we are still 868 million undernourished people in the world (FAO et al., 2012). Absolute figures of hungry people are mounting in developed countries, the Near East and North and Sub-Saharan Africa. These relatively poor results in the fight against hunger, overshadowed by the huge reductions in China, contrast with the apparently successful actions against poverty reported by the World Bank since 2010 (Chen & Ravaillon, 2010, 2012). To make things worse, the 2008 and 2011 food price crises pushed 153 million people into extreme poverty and hunger (World Bank, 2012). At present, an estimated 314 million under-five children remain chronically undernourished or stunted (Stevens et al., 2012) with 148-165 million moderately or severely stunted in developing countries (De Onis et al., 2011; UNICEF et al., 2011) whereas developed countries host also a growing number of hungry people. More than 45 million people were already receiving food assistance through Federal programs in 2011, the highest ever figure (Congressional Budget Office, 2012), and 50 million people are living in food-insecure households in the USA (Coleman-Jensen et al., 2012). Hunger is the largest single contributor to maternal and child mortality worldwide, with 3.5 million people dying every year of hunger-related causes, what represents 35% of total under-five year old deaths (Black et al., 2008). Out of those, 2.6 million are under five children (UNICEF, 2011). Nine out of ten of the 19 million most severely malnourished children remain untreated (ACF-MSF, 2009) as there is no money to save their lives (UNICEF, 2011). And, contrary to common belief, most deaths do not happen in acute emergencies, but occur on a daily basis as a result of chronic hunger in relatively stable and middle-income countries (Gross & Webb, 2006). With millions of people needlessly dying prematurely each year from hunger in a world of ample food supplies, nobody can dispute the need for a change.

On the other side, more than 1.4 billion people worldwide were overweight in 2008, with a bodily mass index (BMI) >25, out of those at least 500 million are obese, with BMI >30 (Stevens et al., 2012). Overweight and obesity cause worldwide 2.8 million deaths (WHO, 2012), and the trends are rather worrying for the years ahead, with expected figures of 2160 million overweight and 1120 million obese people by 2030 (Kelly et al. 2008). And last but not least, micronutrient deficiency or hidden hunger affects to more than half the population of the world (De Schutter, 2011). The fact that there has been so little headway made in cutting these three manifestations of bad nutrition, in spite of the fact that their dangers are well understood and that quite simple solutions exist, implies an structural failure in the current dynamics, ethics, institutions and governance of the food system that feeds the world. And all this happens despite bountiful harvests and soaring profits for the transnational corporations that dominate global food trade.

Globalized food and energy transnationals, combined with some wealthy but poor-resourced economies, have targeted food, water, land and genetic resources as the new key resources in the global capitalist rush for maximising profit and minimising costs, triggering a renewed process of privatisation, commodification and physical enclosure of commons. This new cycle of resource-grabbing is termed as a new colonialist approach to the Global South and the major drivers are not only the quest for additional food for citizens, but the quest of additional natural resources to produced biofuels, to export drinkable water, to crop feed for livestock or to cultivate more patented GMOs used as cash crops (soybean or cotton). Less than 40% of the new land-grabbing deals settled since 2000 are currently cultivating food for humans (OXFAM, 2012). The relevance of this neoliberal rush on declining natural resources is that it may open a new path in the current transition the global food system is vividly involved. And not for good, of course.

3.- Where is the current food transition leading us to?

Broadly speaking, nature and globalised human societies are experiencing a transition pattern that unfolds from diversity to uniformity, from complexity to homogeneity and from richness to impoverishment. That impoverishing transition is well documented in nature (ecosystems, species: Carpenter & Bishop 2009), culture (languages, food diets, songs: Gorenflo et al. 2012; Prescott-Allen & Prescott-Allen, 1990; Serra et al. 2012) and economy (enterprises, media: Shah, 2009). The globalizing trend seems to be leading a transition towards a less diverse world.

In this evolving scenario, food transitions have been common to human societies since the domestication of wild crops and the origins of agriculture (Fernandez-Armesto, 2002). Actually, in the last 300 hundred years two transitions have been documented in western societies (Fogel, 2008; Popkin, 2003; Bengoa, 2001), as well as in Asia (Chen & Xu, 1996). Some of them have been fast and violent processes, such as the introduction of new crops from the Americas, while on other occasions they have undergone slowly. In any case, the different food transitions were always accompanied by new laws supporting the privatization processes and legal struggles and court cases (Nuijten, 2006). At present, the globalised world is at the crossroad of two food transition trends: the well advanced nutrition transition from vegetable- to meat-dominated diets (Popkin, 2003) and the incipient food transition from oil-dependent industrial agriculture to more sustainable and local food systems (Heinberg & Bomford, 2009). The dietary transition to higher meat and processed food consumption and a drop in the intake of cereals, legumes, fruits and vegetables will increase the water and carbon footprint, as already portrayed for Spain and its Mediterranean diet (Lopez-Gunn at al., 2012).

The path selected by the majority of the population and the new food paradigm that will emerge from this transition will greatly affect our survival within the Earth's carrying capacity. With our current insatiable appetite for natural resources and the highly-polluting development pushed by the neoliberal economic model, the human society has already overstepped three out of nine interlinked planetary boundaries (rate of biodiversity loss, climate change and human interference with the nitrogen cycle), defined as enabling conditions for human development (Rockstrom et al., 2009).

Under the combined effect of changing lifestyles and the concentration and liberalisation of the food industry, the mass industrial food model, which is becoming dominant, is increasingly failing to satisfy the sustainability criteria that should characterise the global food systems, namely producing food for all in an economically and socially fair way, while preserving the environment, promoting healthy diets and maintaining cultural diversity.

Nevertheless, all previous transitions share a common denominator: food always bears the same consideration as a private good that is produced by private means and traded in the market. Market rules and the purchasing power are the main forces to match demand and offer of such a basic stuff. None of the most relevant analyses produced in the last decades on the fault lines of the global food system and the very existence of hunger has ever questioned the nature of food as a private good, produced by private inputs or privately harvested in enclosed areas in the wild (FAO, 2012; IAASTD, 2009; UK Government, 2011; UN, 2005; UNEP, 2009). All researchers and policy makers implicitly admit that food is purely a private good, that you gain access to as long as you have enough money to purchase it in the market or produce it yourself with other privately-owned inputs. Along those lines, there is a common understanding that the main problem nowadays is the lack of food access, although food production concerns are also gaining momentum (FAO, 2012; World Bank, 2008; MDG and WFS Plans of Action, the CFS Global Strategic Framework for Food Security and Nutrition 2012, the G-8 New Alliance for Food Security and Nutrition 2012, the G-20 L'Aquila Food Security Initiative and the Action Plan on food price volatility and agriculture 2012 and the World Economic Forum New Vision for Agriculture 2012). Even, it is becoming a frequent mantra in high-level policy gatherings to highlight the importance of genetically-modified foods in increasing food production and decreasing costs over last two decades (Giddings et al., 2013). However, several dimensions of food production and consumption are yet considered as commons, such as the genetic resources, the cooking recipes and wild foods and fish stocks, and we will develop those dimensions later in the paper.

4.- The three essentials for human life and its consideration as private-public goods

Primum vivere, deinde philosophare (Anonymous)

Adequate and nutritious food, fresh and pure air and drinkable water are three essential and regular inputs produced by Earth our human body requires to functioning: oxygen from air to keep cell processes; the calories, proteins and vitamins from food to provide energy in form of Adenosine Tri-Phosphate and building blocks to keep us alive, and water required to maintain the body hydration (70% water by volume) and as a solvent for vitamins, amino acids and nutrients. From a human perspective, the commons are those goods essential for the survival of each and every human being and food, water and air perfectly fit that definition. Air, food and water are widespread on Earth and easily available. The three essentials are limited, as Earth is finite, but renewable resources and they are produced by nature in a cyclical process. Food and water used to be freely available until the domestication of crops and livestock, when property rights began to be established. As they are key elements for our survival they can be considered as fundamental human rights, closely linked to the most fundamental one: the right to life. In that sense, they should be guaranteed to each and every one. Actually, food is a human right since 1945 and more precisely defined since 1963; water has been recently upgraded to such category by the UN General Assembly in 2010 (United Nations, 2010), whereas air is still so abundant and accessible that has not yet being even considered as a right or as an exploitable natural resource.

Food can be cultivated (crops, fish ponds, livestock) or harvested from nature (hunting, fish stocks, wild fruits and vegetables). Food produced by nature can be considered a public good (fish stocks or genetic resources), but the consideration of cultivated food as a public good is still controversial. Cultivated food is a private good and private producers have an incentive to produce it as they can prevent non-payers from accessing it. Therefore, food is subject to trading, stocking and, increasingly, oligopoly control and this social construct (food as a pure commodity) opposes radically to the consideration of food as a human right that should be guaranteed to all.

And yet, food was considered a common good during the hunting gathering period. Then, during the domestication of crops and livestock, a legal and physical appropriation of cultivated food as a private resource took place, although hunting, wild fruits, sea fruits and fish stocks in the sea, rivers or lakes were still considered as common goods. The privatisation of production brought the privatisation of food products as well, although enabling means for food production, such as genetic resources and water remained public. Not land though. Nowadays, however, most food is considered a private good, and therefore excludable and rival. Food is highly commoditized and its production, harvesting, manufacturing and distribution are gradually concentrated in few private consortiums, that all together control a big share of total food produced in the world.

We are witnessing a complete commodification of nature (ETC Group, 2011) and a concentration of world agri-food chains in few companies controlling most of the food we eat. Nevertheless, nowadays, several types of food (wild fruits, fish stocks) are yet legally owned in common, as they belong to state-owned lands or internationally-managed oceans. And over 2.5 billion people live in and actively use the Earth's forest and drylands, most of them classified as public lands. Grazing and fishing grounds in most traditional societies have often been commonly held and managed quite sustainably for centuries. This was achieved by means of informal social restraints and traditions which prevented overexploitation (Goodstein, 1995:34)

The public-good nature of food can be seen in its many public-good components. While nutritious foods and healthy diets can be rival and exclusive (private goods), their insufficiency can create significant consequences for public health (a public good), through increased social and economic costs of malnutrition and diet-related illnesses such as diabetes and heart disease (Caraher & Coveney, 2004; Haddad, 2003). Healthy food is not only a pillar our physical life and a key determinant to our health, but it is also a driver of the humans' psychological well-being (Blachflower et al. 2012).

From a utilitarian point of view, food as a global commons could be thought of as "the greatest possible amount for the greatest possible number of individuals", what is commonly coined in marketing terms as "enough food for all". From the legal point of view, and using the fundamental right to be free from hunger, the least consideration of food as a global common could be translated into the minimum amount of food for the maximum amount of people, considering the minimum a quantity that prevents from suffering hunger, although not the ideal in quantity and quality to be considered food secure. The food-provided caloric requirements are unique for each person, depending on his body needs, physical activity, weather conditions and ethnic considerations, but these requirements are also absolute: they cannot either be negotiated with our body nor vary depending of the relative abundance of food. The food thresholds for adult human beings are on average established on 2200 Kcal per person per day. That is why hunger is an absolute need whereas poverty is a relative measure, depending on the purchasing capacity of any given unit and the relative wealth of the others (i.e. inflation proves how artificial is the money of one currency, as one person with ten dollars a day can be considered well off in Haiti and poor in Switzerland).

Although food is still regarded as a private good, several authors are already proposing the consideration of Food and Nutrition Security (FNS) as a public good (Rocha, 2007; De Schutter, in press). All individuals living in a food-secure society benefit from that condition even if they were not contributing or paying for its provision. In other words, food security can be simultaneously enjoyed by many people (a public good), in contrast to private goods which are marked by rivalness in consumption and for which property right enforcements prevent consumption if one does not pay (Ver Eecke, 1999).

All along history while available ***water*** resources were exceeding human needs, water was considered as a global public good. Water cannot be produced by human means, only extracted, transported and consumed, as well as polluted or cleaned. Water is partially privatized, or in the process in many countries, although it is still freely available in rivers and lakes, although not always drinkable. Since the very moment human needs overpassed the easily available water supplies, water started to be highly appreciated as a valuable resource, and therefore subject to be priced. The monetisation of

water is triggered by its scarcity and the profit opportunity for companies able to secure and manage the supply. International institutions such as the World Bank or private companies such as Suez are frontrunners in this race to finally privatize every drop of water. Water is in the process of being rebranded from a common good to a club good, a first step towards a general consideration as a fully private good, following a very similar path to that of food (Barlow & Clarke, 2002; Kay & Franco, 2012; Metha et al., 2012). The consideration of water as a commons is gradually evolving as long as its enclosure and commodification is progressing (Barlow, 2007; Finger & Allouche, 2002). Huge monopolies exist within the global water industry with two French water corporations, Vivendi and Suez, dominating about 70% of the world water service market (Polaris Institute, 2003). In Spain, 80% of the private water supply sector (already representing half of total water consumed) is controlled by two companies (Aquagest and Aqualia), functioning de facto as a pure oligopoly (Publico, 2013).

Air is still considered a global public good and it has barely been enclosed although its commodification has already started as long as pollution has rendered some air not breathable (see box 1). Air is a free resource found everywhere on the Earth's atmosphere, non-excludable but rivalrous. As there is plenty for every human being, we do not have to worry yet about its access or control. The carbon market (Emission Trade Scheme) and the agriculture emissions offsetting schemes used by the Clean Development Mechanism are to creative ways of enclosing the atmosphere and the anthropocene, by using creative accounting based on economic valuation of environmental processes, such as the flawed approach to soil carbon sequestration. The carbon market is quite speculative and deeply flawed, as there is an artificial oversupply of carbon credits that is plundering the prices.

Box 1: Pure Air and pollution
Not all available air is breathable and air pollution is becoming a serious health and environmental problem. Air pollution causes serious respiratory diseases such as asthma, chronic obstructive pulmonary disease, cardiovascular disease and lung cancer. More than 90% of spanish citizens are already breathing unhealthy air, according to WHO standards. In the European Union, over 400,000 deaths can be attributed to polluted air, with 20,000 in Spain, and air pollution represents in Spain between 1.7-4.7% of GNP (Ecologistas en Accion, 2012). Many city dwellers do not have the right to breathe a pure clean air (The Jamaica Observer, 2011), and as long as air pollution is growing in parallel to the re-industrialization of developing countries and emerging powers, pure air will be more valuable and therefore will start to be sought after.

5.- The different meanings of the commons to economists and policy makers

In the popular meaning, a common good describes a specific resource that is shared and beneficial for all or most members of a given community. Commons, owned in common or shared among communities, represent needs that go unmet, either by markets or by institutions. Public goods are deemed desirable by the public (Hampson & Hay, 2004), as they generate tremendous benefits to society and presume a legitimation of governmental activity (Ver Ecke, 1999). Behind the natural commons is the fundamental idea that life is not for sale.

Although the literature on public goods is extensive and diverse, there is a standard economic definition of public goods anchored on non-rivalry and non-excludability. A public good (a commons) is a good that is both non-excludable and non-rivalrous in that individuals cannot be effectively excluded from use and where use by one individual does not reduce availability to others. A pure public good is an extreme case of a positive externality. There is, in general, no profit motivation to lead private firms to supply a socially efficient quantity of such goods. In many cases, markets for public goods will not even exist (i.e. pure air). Private goods on the other side cannot be enjoyed simultaneously by many people, and individuals can be prevented from using them. Exclusion mechanisms may include clear property rights, excessive pricing or patents. Those pure public goods provided by the government are usually financed from tax revenues. Different funding options result in different economic outcomes in terms of the distribution of the cost burden between taxpayers and users of the good or service. The excludability and rivalry properties that economists use to classify goods will be extensively discussed later on with regard to food. See Box 2 for two different approaches to common resources.

The economic concept of public goods should not be confused with the expression "the public good", which is usually an application of a collective ethical notion of "the good" in political decision-making. Another typical confusion is that commons are goods provided or to be provided by the public sector or the Government. Although it is often the case, they may also be produced by private individuals and firms, by non-state collective action or they may not be produced at all (naturally-made as sunlight). Additionally, the commons contains public property and private property, over which people have certain traditional rights.

Box 2: The tragedy of the Commons: Hardin vs Ostrom

According to the classic economic theory, the most usual problem created by common-property resources is the tendency for them to be overexploited to the point of exhaustion or extinction, if there is free and open access to them in which people not paying for the good may continue to access it (Hardin, 1968). Throughout the world, natural fisheries, common grazing pastures, forest resources and bio-piracy are also examples of open-access resources prone to the tragedy of the commons. In North America, recent problems with salmon and lobster fishing illustrate situations in which common-property resources in food production are involved (Rocha, 2007).

Some public goods may be subject to excessive use resulting in negative externalities affecting all users. Fish in the oceans and mushrooms in the forests are renewable resources in that their stocks can be replenished as long as the rate at which they are harvested is lower than the rate at which they can reproduce themselves. The problem with free, open-access common resources is that they tend to be harvested at a faster rate than they can naturally replenish themselves. Without controls, each resource taker has an incentive to take as much and as fast of this common resource as it can.

Up to recent times, the debate on the best governance of common goods was circumscribed to the state or the market. The Hobbesian solution portrayed in the Leviathan (Hobbes, 1651) acknowledges human selfishness and the subsequent trend to free-riding and thus the only possible solution to govern the commons and avoid its tragedy is through a centralised state and its regulatory force of public ownership. On the contrary, the Lockean solution assumes that common property prevents the optimal use of a good as no incentives are provided to keep and care for it and only fully privatised ownership can work. However, private property is not the only (or the most practical, or fair, or effective) way of dealing with this externality problem. The merit of Elinor Ostrom's theoretical and practical research was to offer a convincing experience-based third model: one of emergent localised polycentric governance of complex economic systems (Ostrom, 2009), where self-motivated collective actions by local groups had also an important role to play in governing natural resources.

The tragedy of the commons in economic terms is rebranded as social dilemmas in the political sphere (Kaul et al., 2003), since all those who benefit from the provision of a local public good find it costly to contribute and would prefer others to pay for the good instead. If everyone follows the selfish dominant strategy, then the good is not provided or is underprovided. Yet, everyone would be better off if everyone contributed. In those situations of social dilemmas, institutions introduce a certain level of collective constraint, whether through formal or informal rules (such as social norms and intrinsic preferences), with the aim to produce better outcomes (Ostrom, 2005). Another political dilemma rather relevant these days is that "public" no longer means the communities who manage their local resources, but the central governing authority who controls these resources. In theory, public still means people; in practice, public means government decoupled from the people's social/ecological rights to their common goods (Quilligan, 2012).

The political notion of public goods emerged a decade ago in the work of the United Nations Development Programme (UNDP) to highlight the need for greater cooperation across States in a context of increased interdependencies (Kaul et al., 2003). Global public goods are goods whose benefits or costs are of nearly universal reach in terms of countries, peoples, and generations or potentially affecting anyone anywhere, and they are public in consumption (Kaul, 2013). They are universal in that all actors can benefit from their production; non excludable in that no actor can be denied their benefits; and non-rival in that the cost of a good does not go up with additional consumers. They are the building blocks of different civilisations (Wolf, 2012). Examples of commons include fresh air, knowledge, lighthouses, national defence, flood control systems, street lighting, avoiding financial instability, clean environment, a legal justice system, universal public health, social security and peace. Environment and climate may be the ultimate examples of a global commons, meaning something that is shared across borders, across generations, by all populations, and that all

depend on to thrive (Kaul & Mendoza, 2003). Most global public goods were originally considered as national public goods that, in the wake of globalization, have gone global. Public Goods are provided at national level by governments, such as public health, economic stability or the road network (Brousseau et al., 2012), and at international level they are naturally-produced (genetic resources, atmosphere, stable climate) or man-made produced (internet, financial stability), being regulated in some cases by semi-sovereign international institutions: i.e. the ISO regulatory framework or the Codex Alimentarius.

Public goods can only be obtained through politics: the politics of consensus building, collective participation, transparent decision making and democratic commitments, inspired by the values of freedom, justice and morality (Stavenhagen, 2003). The commons contain many of the keys to move towards a social model that is sustainable and based on principles of social justice, as they do not either operate strictly under the logic of private property or under state hierarchy. In political terms, global public goods (or commons) are defined by entitlements, regulations and sanctions that allowed certain activities and proscribed others for specific groups or people.

In this paper, we will be using pure public goods and commons as interchangeable terms, the former being mostly used in the economic realm and the latter being predominant in the sociological and social sciences domains. In both economic and political terms, food is an essential resource that requires management as a social mandate in order to guarantee the right to food for all. And food and nutrition security (FNS) could be considered a global commons or global public goods as it is beneficial for the community, the nations and the planet in general. FNS is not rivalrous (my own food and nutrition security does not prevent you to have yours) but it is definitely excludable (as we can see at present, with over 860 million people with no food security at all) although ethically abominable.

6.- Revisiting the excludable and rivalrous filter for food: social constructs can be modified

An old error is always more popular than a new truth (German Proverb)

Samuelson (1954) described non-rivalry as one of the two defining characteristics of a public good. Rivarly refers to the extent to which the use of a good by one person precludes its use by someone else. A good that is non-rivalrous can be used by an additional person without reducing its availability to others. Samuelson also mentioned that the marginal cost of producing one additional item is zero: it does not cost anything when, in addition, other persons consume the good. In strict economic terms, food is rivalrous: if I eat a cherry it is no longer available for others to eat. However, cherries are continuously produced by nature (wild cherries) and by human beings (cultivated cherries), so it is no longer restricted in number as there is no a finite number of cherries on Earth. As long as the replenishment rate outpaces the consumption rate, the resource is always available and food is considered a renewable resource with a never-ending stock such as air. This renewal characteristic could play against the rivalrous consideration, as there should be always food, either produced by nature or cultivated. Food produced by nature and harvested in a sustainable way seems to be unlimited, available worldwide and enough for all human beings. Therefore, the food I eat would not prevent others to eat food, although they could not eat the same piece I already ate, as there is available food for everybody in practical terms.

Excludability means that it is possible for one person to prevent someone else from using the good. Usually whether or not a person consumes the good depends on whether or not he pays for it. Excludability is usually determined by ownership or property rights (Sands, 2003), as the owner of a good can limit access to it. According to Ostrom, excludability is the ability of producers to detect and prevent uncompensating consumption of their products (Ostrom & Ostrom, 1977), but this feature cannot be applied to wild foods. In that sense, the debate on who owns nature-made wild food is rendered pivotal to understand the proprietary rights of food. Economists also say that because its non-excludability, public goods get under-produced or under-accesed, and that idea fits well with wild food and human demand. The degree of excludability and rivalry depends on the technological nature of the good and the definition and enforcement of property rights. Theoretically speaking, food is also excludable as we can prevent anyone to get access to food, either by physical terms or by pricing it at

unaffordable costs. However, should that food exclusion be done in absolute terms, that person would die of starvation, and thus it would eliminate the subject to whom the good, either private or public, is related to. One could argue that currently most foods have a price in the market, and that price deters many people to freely access to food. Although true, this is a superb example of a social construction that can be modified by social norms: proprietary rights are nothing but a set of social and legal norms, whose nature and specificities are determined by each society. Many societies have considered, and still consider, food as a common good (REFERENCES), as well as forests, fisheries, land and water, and the consideration different civilisations and human communities have assigned to natural resources is rather diverse and certainly evolving.

Therefore, the main features that traditionally have been assigned to food (excludability and rivalry) can be contested or at least revisited (see table 1). In that sense, it is worth mentioning that both properties are neither ontological to the goods nor permanent, but mostly social constructions whose nature evolves along time and depending on societal norms. The main reason is that society can modify the (non)-rivalry and (non)-excludability of goods that often become private or public as a result of deliberate policy choices (Kaul & Mendoza, 2003). That has clearly happened to food, it is currently happening to water and it will certainly occur to air. But the privatizing trend can be reversed and the rivalrous/excludable features of food can thus be modified if the society so considers.

Table1: Food-related elements and its excludable-rivalry features

		Rivalry the property of a good whereby one person's use diminishes other people's use	
		Low	High
Excludability *the property of a good whereby a person can be prevented from using it*	Difficult	**PUBLIC GOODS** **(Public provision)** *Free-to-air television, air, street lighting, national defence, scenic view, universal health system* **1. Emergency management for zoonotic diseases** **2. Cooking recipes** **3. Gastronomy knowledge** **4. Safe food supply system** **5. Traditional agricultural knowledge** **6. Genetic resources for food and agriculture** **7. Regulation of extreme food price fluctuations**	**COMMON POOL RESOURCES** **(Natural provision)** *Timber, coal, oil fields* **1. Ocean fish stocks,** **2. Edible wild fruits and animals**
	Easy	**CLUB GOODS** **(Public or private provision)** *Cinemas, private parks, satellite television,* **1. Patented agricultural knowledge** **2. Hunting in game reserves** **3. Fishing and hunting licenses**	**PRIVATE GOODS** **(Private provision)** *Clothing, cars, personal electronics* **1. Cultivated food,** **2. Privately owned agricultural land** **3. Genetically modified organisms** **4. Patented improved seeds**

Adapted from Hess & Ostrom (2007)

Nevertheless, most goods do not exhibit these two characteristics in pure form and a significant number of global public goods are non-excludable or non-rival only to a degree (Hampson & Hay, 2004). They have mixed features and are referred to as "impure or near-public goods". The impure goods can either be "club goods", excludable but non-rival (Buchanan, 1965) or "common-pool goods", rival but non-excludable. The private market incentive to provide public and near-public

goods is weak, meaning they will only be supplied at sub-optimal levels from society's perspective. Hence, in the case of public and near-public goods the market fails and government shall intervene. Adam Smith already observed that some goods are regularly underprovided simply because profits cannot be recaptured by the suppliers of those goods. And when markets cannot provide such advantageous goods, governments should.

Common pool goods apply well to wild edible plants and animals, and they suffer from depletion through over-use and free-riding (Sands, 2003). Club goods are those whose costs and benefits are shared among and limited to a specific group of individuals, the club, and they are funded through a blend of taxpayer subsidy and user fees. Hunting or fishing licenses or game reserves are food-related examples. Club goods can be either publicly or privately provided and often result in the creation of monopoly power. Sometimes club goods are provided by the public sector and funded either entirely through user fees or through a combination of user fees and taxpayer subsidization (e.g. public buses). Alternatively, private firms may provide the good or service with regulatory oversight to regulate the price as it has been the case of the price of staple food.

7.- The enclosure of food: the privatization of a basic human need

Don't you remember the rule we had when we lived with you? If you don't work, you don't eat (St. Paul's letter to the Thessalonians 3:10)

During the long-lasting hunting-gathering period of our human history, food and water were widely considered as commons goods. Nature was providing food in form of wild fruits, roots, leaves, animals, fishes, sea fruits or running water. Food was all over the planet, freely available to anyone with enough knowledge to hunt it, grab it or find it. Although food and water are intrinsically rivalrous (whatever you eat or sip goes to your stomach and prevents others to eat the same piece), their abundance and renewal was exceeding by far human needs. Wild animals and vegetables were commonly found across the globe (except some areas of the Poles), with no private ownership or control over them, and they were thus non-excludable. At that time, they were considered global common goods. Then, between twelve to ten thousand years ago, the domestication of some crops and animals provided surplus food that allowed the development of cities and the consolidation of primitive forms of property rights. People around the world exchanged food and biological materials, mainly for food and agricultural purposes (Morgan 1979; Diamond 1997), and agriculture and food trade grew quickly and extensively, reaching all regions. However, it was not until the XX century that the commoditization of food took shape so as to mould the dominant industrial food system that feed a great share of human population. Food became an industry and a market of mass consumption, as eaters became just consumers (Fischler, 2011). Commodity is defined as a "good supplied without qualitative differentiation across the market". Food was detached from its multiple dimensions just to retain its tradable features (durability, external beauty, standardisation). In 1900, the majority of US citizens grew their own food or had direct access to the producers and the food produced by them (Dimitri et al., 2005). This is not the case a century later, where food items are considered as fungible items, capable of mutual substitution, with flavour- or health-related properties pretty much undervalued, and no incentives to cultivate better food, different food or more sustainable food. As the value- added to food items is provided by the middlemen and processors, the food producers have no incentives to produce good food but only more and cheaper.

The natural world is gradually but steadily being brought under private control with the aim of making profits, instead of supplying the needs of people. Enclosure is the gradual or sudden decrease of accessibility of a particular resource due to privatization, new legislation or overconsumption (Hess, 2008). The enclosure mechanisms, through privatization or legislation, have played a role in limiting the access to food as a public good. Privatization and enclosure of natural resources meant the transfer of common properties "from the many to the few" (Nuijten, 2006). For example, fishing from the seashore or collecting mushrooms from the forest used to be free and now are regulated by license or banned in many areas and seasons. Nevertheless, evidence from Africa suggests that privatization schemes to control tribal rangelands have in fact worsen inequalities (REFERENCES).

The foundational premises of the capitalism and its radical version we experience today (globalised neoliberalism) are the primacy of individual proprietary rights and the endless accumulation of profits (Scholte, 2005) and the food system has not escaped from that transformation. Private property is regarded as the fundamental right, with sovereign borders as the inalienable space and the enclosure of the commons as the long-term goal to be achieved by force, legal measures or market rules (Quilligan, 2012). However, the world is still rather diverse in proprietary schemes, and the private arrangements highly dominant within the realm of the agro-industrial agriculture are not equally prevalent in other areas of the world, where subsistence, traditional and agro-ecological types of agriculture are the norm. Actually, in numbers, the small traditional farmers that have mixed proprietary arrangements for natural resources are the great majority, with only 27 million farmers working with tractors, 250 million using animal traction and more than a 1 billion working just with their hands and tools. About 500 million sub-Saharan Africans still rely on communally held land (Kugelman & Levenstein, 2013), and the same can be said of millions of Latin American people (REFERENCES). There are 2.5 billion people still live in households involved in agriculture (World Bank, 2008), out of those 1.5 billion people are small-scale farmers, many of whom are marginalized and include up to half of the hungry people (United Nations, 2005). That seems to be an ironic paradox of the globalised industrial food system: half of those who grow at least 70% of the world's food are hungry, including 800 million growing urban gardens; 410 million gathering food in the forests; 190 million pastoralists and 100 million small fisher folks (ETC Group, 2009).

Traditionally, capitalism tends to over-exploit natural resources to overcome economic crises, not fully incorporating the externalities causes by the production/consumption processes. The enclosure and full privatization of goods owned by no one explains an important aspect of capitalism's insatiable appetite (Arvanitakis, 2006). Resource grabbing, either food, water, soil or energy, is an expression of an economic model of development in which capital accumulation is linked to increasing control over abundant and cheap supplies of natural resources. Examples of this commons-public-private rebranding include water, food, forests, energy, health services, schools, culture, indigenous artifacts, parks, community zoning, knowledge, means of communication and ecological and genetic resources (Quilligan, 2012). As industrial methods were applied to raising crops and animals, the agriculture-input sector grew dramatically and became highly concentrated, with relatively few companies now producing and selling farm machinery, fertilizers, pesticides, and seeds. Market concentration in the past 20 years has been significant not only in food production, but also in food transportation and retailing, and in agrochemicals where seven companies accounted for 90% of worldwide sales in 2001 (Lang, 2003). A few transnational corporations are able to exert near monopoly power all along the industrial food chain, from the seeds to the ready-to-eat meals sold in the supermarkets. The agri-food corporations have stakes in land-grabbing initiatives, in water companies and the retailer sector as well. The top 10 multinational seed companies now control 73% of the world's commercial seed market, up from 37% in 1995 (ETC Group, 2011). The innovation in agricultural research in the last 30 years has been greatly privatized, and put under control by license and patents (Benkler, 2006). Copyrighted crops are relentlessly increasing with over 170 million hectares of GMO already cropped in 2012, a 6% increased from previous year (10.3 million hectares) (James, 2012).

Expanding copyrights, issuing permits or taxing specific activities enable enclosure of previous commons. Among the different types of enclosure, two schemes are quite relevant for the three essential goods (food, water and air): setting quotas and developing new markets. Setting quotas may be a way to address the problem of open-access resources such as in fisheries (Young, 2003), although setting appropriate quota levels requires governments to collect and analyse a lot of information and enforcing regulations, adding to the cost of this policy (Rocha, 2007). Another form of enclosure of the commons is developing new markets for the services these common-pool resources provide. The 1997 Kyoto Protocol was the first attempt to create an international market for permits for greenhouse gases, being also regarded as the first steps towards the enclosure of the pure air in the atmosphere. Forest environmental services also present a great array of enclosure cases, either the REDD+ or the bird- or forest-friendly coffee labels.

8.- Why the market cannot guarantee food and nutrition security and the right to food for all?

One of the great illusions of recent decades has been that market forces by themselves could regulate the national and international food systems to pull hungry people out of the plight of starving and destitution. It was amply believed and praised that market-led food security would finally achieve a better nourished population, as long as the world's average wealth increases. Along those lines, food production and food access are mostly governed by market rules: you pay and your crop or you pay and you eat. In the Global South, exports have boomed while hunger has continued unabated or actually worsened, since cash crop production replaced basic food production to feed nationals. The market's efficiencies can only work to eliminate hunger, however, when purchasing power is widely dispersed (Moore-Lappe et al., 1998), what it is not actually the case (Milanovic, 2012).

However, reality has proven otherwise, dismantling the myth that free market can end hunger (Moore-Lappe et al., 1998). Unregulated markets may still not provide a socially efficient quantity of food even if enough income was distributed to low-income groups (Rocha, 2007), and thus hunger arises from negative market externalities (pollution, public health problems, unregulated use of common-resources, etc). Six sources of inefficiency in capitalism are especially important with regard to food security: the underproduction of public goods; the underpricing of natural resources; negative externalities; the weak monitoring and enforcing of market contracts; the primacy of intellectual property rights; and the costs of inequality (Wright, 2010). Free markets, governed by private, individual self-interest, will not provide an adequate quantity of public goods with enormous although non-monetised benefits to human beings (Ver Eecke, 1999), as the beneficial externalities cannot be captured by those private markets. The market will under-provide public goods since the market mechanism works on the principle that those who cannot pay for a good cannot consume it. Traditionally, the solution for the absence of efficient markets for public goods has been to have these goods produced and delivered by governments, as benefiting the maximum amount of citizens and increasing their welfare is the primary goal of the government.

Box 3: The quest for scarce arable land as a collateral effect of excessive commodification
Land-grabbing schemes are catching media attention, with private capital and sovereign wealth funds purchasing or leasing land in Africa, Asia, Europe and Latin America to produce food and biofuels for exporting to the investor's home country. Food-importing nations and profit-seeking private corporations are acquiring farmland overseas at unprecedented scale. Nearly 230 million hectares of farmland, an area equivalent to the size of Western Europe, have been sold or leased since 2001, with most of these transactions occurring since 2008 (Kugelman & Levenstein, 2013). This land could feed a billion people, exceeding the number of people who go to bed hungry each night (Oxfam, 2012). They cultivate the land themselves to get staple food and biofuels, and export the harvests back home to feed their citizens or industries. More than 40 percent of the land involved in overseas farmland acquisitions is to set aside for biofuels production (Kugelman & Levenstein, 2013). Some examples are Cambodia, where in 2011 55 percent of arable land has been acquired by domestic and foreign agribusiness interests or Liberia where 30 per cent of the land has been handed out in large-scale concessions in the past five years (Oxfam, 2012). But land grabbing deals are not circumscribed to the Global South, as half of all farmland in the European Union is now concentrated in the 3% of large farms and in some EU countries, land ownership is as unequal as it is in Brazil, Colombia and the Philippines (TNI, 2013).

Despite the common reliance on industry self-regulation and public–private partnerships to improve public health and nutrition, there is no evidence to support their effectiveness or safety (Moodie et al., 2013). Transnational corporations are major drivers of non-communicable disease epidemics and profit from increased consumption of tobacco, alcohol, and ultra-processed food and drink, the so-called unhealthy commodities. So far, the only evidence-based mechanisms that can prevent harm caused by unhealthy commodity industries are public regulation and market intervention. In plain terms, more state not less.

There are several implications of treating food as a mere commodity:

1. Food crops have many different uses other than direct human consumption, such as feed for livestock, biofuel, pharmaceutical by-products or industrial raw materials. The best use of any commodity is where it can get the best price.

2. Another implication of the commoditised nature of food is the unethical speculation with staple food. The amount of money in natural resources-based funds increased from $13 billion in 2003 to $317 billion in 2008 (Magdoff, 2012).
3. We are witnessing an out-of-control race for scarce natural resources since 2008 (see Box 3), with land-grabbing, water-grabbing, Arctic and Antarctic preliminary exploitation schemes and shale-gas fracking as just examples with global implications. The chief drivers of the this new colonialism are population growth, food and energy demand, volatile and high commodity prices, dietary transition to meat-dominated meals and land and water shortages, with any of those expected to slow anytime soon. By 2015, more than 200 private equity firms are expected to have almost $30 billion invested in overseas land grabbing schemes (Kugelman & Levenstein, 2013).
4. Because food products are commodities and the only goal of the food and agriculture system is to sell more and make more profits, the other dimensions of food presented above (the fundamental right to be free from hunger, the cultural implications of cropping and cooking or the public health benefits of a good nutrition) are overshadowed by the profit goal. That is why the world still harbours 868 million undernourished people and more than 500 million obese and the meat-based transition that is so resource-demanding is dominating world diets.
5. Finally, a food system anchored in the consideration of food as a commodity to be distributed according to the demand-offer market rules will never achieve food security for all, and least to say the aspirational status where every human being can have his/her right to food guaranteed. Access to food will improve with more income allocated to the poor, but market failures do not disappear simply by turning people into consumers. It is evident that the private sector is not interested in people who do not have the money to pay for their services or goods, either be videogames or staple food.

9.- Food as a commons

As seen earlier, public goods that are specific resources available everywhere that are shared and beneficial for all of us. Nevertheless, food and water are available everywhere and yet not considered public goods. Food is found all over the world, except the Poles, either produced by nature or human-made, and it benefits everybody. Food is central to life and none can fully control all food produced by Earth. Moreover, in a global world, food security is beyond the control of any institution or state. Food is public in consumption and a mixed good in production, as it can be privately produced, state produced and naturally produced. Food is a *de facto* mixed good, governed by public institutions in many aspects (food safety regulations, seed markets, fertilizer subsidies, the EU Common Agricultural Policy and US Farm Bill provisions), provided by collective actions in thousands of customary and post-industrial collective arrangements (cooking recipes, farmers' seed exchanges, consumer-producers associations) but largely distributed by market rules: you eat as long as you have money to purchase either food or food-producing inputs. However, man-made food is an impure public good, as food is rival but not ontologically excludable as every human has to eat every day, three times ideally, to keep on living.

Very recently, the status of food security has been regarded as a global public good by the Committee of World Food Security based at FAO in Rome (De Schutter *in press*) although this consideration had already been mentioned by some commoners (Quilligan, 2012) and food sovereignty proponents (Rosset, 2006). The global food price crisis of 2008 was a major turning point in this regard, and food and nutrition security is nowadays a major political concern for any global institution (WEF, 2013; United Nations (2012) for the G-20, G-8 (2009), WTO Food Security web site).

There is a need to reverse the process to excessive commodification of food, understood this as the trend to develop the traits and goods that fit better with the mechanized processes and standardized regulations put in practice by the agri-business and the governments (Manno, 2002). And we need to reclaim a narrative of the commons to reassess the excessive commodification of some resources and the re-commonification of others (Bollier, 2002). What triggers the re-conceptualization of food as a commons? Using Hess' entrypoints: the need to protect this essential resource from excessive

commodification and control by a few, the desire to build civic education towards this resource and the evolving nature of some food-related elements that are already considered as global commons (Hess, 2008). The de-commodification implies to delink commodities and well-being, rising the proportion of goods and services consumed outside the regulated formal market, either acquired in the public sphere (public services) or in the autonomous sphere (fair trade, exchange groups, producers-consumers associations, community-supported agriculture, etc).

10.- De-constructing food-related elements: all dimensions are considered as commons except the cultivated food.

Recent documents and public statements indicate that policy makers are moving from the technical definition of a pure public good elaborated by the economic theorists to a looser but more inclusive definition of the so-called impure public goods (Gerrard et al., 2012, p. 3), those goods that many economists already call "merit or social goods" who are those that different members or groups in society believe that the state or other publicly interested entities or groups should provide to society as a whole (Hampson & Hay, 2004).

The ancient commodification of food and the modern trend for water nowadays are human-induced processes that deal more with the private property of natural resources than with the intrinsic nature of the good. Publicness and privateness are not innate properties of a good, but the result of social or political choice. Therefore, it is important to distinguish between the potential and de facto publicness of a good (Kaul, 2013). Features of food as a private good are merely social constructs that can be de-constructed and re-constructed in a different way provided there is a common agreement within our societies. The commodification process can be reversed and a re-commonification of food and water is deemed an essential paradigm shift in light of the global fight against hunger and malnutrition. However, there is still a long road to go, as even those authors or institutions that are really committed to hunger eradication usually consider that free markets improve food production and access.

In this section, we are to deconstruct the food concept and to prove that most of its dimensions are considered, to a certain extent, common goods or even global common goods; while others are contested (naturally produced food and water) or generally regarded as private goods (cultivated food and livestock). The term "food" embraces the following dimensions:

a.- Cultivated food (crops and livestock):

Limited but renewable resources essential to human life and broadly considered as private goods. Cultivated food is produced in private or state-owned lands with private and public goods (seeds, fertilizer, rainfall, irrigation, machinery, human labour force), and this varied nature of means of production should affect the nature of the final product. Table X below depicts two examples of cultivating food and the different nature of the harvested product.

Table 2: Production means of cultivated food

	Cultivated Food 1	**Cultivate Food 2**
Means of production	Privately-owned land	State- or community-owned land
	Using priced water for irrigation	Rainfall irrigation
	Agro-chemical fertilizer	Animal manure
	Patented seed purchased in the market	Local landraces exchanged in seed fairs
	Waged labourers	Farmers from the community in labour exchange schemes
Final product	*Pure private food*	*Impure public food*

b.- Traditional agricultural knowledge accumulated after thousands of years of practices:

For centuries, small farmers, peasants and indigenous people have developed agricultural innovations that produce food in harmony with the surrounding environment, preserving seeds, land, water and community social life. The modern world needs to rediscover these commons-based solutions, generally regarded as common goods (knowledge perfectly qualifies as a global and pure public good).

Commons-based patent-free agricultural innovations would greatly contribute to global food security by upscaling and networking grassroots innovations for sustainable and low cost food production and distribution. The governance of this networking shall be adaptive and based on polycentric nodes and unpatented shared knowledge.

c.- Modern science-based agricultural knowledge produced by national institutions:

Most of the agricultural science and knowledge generated by private companies is finally copyrighted, but the knowledge produced by national institutions (universities and research centres) is public. Food-related scientific knowledge produced by state-owned institutions should be used for the common good, and not just for the benefit of large agribusinesses. In that sense, more research funds shall be invested in sustainable practices and agro-ecology, not further subsidizing industrial agriculture.

d.- Cuisine, recipes and national gastronomy

Food, cooking and eating habits are inherently part of our culture, and it determines who we are in the world, inasmuch as language and birthplace. Moreover, cooking is also regarded as a creative accomplishment of humankind, equalling literature, music or architecture. Recipes are commonly exchanged within family networks, friends and even unknown interlocutors in almost every culture, what it is clearly a superb example of commons in action (Walljasper, 2011). Super-star cooks are not reluctant in sharing their recipes and gastronomy knowledge. Cooking knowledge is not patented, copyrighted or trademarked, although some traditional food-processing knowledge has already been copyrighted by market demands (AOC, Appellations of Origin). Surprisingly as it may be, in this copyright-free domain of human activity, creativity and innovation are still dominant, as it seems that the freedom to copy actually promotes creativity rather than deter it (Raustiala & Sprigman, 2012).

e.- Edible plants and animals produced by nature (fish stocks and wild fruits and animals)

In economic terms, the environment is largely a public good so the natural resources produced by the environment shall also be public goods. Fish stocks, especially those in international waters, are generally accepted as common goods or common-pool resources in economic vocabulary (Christy & Scott, 1965). But within this group we can also include terrestrial animal and plants, such as wild fruits and animals either if they are found in state-, commonly- or privately-owned lands. Depending on the proprietary rights schemes applied in each country, the wild biodiversity living in my own land may or may not be mine.

f.- Genetic resources for food and agriculture

Genetic resources are generally accepted common goods, global in some cases (i.e. the International Treaty on Plant Genetic Resources for Food and Agriculture) and under sovereign state's control in many others. Seed exchange schemes are considered networked-knowledge goods with non-exclusive access and use conditions, produced and consumed by communities (Hess & Ostrom, 2007). At present, there is a lively debate between defenders of free-patent seeds distribution and the industrial copyright system that benefits transnational agricultural companies. Agro-biodiversity is a whole continuum of wild to domesticated diversity that is important to people's livelihood, and it should be mostly patent-free to promote and enable innovation. There is an urgent need to find a balanced legal framework around the protection and use of agro-biodiversity in traditional farming systems, with emphasis on the cultural commons that genetic resources represent.

g.- Food Safety considerations (Codex Alimentarius)

Food safety is addressed as a global public good (Unnevehr, 2006) through a try-centric system of private sector self-regulating efforts, governmental legal frameworks working at national level (national food safety and consumer laws) and international institutional innovations such as the Codex Alimentarius, hosted by FAO in Rome, or the SPS agreement issued by the WTO. Epidemic disease knowledge and control mechanisms are amply considered as global public goods, as zoonotic pandemias are a public bads with no borders and thus its control is in everybody's interest.

h.- Nutrition, including hunger and obesity unbalances

There is a growing consensus that health shall be considered as a public good, either nationally or internationally (Anomaly, 2011; Chen et al., 1999; The Economist, 2009; WHO, 2002). And as good nutrition is an integral part of health, good nutrition for all should also be considered as global public good. Their nemesis however, hunger and obesity, shall be seen as public bads.

i.- Extreme food price fluctuations in global and national markets

Extreme financial instability is a public bad and therefore economic stability is a public good (Wolf, 2012). Those acting inside the market system have no incentive to supply the good or avoid the bad, so there is a need of concerted action where the states have an important role to play. The very same argument can be used to value extreme food price fluctuations in global and national markets as a public bad that benefits none but a few traders and brokers. And since 2008 we have already experienced three important food peaks with accompanying high fluctuations.

11.- What if food is considered a commons… The commons-based transition to sustainable agriculture

I do not expect to see the fruits of this paper in my lifetime, but my grandchildren may, hopefully (James Quiligan)

This first approach to food as a commons seeks to contribute to the debate on the moral values that motivate people to produce, sell and consume food and the most appropriate institutional arrangements for achieving a sustainable food production for all. This paper aims at provoking further thoughts and reflexive knowledge, ideally produced in a commons-manner. The efforts to address the imbalances of the current industrialized food system are a classic collective action problem that we think is best addressed at multiple scales and levels. If food is considered a commons or impure public good instead of a pure private good as considered by the dominant post-industrial food system, the legal, economic and political implications would be huge, although nowadays we can barely glimpse a few of them, the most straightforward. In the next sections, we barely sketch a tri-centric approach that could be helpful in steering the transition towards a sustainable food system. We are still far from being able to present detailed proposals on how this concept could be materialised in practice. Many gaps are still waiting to be enlightened by subsequent research in economic, philosophical, agricultural, legal and social areas. In any case, quoting Marx, detailed blueprints of alternative designs are often pointless exercises in fantasy.

On the other side, should hunger be considered a public bad, it would entail implications far beyond the hungry themselves and the countries harbouring hungry people, as eradicating hunger would be then considered a global duty and the governance of the global food system should be reviewed accordingly. To date, advocating for anti-hunger measures has been very much depending on demonstrating the economic and political losses that hunger infringe to human societies and economics (World Bank, 2006, Grantham-McGregor et al. 2007; Martinez & Fernandez, 2008). Hunger deters innovation and productivity and therefore it brings huge economic losses. Hunger also triggers social unrest and political turmoil (Messner & Cohen, 2008; Lagi et al. 2011; Holt-Giménez & Patel, 2009). Alternative non-economic arguments and strategies to fight hunger have been largely neglected: ethical imperative (Pinstrup-Andersen, 2007), public health considerations (Sidel, 1997), social cohesion (FAO-CEPAL-PMA, 2007) or human rights approaches. Considering food as a commons would provide the adequate rationale to support these non-economic arguments.

The consideration of food as a commons could provide the background to reverse main threats to food and nutrition security, such as:

- Excessive commodification of food, with high-pricing, laws and private enclosure as main barriers to fully enjoy those vital resources
- Irregular private land titling, land grabbing and land evictions, as the proprietary right schemes would incorporate collective rights at national and international levels
- Excessive patents of life, bio-piracy and patented GMOs, applying to agricultural and food innovations the same principles of the GNU free software (Stallman, 2012). See table 3 for the

four freedoms. The farmers and researchers would have the freedom to sow, distribute, study, select, modify and improve the seeds and its genetic material for its own benefit. Benkler (2006) clearly states that the copyrighted agricultural sector is deterring further innovation, an innovation very much needed if we want to increase our food production by 60% by 2050 (OECD-FAO, 2012).

- The concentration of agri-food chains in few transnationals.
- Discourage the enclosing schemes targeting the atmosphere, such as the Carbon Sequestration Initiative, the REDD+ and the Payment for Environmental Services.

Table 3: Production means of cultivated food

Freedoms of the GNU free software[1]	Freedoms of patent-free seeds
The freedom to run the program, for any purpose (freedom 0).	Freedom to use the seeds, for any purpose
The freedom to study how the program works, and change it so it does your computing as you wish (freedom 1). Access to the source code is a precondition for this.	Freedom to study how the seed works and how the genetic information is translated into phenotypic features. And the freedom to change that genetic information as you wish (though due considerations shall be given to ethical concerns in this case, as we are dealing with living entities).
The freedom to redistribute copies so you can help your neighbour (freedom 2).	The freedom to redistribute seeds so you can help your neighbour.
The freedom to distribute copies of your modified versions to others (freedom 3). By doing this you can give the whole community a chance to benefit from your changes. Access to the source code is a precondition for this.	The freedom to distribute seeds of your improved landraces to others (freedom 3). By doing this you can give the whole community a chance to benefit from your changes. Access to the genetic material is a precondition for this.

[1] Stallman, 2012.

12.- Legal considerations of food as a commons

Several authors have expressed the post-2015 agenda for development needs to contain an articulation of the various sets of global public goods, how they are financed, and which global institutions can be held accountable for the provision of these global public goods (von der Hoeven, 2012). In that sense, considering food as a public good as well as a human right could pave the way for more binding legal frameworks to fight hunger and guarantee the right to food for everybody (Vivero, 2012), as well as reinforced cosmopolitan global policies (Held, 2009) and more fraternal ethics and legal frameworks (Gonthier, 2000) for the whole human race.

Another implication would be that food should be kept out from trade agreements dealing with pure private goods (Rosset, 2006). Food issues would be dealt with outside the WTO negotiations and there would be a need to establish a particular governing system for production, distribution and access to food. Moreover, there would be a legal and ethical ground to ban on futures trading in agricultural commodities, as the futures trading activity influences considerably the international and domestic prices (Jian et al., 2005). Subsequently, there would a need to develop an international legal framework to regulate food at global level, complementing the national legislations and the international agreements currently in use (ICESCR, Deep Sea Oceans, Antarctica…). A binding Food Treaty (MacMillan & Vivero, 2011) could be an example of global legal agreement to guarantee the common dimension of food as an essential element to human beings survival and as a human right. Binding agreements as legal tools to materialise global governance of the commons have also being proposed for other commons such as climate change (Griggs et al., 2013) and universal health coverage (Gostin et al., 2011). The political and legal framework that governs food as a global public good could take shape as, for example, a global union where sovereign countries should share part of its sovereignty regarding food to that international institution (Corner, 2008; McClintock, 2010). But these immediate considerations on legally-binding food agreements are not expected to become real

without a strong opposition from the market power and lobbying pressures of companies that dominate food systems in the global market.

Another legally-based scheme anchored in the consideration of food as a commons could be a universal Basic Food Entitlement, whereby the State shall guarantee a minimum amount of food for all, a social guarantee scheme similar to the basic income for all (Van Parijs, 2005) or the Social Protection Floor (Deacon, 2012). Just recently, the term "food security floor" has been coined whereby a minimum set of policies are put into practice to protect the only human right declared as a fundamental right in the ICESCR: freedom from hunger (HLPE, 2012). These type of state-regulated measures could be implemented during the transition period, as a sort of Food Floor to get rid of hunger quickly and similar to the called Economic Transition Income proposed by Arnsperger & Johnson (2012). State institutions could govern, guarantee and provide a minimum amount of food for everyone, either in kind or in cash. During the transition period, and as an immediate mechanism, the state should guarantee a minimum amount of income to purchase enough food: the minimum salary shall be equal to the food basket in all countries.

Innovation in agricultural and nutrition research and evidence-based locally-adapted technologies would highly benefit from this consideration of food as a commons, fostering crowdsourcing innovations and creative-commons licensing systems to improve the sustainability and fairness of the global food system. Proprietary rights by private companies of food related elements, such as seeds, processed foods or agricultural knowledge, prevent further innovation by the stakeholders involved (either farmers or consumers), and thus copyrighted schemes deter rather than trigger broad agricultural innovations. Millions of people innovating have far more capacity to find adaptive and appropriate solutions that a few thousands of scientists in the laboratories and research centres (Benkler, 2006). Along those lines, Benkler presents how a creative commons approach to food security and agriculture can stimulate progress in hunger eradication and sustainable food systems, although his examples are confined to science-based networks such as PIPRA (Public Intellectual Property for Agriculture), a network of public US universities, or BIOS (Biological Innovation for an Open Society), an initiative by the australian NGO Cambia on open source biotech agricultural developments.

13.- The tri-centric governance of the local food systems: markets, governments and civic collective actions for food

There is an urgent need to rearrange the food system governance, devolving control power from the state to the commons, and rebranding privately-owned food stuff and food-producing resources. Nowadays, in different parts of the world, there are many initiatives that demonstrate that a right combination of collective action, governmental rules and incentives, and private sector entrepreneurship yield good results for food producers, consumers, the environment and society in general, and the challenge now is how to scale up those local initiatives to national level. The commons are gaining ground as a third force of governance and resource management by the people as a compliment to the market and the state. Unlike the market, the commons are about cooperation, stewardship, equity, sustainability, and direct democracy from local to global.

Paralleling the polycentric approach to climate change proposed by Ostrom (2009), single policies adopted only at a global scale (i.e. the Updated Comprehensive Framework for Action of the High Level Task Force on the Global Food Security Crisis or the UN Millennium Development Goals) are unlikely to generate sufficient trust among citizens and firms so that collective action can take place in a comprehensive and transparent manner to reduce hunger and tackling global food security (production and consumption). The solution to the unsustainability of the food system and their negative effects on malnutrition will not arrive in a blueprint agreement or a silver-bullet panacea (Ostrom, 2012), but will require experimentation at multiple levels (personal, local, national, international) and diverse approaches to governance (market-led, state-led and collective action-led).

The foundations of many civic collective actions for food lay on the multiple consideration of (a) food as basic human need that shall be available to all, (b) food as fundamental human right that shall be guaranteed to every citizen, (c) food as a pillar and major feature of our culture either as producers of consumers of food, (d) food as a marketable product subject to fair trade and sustainable production and (e) food as a global common good that shall be enjoyed by mankind. In that sense, food considered as a tradable commodity only reveals one fraction of the whole meaning, being in any case just a means to facilitate access to all, and not to determine who can get access to that food. In that sense, customary and post-industrial food civic actions share a consideration of food as a commons that radically diverges from the mainstream industrial food system that merely considers food as a commodity.

The re-commonification of food shall take several generations so the transition phase should witness the coexistence of a dual consideration of food: as a common good, whereby a minimum amount of food should be available and accessible to every human being; and as a private good still tradable and subject to excludability and rivalry. Market rules have proven unsuccessful in reaching a sustainable production and fair distribution of food to every human being, although enough food is available to feed us all adequately. Therefore, governmental regulations and collective actions are also essential to ensure a fair distribution of this essential good, so as to satisfy the caloric needs and cultural preferences of humans. The transition path can be compounded of soft changes or disruptive changes, but it will likely be a heterogeneous mix of both (Quilligan, 2012). Although at the initial stage of the transition period the State should take a leading role in guaranteeing food for all, that leading role should gradually be shifted to the self-negotiated collection actions by groups of producers and consumers, as the State provision of food does not surpass the net benefit that consumers would receive through the self-organized and socially negotiated protection, production and use of their own resources.

The tri-centric governance schemes shall be compounded of (a) *civic collective actions for food* undertaken initially at local level and whose aim is mostly preserving and regenerating the commons that are important for the community (food as a common good); (b) *governments* whose main goal is to maximize the well-being of their citizens and providing an enabling framework to enjoy the commons (food as a public good); and (c) *the private sector* that can prosper from the surplus resources it owns or rents from the owners of the commons, either the community or the state (food as a private good).

Civic collective actions for food (also called Alternative Food Networks) are built upon the socio-ecological practices of civic engagement, community and the celebration of local food (Sumner et al., 2010). Commons-based principles and models have the potential to build a rich array of stable, equitable and ecological alternatives to conventional food markets while strengthening communities and networks, innovative or more traditional, self-governing or state-induced. The local institutional arrangements that generate and govern local food systems (production and consumption) are key units for transition and the essential bricks of any reconfiguration of the global food system to render it more sustainable and productive enough to feed all of us by 2050 and beyond. People's capacity for collective action is an agency that can complement the regulatory mandate of the state and the demand-driven allocation by the private sector. Ostrom (1990) and her polycentric approach to governing the commons helped us understand how institutional diversity is the most suitable and successful solution to maximize the material and non-material outputs of common goods.

A possible transition path from the current scenario to the commons-based one would be testing and scaling up approaches in small- to medium-scale governance units that are linked together through information networks (Dedeurwaerdere, 2005) and monitoring at all levels, including accountability, transparency and participation (De Schutter & Cordes, 2011). Food could be produced, consumed and distributed by hybrid institutional arrangements formed by state institutions, private producers and companies, and self-organized groups under self-negotiated rules, such as those actions labelled as Community-Supported Agriculture in the US (Abbott-Cone & Myhre, 2000). Those self-organized

groups or communities of users and the local rules they develop are key components of the emergent polycentric governance of natural resources described by Ostrom (2005).

A community can be understood as group of people with a shared interest in the sustainable use of a given resource, implying communication and commitment between people who can interact to arrive to governance rules concerning the resource. Local communities willing to govern their own resources may formalize this through a social charter and food trusts, associations or non-governmental organizations. An example for a Food-related Charter was already proposed by Maxwell (1997) to mobilise political commitment at local and national level to reach food security and fight against hunger, and the institutional shape of collective actions may be materialised as cooperatives, self-help groups or social enterprises. Many food communities have developed their own sets of norms and rules to oversee their collective food resources sustainably, both for themselves and for future generations. The decentralized, self-governing systems of food production also offer fairer access to resources and higher efficiency than can be gained through distributive enterprises operated as private monopolies or state hierarchies (Quilligan, 2012).

Recently-proposed Food Trusts, as catalysts for the integration of producers and consumers, could be a nice example of this tri-centric governance arrangement (The Food Commons, 2011; Nature et Progrès, 2012). Food Trusts could own farm land and water resources, produce food, lend money to low-carbon groups and guarantee food for every citizen through a basic food entitlement. Trusts are generally created to preserve depletable resources, but many replenishable commons can also benefit from trusts that ensure their regeneration (Quilligan, 2012). Trustees set a cap on the extraction or the use of a resource according to non-monetized, intergenerational metrics such as sustainability, quality of life and well-being. Having protected a commons safely for future generations, the trust may rent a proportion of the resources beyond the cap to the private sector or to state businesses and utilities for extraction and production. A percentage of this rent is taxed by the state and redistributed to citizens as dividends or subsistence income, with emphasis on the poor and marginalized.

In any case, self-governing collective actions cannot do the transition by themselves, as food provision and food security shall involve greater levels of public sector involvement and market-driven distributions. There are many dimensions of food that are already considered as public goods and they should be governed by the government. Governments have a vital role to play in countering the tendency toward economic concentration, through genuine tax, credit, and land reforms to disperse buying power toward the poor (Moore-Lappe et al., 1998). This suggests the need for the public sector funding schemes to guarantee a minimum food for all. The state must be seen not only as a regulatory mechanism for diverse and sometimes conflictive interests, but also as an funding and operational instrument for the achievement of socially desired collective goods and the well-being of all of society's members, being the food security of the population clearly one of those. As recent examples of governmental rules that may contribute to facilitate the transition towards sustainable food systems, two taxing proposals are quite relevant: taxing meat to incentivise a reduction in consumption as suggested in a recent report by the Swedish Board of Agriculture (2013) or taxing fast food with high contents of sugar, fat and salt (De Schutter, 2011). Both proposals will surely become a reality within a decade, as part of government schemes to supervise the uncontrolled rise meat production and consumption due to the environmental, social and health consequences.

Finding the adequate equilibrium between this tri-centric institutional setup to govern food production, distribution and consumption will be one of the major challenges the humankind will have to address in the XXI century, as long as the population grows and Earth's carrying capacity seems to be surpassed by human's greed for resources, as Ghandi once mentioned.

Bibliography

Abbott Cone, C. & A. Myhre (2000). Community-Supported Agriculture: A Sustainable Alternative to Industrial Agriculture? Human Organization Vol. 59, 2: 187-197

ACF-MSF (2009). One crisis may hide another: food price crisis masked deadly child malnutrition. Briefing paper. Action Contre la Faim International Network and Médecins Sans Frontieres.

Alexander, E., D. Yach & G.A. Mensah (2011). Major multinational food and beverage companies and informal sector contributions to global food consumption: implications for nutrition policy. Globalization and Health, 7:26 doi:10.1186/1744-8603-7-26

Alpen Capital (2011). The Gulf Countries Consortium. Page 5.
http://www.alpencapital.com/downloads/GCC_Food_Industry_Report_June_2011.pdf

Anomaly, J. (2011). Public Health and Public Goods. Public Health Ethics (2011) 4 (3): 251-259. doi: 10.1093/phe/phr027

Arnsperger, Ch. & W.A. Johnson. (2012). The guaranteed income as an equal-opportunity tool in the transition toward sustainability. in A. Gosseries & Y. Vanderborght (eds.), Arguing about justice. Essays for Philippe Van Parijs. Presses universitaires de Louvain, Louvain-la-Neuve.

Arvanitakis, J. (2006). The Commons: Opening and Enclosing Non-commodified Space. Portal Journal of Multidisciplinary International Studies. Vol 3, No 1.

Benkler, Y. (2006). The wealth of networks. How social production transforms markets and freedom. Yale University Press. New Haven. Pp 329-344.

Barlow, M. (2007). Blue Covenant: The Global Water Crisis and the Coming Battle for the Right to water. The New press, New York.

Barlow, M. & T. Clarke (2002). Blue gold: the fight to stop the corporate theft of the world's water. The New Press, New York.

Bengoa, J.M. (2001). Food transitions in the 20th-21st century. Public Health Nutrition 4 (6A): 1425-7.

Black R et al. (2008). Maternal and child undernutrition: global and regional exposures and health consequences. The Lancet 371(9608), 243-260.

Blanchflower, D.G., A.J. Oswald & S. Stewart-Brown (2012). Is Psychological Well-being Linked to the Consumption of Fruit and Vegetables? National Bureau of Economic Research Working Paper No. 18469. Issued in October 2012. http://www.nber.org/papers/w18469

Bollier, D. (2003). Silent theft. The private plunder of our common wealth. Routledge, New York.

Brousseau, E., T. Dedeurwaerdere & B. Siebenhuner (2012). Reflexive governance for global public goods. The MIT press, Boston.

Buchanan, J. (1965) An economic theory of clubs. Economica, 32, pp. 1-14.

Caraher, M. & J. Coveney (2004). Public health nutrition and food policy. Public Health Nutrition, 7(5), 591 - 598.

Carpenter, P.A. & P.C. Bishop (2009). The seventh mass extinction: Human-caused events contribute to a fatal consequence. Futures, vol. 41, Issue 10, December 2009, Pages 715–722. doi: 10.1016/j.futures.2009.07.008

Chen, L.C., T.G. Evans & R.A. Cash (1999). Health as a global public good. In Inge Kaul, Isabelle Grunberg & Marc A. Stern, eds. Global public goods. International cooperation in the 21st century.
UNDP, Oxford University Press.

Chen, S. & M. Ravallion (2010). The developing world is poorer than we thought, but no less successful in the fight against poverty. The Quarterly Journal of Economics 125 (4): 1577-1625. doi: 10.1162/qjec.2010.125.4.1577
http://qje.oxfordjournals.org/content/125/4/1577.short

Chen, S. & M. Ravallion (2012). An Update to the World Bank Estimates of Consumption Poverty in the Developing World. Washington, DC: World Bank. http://siteresources.worldbank.org/INTPOVCALNET/Resources/Global_Poverty_Update_2012_02-29-12.pdf

Chen JD & H. Xu (1996). Historical development of Chinese dietary patterns and nutrition from the ancient to the modern society. World Rev Nutr Diet. 79:133-53.

Christy, F. T. & A. Scott (1965). The common wealth in ocean fisheries; some problems of growth and economic allocation. Johns Hopkins Press, Baltimore.

Clapp, J. & D. Fuchs, eds. (2009). Corporate power in global agrifood governance. MIT press, Cambridge, MA.

Coleman-Jensen, A., M. Nord, M. Andrews & S. Carlson (2012). Household Food Security in the United States in 2011. Economic Research Report No. (ERR-141), US Department of Agriculture. http://www.ers.usda.gov/publications/err-economic-research-report/err141.aspx#.UXFquPX9XfU

Congressional Budget Office (2012). The Supplemental Nutrition Assistance Program. April. http://www.cbo.gov/publication/43175

Corner, M. (2008). Towards a Global Sharing of Sovereignty. European Essay No. 44. The Federal Trust. London. http://www.fedtrust.co.uk/content.php?cat_id=4&content_id=123

Datamonitor. http://www.datamonitor.com/Default.aspx

Deacon, B. (2012). The social protection floor. CROP Poverty Brief http://www.crop.org/viewfile.aspx?id=415

De Onis, M., M. Blossner & E. Borghi (2011). Prevalence and trends of stunting among pre-school children, 1990–2020. Public Health Nutrition: 1-7. http://www.who.int/nutgrowthdb/publications/Stunting1990_2011.pdf

De Schutter, O. (2011). The right to an adequate diet: the agriculture-food-health nexus. Report presented at the 19th Session of the United Nations Human Rights Council. A/HRC/19/59.

De Schutter, O. & K.Y. Cordes, eds. (2011). Accounting for Hunger. The Right to Food in the era of Globalisation. Hart Publishing, Oxford.
Deacon, B. (2012). The social protection floor. CROP Poverty Brief, October 2012. http://www.crop.org/viewfile.aspx?id=415

Dedeurwaerdere, T. (2005). The contribution of network Governance to Sustainable Development", Les séminaires de l'IDDRI, n°13. http://www.iddri.org/Evenements/Seminaires-reguliers/s13_dedeurwaerdere.pdf

Diamond, J. (1997). Guns, germs and steel. A short history of everybody for the last 13,000 years. Vintage, London. Pp. 85-156
Digital Library of the Commons http://dlc.dlib.indiana.edu/dlc/handle/10535/830

Dimitri, C., A. Effland & N. Conklin (2005). The 20th Century Transformation of U.S. Agriculture and Farm Policy. Economic Information Bulletin No. (EIB-3), June. USDA Economic Research Service, Washington, DC. http://www.ers.usda.gov/publications/eib-economic-information-bulletin/eib3.aspx#.UXZMzPX9XfU

Ecologistas en Accion (2012). La calidad del aire en el Estado Español durante el 2011. http://www.ecologistasenaccion.org/IMG/pdf/informe_calidad_aire_2011.pdf

ETC Group (2008). Who owns nature? Corporate power and the final frontier in the commodification of life. Communique #100.

ETC Group (2009). Who Will Feed Us? Questions for the Food and Climate Crises. ETC Communique no. 102, Ottawa. http://www.etcgroup.org/en/node/4921

ETC Group (2011). Who Will Control the Green Economy? Corporate Concentration in the Life Industries. Communiqué 107. ETC Group, Ottawa.

Euromonitor. http://www.euromonitor.com/

FAO (2011). Global food losses and food waste. Extent, causes and prevention. FAO, Rome & Swedish Institute of Food and Biotechnology, Gothenburg. http://www.fao.org/docrep/014/mb060e/mb060e00.pdf

FAO (2012). The future we want. End hunger and make the transition to sustainable agricultural and food systems. FAO, Rome.

FAO, CEPAL & PMA (2007). Hambre y Cohesión Social. Cómo revertir la relación entre inequidad y desnutrición en América Latina y el Caribe. FAO Santiago, Chile. http://www.rlc.fao.org/iniciativa/librocs.htm

FAO, WFP & IFAD (2012). The state of food insecurity in the world. Economic growth is necessary but not sufficient to accelerate reduction of hunger and malnutrition. FAO, Rome.

Fernandez-Armesto, F. (2002). Near a thousand tables. A history of food. Free Press, New York.

Finger, M & J. Allouche (2002). Water Privatisation: Trans-National Corporations and the Re-regulation of the Water Industry. Spoon Press, London.

Fischler, C. (2011). L'alimentation, une consommation pas comme les autres. Sciences Humaines. Consommer. Comment la consommation a envahi nos vies. Grands Dossiers N° 22 - mars-avril-mai 2011. http://www.scienceshumaines.com/l-alimentation-une-consommation-pas-comme-les-autres_fr_26889.html#achat_article

Fogel, R.W. (2004). The escape from hunger and premature death, 1700-2100. Europe, America and the Third World. Cambridge University Press, New York.

Forbes (2007). The world's biggest industry. Forbes, 15 November 2007.
http://www.forbes.com/2007/11/11/growth-agriculture-business-forbeslife-food07-cx_sm_1113bigfood.html

Fraser, E.D.G. & A. Rimas (2011). Empires of food. Feast, famine and the rise and fall of civilizations. Arrow Books.

G8 (2009). L'Aquila Joint Statement on Global Food Security. L'Aquila Food Security Initiative (AFSI). http://www.g8italia2009.it/static/G8_Allegato/LAquila_Joint_Statement_on_Global_Food_Security%5B1%5D,0.pdf

GAIN (2013). Access to nutrition index. Global Index 2013. Global Alliance for Improved Nutrition. http://s3.amazonaws.com/ATN/atni_global_index_2013.pdf

Gerrard, C.L., L.G. Smith, B. Pearce, S. Padel, R. Hitchings, M.measures & N. Cooper (2012). Public goods and farming. In Lichtfouse, E. (ed.), Farming for food and water security. Sustainable Agriculture Reviews 10. Springer, Dordrecht. DOI 10.1007/978-94-007-4500-1_1

Giddings, L.V., M. Stepp & M. Caine (2013). Feeding the planet in a warming world: building resilient agriculture through innovation. The Innovation Technology and Information Foundation and the London School of Economics, London.

Gonthier, C.D. (2000). Liberty, Equality, Fraternity: The Forgotten Leg of the Trilogy. Mcgill Law Journal / Revue de Droit de Mcgill, vol. 45: pp. 567-589. http://cisdl.org/gonthier/public/pdfs/publications/Liberty_Equality_Fraternity_-_Charles_D_Gonthier.pdf

Goodstein, E. S. (1995). Economics and the Environment. Englewood Cliffs, Prentice-Hall.

Gostin L.O. et al. (2011). The Joint Action and Learning Initiative: Towards a Global Agreement on National and Global Responsibilities for Health. PLoS Med 8(5): e1001031. doi:10.1371/journal.pmed.1001031

Gorenflo, L.J. et al. (2012). Co-occurrence of liguistic and biological diversity in biodiversity hotspots and high biodiversity wilderness areas. Proc. Nat. A. Sci. http://www.pnas.org/content/early/2012/05/03/1117511109.short

Grantham-McGregor, S. et al (2007). Development potential in the first 5 years for children in developing countries. The Lancet, 369:60–70

Griggs, D., M Stafford-Smith, O. Gaffney, J. Rockström, M.C. Öhman, P. Shyamsundar, W. Steffen, G. Glaser, N. Kanie & I. Noble (2013). Sustainable development goals for people and planet. Nature, vol 495, 21 March: 305-307.

Gross, R & P Webb (2006). Wasting time for wasted children: severe child undernutrition must be resolved in non-emergency settings. The Lancet, 367: 1209–1211.

Haddad, L. (2003). Redirecting the Diet Transition: What Can Food Policy Do?. Development Policy Review, 21 (5-6): 599-614.

Hampson, F.O. & J.B. Hay (2004). Review Essay: Viva Vox Populi quick view. Global Governance, Vol. 10, No. 2 (Apr.–June 2004), pp. 247-264

Hardin, G. (1968). The Tragedy of the Commons. Science 168, December 13.

Heinberg, R. & M. Bomford (2009).The Food and Farming Transition: Toward a post-carbon food system. The Post Carbon Institute, California, USA

Held, D. (2009). Restructuring global governance: cosmopolitanism, democracy and the Global Order. Millenium: Journal of International Studies. Vol 37, No 3, pp. 535-547.

Hess, C. (2008). Mapping the New Commons. Presented at "Governing Shared Resources: Connecting Local Experience to Global Challenges;" the 12th Biennial Conference of the International Association for the Study of the Commons, University of Gloucestershire, Cheltenham, England, July 14-18, 2008.

Hess, C. & E. Ostrom, eds. (2007). Understanding Knowledge as a Commons: From Theory to Practice. MIT Press, Cambridge, MA.

HLPE (2012). Social protection for food security. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome 2012. 58-59. http://www.fao.org/fileadmin/user_upload/hlpe/hlpe_documents/HLPE_Reports/HLPE-Report-4-Social_protection_for_food_security-June_2012.pdf

Hobbes, T. (1651). Leviathan. Oxford University Press, 1996

Holt-Giménez, E & R Patel (2009). Food Rebellions: Crisis and the Hunger for Justice. Fahumu Books, UK

Howard, P.H. (2009). Visualizing Consolidation in the Global Seed Industry: 1996–2008. Sustainability 2009, 1, 1266-1287; doi:10.3390/su1041266

IAASTD (2009). Agriculture at a crossroads: the global report. Island Press.

IMAP (2011). Food and beverage industry global report 2010. IMAP Consumers staple report. http://www.imap.com/imap/media/resources/IMAP_Food__Beverage_Report_WEB_AD6498A02CAF4.pdf

James, C. (2012). Global Status of Commercialized Biotech/GM Crops: 2012. ISAAA Brief No. 44. International Service for the Acquisition of Agri-biotech Applications: Ithaca, NY.

Jian, Y., BR Balyeat & DJ Leatham (2005). Futures trading activity and commodity cash price volatility. Journal of Business finance and accounting 32: 297-323.

Kaul, I. (2013). Global Public Goods A concept for framing the Post-2015 Agenda? German Developmemnt Institute Discussion paper 2/2013, Bonn.
http://www.die-gdi.de/CMS-Homepage/openwebcms3_e.nsf/%28ynDK_contentByKey%29/ANES-959D4N/$FILE/DP%202.2013.pdf

Kaul, I., P. Conceição, K. Le Goulven & R.U. Mendoza (eds.) (2003). Providing Global Public Goods: Managing Globalization. Oxford University Press, New York. DOI: 10.1093/0195157400.001.0001

Kaul, I. & R.U. Mendoza (2003). Advancing the concept of public goods. In Inge Kaul; Pedro Conceição; Katell Le Goulven; Ronald U. Mendoza (eds.). Providing Global Public Goods: Managing Globalization. Oxford University Press, New York. DOI: 10.1093/0195157400.001.0001

Kay, S. & J. Franco (2012). The global water grab. A primer. The Transnational Institute, Amsterdam.
http://www.tni.org/sites/www.tni.org/files/download/watergrabbingprimer-altcover2.pdf

Kelly, T., W. Yang, C-S. Chen, K. Reynolds & J. He (2008). Global burden of obesity in 2005 and projections for 2030. International Journal of Obesity 32: 1431-37.

Kugelman, M. & S. L. Levenstein (2013). The Global Farms Race: Land Grabs, Agricultural Investment and the Scramble for Food Security. Island Press.

Lagi, M., K.Z. Bertrand & Y. Bar-Yam (2011). The Food Crises and Political Instability in North Africa and the Middle East. http://arxiv.org/pdf/1108.2455v1.pdf\

Lang, T. (2003). Food Industrialisation and Food Power: Implications for Food Governance". Development Policy Review, 21 (5-6): 555-568.

Lopez-Gunn, E. B. Willaarts, A. Dumont, I. Niemeyer & P. Martinez-Santos (2012). The concept of water and food security in Spain. In D'Estefano et al. Water, Agriculture and the Environment in Spain: Can We Square the Circle? Botin Foundation, Madrid.

MacMillan, A & JL Vivero (2011). The governance of hunger. Innovative proposals to make the right to be free from hunger a reality. In: Martín-López, MA & JL Vivero, eds. New challenges to the Right to Food. CEHAP, Cordoba and Editorial Huygens, Barcelona.

Magdoff, F. (2012). Food as a commodity. Monthly Review. Volume 63, Issue 08 (January). http://monthlyreview.org/2012/01/01/food-as-a-commodity

Manno, J. P. (2002). Commoditization: Consumption Efficiency and an Economy of Care and Connection. In Confronting Consumption, eds. T. Princen, M. Maniates and K. Conca, pp. 67-100. MIT Press, Cambridge, MA.

Martínez, R. & A. Fernández (2008). The cost of hunger: Social and economic impact of child undernutrition in Central America and the Dominican Republic. WFP-ECLAC, Santiago.

Maslow, A. (1943). A Theory of Human Motivation. Psychological Review, 50(4), 370-96.

Maxwell, S. (1997). A charter for food security. Food Policy 22, Issue 6, Pages 469–473

McClintock, J. (2010). The uniting of nations. An essay on global governance. Peter Lang, Brussels.

Messner E. & M. Cohen (2008). "Conflict, food insecurity and globalization". En J. Von Braun y E. Díaz-Bonilla. Globalization of food and agriculture and the poor. Oxford University Press, New Delhi, India, págs. 299-366.

Mehta, L., G.J. Veldwisch & J. Franco (2012). Introduction to the Special Issue: Water grabbing? Focus on the (re)appropriation of finite water resources. Water Alternatives 5(2): 193-207.
http://www.water-alternatives.org/index.php?option=com_content&task=view&id=194&Itemid=1

Milanovic, B. (2012). Global income inequality by the numbers: in history and now. An overview. Policy Research working paper 6259. World Bank, Washington DC.
http://econ.worldbank.org/external/default/main?pagePK=64165259&piPK=64165421&theSitePK=469372&menuPK=64216926&entityID=000158349_20121106085546

Montanori, M. (2006). Food is culture. Arts and traditions on the table. Columbia University Press, New York.

Moodie, R. et al. (2013). Profits and pandemics: prevention of harmful effects of tobacco, alcohol, and ultra-processed food and drink industries. The Lancet - 12 February 2013. DOI: 10.1016/S0140-6736(12)62089-3

Morgan, D. (1979). Merchants of Grain. New York: Penguin Books.

Murphy, S., D. Burch & J. Clapp (2012). Cereal secrets: The world's largest grain traders and global agriculture. Oxfam Research Reports, August 2012. Oxford, UK: Oxfam International. www.oxfam.org/en/grow/policy/cereal-secrets-worlds-largest-grain-traders-global-agriculture

Murray, S. (2007). Moveable Feasts: From Ancient Rome to the 21st Century, the Incredible Journeys of the Food We Eat. St. Martin's Press, New York.

Nature et Progrès (2012). Les groupes d'achats communs. Un partenariat entre producteurs et consommateurs pour produire et consommer autrement. Belgique http://www.groupesalimentaires.be/wp-content/uploads/Brochure-Groupes-dachat.pdf

Nuijten, Monique. (2006). Food Security, Technology, and the Global Commons 'New' Political Dilemmas? Focaal. 2006(48): v-vii.

OECD-FAO (2012). Agricultural Outlook 2012-2021. OECD, Paris & FAO, Rome.

Ostrom, E. (1990) Governing the Commons: The Evolution of Institutions for Collective Action. Cambridge University Press, New York.

Ostrom, E. (2005). Understanding institutional diversity. Princeton University Press.

Ostrom, E. (2009). A polycentric approach to climate change. Policy Research working paper WPS 5095. World Bank, Washington, DC.

Ostrom, E. (2012). Green from the grassroots. Project Syndicate Commentry. http://www.project-syndicate.org/commentary/green-from-the-grassroots#czmrLHGBglhhU2P0.99

Ostrom, V. & Ostrom, E. (1977). Public goods and public choices. In E.S. Savas, ed. Alternatives for delivering public services: toward improved performance. Boulder, Colorado, USA, Westview Press.

OXFAM (2012). Our land, Our lives. Time out on the global land rush. Oxfam Briefing Note, October. http://www.oxfam.org/sites/www.oxfam.org/files/bn-land-lives-freeze-041012-en_1.pdf

Pinstrup-Andersen, P. (2007). Eliminating Poverty and Hunger in Developing Countries: A Moral Imperative or Enlightened Self Interest? In Pinstrup-Andersen, P & P. Sandøe, Peter (eds.). Ethics, Hunger and Globalization – in Search of Appropriate Policies. Pp. 15-27

Polaris Institute (2003). Global Water Grab: How Corporations are Planning to Take Control of Local Water Services. Ottawa.

Popkin, B.M. (2003). The nutrition transition in the developing world. Development Policy Review 21 (5-6): 581-597.

Prescott-Allen, R. & Prescott-Allen, C. (1990), How Many Plants Feed the World? Conservation Biology, 4: 365–374. doi: 10.1111/j.1523-1739.1990.tb00310.x

Publico (2013). Agua, del derecho al negocio. 03 March 2013. http://www.publico.es/451517/agua-del-derecho-al-negocio

Quilligan, J. (2012). Why Distinguish Common Goods from Public Goods? In Bollier, D. & S. Helfrich, eds. (2012). The Wealth of the Commons. A world beyond market & state. Levellers Press. Amherst, MA. Abridged version available at http://p2pfoundation.net/Public_Goods_vs_Common_Goods

Raustiala, K. & C. Sprigman (2012). The Knockoff Economy: How Imitation Sparks Innovation. Oxford University Press.

Rocha, C. (2007). Food Insecurity as Market Failure: A Contribution from Economics. Journal of Hunger and Environmental Nutrition. 1(4): 5-22.

Rockström, J. et al (2009). A safe operating space for humanity. Nature 461, 472-475 (24 September 2009) | doi:10.1038/461472a; Published online 23 September 2009

Rosset, P.M. (2006). Food is Different: Why the WTO Should Get out of Agriculture (Global Issues). Zed Books, London, UK.

Samuelson, P.A. (1954). The Pure Theory of Public Expenditure. The Review of Economics and Statistics, Vol. 36, No. 4, pp. 387-389.

Sands, P. (2003). Principles of International Environment Law, Cambridge University Press, Second Edition

Scholte, J.A. (2005). The Sources of Neoliberal Globalization. UNRISD Overarching Concerns Programme Paper 8, Geneve. http://www.unrisd.org/80256B3C005BCCF9/%28httpAuxPages%29/9E1C54CEEB19A314C12570B4004D0881/$file/scholte.pdf

Serra, J. et al. (2012). Measuring the Evolution of Contemporary Western Popular Music. Scientific Reports 2, 521. doi:10.1038/srep00521

Shah, A. (2009). Media Conglomerates, Mergers, Concentration of Ownership. Global Issues, 02 January 2009. http://www.globalissues.org/article/159/media-conglomerates-mergers-concentration-of-ownership

Sidel, V.W. (1997). The public health impact of hunger. Am J Public Health. 1997 December; 87(12): 1921–1922.

Stallman, R. (2012). The free software definition. http://www.gnu.org/philosophy/free-sw.en.html

Stavenhagen, R. (2003). Needs, Rights and Social Development. Overarching Concerns Programme Paper Number 3. UNRISD, Geneva.

Stevens G. et al. (2012a). Trends in mild, moderate and severe stunting and underweight, and progress towards MDG 1 in 141 developing countries: a systematic analysis of population representative data. The Lancet 380 (9844), 824-834.

Stevens, G., G. Singh, G. Danaei et al. (2012b). National, regional and global trends in adult overweight and obesity prevalences. Population Health Metrics 10 (22): 1-16.

Stuart, T. (2009). Waste: uncovering the global food scandal. Penguin Books, London.

Sumner, J. H. Mairb & E. Nelson (2010). Putting the culture back into agriculture: civic engagement, community and the celebration of local food. International Journal of Agricultural Sustainability, Vol. 8, Issue 1-2: 54-61.

Swedish Board of Agriculture (2013). Sustainable meat consumption: What is it? How do we get there? Stockholm.
http://www.jordbruksverket.se/download/18.5df17f1c13c13e5bc4f800039403/En+h%C3%A5llbar+k%C3%B6ttkonsumtion.pdf

The Economist (2009). Universal health insurance is a common good. 8 October 2009.
http://www.economist.com/blogs/democracyinamerica/2009/10/universal_health_insurance_is

The Food Commons (2011). The Food Commons 2.0. Imagine, design, build. October 2011.
http://www.thefoodcommons.org/images/FoodCommons_2-0.pdf

The Jamaica Observer (2011). The right to breathe fresh air. 02 March 20111. http://www.jamaicaobserver.com/columns/The-right-to-breathe-fresh-air_8453339#ixzz264bVFCJU

TNI (2013). Land concentration, land grabbing and people's struggles in Europe. Transnational Institute (TNI), the European Coordination of Via Campesina and Hands off the Land network. Amsterdam. http://www.tni.org/sites/www.tni.org/files/download/land_in_europe_1.pdf

UK Government (2011). The future of food and farming: challenges and choices for global sustainability. Final project report. Foresight, Department for Business Innovation and Skills. The Government Office for Science, London.

UNEP (2009). The environmental food crisis. The environment's role in averting future food crises. United Nations Environmental Programme, Nairobi.

UNICEF (2011). Levels and trends in child mortality. UN Inter-agency Group for Child Mortality Estimation, New York.

UNICEF, WHO & The World Bank (2011) Joint child malnutrition estimates. http://www.who.int/nutgrowthdb/estimates/en/index.html

United Nations (1948). Universal Declaration of Human Rights. General Assembly Resolution 217 A (III). UN Doc. A/810, at 71 (1948))

United Nations (1966). International Covenant on Economic, Social and Cultural Rights, adopted on 16 December 1966, General Assembly Resolution 2200(XXII), UN. GAOR, 21st sess., Supp. No. 16, U.S. Doc. A/6316 (1966), 993 UNTS 3.

United Nations (2005). Halving Hunger: It can be done. Report of the Task Force on Hunger of the UN Millennium Project. http://www.unmillenniumproject.org/documents/HTF-SumVers_FINAL.pdf

United Nations (2010). Sixty-fourth General Assembly Plenary resolution. GA/10967
http://www.un.org/News/Press/docs/2010/ga10967.doc.htm

United Nations (2012). Sustainable agricultural productivity growth and bridging the gap for small-family farms. Interagency Report to the Mexican G20 Presidency. http://un-foodsecurity.org/sites/default/files/G20%20agricultural%20productivity%20report_Publication.pdf

Unnevehr, L.J. (2006). Food Safety as a Global Public Good: Is There Underinvestment? Plenary paper prepared for presentation at the International Association of Agricultural Economists Conference, Gold Coast, Australia, August 12-18, 2006.
http://ageconsearch.umn.edu/bitstream/25733/1/pl06un01.pdf

USDA (2009). Global Food Markets: Global Food Industry Structure. US Department of Agriculture Economic Research Service. http://webarchives.cdlib.org/sw1bc3ts3z/http://ers.usda.gov/Briefing/GlobalFoodMarkets/Industry.htm

Van Parijs, P. (2005). Basic income. A simple and powerful idea for the twenty-first century.
http://www.uclouvain.be/cps/ucl/doc/etes/documents/Chap1.Simple_and_Powerful.pdf

Ver Eecke, W. (1999). Public Goods: An Ideal Concept. Journal of Socio-Economics 28: 139-156.

Vivero, J.L. (2012). A binding Food Treaty: a post-MDG proposal worth exploring. Memo 173, Fundacion Alternativas, Madrid. http://www.falternativas.org/opex/documentos/memorandos/a-binding-food-treaty-a-post-mdg-proposal-worth-exploring

Von der Hoeven, R. (2012). MDGs post 2015: Beacons in turbulent times or false lights? Background paper was prepared for the UN System Task Team on the Post-2015 UN Development Agenda.
http://www.un.org/en/development/desa/policy/untaskteam_undf/rolph_van_der_hoeven.pdf

Walljasper, J. (2011). Celebrating all we share three times a day. On the Commons Magazine. http://www.onthecommons.org/magazine/celebrating-all-we-share-three-times-day

Weis, T. (2007). The global food economy. The battle for the future of farming. Zed books, London.

WHO (2002). Global public goods for health: the report of Working Group 2 of the Commission on Macroeconomics and Health. Geneva.

WHO (2012). Obesity and overweight factsheet # 311. World Health Organisation. http://www.who.int/mediacentre/factsheets/fs311/en/

Wise, T.A. & S. Murphy (2012). Resolving the Food Crisis: Assessing Global Policy Reforms Since 2007. Global Development and Environment Institute and the Institute for Agriculture and Trade Policy. Medford, Mass. http://www.ase.tufts.edu/gdae/Pubs/rp/ResolvingFoodCrisis.pdf?utm_source=SRFood+Newsletter&utm_campaign=e512da1b14-2012-0206_Taking_back_globalization_in_Davos&utm_medium=email

Wolf, M. (2012). The world's hunger for public goods. Financial Times, 24 January 2012. http://www.ft.com/cms/s/0/517e31c8-45bd-11e1-93f1-00144feabdc0.html#axzz2OlUV0Tof

World Bank (2006). Repositioning nutrition as central to development. A strategy for large-scale action. Washington, DC.

World Bank (2008). World development report 2008: Agriculture for development. Washington, DC.

World Bank (2012). Global Monitoring Report 2012: Food Prices, Nutrition and the MDGs. Washington D.C.

WEF (2013). Achieving the New Vision for Agriculture. New models for action. The World Economic Forum, Davos, Switzerland.

Wright, E.O. (2010). Envisioning Real Utopias. Verso, London.

Young, O. R. (2003). Taking Stock: Management Pitfalls in Fisheries Science. Environment 45 (3).

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Extending market allocation to ecosystem services: Moral and practical implications on a full and unequal planet

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ABSTRACT

Both economists and conservationists are calling for expanded use of market-based instruments (MBIs) to address worsening environmental problems, but the lack of MBIs at the scale required to solve major global problems makes it difficult to empirically evaluate their effectiveness. This article indirectly evaluates MBIs for essential ecosystem services by examining market allocation of another essential resource that is allocated by markets and which has experienced dramatic price increases: food. In an unequal world, markets respond to price increases by reducing food allocations to the destitute and malnourished, but not for the affluent. MBIs would increase the prices of ecosystem services and the commodities whose production degrades them, forcing the impoverished to reduce consumption by more than the wealthy. Furthermore, most MBIs would be prone to speculation and price instability, be incompatible with the satisfaction of individual preferences, or would not maximize economic surplus. Most environmental problems can be characterized as prisoner's dilemmas, which are best solved through cooperation, not competition. Society must create economic institutions that promote cooperation and ensure that the burdens of reducing throughput are not borne disproportionately by the poor.

1. Introduction

A growing number of studies suggest that the continually expanding human economy threatens potentially catastrophic destabilization of planetary life support functions, with specific threats ranging from climate chaos to the irreversible domination of oceanic ecosystems by jellyfish (Gershwin, 2013; IPCC, 2013; Millennium Ecosystem Assessment, 2005; Rockstrom et al., 2009). If the field of economics is to remain relevant to human society it must acknowledge and address these emerging challenges.

Conventional microeconomics[1] (also known as price theory) has long defined environmental problems as externalities, with the implication that solving these problems requires the internalization of these externalities into the market system via monetary penalties for activities that harm the ecosystem and monetary rewards for activities that benefit it (Baumol and Oates, 1989; Pearce and Turner, 1990; Pigou, 1932). For the purposes of this article, we define a market as an institution in which private sector parties offer goods and services to other private sector parties in voluntary exchange for money. Prices adjust to and balance supply and demand. Market-based instruments (MBIs) are incomplete markets in which the government or some other institution determines supply, demand or price, while the other two are determined through voluntary exchange. With environmental taxes, the government determines a major component of the price, and supply and demand adjust; with cap and trade or cap and auction systems, governments typically determine the supply, and demand and price adjust. In most examples of payments for ecosystem services, governments or other forms of collective action determine the demand and/or the price, and allow supply to adjust.[2] These mechanisms allow individual agents to balance the costs and benefits of a given activity at many different margins (e.g. shifting consumption to substitutes, improving efficiency, and developing new technologies), which in theory can minimize the cost of achieving particular environmental goals.

In recent years both conservationists and economists have been calling for even greater use of MBIs to achieve environmental goals

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[1] By 'conventional microeconomics', this article refers to neoclassical economic theory as taught in the vast majority of economics programs in the US, Europe, and many other nations. Its core features include the assumptions (i) that economic behavior is driven by individual preferences with the goal of maximizing preference satisfaction, and (ii) that analysis should start from the axiomatic imposition of equilibrium (Arnsperger and Varoufakis, 2006).

[2] In some cases, such as Costa Rica's payment for environmental service program, landowners are essentially compensated for complying with existing law, so there is an element of government-determined supply as well (Daniels et al., 2010).

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(McCauley, 2006; Spash, 2008). One result has been a dramatic surge in payment for ecosystem service schemes (See for example three special issues in Ecological Economics on PES: Engel et al., 2008; Farley and Costanza, 2010; Muradian et al., 2010). Leading academic proponents of these schemes explicitly seek to model them after conventional markets, and argue that private sector initiatives show the greatest success (Engel et al., 2008; Wunder et al., 2008).

However, market-like approaches have also drawn serious criticism. One standard criticism is that many ecosystem services are both non-excludable and non-rival: markets do not function for non-excludable resources, and are inefficient for non-rival ones (Farley and Costanza, 2010; Randall, 1993; Samuelson, 1954). Another major criticism is that MBIs are grossly unfair: the planet's richest inhabitants have done the most harm to the global environment, but MBIs might force the poorest people to reduce their consumption the most. A partial list of other criticisms include the high level of irreducible uncertainty involving natural systems (Faber et al., 1998; Limburg et al., 2002; Vatn, 2005), the argument that nature's values are incommensurable with market values (Martinez-Alier et al., 1998), and the lack of confirmation that MBIs actually work (Pattanayak et al., 2010).

A careful evaluation of the empirical evidence regarding MBIs for ecosystem services would help inform efforts to expand their use. Such an evaluation should include not only conventional economic criteria such as impacts on cost-effectiveness, efficiency and utility, but also fairness: will those who caused the problem pay the costs? The evaluation should also carefully define the criteria so that decision makers can better assess their suitability. However, using MBIs to address major problems like climate change, excessive nitrogen emissions or biodiversity loss will require changes to market signals beyond the scale of past or current experience, which makes empirical evaluation very difficult, especially if responses to price or quantity restrictions are non-linear.

The objective of this paper is to evaluate the potential desirability and effectiveness of MBIs in allocating the most important ecosystem services, defined as those for which there is a high likelihood that beyond some threshold, the marginal loss of the service or of the ecosystem that generates it would have unacceptable impacts on human welfare. Such ecosystem services are essential and non-substitutable, and if an economic instrument is going to allocate any resources correctly, it should be those that are essential. Given the lack of empirical data on MBIs that that have major impacts on essential ecosystem services, we will use as a proxy an essential market resource that has undergone dramatic price increases, and for which there is abundant data on the outcomes: staple foods. We will evaluate these outcomes in terms of market efficiency, utility maximization, and justice, but also assess the desirability of market efficiency as a criterion for allocating essential resources in the presence of extreme income inequality. This approach ignores whether or not it is possible to apply MBIs to ecosystems to focus instead on whether it is desirable. We will therefore also assess the extent to which the physical characteristics of essential ecosystem services affect the ability of MBIs to achieve efficient outcomes, then suggest alternatives to market instruments allocating ecosystem services and other essential resources.

Section two of this paper discusses the economics of essential, non-substitutable resources and describes how they are allocated by markets in an unequal world. Section three explains how the resulting allocations are defined by conventional economists as efficient or optimal, and discusses the desirability of this criterion for essential resources. Section four examines how markets might allocate ecosystem services if market allocation were possible. Analysis in the first sections focuses on the economics of essential resources. Section five in contrast explains how the physical characteristics of ecosystem services pose serious challenges to their market allocation, with the result that MBIs in ecosystem services will not even satisfy the criteria for efficient outcomes discussed in section three. Most environmental problems have the characteristics of prisoner's dilemmas, and solving them requires institutions that promote cooperative and other-interested behaviors (Henrich et al., 2001; Nowak and Highfield, 2011; Sober and Wilson, 1998; Wilson, 2007), not competition and self interest. Section six suggests that rather than trying to force environmental problems into market institutions, we must instead develop economic institutions tailored to the physical characteristics of the environmental problems, the goals society wishes to achieve, and our best understanding of human behavior. Section seven offers some brief conclusions.

2. The Economics of Essential, Non-Substitutable Resources

A resource is essential if humans require it to survive, such as food, water, energy, and life sustaining ecosystem services. Ecosystem services have been defined in numerous ways (Fisher et al., 2008), but we use a definition derived from Georgescu-Roegen's (1971) seminal work, in which he distinguishes between stock-flow and fund-service resources. Stock-flow resources, such as timber, seafood, oil, and water for irrigation, are materially transformed and used up in the act of production. A tree for example is transformed into a house, and oil into work, dissipated heat, greenhouse gasses and particulate matter. We can decide how fast to harvest stock flow resources, and we can stockpile them if we choose to do so. We define stock-flow resources provided by nature as *ecosystem goods*.

A fund-service or fund-flux resource, in contrast, results from a particular configuration of stock-flow resources that interact to generate a flux of services over time. Both labor and built capital are fund-service resources. In the case of natural systems, a particular configuration of plants, animals, water, minerals, atmospheric gasses and so on creates an ecosystem fund that generates a flux of *ecosystem services*. Funds are not materially transformed into the services they generate, but rather are worn out over time. Human made funds can be maintained with a constant flow of stock-flow inputs, while ecosystems continually renew themselves by capturing solar energy. A fund generates services at a rate over time that is determined by the size and health of the fund, and services cannot be stockpiled for later use. For example, a forest is not physically transformed into something else when it regulates water flows, it can regulate a certain maximum flow per hour, and the regulation capacity cannot be stockpiled. By this definition, provisioning services are the reproductive capacity of ecosystems, not the stock of raw materials they contain (Daly and Farley, 2010; Farley and Costanza, 2010; Malghan, 2006).

All economic activity involves the use of energy to transform raw materials into economic products. Many of those raw materials alternatively serve as the structural building blocks of ecosystems funds, and their removal or reconfiguration coupled with waste emissions affects the fund's ability to generate services, including its ability to reproduce. Economic production inevitably affects ecosystem function, and so-called externalities are completely internal to the economic process. This is basic ecological economics.

For a resource to be truly essential, it must be extremely difficult or impossible to obtain a substitute. Many economists argue that ecosystem goods and services are neither essential nor non-substitutable. Several classic publications on essential resources assume that resource scarcity is reflected in rising prices, creating incentives to use the resources more efficiently or develop substitutes (Barnett and Morse, 1963; Dasgupta and Heal, 1974; Solow, 1974)—in which case the resources are not truly essential.[3] A recent review on the economics of scarcity and growth acknowledges that markets often do not exist for the ecosystem services and thus may fail to signal scarcity, but nonetheless the "majority opinion is that even in relatively short periods—years, even months—substitution possibilities obviate resource scarcity" (Simpson et al., 2005, p. 6). At the extreme, some economists have

[3] It is worth noting that both Dasgupta and Heal explicitly acknowledge that human life depends on ecosystem services, and these services are seriously threatened (Dasgupta, 2008; Heal, 2014).

even argued that climate change will have negligible economic impacts because it primarily affects agriculture, which accounts for a small percentage of GDP (e.g. Beckerman, 1995; Schelling, 2007): presumably, from this perspective even food has substitutes.

We assume that it is likely impossible to develop substitutes for complex, interdependent services, especially at a large scale. Even with major energy subsidies, Biosphere 2 proved unable to reproduce vital ecosystem services at a cost of $9,000,000 per person per year (Avise, 1994). It would be foolhardy to bet the future of human civilization on the development of future technologies that might provide substitutes.

For practical purposes, substitutability cannot be divorced from affordability. It is often possible to develop substitutes for certain specific life sustaining ecosystem services, such as dikes and chlorine to replace the storm surge protection and water filtration provided by wetlands. However, the world's poorest are frequently the most dependent on ecosystem services for their survival (Dasgupta, 2005), and if they cannot afford substitutes, then the services are essential to them.

Essential resources—whether essential for an individual, human society as a whole, other species or entire ecosystems—have distinct economic characteristics. By definition, a shortage of an essential resource has catastrophic consequences, and as we approach the catastrophe threshold, the marginal value of the resource as measured by its contribution to well-being must become immeasurably large—at least to the people or species for whom they are essential (Farley, 2008; Limburg et al., 2002).

A catastrophic threshold can be physiological or ecological. A catastrophic physiological threshold is a limit beyond which humans cannot survive, for example as the result of inadequate food or clean water. Physiological thresholds are relatively predictable. An ecological threshold is "the point at which there is an abrupt change in a quality (for example, wood production, the maintenance of a particular species), property or phenomenon or where small changes in a driver (for example, pollutant input, landscape fragmentation) may produce large responses in the ecosystem." (Groffman et al., 2006, p. 1) From an anthropocentric perspective, such a threshold is catastrophic when it results in the loss of human life sustaining ecosystem services. For example, excessive deforestation may prevent the Amazon forest from recycling adequate rainfall to sustain its regeneration, potentially resulting in drought, fire, and decreased forest cover in a positive feedback loop that could eventually flip the forest into an alternate state. The release of stored carbon would make it exceptionally difficult to stay below the two degree centigrade change in global climate that is widely cited as a catastrophic threshold (Coe et al., 2013; Lima et al., 2013; Nepstad et al., 2008; Nobre and Borma, 2009). Ecological thresholds are very difficult to predict ahead of time, and may not even be evident for some time afterwards due to time lags in response to drivers (Groffman et al., 2006).

In the vicinity of thresholds, marginal analysis fails as marginal changes in quantity can have non-marginal outcomes, such as a small reduction in daily caloric intake resulting in death, or a small increase in timber harvest resulting in ecosystem collapse. The marginal value (or price, for a market good) of an essential resource will increase dramatically as we approach this threshold (Farley, 2008). In terms of the diamond–water paradox, water becomes more valuable than diamonds, but if we are ignorant of where the threshold lies, which is often the case for ecosystem services, we will be unaware of the rising value.

When essential resources are traded in markets, total expenditure increases as quantity declines, which is the definition of price inelastic demand. Inelastic demand explains why the price of staple grains doubled or tripled during the 2007–2008 food crisis in response to small declines in supply (FAO et al., 2011).[4] The physiological threshold for staple foods is the minimum required to sustain life, and as an individual nears that point, his or her willingness to pay for food skyrockets together with the food's marginal contribution to survival.

Ecosystem services are rarely priced, most people are unaware of their importance, there may be significant time lags between an ecosystem stressor and the resulting impact, and there is high uncertainty concerning the exact location of ecological thresholds (Muradian, 2001), all of which make it extremely difficult to estimate a demand curve. Ecosystem services such as pollination, climate regulation, and nutrient cycling are essential to agricultural systems (Zhang et al., 2007), and therefore are as essential as agriculture. If it were possible to integrate essential ecosystem services into the market, presumably their demand curves would be quite similar to the demand curve for food, an obvious market good for which there are abundant empirical data on price and consumption.

Estimating an individual's demand curve for staple foods requires a wider range of prices and quantities than most individuals experience in their lives. As a physiological need, we assume that the demand for staple foods is reasonably similar across individuals, and points on an individual's demand curve can therefore correspond to different individuals facing different prices for food. Global data supplies the broadest range of prices and consumption levels. A basic principle in microeconomics is that the cost of something is what you give up to get it (e.g. Mankiw, 2009), or opportunity cost. Therefore the real price an individual pays for food is what she has to give up in order to purchase another unit (e.g. calorie) of food. The best measure of opportunity cost is the share of income dedicated to food consumption: a person spending 70% of her income on food must sacrifice the consumption of other very important commodities for the marginal unit of food, while someone spending only 1% of income gives up very little at the margin. In other words, the opportunity cost of food is a better measure of its marginal value to an individual than its market price.

The average percentage of household income spent on food consumed at home varies from about 6.7% in the US (USDA Economic Research Service, 2012) to over 70% in some of the world's poorest countries (Anker, 2011; Seale et al., 2003). However, these estimates include costs of processing, packaging and retail markups. In the poorest countries, households consume largely unprocessed foods. In wealthier countries, unprocessed food represents only a small share of food expenditures. In the US for example, only 11.6% of total food expenditures go to farmers and agribusiness (Canning, 2011), which suggests that the proportion of income spent on unprocessed foods is less than 1%. We hazard a rougher guess that unprocessed food might account for 50% of income in poor countries.

Unfortunately, only a handful of African countries show up on available data-bases reporting the share of income spent on food. Since these are some of the poorest countries on the planet with the lowest per capita levels of consumption, they should not be left out when calculating a demand curve. Engel's law however states that as income falls, the proportion of income spent on food increases, even as overall food expenditures decrease; though first formulated in 1857, numerous subsequent studies have verified the results (Anker, 2011). We do not claim any fixed relationship between Engel's curves and demand curves in general, only that for the special case of food, the inverse of per capita incomes adjusted for purchasing power parity (PPP) is a suitable proxy for the opportunity cost and hence marginal value of food.

Fig. 1 therefore uses the inverse of per capita incomes (PPP) as a proxy for price on the Y-axis and calories consumed per capita as a measure of quantity on the x-axis to derive an individual's demand curve for food. Calories of course are a poor proxy for food consumption, especially in a world where people are increasingly obese and malnourished at the same time, and the fact that markets allocate so many resources toward the production of unhealthy calories is itself problematic. We nonetheless found an R-squared of 0.60 when using Excel to fit a power function curve to the data. Though a very crude estimate, the demand curve clearly fits our expectations that demand becomes

[4] The reduction in grain supply for food markets likely resulted from a combination of drought, increased ethanol production, and speculation (Lagi et al., 2012).

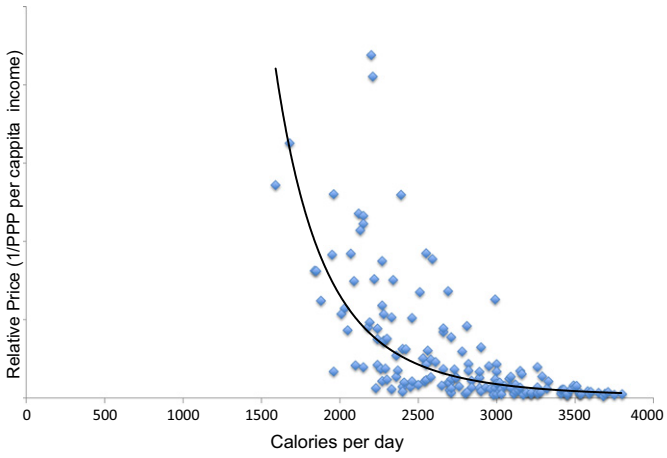

Fig. 1. Individual demand curve for food estimated from per capita income measured in purchasing power parity (World Bank, 2013) and per capita calorie consumption per day (FAO, 2012).

increasingly price inelastic as we reach a physiological threshold of around 1500 cal per day.[5]

A market demand curve is simply the sum of individual demand curves. This individual demand curve seems to suggest that an increase in the price of food would efficiently allocate food away from those who are consuming more than enough calories toward those who are struggling to meet basic needs, as the latter would be willing to pay a much higher price. Market demand curves however are not based on opportunity costs (which differ widely according to income levels), but rather on market price (which in nominal terms are the same for everyone), so the empirical evidence tells a dramatically different story. Americans consume an estimated 3750 cal per day (FAO, 2012). The US exhibits the highest recorded levels of obesity in human history (OECD, 2012), and wastes nearly 40% of its food supply, mostly at the consumer level (Gunders, 2012). The marginal calorie is clearly non-essential. Nonetheless, the price elasticity of demand for food in the United States is estimated at 0.084, which means that a 1% increase in the retail price of food leads to a .084% decrease in consumption (Seale et al., 2003). In contrast, per capita calorie consumption in Zambia is just half that in the US, well below the recommended daily allowance, and malnutrition is responsible for an estimated 80% of the deaths of Zambian children (Panafrican News Agency, 2001). Though the marginal calorie in Zambia is physiologically essential, the price elasticity of demand for food is estimated at 0.628, a fairly typical number for the poorest countries (Seale et al., 2003).

The reason for this seeming anomaly is that the share of income dedicated to a resource heavily influences elasticity of demand. When expenditures on a resource account for only a small share of income, then demand can be inelastic even when a resource is not essential at the margin. Demand for food at the non-essential margin may be particularly inelastic because humans undoubtedly evolved to consume excessive calories in times of abundance to increase resilience against once-common famines. Zambians spend over 60% of their income on primarily unprocessed food (Seale et al., 2003). A paradox occurs as food expenditures approach 100% of income: though the marginal unit of food is likely more essential than ever, demand must approach unitary elasticity, since total expenditures cannot possibly increase with another increase in price. If raw food prices doubled, as happened for rice and corn in the 2007–2008 food crisis, store prices of food in the US would increase by about 18%, in response to which Americans would consume about 1.5% less food. In Zambia, the same doubling of raw food prices would nearly double the price of a food basket, necessarily resulting in a dramatic decline in food consumption. The World Bank estimates that the 2010–2011 surge in food prices drove an additional 44 million people into poverty (Ivanic et al., 2011).

3. Efficiency and Utility from a Market Perspective

Advocates of market allocation typically claim that markets efficiently allocate scarce resources in a fashion that maximizes well-being or utility, and explicitly refer to the resulting allocation as optimal. But markets allocate more food toward the wealthy and overfed rather than toward the destitute and malnourished. Historical famines in fact have not been the result of insufficient food to feed a given population, but rather of economic institutions that fail to allocate food to those who need it most (Sen, 1981), and can result from markets functioning exactly as they are meant to in societies characterized by extreme inequality in purchasing power. As Sen has pointed out elsewhere, "an economy can be Pareto optimal and still be perfectly disgusting" (Sen, 1970, p. 22). To understand why, we must carefully examine the meanings of efficiency, optimality and utility as used by conventional economists.

Efficiency in general is nothing more than a ratio between benefits and costs or outputs and inputs. Modern agriculture is the most efficient in history if we measure agricultural output per unit of land or unit of labor, but far less efficient than traditional agriculture if we measure food calories produced per calorie of energy inputs (Heller and Keoleian, 2000; Pimentel and Pimentel, 1996). In short, whether or not an activity is efficient depends entirely on how we measure benefits and costs. The goal of modern neoclassical welfare economics is Pareto efficiency, defined as an allocation of resources in which it is impossible to make at least one person better off without making anyone else worse off. The first fundamental theorem of welfare economics states that under certain rigid conditions (including perfect information and no externalities), competitive market equilibriums are Pareto efficient. However, this tells us nothing about what defines 'better off'.

Neoclassical economics emerged from the moral philosophy of classical utilitarianism, which defined utility as pleasure and the absence of pain, and sought to attain the greatest utility for the greatest number. In theory, voluntary production and exchange in competitive markets allows individuals to continue any economic activity until the diminishing marginal benefits are equal to the rising marginal costs, however the individual might define those costs and benefits. Rational individuals will allocate their time, resources, and income in such a way that marginal benefits equal marginal costs across all activities, which is the efficiency condition that maximizes individual utility.

However, the economic principle of diminishing marginal utility suggests that redistributing wealth and income from the rich to the poor can increase total utility, and maximizing individual utility for each individual is therefore not the same as maximizing utility for society as a whole. Furthermore, there are an infinite number of Pareto efficient allocations corresponding to different initial distributions of wealth and income. The second fundamental theorem of welfare economics states that any one of these different Pareto efficient outcomes can be achieved in a competitive market through a lump sum redistribution of resources. How then does one decide which of these possible efficient allocations is actually optimal from the perspective of society? Modern welfare economics assumes that it is impossible to objectively compare utility between individuals, so the only objective criterion for maximizing utility is Pareto efficiency.

Drifting from its classical utilitarian roots, modern neoclassical economics is now based on *choice* or *preference* utilitarianism (O'Neill, 1998) in which "the term utility maximization and choice

[5] The FAO estimates that the lowest acceptable body weight for a 1.59 m woman is 47 kg, and to sustain this weight with light activity, such a woman must consume 1846 cal a day, while a 54 kg, 1.71 m man undertaking heavy activity should consumer over 3000 cal per day (WHO, 1985). However, many of the countries with the lowest levels of per capita food consumption also have a high proportion of very young people in their population, who are smaller and require less food. The FAO (2012) reports that Eritreans consume only 1570 cal per capita per day, but 43% of their population is under 15.

are synonymous" (Gul and Pesendorfer, 2008, p. 6). Preferences are considered stable, and there is no distinction between needs and wants (O'Neill, 1998; Stigler and Becker, 1977). Preferences are objectively revealed by market choices. The more an individual is willing to pay for something, the greater a contribution it must make to her utility. The market value of goods and services therefore serves as a proxy for utility or replaces it all together (Samuelson, 1938), and the goal of economics becomes the maximization of the monetary value of goods and services net of costs (referred to as economic surplus) given existing distributions of purchasing power. In other words, "the refusal of modern economists to make 'interpersonal comparisons of utility' means in effect that they use wealth rather than happiness as the criterion for an efficient allocation of resources" (Posner, 1985, p. 88). Voluntary markets can be shown to maximize economic surplus under certain rigidly specified conditions. Economists continue to defend markets as the economic institutions that make the greatest contribution to human well-being, but well-being is now explicitly defined as the satisfaction of individual preferences rather than as the greatest good for the greatest number (O'Neill, 1998).

What economists frequently ignore is the fact that markets weight preferences by purchasing power, and monetary value is thus maximized when we allocate the marginal unit of food to an affluent, overfed American who will throw it into the garbage instead of to a destitute Zambian mother who will use it to keep her child from dying of malnutrition, as long as the former is willing to pay more for it. While economists claim that as the price of a particular commodity increases, individuals will stop allocating that commodity toward its least important uses, in the real world, society stops allocating that commodity toward those whom the market implicitly determines are the least important individuals—the poor. Poor families around the world plan 'no food days' in response to price increases (Brown, 2012). MBIs in ecosystem services are likely to function in the same manner (Martinez Alier, 2003; Spash, 2008).

The argument that market allocations are efficient or utility maximizing only works if we make no distinction between preferences and tastes. While it may be true that we cannot know if the utility an apple-lover derives from eating an apple exceeds the utility an orange-lover derives from an orange, it is simple common sense that satisfying objective physiological needs generates greater utility than satisfying an overfed person's preference for the tastiest fruit. How we allocate food among individuals, some of whom are starving while others are overfed, is a question of ethics; it concerns an altogether different type of value from preferences for apples over oranges (Malghan, 2006; O'Neill, 1997; Spash, 2008). If we re-define efficiency as the maximization of human well-being from a given level of inputs, then markets characterized by wide disparities in purchasing power are inherently inefficient when allocating essential and non-substitutable resources.

Unfortunately, disparities in purchasing power are only rising. The Gini coefficient, the most widely used measure of income inequality, has increased in recent decades in China, India, the European Union, the USA and in most other OECD nations, often to record levels (OECD, 2011). The global Gini coefficient exceeds that for most nations (UNDP, 2011). As a result, markets increasingly allocate essential resources toward those with the greatest purchasing power, but with the least physiological need.

4. Extending Market Logic to Ecosystem Goods and Services

The definition of ecosystem goods services offered in Section 2 is based entirely on their physical characteristics, and is not meant to suggest they should be integrated into markets. In fact, the non-rival and non-excludable nature of many ecosystem services make them particularly ill-suited for market allocation. This section however ignores the difficulties in creating markets in ecosystem services, and focuses instead on how markets would allocate them if they could be effectively integrated into markets. We focus here on essential ecosystem services with limited possibilities for substitution such as climate regulation, protection from UV radiation, pollination, the capacity of ecosystems to reproduce themselves and water purification.

Substitutes do exist for many essential ecosystem services, particularly at the local level. For example, water purification plants or bottled water can substitute for water purification services, medicines or mosquito nets can substitute for disease regulation services, and stronger houses can substitute for disturbance regulation, while the capacity to flee to another location can substitute for the loss of almost any locally essential ecosystem service. However, the degree to which many locally provided ecosystem services are substitutable depends on purchasing power. A destitute family may depend entirely on water purification by forests to obtain clean drinking water; on micro-climate regulation, water regulation and pollinators to obtain essential calories; on disturbance regulation to protect them from floods and landslides; and on disease regulation to protect them against life threatening illness (Martinez Alier, 2003). The physiological demand curve for essential ecosystem services may look very much like that for food, approaching the vertical as the service declines to levels that threaten survival. However, if a wealthy family can afford purchased substitutes for the benefits generated by locally essential ecosystem services, then the physiological demand curve for local services will be lower for rich people than for poor people, as depicted in Fig. 2.

Weighting the intense preferences of destitute families for ecosystem services by their purchasing power however would yield negligible market demand, while the lower physiological demand by rich people would conversely translate into greater market demand. Markets for non-excludable ecosystem services would not determine to whom those services flow, but rather whether ecosystem structure is converted into economic products or left intact to provide ecosystem services. In this case, rich people's market demand for timber to build second homes could easily overwhelm poor people's demand for intact forests that generate life sustaining ecosystem services.

A different problem may occur if wealthy individuals want to conserve or restore ecosystems at the expense of agricultural land, as their willingness to pay to conserve non-essential capital (e.g. areas with great scenic beauty) may exceed poor people's ability to pay for agricultural production lost to conservation. Market allocation will then favor conservation. There are in fact numerous examples of people being excluded from protected areas, or of their crops being damaged by protected animals (e.g. Heinen, 1996; Rao et al., 2002; Richardson et al., 2012). This might not be a problem for poor individuals if they were compensated for their loss of crops and farmland. However, on the global scale, the wealthy could potentially pay for so much ecosystem conservation at the expense of farmland that it would reduce food supply and hence dramatically drive up the cost of food. Even if specific

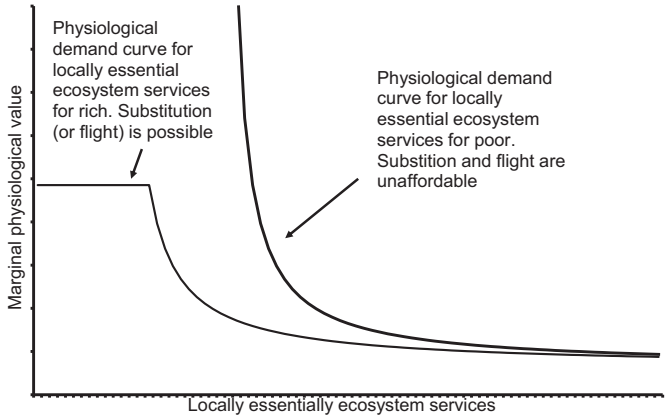

Fig. 2. The physiological demand curve for essential ecosystem services, where substitutes are available at a price that poor families cannot afford (adapted from Farley, 2012).

farmers were compensated for their loss of farmland, higher food prices would force poorer people in countries like Zambia to essentially drop off the market demand curve. This does not mean to imply that society should not be protecting ecosystems or not converting farmlands to conservation, but simply questions the ethics of leaving such allocation decisions up to markets.

5. Further Problems with Market Solutions

Discussion so far has focused primarily on the problems associated with the market allocation of essential resources, of which ecosystem services are but one example. In additional to these problems, the physical and economic characteristics of ecosystem services make it unlikely that MBIs will achieve the equilibrium outcomes, free choice, maximized economic surplus, and Pareto efficient allocations that justify MBI adoption.

A central assumption of neoclassical economic analysis is that the price mechanism drives competitive markets to equilibrium (Arnsperger and Varoufakis, 2006; Vatn, 2005). Rising resource prices however can attract speculative demand, which in turn increases prices in a destabilizing, positive feedback loop leading to bubbles and busts resulting in recessions, misery and hardship (Hudson, 2012; Minsky, 1986). Logically, speculation is more likely to occur under three circumstances: (i) wealth is highly concentrated and a surplus is available for speculative investments; (ii) supply does not increase in response to price signals and (iii) demand does not decrease in response to price signals.

To elaborate, the price mechanism serves as a negative feedback loop leading to equilibrium to the extent that resource scarcity triggers price increases that lead consumers to reduce demand and producers to increase supply or develop substitutes (Simpson et al., 2005). However, when resources are truly essential or they account for only a small share of the consumer budget, demand is highly insensitive to price. For example, wheat consumption in the US actually increased between 2006/2007 and 2007/2008 even though wheat prices nearly tripled (USDA, 2013), which should raise a serious red flag about the potential impacts of internalizing environmental externalities in prices: the poor are likely to reduce consumption, while the rich may scarcely notice. When resource supply is subject to binding biophysical constraints (e.g. food, freshwater, energy and ecosystem services) it will scarcely respond to a price surge, particularly in the short run. For example, from January 2005 to July 2008, the price of oil increased by over 300% while the supply increased by less than 3.4% (British Petroleum, 2012). Oil supply is particularly relevant because cheap energy has fueled our ability to increase market supply and/or develop substitutes for other essential resources, including food and water (e.g. Ayres et al., 2013; Hall and Klitgaard, 2011). In other words, for essential resources on a full planet, neither supply nor demand will be very responsive to price signals.

When both supply and demand are highly price inelastic, any small increase in demand or decrease in supply can trigger a major price increase that attracts speculative demand. Speculators can even initiate the price increase by purchasing then withholding essential commodities from the market in a self-fulfilling prophecy. Land, fossil fuels, and food all exhibit inelastic supply and demand, and saw speculative bubbles burst between 2006 and 2008 (Du et al., 2011; Hudson, 2012; Lagi et al., 2012; Tadesse et al., 2014).

The amount of capital currently available for speculation is unprecedented. According to the BIS, there are currently $5.3 trillion dollars of foreign currency transactions every day, which amounts to 27 times gross world product (Bank for International Settlements, 2013). According to economist Michael Hudson, foreign currencies are held for 30 s on average, and stocks for only 22 s (Hudson, 2011). The speculative economy now dwarfs the real economy, leading to situations in which the price mechanism fuels disequilibrium.

Ecosystem services are in decline (Millennium Ecosystem Assessment, 2005), and increasing the size and health of the ecosystem funds that generate those services is exceptionally challenging in a full world. Furthermore, cap and trade schemes explicitly seek to fix supply. As essential and non-substitutable resources, ecosystem services also have inelastic demand. If we integrate ecosystem services into the market system, they too will become prone to destabilizing speculative bubbles. Financial sector support for MBIs is undoubtedly driven by pursuit of trading profits which actually siphon away resources that could otherwise be invested in solving environmental problems (Spash, 2010).

Another serious problem is that markets only function as theory predicts for rival, excludable resources that generate no externalities (Simpson et al., 2005; Vatn, 2005) but most ecosystem services are non-excludable, non-rival or both. When a resource is non-excludable, markets are essentially impossible, and cooperation is required to protect or provide it. For example, it is impossible to create markets in climate stability in which each consumer independently determines how much to consume. There is no freedom of choice. When a resource is non-rival, using prices to ration access reduces marginal benefits without reducing marginal costs, and is therefore inherently inefficient (Farley and Costanza, 2010; Vatn, 2010). For example, in 2007 Indonesia threatened to sell access to a newly discovered strain of avian flu to the highest bidder (McNeil, 2007) even though restricting scientists' access to the strain would reduce the probability of finding a cure. In its defense, Indonesia was legitimately worried that corporations competing to find a cure (for which the 'recipe' is non-rival) would make it excludable with patents in order to sell if for monopoly profits, reducing economic surplus, making the cure potentially unaffordable to Indonesians, and reducing the likelihood of establishing herd immunity. The economic surplus from non-rival resources is maximized at price of zero, at which price markets will not provide them. Cooperation is again required (Farley and Perkins, 2013).

The problem of allocating resources that are non-rival, non-excludable or both presents a prisoner's dilemma. The optimal outcome occurs when individuals put the interests of the group ahead of individual interests, but regardless of what others do, individuals will always come out ahead by putting their own interests ahead of group interests. Prisoner's dilemmas are solved through cooperation (Axelrod, 1984; Nowak and Highfield, 2011).

In some situations, cooperation can pave the way for MBIs. While inherently non-excludable ecosystem services cannot be directly allocated via markets, they are generated by a particular configuration of biotic and abiotic stock-flow resources and degraded by waste emissions. The allocation problem is to decide how much ecosystem structure should be transformed into economic products and waste, and how much left intact to generate ecosystem services. Both stock-flow resources and waste absorption capacity are rival, and through collective action, it is possible to create or reassign marketable property rights to them. For example, the Kyoto protocol made access to the waste absorption capacity for greenhouse gasses partially excludable so that individual emission permits could be assigned to polluters then traded in markets. Pollution taxes are equivalent to creating property rights to waste absorption capacity for governments then charging for use. Payments for non-excludable ecosystem services require collective action to capture payments from service beneficiaries.

Unfortunately, these market-like instruments fail to achieve the outcomes of free choice, maximization of economic surplus, and Pareto efficiency that justify markets in the first place. With markets for pollution or for the structural building blocks of non-excludable services, as with environmental taxes, individuals can decide how much ecosystem structure to consume or how much to pollute, but cannot satisfy their own subjective preferences for the ecosystem services themselves, whose status is determined by collective decisions (caps) or by independent decisions of others (taxes or voluntary payments). Price rationing of non-rival resources (e.g. genetic information) causes artificial scarcity and reduces economic surplus. Finally, on a full planet,

economic activity unavoidably alters ecosystem structure and emits waste, whether taxed or permitted by environmental allowances, thus degrading ecosystem services, with inevitable negative impacts on others. In short, when externalities are ubiquitous, all allocations become Pareto incomparable, and Pareto efficiency becomes a useless criteria.

6. Economic Institutions for Allocating Essential Ecosystem Services

Institutions for allocating any resources should be determined by the desired goals, the relevant characteristics of the resources, and human nature. The empirical outcomes for the market allocation of food in a highly unequal world challenge Pareto efficiency as a legitimate criterion for evaluating the allocation of essential resources. A reasonable alternative would be to prioritize the satisfaction of basic physiological needs for this and future generations. In the case of ecosystem services, this means avoiding irreversible ecological thresholds.

Concerning resource characteristics, ecosystem goods and services that are rival and scarce must be rationed to avoid unsustainable use. Price rationing is one possible option, but by definition access to non-excludable resources cannot be rationed. Non-rival resources in contrast should be open access, since rationing access reduces benefits without reducing costs, and adequate provision requires collective action. Cooperation is therefore required to manage the innumerable ecosystem services that are either non-excludable or non-rival.

It would be unwise to design economic institutions based on cooperation if humans were solely capable of competitive and selfish behavior, as economists have traditionally assumed. However, growing evidence from behavioral economics (Fehr and Gachter, 2000; Fischbacher et al., 2001; Gintis et al., 2003, 2005; Henrich et al., 2005), evolutionary biology (Sober and Wilson, 1998; Wilson, 2007, 2012), mathematical biology (Nowak and Highfield, 2011), anthropology (Henrich and Henrich, 2007), neuroscience (Gordon et al., 2011; Kosfeld et al., 2005) and other fields confirms that humans regularly exhibit cooperation, pure altruism and other pro-social behaviors.

Growing evidence also suggests that it is possible to design institutions that promote pro-social behavior or selfish behavior. For example, generosity, trust and a history of reciprocal cooperation stimulates further cooperation, as does punishing people who fail to cooperate or punishing people who fail to punish non-cooperators (Fehr and Gachter, 2000; Fischbacher et al., 2001; Henrich and Henrich, 2007). In contrast, considerable evidence suggests that the market mechanism may trigger selfish behavior and undermine cooperative outcomes. For example, simply cueing subjects in an experiment to think of money can lead them to offer less help to others, solicit less help from others, engage in more solitary activities and accept greater inequality (Caruso et al., 2013; Vohs et al., 2006). Simply studying conventional economics appears to stimulate selfish behavior (Bauman and Rose, 2011; Frank et al., 1993; Kirchgässner, 2005). Offering people monetary incentives to act pro-socially can crowd out intrinsic motivations to act pro-socially to the extent that pro-social behavior is reduced (Bowles, 1998; Frey and Jegen, 2001; Gneezy and Rustichini, 2000). Resources that are best allocated through cooperative institutions should be insulated from markets, not integrated into them.

Furthermore, the goal of market-like solutions to environmental problems is to internalize externalities by forcing prices to reflect full costs. However, the more we atomize the decision making unit (e.g. through individual choice), the more boundaries exist over which externalities can occur, and the greater the transaction costs of resolving them (Vatn and Bromley, 1994). In addition, humans may make very different choices as atomistic consumers with a focus on what is good for themselves than they do as citizens with a focus on what is good for society (Holland, 1997; O'Neill, 1998; Sagoff, 1998). An alternative mechanism for internalizing externalities is to make collective, deliberative decisions at the level of the community affected by the decision's economic, social and ecological outcomes.

Though frequently flawed in practice, democratic processes based on the principle of one person, one vote is one type of collective action with a long history of addressing environmental problems. Rather than seeking to improve deliberative democratic processes, for example by striving to account for future generations or other species (O'Neill, 2001), those who advocate market solutions to the currently unsustainable loss of ecosystem services implicitly call for replacing this decision making process with one based on one dollar, one vote. Giving wealthier individuals more say in the allocation of our shared inheritance from nature is an ethical decision concerning the distribution of power.

There is compelling evidence that MBIs would achieve few of the benefits attributed to competitive markets, would allocate resources to those who gain the least physiological benefit from additional consumption, and could undermine the conditions required to develop cooperative solutions. Furthermore, we believe that deliberative, democratic processes that at least in theory give equal voice to all are inherently preferable to weighting preferences by purchasing power when deciding how to allocate our shared inheritance from nature. Rather than replacing democratic decision making with market forces, we should be working to protect the former from the later (Lessig, 2012).

Going even further, it may be time to reconsider market allocation of essential resources. We suggest two (of many!) possibilities worth considering.

First, technologies required to help solve environmental problems should be publicly financed and open source. Price rationing of green technologies reduces adoption rates to the detriment of all. In contrast, both theoretical and empirical evidence suggest that publicly funded, open source R&D is more likely to provide public goods, accelerate technological progress, and generate higher rates of return than proprietary investments (Alston et al., 2000; Farley and Perkins, 2013; Kolata, 2010). Ideally such research should be funded by a global research consortium, but for practical and ethical reasons, the wealthiest nations that have caused the most harm to the global environment should take the lead. If nations that do not contribute 'free-ride' by adopting the resulting green technologies, those who funded them will still be better off, since a healthy environment is a public good (Farley et al., 2010). Furthermore, giving countries free access to such technologies might stimulate future cooperation, initiating a virtuous circle of reciprocation.

Second, non-price rationing of essential resources to ensure that basic needs are met was done successfully by many countries during World War II and has been proposed for carbon emissions (Cohen, 2011). Brazil suffered an electricity crisis between 2001 and 2002 as a result of drought, and rationed consumer access to reflect the drop in supply, keeping prices largely constant and forcing efficiency gains with negligible economic or political disruption (Rosa and Lomardo, 2004). In contrast, the electricity shortage in California at the same time—partially caused by collusion among electricity producers to reduce supply— led to a nine-fold increase in prices, blackouts, and economic and political turmoil (Weare, 2003). Rationing ensures basic needs are met, minimizes price instability and opportunities for speculation, promotes more efficient use of resources, and reduces environmental impacts. Conventional economists might argue that non-price rationing reduces choice, but this implies that the 75 million additional people who became malnourished from 2003–05 to 2007 (FAO, 2007), and the addition 80 million between 2007 and 2008 (FAO, 2008) simply chose to consume less food.

7. Conclusions

The current ecological crisis may be the most serious challenge humanity has faced in thousands of years. We must recognize that ecosystem goods and services are a shared societal inheritance that must be protected for future generations; decisions concerning their allocation and distribution should also be shared in a deliberative democratic process and preferences should not be weighted by purchasing power. Through democratic processes, basic needs of the many would almost

inevitably take precedence over the wants of the wealthy few. Most environmental problems take the form of prisoner's dilemmas, which are best solved through cooperation. We should adapt economic institutions to the nature of the problem. Considerable evidence suggests that MBIs may actually deter cooperation. We should instead focus on creating institutions that build trust, reciprocation and cooperation.

Solving our environmental problems will inevitably demand substantial reductions in throughput and hence consumption. Agriculture and energy use currently pose the greatest threats to the global ecosystems, and solving environmental problems may require particularly significant reductions in agricultural land and energy use (Foley et al., 2011; IPCC, 2013; Rockstrom et al., 2009; Tilman et al., 2011). Using MBIs to reduce total consumption and degradation of ecosystem goods and services would significantly increase the costs of numerous essential goods and services, including food. The likely result would be negligible inconvenience for the wealthy and misery or worse for the poor. Such outcomes are neither morally acceptable nor politically feasible. As Herman Daly has repeatedly argued (Daly, 1992), it would appear that the problems of ecological sustainability and just distribution simply cannot be solved by market forces.

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References

Alston, J.M., Marra, M.C., Pardey, P.G., Wyatt, T.J., 2000. Research returns redux: a meta-analysis of the returns to agricultural R&D. Aust. J. Agric. Resour. Econ. 44, 185–215.
Anker, R., 2011. Engel's Law Around the World 150 Years Later Working Paper Series. University of Massachusetts Political Economy Research Institute (Number 247).
Arnsperger, C., Varoufakis, Y., 2006. What Is Neoclassical Economics? The three axioms responsible for its theoretical oeuvre, practical irrelevance and, thus, discursive power. post-autistic economics review, article 1.
Avise, J.C., 1994. Editorial: The real message from Biosphere 2. Conserv. Biol. 8, 327–329.
Axelrod, R.M., 1984. The evolution of cooperation. Basic Books (New York).
Ayres, R.U., van den Bergh, J.C.J.M., Lindenberger, D., Warr, B., 2013. The underestimated contribution of energy to economic growth. Struct. Chang. Econ. Dyn. 27, 79–88.
Bank for International Settlements, 2013. Triennial Central Bank Survey; Foreign exchange turnover in April 2013: preliminary global resultson-line: http://www.bis.org.
Barnett, H., Morse, C., 1963. Scarcity and Growth: The Economics of Natural Resource Availability. John Hopkins University Press, Baltimore, MD.
Bauman, Y., Rose, E., 2011. Selection or indoctrination: why do economics students donate less than the rest? J. Econ. Behav. Organ. 79, 318–327.
Baumol, W., Oates, W., 1989. The Theory of Environmental Policy. Cambridge University Press, Cambridge, MA.
Beckerman, W., 1995. Small Is Stupid: Blowing the Whistle on the Greens. Duckworth, London.
Bowles, S., 1998. Endogenous preferences: the cultural consequences of markets and other economic institutions. J. Econ. Lit. 36, 75–111.
British Petroleum, 2012. Statistical Review of World Energy, Full Report 2012Online: http://www.bp.com.
Brown, L., 2012. Full Planet, Empty Plate: The New Geopolitics of Food Scarcity. Earth Policy Institute, Washington, DC.
Canning, P., 2011. A Revised and Expanded Food Dollar Series: A Better Understanding of Our Food Costs. USDA, Washington, DC.
Caruso, E.M., Vohs, K.D., Baxter, B., Waytz, A., 2013. Mere exposure to money increases endorsement of free-market systems and social inequality. J. Exp. Psychol. Gen. 142, 301–306.
Coe, M.T., Marthews, T.R., Costa, M.H., Galbraith, D.R., Greenglass, N.L., Imbuzeiro, H.M.A., Levine, N.M., Malhi, Y., Moorcroft, P.R., Muza, M.N., Powell, T.L., Saleska, S.R., Solorzano, L.A., Wang, J., 2013. Deforestation and climate feedbacks threaten the ecological integrity of south–southeastern Amazonia. Philos. Trans. R. Soc. Lond. B Biol. Sci. 368.
Cohen, M.J., 2011. Is the UK preparing for "war"? Military metaphors, personal carbon allowances, and consumption rationing in historical perspective. Clim. Chang. 104, 199–222.
Daly, H.E., 1992. Allocation, distribution, and scale: towards an economics that is efficient, just, and sustainable. Ecol. Econ. 6, 185–193.
Daly, H.E., Farley, J., 2010. Ecological Economics: Principles and Applications, 2nd ed. Washington, DC, Island Press.
Daniels, A.E., Bagstad, K., Esposito, V., Moulaert, A., Rodriguez, C.M., 2010. Understanding the impacts of Costa Rica's PES: are we asking the right questions? Ecol. Econ. 69, 2116–2126.
Dasgupta, P., 2005. Sustainable Economic Development in the World of Today's Poor. In: Simpson, R.D.P., Toman, M.A.P., Ayres, R.U.P. (Eds.), Scarcity and Growth Revisited: Natural Resources and the Environment in the New Millenium. Resources for the Future, Washington, DC.
Dasgupta, P., 2008. Nature in Economics. Environ. Resour. Econ. 39, 1–7.
Dasgupta, P., Heal, G., 1974. The optimal depletion of exhaustible resources. Rev. Econ. Stud. 41, 3–28.
Du, X., Yu, C.L., Hayes, D.J., 2011. Speculation and volatility spillover in the crude oil and agricultural commodity markets: a Bayesian analysis. Energy Econ. 33, 497–503.
Engel, S., Pagiola, S., Wunder, S., 2008. Designing payments for environmental services in theory and practice: an overview of the issues. Ecol. Econ. 65, 663–674.
Faber, M.M., Proops, J.L., Manstetten, R., 1998. Evolution, Time, Production and the Environment. Springer-Verlag, New York.
FAO, 2007. The State of Food Insecurity in the World 2007. FAO, Rome.
FAO, 2008. The State of Food Insecurity in the World 2008. FAO, Rome.
FAO, 2012. Food security statistics. Food and Agriculture Organization.
FAO, IFAD, IMF, OECD, UNCTAD, WFP, The World Bank, The WTO, IFPRI, UN HLTF, 2011. Price Volatility in Food and Agricultural Markets: Policy Responseson-line: http://www.worldbank.org/foodcrisis/pdf/Interagency_Report_to_the_G20_on_Food_Price_Volatility.pdf.
Farley, J., 2012. Ecosystem services: the economics debate. Ecosystem Services 1 (1), 40–49.
Farley, J., 2008. The role of prices in conserving critical natural capital. Conserv. Biol. 22, 1399–1408.
Farley, J., Costanza, R., 2010. Payments for ecosystem services: from local to global. Ecol. Econ. 69, 2060–2068.
Farley, J., Perkins, S., 2013. Economics of Information in a Green Economy. In: Robertson, R. (Ed.), Building a Green Economy. Michigan State University Press, East Lansing, Michigan.
Farley, J., Aquino, A., Daniels, A., Moulaert, A., Lee, D., Krause, A., 2010. Global mechanisms for sustaining and enhancing PES schemes. Ecol. Econ. 69, 2075–2084.
Fehr, E., Gachter, S., 2000. Cooperation and punishment in public goods experiments. Am. Econ. Rev. 90, 980–994.
Fischbacher, U., Gächter, S., Fehr, E., 2001. Are people conditionally cooperative? Evidence from a public goods experiment. Econ. Lett. 71, 397–404.
Fisher, B., Turner, K., Zylstra, M., Brouwer, R., Groot, R.D., Farber, S., Ferraro, P., Green, R., Hadley, D., Harlow, J., Jefferiss, P., Kirkby, C., Morling, P., Mowatt, S., Naidoo, R., Paavola, J., Strassburg, B., Yu, D., Balmford, A., 2008. Ecosystem services and economic theory: integration for policy-relevant research. Ecol. Appl. 18, 2050–2067.
Foley, J.A., Ramankutty, N., Brauman, K.A., Cassidy, E.S., Gerber, J.S., Johnston, M., Mueller, N.D., O'Connell, C., Ray, D.K., West, P.C., Balzer, C., Bennett, E.M., Carpenter, S.R., Hill, J., Monfreda, C., Polasky, S., Rockstrom, J., Sheehan, J., Siebert, S., Tilman, D., Zaks, D.P.M., 2011. Solutions for a cultivated planet. Nature 478, 337–342.
Frank, R.H., Gilovich, T., Regan, D.T., 1993. Does studying economics inhibit cooperation? J. Econ. Perspect. 7, 159–171.
Frey, B.S., Jegen, R., 2001. Motivation Crowding Theory. J. Econ. Surv. 15, 589–611.
Georgescu-Roegen, N., 1971. The Entropy Law and the Economic Process. Harvard University Press, Cambridge, MA.
Gershwin, L.-A., 2013. Stung! On Jellyfish Blooms and the Future of the Ocean. University of Chicago Press, Chicago.
Gintis, H., Bowles, S., Boyd, R., Fehr, E., 2003. Explaining altruistic behavior in humans. Evol. Hum. Behav. 24, 153–172.
Gintis, H., Bowles, S., Boyd, R., Fehr, E., 2005. Moral Sentiments and Material Interests: The Foundations of Cooperation in Economic Life. MIT Press, Cambridge, MA.
Gneezy, U., Rustichini, A., 2000. Pay Enough Or Don't Pay At All. Q. J. Econ. 115, 791–810.
Gordon, I., Martin, C., Feldman, R., Leckman, J.F., 2011. Oxytocin and social motivation. Dev. Cogn. Neurosci. 1, 471–493.
Groffman, P., Baron, J., Blett, T., Gold, A., Goodman, I., Gunderson, L., Levinson, B., Palmer, M., Paerl, H., Peterson, G., Poff, N.L., Rejeski, D., Reynolds, J., Turner, M., Weathers, K., Wiens, J., 2006. Ecological thresholds: the key to successful environmental management or an important concept with no practical application? Ecosystems 9, 1–13.
Gul, F., Pesendorfer, W., 2008. The Case for Mindless Economics. In: Caplin, A., Schottter, A. (Eds.), The Foundations of Positive and Normative Economics. Oxford University Press, Oxford.
Gunders, D., 2012. Wasted: How America Is Losing Up to 40 Percent of Its Food from Farm to Fork to Landfill NRDC Issues Paper AUGUST 2012 IP:12-06-B. Natural Resources Defense Council.
Hall, C.A.S., Klitgaard, K.A., 2011. Energy and the Wealth of Nations. Springer, New York.
Heal, G., 2014. Managing Natural Capital. Plenary panel presentation at the Sustainable Prosperity Research Network Conference, Ottawa, Ontario (April).
Heinen, J.T., 1996. Human behavior, incentives, and protected area management. Conserv. Biol. 10, 681–684.
Heller, M.C., Keoleian, G.A., 2000. Life Cycle-Based Sustainability Indicators for Assessment of the U.S. Food System. Center for Sustainable Systems, Ann Arbor, Michigan.
Henrich, J., Henrich, N., 2007. Why Humans Cooperate: A Cultural and Evolutionary Explanation. Oxford University Press, New York.
Henrich, J., Boyd, R., Bowles, S., Camerer, C., Fehr, E., Gintis, H., McElreath, R., 2001. In search of Homo economicus: behavioral experiments in 15 small-scale societies. Am. Econ. Rev. 91, 73–78.
Henrich, J., Boyd, R., Bowles, S., Camerer, C., Fehr, E., Gintis, H., McElreath, R., Alvard, M., Barr, A., Ensminger, J., Henrich, N.S., Hill, K., Gil-White, F., Gurven, M., Marlowe, F.W., Patton, J.Q., Tracer, D., 2005. Models of decision-making and the coevolution of social preferences. Behav. Brain Sci. 28, 838–855.

Holland, A., 1997. The foundations of environmental decision-making. Int. J. Environ. Pollut. 7, 483–496.
Hudson, M., 2011. Higher Taxes on Top 1% Equals Higher Productivity. The Real News Networkon-line: http://therealnews.com/t2/index.php?option=com_content&task=view&id=31&Itemid=74&jumival=6000.
Hudson, M., 2012. The Bubble and Beyond. ISLET.
IPCC, 2013. Climate Change 2013. the Physical Science Basis Summary for Policymakers. United Nations (on-line: http://www.ipcc.ch/).
Ivanic, M., Martin, W., Zaman, H., 2011. Estimating the Short-Run Poverty Impacts of the 2010–11 Surge in Food Prices. Policy Research Working Paper. World Bank, Washington, DC.
Kirchgässner, G., 2005. (Why) are economists different? Eur. J. Polit. Econ. 21, 543–562.
Kolata, G., 2010. Sharing of Data Leads to Progress on Alzheimer's. New York Times, New York.
Kosfeld, M., Heinrichs, M., Zak, P.J., Fischbacher, U., Fehr, E., 2005. Oxytocin increases trust in humans. Nature 435, 673–676.
Lagi, M., Bar-Yam, Y., Bertrand, K.Z., Bar-Yam, Y., 2012. UPDATE February 2012 — The Food Crises: Predictive validation of a quantitative model of food prices including speculators and ethanol conversion (arXiv 1203.1313, March 6, 2012).
Lessig, L., 2012. The Last Best Chance for Campaign Finance Reform: Americans Elect, The Atlantic. The Atlantic Monthly Group (pp. on-line: http://www.theatlantic.com/politics/archive/2012/2004/the-last-best-chance-for-campaign-finance-reform-americans-elect/256361/).
Lima, L., Coe, M., Soares Filho, B., Cuadra, S., Dias, L.P., Costa, M., Lima, L., Rodrigues, H., 2013. Feedbacks between deforestation, climate, and hydrology in the Southwestern Amazon: implications for the provision of ecosystem services. Landsc. Ecol. 1–14.
Limburg, K.E., O'Neill, R.V., Costanza, R., Farber, S., 2002. Complex systems and valuation. Ecol. Econ. 41, 409–420.
Malghan, D., 2006. On Being the Right Size: A Framework for the Analytical Study of Scale, Economy, and Ecosystem, Public Affairs. University of Maryland, College Park.
Mankiw, N.G., 2009. Principles of Economics, 5th ed. Cengage Learning, Mason, Ohio.
Martinez Alier, J., 2003. The Enviromentalism of the Poor. Edward Elgar, London.
Martinez-Alier, J., Munda, G., O'Neill, J., 1998. Weak comparability of values as a foundation for ecological economics. Ecol. Econ. 26, 277–286.
McCauley, D.J., 2006. Selling out on nature. Nature 443, 27–28.
McNeil Jr., D.G., 2007. Indonesia May Sell, Not Give, Bird Flu Virus to Scientists. New York Times, New York.
Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington, DC.
Minsky, H.P., 1986. Stabilizing an unstable economy. Yale University Press, New Haven.
Muradian, R., 2001. Ecological thresholds: a survey. Ecol. Econ. 38, 7–24.
Muradian, R., Corbera, E., Pascual, U., Kosoy, N., May, P.H., 2010. Reconciling theory and practice: an alternative conceptual framework for understanding payments for environmental services. Ecol. Econ. 69, 1202–1208.
Nepstad, D.C., Stickler, C.M., Soares, B., Merry, F., 2008. Interactions among Amazon land use, forests and climate: prospects for a near-term forest tipping point. Philos. Trans. R. Soc. Lond. B Biol. Sci. 363, 1737–1746.
Nobre, C.A., Borma, L.D., 2009. 'Tipping points' for the Amazon forest. Curr. Opin. Environ. Sustain. 1, 28–36.
Nowak, M., Highfield, R., 2011. SuperCooperators: Altruism, Evolution, and Why We Need Each Other to Succeed. Free Press (Simon Schuster), New York.
OECD, 2011. Divided We Stand: Why Inequality Keeps Rising. OEDC Publishing.
OECD, 2012. OECD Health Data 2012. Organization for Economic Cooperation and Development.
O'Neill, J., 1997. Managing without prices: the monetary valuation of biodiversity. Ambio 26, 546–550.
O'Neill, J.F., 1998. The Market: Ethics, Knowledge & Politics. Routledge, London.
O'Neill, J., 2001. Representing people, representing nature, representing the world. Environ. Plan. 19, 483–500.
Panafrican News Agency, 2001. Zambia: Malnutrition Kills 80 Percent of Zambian Childrenon-line: http://allafrica.com/stories/200101240065.html.
Pattanayak, S., Wunder, S., Ferraro, P.J., 2010. Show me the money: do payments supply environmental services in developing countries? Rev. Environ. Econ. Policy 254–274 (Summer).
Pearce, D.W., Turner, R.K., 1990. Economics of Natural Resources and the Environment. Harvester Wheatsheaf, Hertfordshire England.
Pigou, A., 1932. The Economics of Welfare, 4th ed. Macmillan, London.
Pimentel, D., Pimentel, M., 1996. Energy Use in Fruit, Vegetable, and Forage Production, In: Pimentel, D., Pimentel, M. (Eds.), Food, energy, and society, revised editionUniversity Press of Colorado, Niwot, CO, pp. 131–147.
Posner, R.A., 1985. Wealth Maximization Revisited. Notre Dame J. Law Ethics Public Policy 2, 85–105.
Randall, A., 1993. The Problem of Market Failure, In: Dorfman, R., Dorfman, N. (Eds.), Economics of the Environment, 3rd ed.Norton, New York, pp. 144–161.
Rao, K.S., Maikhuri, R.K., Nautiyal, S., Saxena, K.G., 2002. Crop damage and livestock depredation by wildlife: a case study from Nanda Devi Biosphere Reserve, India. J. Environ. Manag. 66, 317–327.
Richardson, R.B., Fernandez, A., Tschirley, D., Tembo, G., 2012. Wildlife conservation in Zambia: impacts on rural household welfare. World Dev. 40, 1068–1081.
Rockstrom, J., Steffen, W., Noone, K., Persson, A., Chapin, F.S., Lambin, E.F., Lenton, T.M., Scheffer, M., Folke, C., Schellnhuber, H.J., Nykvist, B., de Wit, C.A., Hughes, T., van der Leeuw, S., Rodhe, H., Sorlin, S., Snyder, P.K., Costanza, R., Svedin, U., Falkenmark, M., Karlberg, L., Corell, R.W., Fabry, V.J., Hansen, J., Walker, B., Liverman, D., Richardson, K., Crutzen, P., Foley, J.A., 2009. A safe operating space for humanity. Nature 461, 472–475.
Rosa, L.P., Lomardo, L.L.B., 2004. The Brazilian energy crisis and a study to support building efficiency legislation. Energ. Bldg. 36, 89–95.
Sagoff, M., 1998. Aggregation and deliberation in valuing environmental public goods: a look beyond contingent pricing. Ecol. Econ. 24, 213–230.
Samuelson, P., 1938. A note on the pure theory of consumers' behaviour. Economica 5, 61–71.
Samuelson, P.A., 1954. The pure theory of public expenditure. Rev. Econ. Stat. 387–389.
Schelling, T.C., 2007. Greenhouse Effect. In: Henderson, D.R. (Ed.), The Concise Encyclopedia of Economics. Liberty Fund, Inc.
Seale Jr., J., Regmi, A., Bernstein, J., 2003. International Evidence on Food Consumption Patterns. Economic Research Service, Electronic Report.
Sen, A., 1970. Collective Choice and Social Welfare. Holden Day Inc., San Francisco.
Sen, A., 1981. Poverty and Famines: An Essay on Entitlement and Deprivation. Oxford University Press, Oxford.
Simpson, R.D., Toman, M.A., Ayres, R.U., 2005. Scarcity and Growth Revisited: Natural Resources and the Environment in the New Millenium. Resources for the Future, Washington, DC.
Sober, E., Wilson, D.S., 1998. Unto Others: The Evolution and Psychology of Unselfish Behavior. Harvard University Press, Cambridge, MA.
Solow, R.M., 1974. Intergenerational equity and exhaustible resources. Rev. Econ. Stud. 41, 29–45.
Spash, C.L., 2008. How much is that ecosystem in the window? The one with the biodiverse trail. Environ. Values 17, 259–284.
Spash, C.L., 2010. The brave new world of carbon trading. New Polit. Econ. 15, 169–195.
Stigler, G.J., Becker, G.S., 1977. De Gustibus Non Est Disputandum. Am. Econ. Rev. 67, 76–90.
Tadesse, G., Algieri, B., Kalkuhl, M., von Braun, J., 2014. Drivers and triggers of international food price spikes and volatility. Food Policy. 47, 117–128.
Tilman, D., Balzer, C., Hill, J., Befort, B.L., 2011. Global food demand and the sustainable intensification of agriculture. Proc. Natl. Acad. Sci. 108, 20260–20264.
UNDP, 2011. The Real Wealth of Nations: Pathways to Human Development, 2010. UNDP, New York.
USDA, 2013. Wheat dataonline: http://www.ers.usda.gov/data-products/wheat-data.aspx (Uulb42RdXyU).
USDA Economic Research Service, 2012. Expenditures on food and alcoholic beverages that were consumed at home by selected countrieson-line: http://www.ers.usda.gov/data-products/food-expenditures.aspx.
Vatn, A., 2005. Institutions and the Environment. Edward Elgar, Northampton, MA.
Vatn, A., 2010. An institutional analysis of payments for environmental services. Ecol. Econ. 69, 1245–1252.
Vatn, A., Bromley, D.W., 1994. Choices without prices without apologies. J. Environ. Econ. Manag. 26, 129–148.
Vohs, K.D., Mead, N.L., Goode, M.R., 2006. The psychological consequences of money. Science 314, 1154–1156.
Weare, C., 2003. The California Electricity Crisis: Causes and Policy Options. Public Policy Institute of California, San Francisco.
WHO, 1985. Energy and protein requirements. Report of a Joint FAO/WHO/UNU Expert ConsultationWorld Health Organization, Geneva.
Wilson, D.S., 2007. Evolution for everyone: how Darwin's theory can change the way we think about our lives. Delacorte Press, New York.
Wilson, E.O., 2012. The Social Conquest of Earth. Liveright Publishing Corporation, New York.
World Bank, 2013. GNI per capita, PPP (current international $). World Bank, Washington, DC on-line: http://data.worldbank.org/indicator/NY.GNP.PCAP.PP.CD.
Wunder, S., Engel, S., Pagiola, S., 2008. Taking stock: a comparative analysis of payments for environmental services programs in developed and developing countries. Ecol. Econ. 65, 834–852.
Zhang, W., Ricketts, T.H., Kremen, C., Carney, K., Swinton, S.M., 2007. Ecosystem services and dis-services to agriculture. Ecol. Econ. 64, 253–260.

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PLACE-BASED FOOD SYSTEMS VIEWPOINT

Early lessons from The Food Commons: A new economic whole system approach for regional food

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Abstract
The Food Commons is an agro-ecological approach to local and regional food in which the health of employees, the community, and the commons are considered holistically. Food Commons Fresno is operationalizing the model with wholesale, food box, hub, commissary, and farming businesses managed through a linked for-benefit corporation and a community trust. Aside from typical start-up challenges, the key hurdles include the cultural and economic unfamiliarity with ecological models and relational operating systems.

Keywords
Commons, Ecological Model, Agro-ecology, Holism, Food Systems, Integrative, Relational Model, Regenerative Capital, Inequality, Health, New Paradigm, Systems Thinking, Impact Investing

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Disclosure
Mr. Harvie is the volunteer coordinating director of The Food Commons and serves on its board. He is also an independent consult, but for the presentation at the Place-Based Food Systems Conference and this resulting paper, his time and expenses were volunteered.

Introduction

The economic model for the U.S. food and agricultural industry is predicated on scale, technology, centralization, and consolidation, serving large enterprises and global markets. It is widely recognized that this industrial food system—how we currently produce and distribute food—is intimately linked to the declining health of individuals, communities and the planet.

Over the last two decades, we have observed important and necessary responses to the industrialized food model. One notable example is The Food Commons (TFC), a new economic paradigm and whole system approach to local and regional food in which the health of employees, the community and the commons are considered holistically. Its prototype, Food Commons Fresno, is based in the heart of the industrial food industry, home to a nearly US$8 billion agriculture industry, but also which hosts the zip codes with some of the highest rates of persistent poverty, pollution, obesity, diabetes, and food insecurity in the country.

Our Failed Industrial Agriculture Paradigm

It is widely recognized that our industrial food system is intimately linked to the deteriorating health of individuals, communities and the planet (Harvie, Mikkelsen, & Shak, 2009). We are already experiencing significant impacts in the form of increased antibiotic-resistant bacteria, polluted air and water, food-borne pathogens, and the loss of mid-size family farms with negative impacts on the economies of rural communities and farm states. Obesity is now a global health concern, representing 21% of health costs in the United States (Harvard School of Public Health, n.d.). Poor nutrition is a risk factor for four of the six leading causes of death nationally: heart disease, stroke, diabetes, and cancer. According to recent data, 10% percent of households with children (3.9 million households) were unable to provide adequate, nutritious food for their children (Coleman-Jensen, Nord, & Singh, 2013). The global food system is responsible for up to 29% of climate change emissions (Vermeulen, Campbell, & Ingram, 2012), leading to a host of climate-related health impacts such as heat stress and respiratory distress— conditions to which children and the elderly are the most vulnerable. Mirroring changes in manufacturing and retailing sectors, the industrial food model is now a highly consolidated economic model, characterized by global supply chains, commoditized foods, externalized health, and social and environmental costs. Farmers, as original stewards, have been largely supplanted by a plant and animal manufacturing system, supported by chemistry and technology. Experts have compared our industrial food system to a runaway train (Aubrun, Brown, & Grady, 2006), and unless it is brought under control, the industrialized food system will continue to exert negative impacts on the health of people and planet.

The Call for a Systems Paradigm

Over the last several decades, the Good Food Movement has offered a critical response to the industrialized food model. The Good Food Movement is a broad collection of food system actors—consumers, farmers, distributors, retailers, healthcare, and others—who have evolved a "bottom up" response through a call to action for good food for all. Good food is a holistic definition of food that bridges various food value systems—environment, access, justice, and nutrition—rather that a continued siloing of consumer, producer, and community needs and interests. The Good Food Movement has helped elevate the importance of food sovereignty, the right of people to healthy and culturally appropriate food and to define their own food systems.

At the global level, a variety of governmental reports underscore the need for a transformation of global food systems. Noteworthy is the International Assessment of Agriculture Knowledge, Science, and Technology for Development (IAASTD), funded by the United Nations organizations (McIntyre, Herren, Wakhungu, & Watson, 2009). This report highlights the findings of global scientists charged with answering the question: What must we do differently to overcome persistent poverty and hunger, achieve equitable and sustainable development and sustain productive and resilient farming in the face of environmental crises (Ishii-Eiteman, 2009)? Their conclusion explicitly recognized that the health of the environment,

social health of communities and the sustainability of agriculture are interrelated and must be considered holistically.

Recommendations include the need to promote value chains, fair trade, organic agriculture and local food systems that distribute benefits fairly and equitably along the chain, and the support of democratic institutions. Moreover, the report highlighted that the continued reliance on simplistic technological fixes will not reduce persistent hunger and poverty and could exacerbate environmental problems and worsen social inequity. This landmark report has become the basis for the UN Human Rights Commission support for agroecology, a local food systems model, and the Right to Food, providing a global framework that is consistent with the development of the Good Food Movement.

In 2015, an Institute of Medicine and National Research Council report concluded that the food system can be conceptualized as a complex, adaptive system and that "systemic approaches that take full account of social, economic, ecological, and evolutionary factors and processes will be required to meet challenges to the U.S. food system in the 21st century" (Institutes of Medicine, 2015, p. 15). Similarly, through a study of five case studies, researchers recently concluded that, "adaptive governance of agro-ecosystems will likely hinge upon three paradigm shifts: viewing farmers and ranchers not only as food producers but also as land and water managers; seeking not yield maximization but rather resilient management of food ecosystems; and critically, as it transcends the production-system literature, engaging broad audiences not only as consumers but also citizens" (Chapman, et al., 2017). It is clear that food system design for a livable economy necessitates a broad cultural paradigm shift towards a new operating system in which the relationships between people, their communities and planet are paramount.

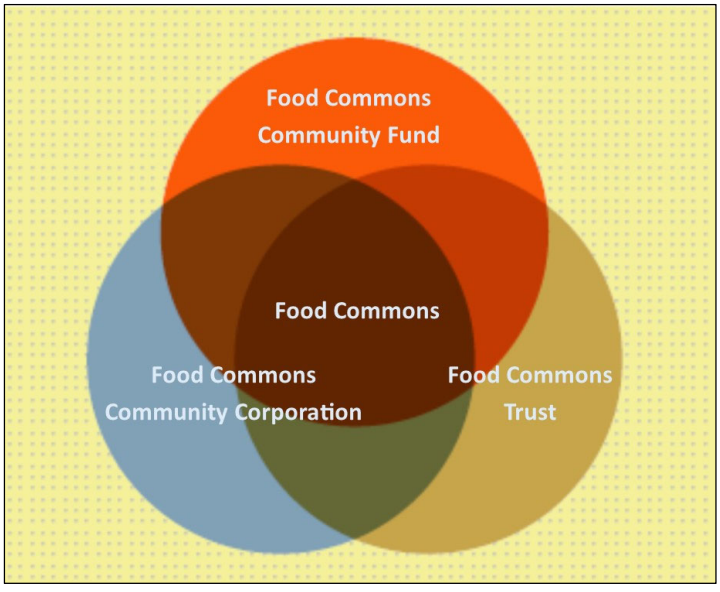
The Food Commons Model

Inspired by the grass roots movement and global call to action, TFC was developed to design and build a new food system model. TFC implicitly recognizes that that the failures of and the problems associated with the industrial food system are largely a function of its concentrated ownership, mechanistic design and industrial model based on efficiency and extraction. Moreover, a food system that truly meets the long-term needs of people and the planet should follow ecological principles, to reflect the complexity of its living systems. With this vision, TFC initiated convenings with a broad set of community actors to explore questions central to their vision:

- What would it take to bring to scale a nationwide regionalized food system?
- What is the necessary physical and organizational infrastructure?
- How do we capitalize and finance for the long term?
- How do we develop such a system to be integrative and holistic?
- What economic principles would ensure equity, fairness, and sustainability?
- How would such a system be governed?
- Why would this new system be desirable and how would it help people prosper and flourish?

In 2011, after a one-year community process,

Figure 1. Food Commons Components



TFC published its findings in the document *Food Commons 2.0* (The Food Commons, 2011). The vision outlines linked, localized food systems, each consisting of three inter-connected organizational components (Figure 1) and governed by a set of core principles (Figure 2). These components include:

1. A Food Commons Trust, a nonprofit, quasipublic entity to acquire and steward critical foodshed assets;

Figure 2. Principles for a Just and Sustainable Food Commons (The Food Commons, 2011)

1. Fairness
Across the entire value chain all participants' needs, from farmers and food business owners to agricultural and retail workers, are met in a balanced way, and all get a fair deal. Throughout the food system, the value of human labor is fairly recognized and appreciated. Individuals and institutions shall return to their communities' fair measure for what they receive.

2. Sustainability and Stewardship
In all aspects of food production and distribution, stewardship of our land and marine ecosystems is required to ensure that succeeding generations will have an equal or better opportunity to flourish from its resources. With respect to human relationships, active stewardship is also required to ensure a holistic vision of sustainability that includes ecological, social, and economic components. The true costs of food production should be reflected in market pricing to the fullest extent possible, though not all social, environmental or ethical values can be monetized.

3. Economic Opportunity
Create economic opportunities that facilitate the pursuit of Right Livelihood, so that people may earn a living without compromising the underlying principles of the Food Commons. Expand ownership opportunities for those who may not have access due to the high cost of infrastructure and expand career opportunities and access to good jobs with benefits and security, restoring hope to the unemployed and restoring craft and pride to labor.

4. Food Sovereignty
All people have the right to have access to quality, healthy food that is produced and distributed through environmentally and socially sustainable methods.

5. Integration
Create an integrated value chain, from farm to table, in order to achieve economic efficiency and fairness. Think systemically.

6. Transparency
Openly and honestly, share costs and pricing information essential to the equitable functioning of the value chain. Facilitate traceability of products, procedures and other relevant information throughout the value chain.

7. Ethics and Accountability
Governing bodies maintain the highest standards of credibility and ethical conduct, fair and accurate dissemination of information and full disclosure and accountability for their affairs. Representatives are accountable to the environment, to workers, to the public, and to future generations. Representatives set policies, but do not have any personal ownership in participating businesses.

8. The Commons
The segment of the food system that falls within the Food Commons is based on the establishment of shared and collectively managed infrastructure and resources, operating for the benefit of communities.

9. Subsidiarity
Decisions should be made at the most local level possible. Regional and national decisions should involve only those matters that are relevant to that level of governance, coordination and representation. The Food Commons will provide structures for overall coordination to allow decentralized management structures to operate efficiently and develop network linkages for formal and informal connections at the local and regional levels.

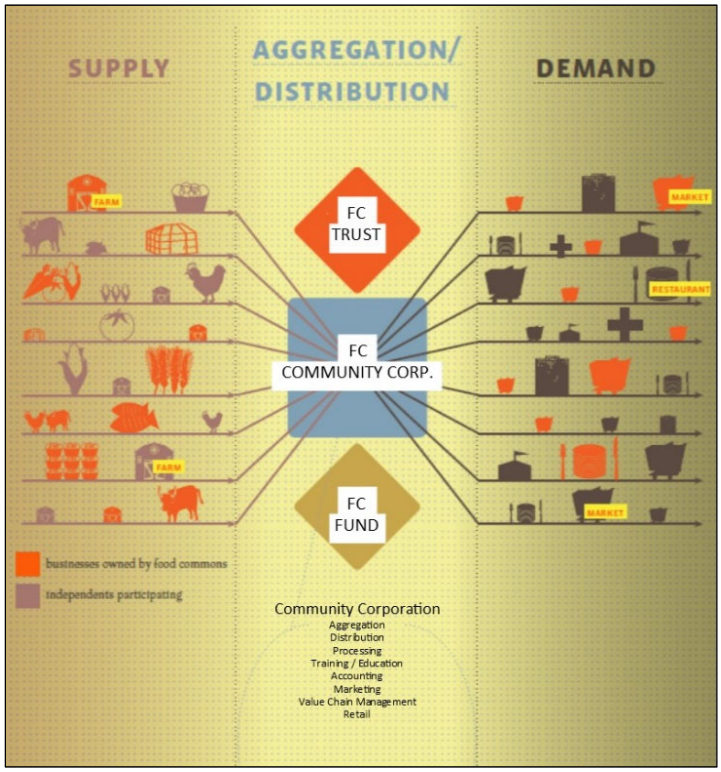
10. Reciprocity
The whole is responsible to all of the parts as well as the parts being responsible to the whole.

11. Representation and Decision-making
Equitable participation of the Food Commons stakeholders shall be present at all levels and entities of governance throughout the Food Commons, from farmers, to workers, to consumers. Decisions and deliberations must fairly represent the diversity of affected views and interests and not be dominated by any single view or interest.

2. A Food Commons Community Fund, a community-owned financial institution that provides capital and financial services to foodshed enterprises; and
3. A Food Commons Community Corporation, a locally owned, cooperatively integrated business enterprise that builds and manages foodshed-based physical infrastructure and facilitates the complex logistics of aggregation and distribution at different scales among all the moving parts of the system, and provides scale economies, business services, technical assistance and training to new small food businesses.

In simple terms, TFC model is a new economic paradigm for local and regional food. It seeks the efficiencies of vertical integration with the goal of sharing the benefits across the value chain and within the community, rather than extracting and exporting wealth. Central to the model is the recognition that farmland must be protected from privatization and held as a long-term public good. Through vertical (or holistic) integration and broad shared ownership, the Food Commons model aims to provide an economic alternative to the industrial food system for individuals, independent businesses, and producers seeking access to a community-owned food system operating in accordance with commonly shared principles of fairness, sustainability and accountability (Figure 3).

Figure 3. The Food Commons' Vertical Integration



The Food Commons model follows Buckminster Fuller's maxim, "You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete." However, in order to build a prototype, TFC required a community willing and able to imagine and support an entirely new approach to food, health and community.

Food Commons Fresno

Fresno, California, was selected as the location of the first Food Commons prototype after it became clear there was a need, an invitation, and the support of community leadership. While Fresno County is home to a nearly US$8 billion agriculture industry, it also hosts the zip codes with some of the highest rates of persistent poverty, pollution, and food insecurity in the country, and its poor residents are among the most isolated of any American city, regardless of race (Jargowsky, 2015). Yet these deficits mask many community assets. One example is the Fresno Business Council (FBC), whose board and membership span the public and private sectors and led the development of Fresno's Community Values. Written to serve as guiding principles for community action, they align closely with The Food Commons principles. The FBC also applies The Four Sphere Framework, a model developed to illustrate a systems approach to community business because "treating only symptoms means the problem is never really addressed or corrected. Instead, we must address the system holistically—from the fourth sphere" (Fresno Business Council, 2018, para. 1). Through a different sectoral lens, the FBC's holistic framework and associated

guiding principles offered important community alignment with TFC model.

Building the Prototype

In 2015, TFC incorporated two of the three Food Commons components for its Fresno prototype: the Food Commons Fresno Trust and its fully owned business, Food Commons Fresno Community Corporation (henceforth, we will refer to both, interrelated entities as Food Commons Fresno [FCF]).

Operations began with the launch of Ooooby, FCF's organic produce box business, which has now delivered over 95,000 boxes to families across the region. In 2017, FCF took over operation of a 75-acre (30-hectare) certified organic farm, renamed Road 20 Farm, and is developing it into a showcase and training ground for regenerative practices, as well as a supplier of high quality organic produce for local markets. FCF also established a hub facility in a disinvested neighborhood of Fresno to aggregate local produce from more than 60 small-scale organic and sustainable farms and ranches, and a separate facility to serve as a commissary kitchen for local food trucks and carts. FCF distributes product from its hub to area hospitals, institutions of higher learning, and wholesale restaurant customers. FCF's farm-to-fork operation now employs nearly 50 individuals, of whom an overwhelming majority reside in the low-income neighborhood it serves.

With the goal of community ownership and governance of the business, in 2018 FCF launched a direct public offering. Direct public offerings (DPOs) are a way for small businesses to raise capital directly from their communities and customers. Like in an initial public offering (IPO), people buy shares in a company, but unlike an IPO, the shares are not traded on the stock market or sold through investment banks. Also planned is an employee stock ownership program (ESOP), by far the most common form of employee ownership in the U.S. (National Center for Employee Ownership, 2018).

Planning was underway at the time of this writing for the development of a multifunctional Community Food Hub and grocery store in southwest Fresno in 2019. This area is a food desert, where the median income of the diverse population is less than US$25,700 and the unemployment rate is 10.4 percent (PolicyLink & Program for Environmental and Regional Equity, 2018). Other planned activities include expansion of the farm, Ooooby, and wholesale distribution businesses.

Through earned income, philanthropy, and significant internal and external support, FCF has been able to successfully scale operations; increase access to affordable, healthy food; create well-paying urban and rural jobs; support vibrant community spaces and revitalize urban neighborhoods; practice regenerative agriculture; develop leadership and engagement in food system governance; and foster community pride and a sense of place. And FCF continues to wrestle with a host of challenges consistent with a start-up business: cash flow, tight budgets, development of an organizational culture, hiring, and more.

What FCF Is Learning

While FCF faces the daily challenges of any start-up business, these trials are frequently compounded by the unique, holistic vision of The Food Commons model. Following are some of the trials and opportunities FCF and TFC are uncovering.

Regenerative Capital Formation

New paradigm models like TFC are trying to relocalize wealth and create regenerative capital. However, access to working capital is a constant battle in which TFC values and principals often feel held captive by markets that are seeking control or above-market returns. It has been difficult to distinguish between investors and impact investors, those willing to forgo market returns in exchange for true impact. Moreover, it has been surprising to FCF that they must pitch or "sell" the benefits of local capital formation, which FCF felt were self-evident. Ideally, forward-thinking impact investors would create a group that would work together, an impact investing network, which takes a systemic approach to their investments, similar to philanthropic affinity groups. As Rodney Foxworth, executive director of the Business Alliance for Local Living Economies (BALLE) aptly states, "if mainstream impact investing continues to operate

within the culture of the 'free market' and prioritize capital returns, by definition it will promulgate economic injustice" (Foxworth, 2018, para. 7)). In short, the power and narrative of capital markets make it difficult to develop capital that is representative of the community versus extractive from the community.

Let the Business be in Service to Principles and Values Embedded in the Legal DNA and Culture

TFC's board of directors represents more than a century of food-systems and systems-thinking experience and includes leading legal expertise. This experience helped inform the need to weave TFC's core principle and values into the legal structure of the organization before operationalizing work. For example, FCF was designed such that the FCF Trust would maintain local community control and oversight of the FCF Corporation so that it could never be bought or sold. With the FCF now operational within the broader extractive economy, this foresight feels invaluable in helping protect core values that might otherwise be tested and eroded.

A New Operating System: The What is Easy, the How is Hard

A shift from a linear model to an ecological model also shifts what is considered as important (Center for Ecoliteracy, 2018). This change in perception unleashes the emergence of new relationship-focused operating styles characterized by networks and organizational approaches such as collaboration, teamwork, empowerment, and connection rather than hierarchies and control. The challenge is that the broader culture largely operates through the old paternalistic or mechanistic operating system, so many of the skills needed to work in a new paradigm business are difficult to find. From day one, the intent for FCF was to operate holocratically (Holocracy, n.d.), or holocratic-like, yet the challenging reality of a start-up with many moving parts resulted in the business defaulting to a traditional organizational structure. There was not enough time to learn, hire, and embed a new operating system and open a new business. FCF maintains formalized collaborative leadership as a goal as it shifts from start-up mode.

Find, Build, and Support Human Capital

For the TFC model to succeed, its leaders and advocates must represent the community; however, FCF is having trouble finding the necessary business experience within the local community. Many grassroots advocates drawn to TFC model bring an important holistic community approach but lack needed business skills. FCF is exploring how it might formalize training, coupled with the concept of the "opportunity of, by, and for the community." This opportunity might also include the farming community and FCF's interest in assisting farmers in meeting their business, environmental, and community goals.

To Unlock Our Potential We Need a New Model of Health

What is health? At the heart of this question is a debate over the influence of the bio-medical model, which has shaped modern medicine and underpins our healthcare system and cultural beliefs about health. As it has the physical processes of disease as its focus, and assumes linear singular cause and effect, it is poorly equipped to accommodate multiple influences on health. The limits and associated costs to health and well-being of these linear models and embedded assumptions are now impossible to ignore. Although there is a more widespread appreciation for the significant role of social determinants or social and environmental factors, in health outcomes we too often overlook the fact that each of these factors works synergistically with one another and the individual. Similarly, overlooked yet equally important as these risk factors are qualitative factors such a sense of individual control and agency (Tamber & Kelly, 2017).

FCF has discovered that many customers, funders, and community and healthcare leaders still consider foods' relationship to health as singularly related to nutrition. This limiting view diminishes the true benefit of good food and a holistic food system model to individual and community health. Health benefits include the sense of control and self-worth that comes from employment, the sense of community from shared ownership, the ecological health benefits from sustainable agriculture, and the sense of pride and connectedness from cultural

food traditions—all of which holistically support whole health and wellbeing of the individual and community in the context of place.

The ecological model of health, or a systems worldview, is representative of new expansive science and by explaining the interconnections between individual, community, and planetary health, the ecological model provides an important unifying model. And, in our culture that is heavily influenced by a bio-medical model that represents 18% of the GDP, an ecological model is both difficult to explain and difficult to grasp, concealing the full benefits of holistic models such as TFC. Ironically, whole-paradigm models such as TFC offer an important means to catalyze health and wellbeing broadly.

Wealth Creation and Root Cause Healing

TFC views centralized ownership and organization of capital as critical root causes of the growing economic inequities, environmental degradations, food system dysfunctions, and health disparities. As the majority of these impacts fall disproportionally on the poor and on communities of color, the hierarchy of human value built into our economic system is glaring.

High inequality is linked to a sense of personal and public insecurity and increased consumption of resources and waste production, which negatively influence health through multiple means (Dorling, 2010; Warfield, 2016; Dorling, Barford, & Wheeler, 2007; Philips, 2016). In a vicious loop, unequal access to education, poor health, and inadequate nutrition are reasons and results of inequality, thwarting the ability of individuals to thrive (Spratt, 2017). Those suffering from the highest economic disparity experience higher infant mortality and decreased mental health, life expectancy, levels of trust, altruism, social cooperation, reciprocity, and trust in political institutions (Attanasio, Fitzsimons, Grantham-McGregor, Meghir, & Rubio-Condina, 2001; Bowles & Gintis, 2011; Burns, Tomita, & Kapadia, 2014; Elgar & Aitken, 2011; Justino & Moore, 2015; Organization for Economic Development and Cooperation, 2018).

According to a recent study, if current trends hold, median wealth for African Americans will fall to US$0 by 2053, while median wealth for Latino Americans will fall to US$0 about two decades later. By 2020, white American households are projected to own 86 times more wealth than African American households, and 68 times more wealth than Latino households. (Collins, Asante-Muhammed, Nieves, & Hoxie, 2017). This does not bode well for the health and welfare of the United States as a whole, where demographic projections indicate that whites will become the numerical minority in 2044 (Frey, 2014). Viewed holistically, wealth inequity may in fact represent one of the largest influences on the health of individuals, communities, and the planet (Harvie & Guarneri, 2017). It is clear that we must acknowledge that until we change the status quo and capital is owned more widely and governed more locally, the negative health outcomes on society and the environment from capital deployment within the food system and elsewhere will be difficult to reverse, no matter the volume of nutritious food grown.

Conclusion

The Food Commons is but one entity working nationally to demonstrate a new systems approach. It offers an important new operational model that links the health of individuals, community, and the planet. TFC's strategy of systems change driven by community ownership and governance structures and beyond-the bottom-line returns links its work to a whole host of movements from climate change and environmental justice to worker equity and living wages, from cooperatives to community financing, as well as to the many facets of the sustainable agriculture, Good Food, and food democracy movements. TFC is helping elevate the collective benefit of a living systems model and the intractable resistance of culture and economy to change. The lessons from TFC suggest the need for rapid development of true regenerative capital, deepened networks, and collaborations with similar whole-system, place-based models and communities of practice across sectors.

References

Attanasio, O., Fitzsimons, E., & Grantham-McGregor, S., Meghir, C., & Rubio-Codina, M. (2001). *Early childhood development: Identifying successful interventions and the mechanisms behind them* (Policy brief). London: International Growth Center. https://www.theigc.org/wp-content/uploads/2014/10/Attanasio-Et-Al-2012-Policy-Brief.pdf

Aubrun, A., Brown, A., & Grady, J. (2006). *Conceptualizing US food systems with simplifying models: Findings from Talk Back Testing*. Frameworks Institute. Retrieved from http://www.frameworksinstitute.org/workshops/broccoli/foodSystems.pdf

Bowles, S., & Gintis. (2011). *A cooperative species: Human reciprocity and its evolution*. Princeton, N.J.: Princeton University Press. https://doi.org/10.23943/princeton/9780691151250.001.0001

Burns, J. K., Tomita, A., & Kapadia, A. S. (2014). Income inequality and schizophrenia incidence in countries with high levels of income inequality. *International Journal of Social Psychiatry, 60*(2), 185–196. https://doi.org/10.1177/0020764013481426

Center for Ecoliteracy. (2012). *Systems thinking*. Retrieved from https://www.ecoliteracy.org/article/systems-thinking

Chapman, M., Klassen, S., Kreitzman, M., Semmelink, A., Sharp, K., Singh, G., & Chan, K. M. A. (2017). 5 key challenges and solutions for governing complex adaptive (food) systems. *Sustainability, 9*(9), 1594. https://doi.org/10.3390/su9091594

Coleman-Jensen, A., Nord, M., & Singh, A. (2013). *Household food security in the United States in 2012* (Economic Research Report No. ERR-155). Washington, D.C.: U.S. Department of Agriculture, Economic Research Service. https://www.ers.usda.gov/publications/pub-details/?pubid=45132

Collins, C., Asante-Muhammed, D., Nieves, E., & Hoxie, J. (2017). *The road to zero wealth*. Prosperity Now and Institute for Policy Studies. Retrieved from https://www.mintpressnews.com/wp-content/uploads/2017/09/The-Road-to-Zero-Wealth_FINAL.pdf

Dorling, D. (2010). *Injustice: Why social inequality persists*. Bristol, UK: Policy Press.

Dorling, D., Barford, A., & Wheeler, B. (2007). Health impacts of an environmental disaster: A polemic. *Environmental Research Letters, 2*(4), 045007. https://doi.org/10.1088/1748-9326/2/4/045007

Elgar, F. J., & Aitken, F. (2011). Income inequality, trust and homicide in 33 countries. *European Journal of Public Health, 21*(2), 241–246. https://doi.org/10.1093/eurpub/ckq068

Food Commons, The. (2011). The Food Commons 2.0. Retrieved from http://www.thefoodcommons.org/images/FoodCommons_2-0.pdf

Foxworth, R. (2018, February 18). Wealth inequality and the fallacies of impact investing [Blog post]. Retrieved from the Medium website: https://medium.com/balle/wealth-inequality-and-the-fallacies-of-impact-investing-eea902924309

Fresno Business Council. (2018). *The Fourth Sphere—A systems approach*. Retrieved from http://fresnobc.org/project/fourth-sphere/

Frey, W. H. (2014, December 12). *New projections point to a majority minority nation in 2044* [Blog post]. Retrieved from the Brookings Institution's Avenue blog: https://www.brookings.edu/blog/the-avenue/2014/12/12/new-projections-point-to-a-majority-minority-nation-in-2044/

Harvard School of Public Health. (n.d.). Obesity prevention source: Economic costs. Retrieved November 30, 2018, from http://www.hsph.harvard.edu/obesity-prevention-source/obesity-consequences/economic/

Harvie, J., & Guarneri, M. (2017). *Healthy people, healthy planet*. Unpublished manuscript.

Harvie, J., Mikkelsen, L., & Shak, L. (2009). A health care prevention agenda: Sustainable food procurement and agriculture policy. *Journal of Hunger and Environmental Nutrition, 4*(3–4), 409–429. https://doi.org/10.1080/19320240903329055

Holocracy. (n.d.). Self-management practices for organizations. Retrieved November 2018 from https://www.holacracy.org/

Institute of Medicine & National Research Council. (2015). *A framework for assessing effects of the food system*. Washington, D.C.: The National Academies Press.

Jargowsky, P. (2015). *Architecture of segregation: Civil unrest, the concentration of poverty, and public policy*. The Century Foundation. Retrieved from https://tcf.org/content/report/architecture-of-segregation

Justino, P., & Moore, M. (2015). *Inequality: Trends, harms and new agendas* (IDS Evidence Report 144). Brighton, UK: Institute of Development Studies. Retrieved from https://www.ids.ac.uk/publications/inequality-trends-harms-and-new-agendas/

McIntyre, B. D., Herren, H. R., Wakhungu, J., & Watson, R. T. (2009). *International assessment of agricultural knowledge, science, and technology:Global Report* Washington, D.C.: Island Press.

National Center for Employee Ownership . (2018). *How and employee stock ownership program works*. Retrieved from https://www.nceo.org/articles/esop-employee-stock-ownership-plan

Organization for Economic Development and Cooperation. (2018). *OECD data*. Retrieved from https://data.oecd.org/

Philips, B. J. (2016). Inequality and the emergence of vigilante organizations: The case of Mexican *autodefensas. Comparative Political Studies, 50*(10), 1358–1389. https://doi.org/10.1177/0010414016666863

PolicyLink & Program for Environmental and Regional Equity. (2018). *Advancing health equity and inclusive growth in Fresno County*. Retrieved from the National Equity Atlas website: https://nationalequityatlas.org/sites/default/files/FresnoProfile_final.pdf

Spratt, S. (2017). *Equality, security and sustainability: In search of virtuous circles* (IDS Evidence Report 219). Brighton, UK: Institute of Development Studies. Retrieved from https://www.ids.ac.uk/publications/equality-security-and-sustainability-in-search-of-virtuous-circles/

Tamber, P. S., & Kelly, B. (2017). *Fostering agency to improve health: Twelve principles key to the future of health*. Seattle: Bridging Health & Community. Retrieved from https://www.pstamber.com/reports/executive-summary-fostering-agency-to-improve-health/

Vermeulen, S. J., Campbell, B., & Ingram, J. S. (2012). Climate change and food systems. *Annual Review of Environment and Resources, 37,* 195–222. https://doi.org/10.1146/annurev-environ-020411-130608

Warfield, R. (2016) Inequality: A real risk to our planet. *Resurgence & Ecologist*, 297, 20-22. https://www.resurgence.org/

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Analysis

The Vermont Common Assets Trust: An institution for sustainable, just and efficient resource allocation

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ABSTRACT

Both private and public sectors have failed to adequately provide critical ecosystem goods and services or an equitable distribution of wealth and income. To address this problem, the Vermont legislature is considering the creation of a Vermont Common Assets Trust (VCAT) that would make the state's atmosphere, aquifers and other resources created by nature or by society as a whole the common property of all Vermonters, present and future. Under the Trust, a board of trustees would have the legal obligation to manage these assets for the benefit of all Vermonters, including future generations. This paper first explains why certain resources are likely to be managed more sustainably, fairly and efficiently as common property than as private property. It then discusses mechanisms for integrating assets into the trust. Estimates of potential revenue from a VCAT suggest that it could eliminate the state budget deficit, contribute to a better distribution of wealth and resources, and help address critical ecological problems. Survey results suggest that a VCAT is politically feasible. The VCAT promises to be an important pilot project that could later be scaled up to a national or global level.

1. Introduction

Human society currently faces a number of unprecedented challenges that seriously threaten our welfare and perhaps even long term survival (IPCC, 2013; Millennium Ecosystem Assessment, 2005; Rockstrom et al., 2009; Steffen et al., 2011). Three general types of problems deserve mention.[1]

The first is unsustainable resource depletion and accumulation of harmful wastes, which in turn can be subdivided into three components:

- Continual consumption of renewable resources such as fisheries and forests faster than they can regenerate, which must inevitably result in stocks crashing;
- Continual emission of wastes faster than they can be absorbed by eco \systems, which must inevitably result in constantly increasing waste stocks; and
- Depletion of stocks of essential non-renewable resources, such as fossil fuels, faster than we can develop renewable substitutes (Daly, 1977).

Renewable and many abiotic resources alternatively serve as the structural building blocks of ecosystems, which in turn generate ecosystem services[2] essential for the survival of humans and other species. The depletion or re-configuration of resource stocks together with accumulating waste emissions threatens non-linear and potentially catastrophic change to global ecosystems (Farley, 2008; Limburg et al., 2002; Muradian, 2001). These problems can be lumped together as unsustainable throughput, where throughput is defined as the extraction of raw material and energy from the ecosystem, its conversion into economic products, and its return to the ecosystem as waste (Daly, 1990, 1996).

A second serious problem concerns the distribution of wealth and income. While individuals deserve a fair return from their own labor and fairly acquired capital, resources provided by nature or society as a whole should be a shared inheritance of all citizens. Unfortunately, a small minority too often captures or exploits these common assets

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[1] Most readers of this journal will be familiar with the problems of unsustainable resource use, unjust distribution, and inefficient allocation, as well as the problems with non-excludable and non-rival resources. This article strives to strike a balance between boring the ecological economists and informing the law-makers and political activists who we hope will read it. Many ecological economists may choose to skim or skip Section 2. For those who in contrast would like more detail on these topics, please visit http://www.uvm.edu/~gflo/VCAT.

[2] We define ecosystem services as benefits to human society generated by a particular configuration of ecosystem structure (i.e. the material building blocks of ecosystems, such as plants, animals, water and minerals) that do not require the physical transformation of the structure, are made available at a certain rate over time, and cannot be stockpiled for later use. This is distinct from ecosystem goods, which are physically transformed into economic products, can be harvested at a rate that humans choose, and can be stockpiled (Daly and Farley, 2010; Farley and Costanza, 2010).

http://dx.doi.org/10.1016/j.ecolecon.2014.10.016
0921-8009/

(Barnes, 2006; Bollier, 2002; Gaffney, 2009). The poor suffer from inadequate access to resources required to meet their basic needs and disproportionate exposure to life-threatening pollutants, while the consumption patterns of the wealthiest individuals contribute disproportionately to unsustainable throughput (Martinez Alier, 2003). Inequality contributes to a variety of health and social ills, ranging from obesity and homicide rates to loss of trust (Wilkinson and Pickett, 2009). Pronounced inequality may also increase throughput, as lower socioeconomic groups try to increase their status by attempting to keep pace with consumption standards of wealthier ones (Frank, 1999; Levine et al., 2010).

A third serious problem is the inefficient[3] allocation of scarce resources towards unmet human needs. The dominant institutions for resource allocation are currently competitive markets (the private sector) and government (the public sector). It is widely recognized that markets fail to function when resources are non-excludable (i.e. anyone who wants can use the resource without paying), and are inefficient when resources are non-rival (i.e. use by one person does not leave less for others) (Samuelson, 1954; Sandler, 1998). Many natural resources and ecosystem services are non-rival and/or non-excludable (Farnsworth et al., 1983; Sandler, 1993), while information is actually anti-rival in that it improves through use (Kubiszewski et al., 2010; Lessig, 2004; Weber, 2004). Furthermore, market prices fail to reflect the value of natural resources to future generations (Bromley, 1989; Georgescu-Roegen, 1975). While governments have no automatic mechanism for balancing marginal costs and marginal benefits, they account for many costs and benefits that markets ignore.

Current trends suggest that neither markets nor government are adequate for achieving the sustainable, just and efficient use of resources. A promising institution designed to address this problem is the common assets trust (CAT)—a third sector to complement the roles of the private and public sectors. A trust is a legal relationship between trustees, who manage a pool of wealth, and beneficiaries, for whom the wealth is managed. The commons, an ancient concept that can be traced back at least to the Greeks and Romans, refers either to those resources that *are* commonly owned, or those resources that for reasons of justice, sustainability or efficiency *should be* commonly owned (Bollier, 2002; Raffensperger et al., 2009; Wood, 2014). A CAT is a legal entity with explicit obligations to protect, manage and create common assets for the common good of present and future generations (Barnes, 2006; Barnes et al., 2008).

Vermont State House Bill 385, identical to the 2007 State Senate Bill 44 and following the guidelines laid out by Barnes (2006), proposes the creation of a Vermont Common Assets Trust (VCAT) that would make certain resources the common property of all Vermonters. This idea was first proposed in 2005 by co-author and Gund Institute researcher Gary Flomenhoft as the Vermont Permanent Fund. In 2007 the idea was developed into a bill by State Senator Hinda Miller working with co-author and Gund Director Robert Costanza. The authors of this article were consulted in the writing of the bill and continue to research and analyze the VCAT. The bill "proposes to make it clear that state policy is to protect certain common assets (such as air and water) for the benefit of present and future generations, and to establish a framework pursuant to which certain users of those common assets may be assessed fees that would be deposited into a common assets trust fund, which would be managed so as to protect those assets and serve the interests of present and future people of the state" (Vermont House Bill 385, 2011, p. 1). State representative Chris Pearson reintroduced the bill in 2011, and again in 2012 together with representatives Deen, Edwards, Klein, Masland, Partridge, Ram, Sharpe, Weston and Wizowaty. The bill has so far failed to progress beyond committee (the fate of most bills). However, the effort to promote VCAT likely facilitated the passage of a separate law in 2008 that for the first time extends the Public Trust Doctrine, which is the legal basis for a CAT, to groundwater.

As no states have yet developed such a comprehensive common assets trust (CAT), Vermont's legislators have little information to guide their votes on this bill

This article presents the initial results from research intended to provide the background information necessary for Vermont's citizens and legislators, and the citizens and legislators of other states or countries that may want to consider such legislation, to make informed decisions about a CAT. Sections 2 and 3 explain why the existing private and public sectors are unlikely to achieve sustainable, just and efficient solutions to society's pressing problems described above; Section 4 describes how VCAT could do so, how resources should be incorporated into VCAT, how VCAT should manage them, and how much revenue they might generate; Section 5 explains how a CAT increases the effectiveness and enforceability of the economic incentives it uses, and how it conforms to the design principles for managing common pool resources laid out by Elinor Ostrom (2002). Finally, Section 6 offers a brief summary and conclusions.

2. Private Sector Failures

Markets based on private property rights are the dominant form of resource allocation in the much of the world, often trusted to solve society's most pressing problems. In order to develop more effective institutions, we must understand how markets generate sustainable, just and efficient outcomes in theory, and why they often fail to do so in practice.

2.1. The Private Sector and Sustainability

Market prices theoretically reflect resource scarcity. Rising prices reduce demand, and provide incentives to use resources more efficiently, develop substitutes, or discover new sources, ensuring we will never run out. Most economists saw the downward trend in major commodity prices throughout the 20th century as evidence that technology could substitute for growing resource scarcity (Barnett and Morse, 1963; Simpson et al., 2005).

However, it is also possible to meet current demand by more rapidly extracting natural resource stocks, even though this reduces the capacity of ecosystems to regenerate raw materials and provide essential ecosystem services in the future (Wackernagel et al., 2002). New technologies and increased energy use can reduce extraction costs even as resources become scarcer, temporarily masking stock depletion while simultaneously speeding it up. Many substitutes for scarce resources, such as industrial nitrogen for natural nitrogen fixation and mined phosphorous, also rely on rapidly depleting supplies of fossil fuels (Ayres et al., 2013; Cleveland, 1991). Eventually, growing scarcity of resource stocks must dominate these other factors. For example, in spite of new technologies such as hydraulic fracturing, the supply of oil has increased by only 7% over the last ten years as market prices have increased by 130% (British Petroleum, 2012), and these figures ignore the greater energy inputs required to extract increasingly lower quality and less accessible oil deposits (Cleveland et al., 1984; Hall et al., 2014). Since 2000, resource prices have risen rapidly (Grantham, 2011).

Furthermore, the price signal fails for non-marketed ecosystem goods and services. Unregulated markets therefore systematically favor the conversion of ecosystem structure into market products over its conservation to provide un-priced ecosystem services, regardless of the relative contributions of the two to human welfare. Most economists are optimistic that simple policies can force markets to account for these non-market resources and ensure their continued provision (Simpson et al., 2005). Since these policies require government intervention, we explain them below in our discussion of the public sector.

[3] An allocation is efficient when it maximizes the ratio of benefits to costs. Defining benefits and costs is therefore essential. The benefit of economic activity is the shared well-being of this and future generations, while costs must include ecological degradation.

2.2. The Private Sector and Just Distribution in Theory and Practice

The cost share theorem in conventional economics states that markets reward factors of production such as labor, capital and natural resources according to their marginal contribution to market value.[4] This would ensure a just distribution of income only if the initial distribution of capital and natural resources were just. Market forces on a finite planet however will systematically exacerbate injustice resulting from unequal initial distributions or from stochastic events through the private capture of economic rent, or unearned income.

The classic example of rent creation is from land, a gift of nature with zero cost of production and fixed supply. The price of land is determined by the income stream it generates, and increases with its productive capacity or with the value of what it produces (Gaffney, 2009). New technologies that increase agricultural output per hectare[5] or increased demand for output from population growth or biofuels will increase prices for agricultural land, while new technologies for capturing wind or solar energy will drive up the price of windy or sunny land. In fact, since land is a required substrate for virtually all production, economic growth and technological improvements in general will drive up land prices (Gaffney, 2009).

In general, when the supply of a resource is inelastic, a small increase in demand leads to a large increase in price. When demand for a resource is inelastic—which is the case for essential and largely non-substitutable resources such as land, food, energy, or important minerals—a small percentage decrease in supply will lead to a large increase in price. Exxon for example earned a record $46 billion in corporate profits when oil prices soared in 2008 (Romero and Andrews, 2006). Therefore, when resource productivity or demand increases or when resource supply decreases, those who own the resources—typically the wealthiest fraction of society—will become dramatically wealthier. In the face of increasing demand, decreasing supply or output enhancing technologies, markets systematically exacerbate existing income inequalities.

2.3. The Private Sector and Efficient Allocation

Markets prices theoretically allocate resources towards the products that add the most monetary value then ration those products to the consumers who value them the most (as measured by willingness to pay), ensuring efficient allocation. This holds true however only for excludable resources that can be bought and sold in markets and that generate no externalities. As previously mentioned, many ecosystem goods and services are non-excludable, so markets ignore the costs of their degradation. Markets are also inefficient for non-rival resources (i.e. use by one person does not leave less for others), particularly for green technologies that may be essential for overcoming serious environmental problems. For example, if a clean, carbon free energy technology is patented, it can be sold at a very high price. Those who cannot afford royalties may continue to burn coal instead. The economic surplus from existing information is paradoxically maximized at a price of zero, at which price markets will not supply it (Kubiszewski et al., 2010).

Perhaps most important, market efficiency is narrowly defined by the satisfaction of subjective individual preferences. The market mechanism weights preferences by purchasing power, awarding resources to those willing to pay the most even if additional use contributes little to physiological needs (i.e. the conditions for sustaining life) or happiness. It is difficult to objectively assess happiness, but not physiological needs. When food prices skyrocketed in 2007–2008, the countries consuming the fewest calories per capita saw the greatest decline in consumption, while those consuming the most saw no significant change (Farley et al., in press). We expect that most readers of this article did not decrease their consumption of bread at all in response to the price of wheat tripling, even as the same price signal contributed to malnutrition, rioting and political disruption in poorer countries (Arezki and Brueckner, 2014; Berazneva and Lee, 2013). In short, markets frequently allocate essential resources towards those whose physiological benefit from additional consumption is the lowest. Integrating ecological costs into the market prices of essential resources such as food without first addressing income inequality would cause similar hardship for the poor (Farley et al., in press). The more equal the initial distribution of resources, the more likely that market price rationing will maximize human welfare in addition to monetary values.

3. Public Sector Solutions and Failures

The public sector (or a commons sector, once created) has several options for addressing the market shortcomings described. One is explicit regulations that require compliance with inflexible rules. For example, the government can limit the amount of pollution that individual firms are allowed to emit, impose limits on resource harvests (e.g. a daily catch limit or a seasonal limit on fisheries), or demand that firms use a specific technology.

However, most economists argue that the lack of flexibility is inefficient and creates little incentive to innovate. They prefer instead market-like mechanisms that allow firms to respond to price signals (Pearce and Turner, 1990). We briefly describe two approaches here that can address the problem of non-excludable resources: taxation and marketable property rights. Both approaches require the public sector to make decisions concerning sustainability and distribution before the price mechanism can function.

Imposing a tax on an undesired activity such as waste emissions or resource extraction cost effectively reduces the activity (ideally to sustainable levels) and compensates society for harm done. One potential drawback is that the level of pollution is determined by price, rather than the ecosystem's capacity to absorb waste, even though prices can adjust to ecological constraints more rapidly than ecosystems can respond to price signals (Daly and Cobb, 1994).

Taxes can also be used to address income inequality and to improve efficiency. As discussed above, rent is defined as unearned income (i.e. revenue above and beyond what is required to bring a resource to market). Rent therefore includes the return on land and other natural resources. Rent does not include fair returns to improvements to land or to the labor and capital necessary to extract resources. The social capture of rent at worst does not affect market efficiency, and at best improves it. For example, a high tax on land designed to capture rent forces landowners to put land into its most productive use in order to pay the tax. This leads to denser development of urban land, reducing urban sprawl and its associated costs: infrastructure, pollution and destruction of green space. High land taxes do not affect the supply of land, but dramatically reduce land speculation and the economic instability it causes. Virtually all assets created by nature and society as a whole generate rent, and most of this is currently captured by the private sector. Revenue from taxing rent could replace taxes on productive activities (Cobb, in press; Gaffney, 2009).

Another option is to create marketable property rights—public or private—to natural resource stocks and waste absorption capacity (Coase, 1960; Demsetz, 1967; Smith, 1981).[6] With cap and trade schemes, governments or some other collective institution establishes quotas on

[4] Ayres et al. (2013) actually show that the cost share theorem does not hold when some resources are essential and non-substitutable, such as energy.

[5] Paradoxically, because there is a very inelastic demand for food, a new technology that increased global food production could drive down the total value of food, hence the income stream from land and the price of land. However, given that food can be converted to biofuels, this outcome is highly unlikely in today's world.

[6] Ironically, while Coase is generally given credit for the idea of creating private property rights as a means to solve the problem of externalities and open access resources, he believed that this approach was only appropriate when transaction costs were minimal, which they rarely are. In his own words: "[t]he world of zero transaction costs has often been described as a Coasian world. Nothing could be further from the truth. It is the world of modern economic theory, one which I was hoping to persuade the economists to leave." (Coase, 1988, p. 174).

total resource use, ideally at or below the renewal rate of the resource, decides on the distribution of permits entitling owners to a share of the quota, then allows trading of permits in markets. This has been done successfully for sulfur dioxide and nitrogen emissions[7] in the US (Napolitano et al., 2007) and for fisheries in many countries (Costello et al., 2008; Macinko and Bromley, 2004), and is the basic mechanism behind the Kyoto protocol. When permits are distributed to current users (i.e. polluters and harvesters), those users capture the resulting rent. For example, the European Union Emission Trading Scheme (EU-ETS) initially awarded emission allowances to polluting firms, generating an estimated €19 billion in annual rent for the electricity sector alone (Keppler and Cruciani, 2008).

An alternative is to auction emission allowances or harvest permits at frequent intervals (Woerdman et al., 2008) while enforcing anti-trust rules and eliminating re-sale to reduce the potential for speculation and private capture of rent. Vermont for example is a member of the regional greenhouse gas initiative (RGGI), a 10 state cap and trade scheme for carbon emissions from the electricity sector, and auctions off 99% of its quota (RGGI Inc., 2011). With cap and auction, the public sector captures rent.

Though ecosystem services such as climate regulation and protection from UV radiation cannot be made excludable, all ecosystem services are generated by a particular configuration of ecosystem structure. It is generally possible to make the ecosystem structure and waste absorption capacity excludable, though this will frequently require international agreements and enforcement. Private property rights to ecosystem structure however can lead to perverse outcomes. For example, individuals would be unwilling to convert a wetland to farmland or aquaculture in the absence of private property rights because the resulting output would be open access. With property rights, individuals convert wetlands even when the value to society of the wetland's public good services exceeds the private benefits of conversion. In this case, private property may be even worse than no property rights (Adger and Luttrell, 2000; Farley et al., 2010).

Private property rights may also prove worse than no property rights in the case of information, and especially for information that can help provide or protect public goods, such as green technologies as previously mentioned. The public or commons sector should invest in the research, development and dissemination of technologies that promote the public good and make them freely available to all (i.e. open access) for at least three reasons. First, the private sector has little incentive to invest in providing public goods. Second, patents currently increase the cost of developing new technologies; for example, each new medical technology infringes on average upon dozens of existing patents (Heller and Eisenberg, 1998). Third, using patents to ration access to new technologies reduces use and hence benefits, without reducing costs. Many economists argue that patents are required to incentivize the creation of knowledge, but collectively funded scientists would presumably work at least as hard as their corporately funded counterparts. Rather than the monopolistic pricing associated with patents, firms could compete based on their ability to minimize production costs and maximize quality (Farley and Perkins, 2013; Kubiszewski et al., 2010).

Unfortunately, the public sector has largely failed to implement these policies, has implemented them poorly, or has weakened them where they have been implemented in the past. One reason is that governments are heavily influenced by the private sector, which lobbies vigorously against policies that could affect their profits. For example, the mining industry in the US has successfully lobbied to retain an 1872 mining bill that allows them to purchase federal land for dollars an acre and exempts them from royalties (Snyder, 2007). In the EU, businesses pressured policy makers for the EU-ETS to issue emission allowances in excess of actual emissions (Alberola et al., 2008; Porto, 2010).[8]

In the US, taxes on rent, resource extraction and pollution are negligible and declining. Vermont for example has no severance taxes. The inflation adjusted federal gas tax has declined steadily since 1994. Taxes on unearned income have also declined, and are currently much lower than taxes on earned income (Hudson, 2012). The federal government has virtually stopped collecting royalties on offshore oil (Andrews, 2007) and instead subsidizes the fossil fuel industry for billions of dollars a year (Kocieniewski, 2010). Since 1980, Public law 516–517 (commonly known as the Bayh–Dole act) the private sector has been allowed to patent the results of government-financed research.

Wealth and income inequality is rapidly increasing around the world (Picketty, 2014) including in the state of Vermont (Bernstein et al., 2008) and has reached record levels in US as a whole (Saez, 2013). Recent rulings in the US supreme court have struck down many limits on campaign spending. The likely result is increased subservience of the public sector to big private sector money.

In short, in spite of their many positive features, both markets and government are failing to solve the problems of central concern to society.

4. The Promise of the Commons

The commons refers to resources collectively owned by all and managed by mutual agreement. The movement to distinguish common property from public property arises from the role of the state in turning public property over to the private sector with little or no compensation. For example, in the US 98% of broadcast spectrum has been given away for free to media companies, and only 2% auctioned. There are many different ways to manage common property resources. This article focuses largely on the institution of a Common Assets Trust (CAT) and specifically on the Vermont Common Assets Trust (VCAT). A CAT is uniquely suited to address the most serious societal challenges we face. It can impose limits on throughput, internalize externalities, and ensure that benefits created by nature and society as a whole are fairly distributed. It can also invest in the technologies that must contribute to solving pressing societal problems.

A commons sector in general and a CAT in particular complement the private and public sectors rather than replacing them. In many ways it fulfills the role that the public sector should fulfill if it were not so subject to private sector influence, but goes even further by creating legally binding inalienable rights to common assets for this and future generations. The public sector must create a CAT, but this requires only a brief window of opportunity in which politicians are willing to place the common good ahead of private interests (Barnes, 2006). Once a CAT exists, it will be difficult to destroy in a democratic society, as voters would correctly perceive its loss as taking away their property rights. This section will explain what assets should be included in a CAT, how they should be included, and how their inclusion can address the major societal problems outlined above.

It is first necessary however to dispel some misconceptions about the commons. Hardin used the phrase 'tragedy of the commons' to describe the over-exploitation of non-excludable but rival resources (Hardin, 1968), and proposed as a solution "mutual coercion, mutually agreed upon" (p. 1247). At the same time, many economists have called for expansion of private property rights to address the tragedy (Anderson, 2004; Coase, 1960). However, the phrase 'tragedy of the commons' is a misnomer. The tragedy results from the lack of ownership, and not from common ownership, which allows a community to effectively exclude outsiders (Bromley, 1991; Ciracy-Wantrup and Bishop, 1975). Resources that are owned in common can be effectively managed through

[7] The renewal rate in the case of pollutants is waste absorption capacity, i.e. pollutants should be emitted no faster than ecosystems can absorb them. Limits on nitrogen emissions far exceed absorption capacity.

[8] To be fair, the initial stage of the EU-ETS was meant to build the necessary infrastructure, and not necessarily to reduce emissions (Ellerman and Joskow, 2008), but emissions allowances also frequently exceeded emissions during the second stage.

decentralized collective institutions that assure cooperative compliance with established rules (Feeny et al., 1990; Berkes, ed. 1989; Ostrom, 1990), to be discussed in Section 5.

Common ownership through a CAT can avoid the tragedy of open access resources and also overcome the numerous other market failures described above.

4.1. What Resources Should Be Included in VCAT?

The VCAT bill is the first comprehensive CAT legislation that we are aware of and no agreed upon methods exist for determining which assets should be included in the trust or how they should be included. The bill explicitly calls for including "natural assets such as undisturbed habitats, entire ecosystems, biological diversity, waste absorption capacity, nutrient cycling, flood control, pollination, raw materials, fresh water replenishment systems, soil formation systems, and the global atmosphere; and also… social assets such as the internet, our legal and political systems, universities, libraries, accounting procedures, science and technology, transportation infrastructure, the radio spectrum, and city parks" (Vermont House Bill 385, 2011, p. 4). The bill also suggests some specific guidelines. First, the bill seeks to protect common assets for the benefit of present and future generations, and states that "inalienable rights of all humans logically should include rights of access to common assets essential for life" (p. 3), suggesting sustainability should be one criterion for inclusion. Second, the bill identifies assets that were "inherited or created together" (p. 3), implying that justice is a second criterion. Though not directly mentioned in the bill, efficiency is a logical third criterion. When a CAT can be expected to generate 1) more monetary value or 2) greater social welfare from a resource than private or state property rights (Farley, 2010), the resource or the rent it generates should be included.

The concepts of rivalry and excludability are helpful for determining what resources should be included, and how to include them.

4.1.1. Rival but Currently Non-excludable Resources

Creating common property rights to open access resources is fairly straightforward, as it does not take away existing property rights. The most relevant open access resources in Vermont are waste absorption capacity (e.g. for CO_2, nitrogen, phosphate, and other pollutants) and water. The VCAT would be legally required to eventually cap waste emissions at or below waste absorption capacity. In the short run, this might not be possible for the absorption capacity for CO_2, phosphorous, or other emissions generated by activities that provide essential and non-substitutable benefits. Global CO_2 emissions for example need to be reduced by at least 80% to prevent atmospheric concentrations from increasing to dangerous levels (IPCC, 2007), but such dramatic reductions in the short run could threaten economic collapse. An ecological threshold conflicts with an economic threshold. Achieving 80% reductions without economic collapse will require dramatic structural changes in the economy, efficiency improvements and alternative energy sources, but such changes take time. A CAT would therefore need to gradually reduce emissions to sustainable levels, ideally while contributing to the development of new technologies (Kirk, 2010). While reducing Vermont's CO_2 emissions alone would have negligible impact on global warming, responsibility for governing common resources must be built up in nested tiers from the lowest level to the entire interconnected system (Ostrom, 2002).

There is an ongoing debate whether a cap and trade scheme or taxation is the best way for a government or commons sector to manage currently non-excludable, rival resources (Hansen et al., 2008; Kahn and Franceschi, 2006). As Herman Daly has pointed out, with a cap, throughput limits are price determining, and with taxes, prices determine throughput (Daly and Cobb, 1994). Following the definitions provided by Calabresi and Melamed (1972) as well as Bromley (1978) the VCAT would give future generations an inalienable entitlement to essential resources and a healthy environment. Taxes in contrast impose a liability rule; the polluter is allowed to cause harm in exchange for payment (Bromley, 1978), but there is no guarantee that the level of harm will honor the inalienable entitlements of the future. Cap and trade, based on property rules, can limit resource use to regeneration capacity and waste emissions to absorption capacity while respecting the entitlements of future generations. Since the CAT awards property rights to all citizens, a cap and auction scheme is required. Frequent auctions with no subsequent trading both captures rent and avoids speculation (Barnes, 2006; Boyce and Riddle, 2007; Daly and Farley, 2010).

4.1.2. Non-rival Resources

All non-rival resources are also candidates for inclusion in VCAT, since price rationing reduces their value and market forces are unlikely to provide them without price rationing. Non-rival resources should be open access and hence require collective investment and protection (Daly and Farley, 2010; Kubiszewski et al., 2010). Two categories of non-rival resources merit attention: ecosystem services, which are primarily public goods, and information, which can be privately owned.

Many ecosystem services such as habitat for biological diversity, flood control, and pollination are both non-rival and non-excludable and hence require collective provision and protection (Farley and Costanza, 2010). However, they are generated by a particular configuration of ecosystem structure, much of which is privately owned. While arguably these private assets are a common inheritance of all Vermonters, most private owners purchased them under rules that allow management for private benefits. In this case, justice may demand that landowners be compensated for managing their resources for the public good, for example through a payment for ecosystem services (PES) scheme (Muradian et al., 2010). Vermont's Use Value Appraisal law already gives tax breaks to landowners who manage their land for forestry, agriculture, or ecosystem services, which generate more public good benefits than development, but in some cases, additional compensation may be appropriate (Kemkes, 2008; Massanari, 2007).

New technologies will almost certainly be necessary (though far from sufficient) to reduce throughput to sustainable levels without provoking economic collapse. The VCAT should invest in technologies that help reduce throughput, such as low carbon energy alternatives and efficiency improvements and make them open source to maximize their value.[9]

4.1.3. Rival and Excludable Resources

The remaining category, rival and excludable natural and social resources, includes what are conventionally considered market goods: land, timber, water (where laws regulate access), minerals, airwaves, and so on.[10] Most of these resources are gifts of nature, "created or inherited together" and/or "common assets essential to life", and hence remain potential candidates for inclusion in a CAT.

When the state is the legal owner of these resources, but returns from the resource are being inequitably distributed among Vermont's citizens, then property rights should be directly transferred to the commons. For example, though water is a public trust in Vermont, the government currently allows water bottlers to extract it free of charge even though there is inadequate information to determine if excessive extraction causes ecological harm or economic shortages (Kelly, 2013). A VCAT would ensure that water was allocated towards basic needs and healthy ecosystems before auctioning off or taxing any surplus used for commercial purposes. Airwaves and state lands, including their mineral wealth, should also be managed as common assets. If the state has

[9] One possibility would be to make information created by the VCAT open access only for residents of Vermont, including all businesses, which in turn would be required to make any improvements on this knowledge open access as well. This could attract green businesses and entrepreneurs to Vermont, potentially creating a 'green valley' to rival California's silicon valley, but would reduce total environmental benefits compared to open access information.

[10] Fossil fuels, extremely important rival assets, are not found in Vermont in any significant quantities, but are highly relevant to CATs in other states or at the national level.

given assets to the private sector for free or sold them for less than full value, they should be restored to the commons, if legally possible. Airwaves frequently fall into this category,

When the resource is privately owned but generates rent, the commons sector can be assigned the right to tax away that rent for the common good while leaving the asset itself in private ownership. Land is the classic example of a rent-generating resource, as its inherent value is created by nature and society as a whole. Unfortunately, much of the rent from land was captured by previous owners—for example, speculators who profited from real estate bubbles—and is therefore difficult to regain. To be fair to current owners, it would be best to shift taxes from value added (i.e. buildings) to the land itself then gradually increase the tax on land over time, or impose 100% taxes on increases in land prices independent from owner improvements. Such taxes would eliminate the speculative demand for land and prevent future real estate bubbles, stabilizing the economy. Severance taxes on natural resource extraction are another way to capture rent. Gaffney (2009) provides an excellent list of additional assets that generate rent. Economists almost universally recognize that capturing rent does not create the economic distortions that other taxes can cause because it does not affect supply.

4.2. How Much Revenue Could Be Captured?

How much revenue can be captured by a VCAT depends on how many different assets it manages, and how they are managed. Gaffney (2009) shows how simply capturing the rent from land through land value taxes could easily fund government. In the short term however, probably the two assets with the greatest immediate potential to become part of the VCAT are groundwater and waste absorption capacity for CO_2, phosphorous and nitrogen. There is widespread support in Vermont for making these resources common assets. A 2010 poll found that 95.2% of Vermonters believe that "Vermont's atmosphere is a resource that belongs to all Vermonters equally", and 82.5% believe that "individuals or companies should be charged money if they pollute the atmosphere" (Kirk, 2010). A 2011 survey found that 82% of Vermonters favor charges for water extraction, and 93% favor charges for water pollution (Kelly, 2013).

In 2009, bottling companies extracted about 33 million gallons of groundwater from Vermont. The proposed $0.28 per gallon tax could potentially generate just over $9 million in annual revenue, assuming that it did not lead to a decrease in production. In theory collecting rent has no impact on supply, but if bottler and retailers currently collect most of the rent and could source water from other states that do not tax rent, the Vermont industry could shut down. In any event, other commercial water uses overwhelm bottled water. The state currently charges municipal water systems $.0000359/gal for groundwater extraction. Simply applying this fee to commercial, industrial and agriculture users as well would generate $668,278 annually from the 51 million gallons per day extracted. Increasing this charge by a factor of 10 would increase household water costs by only about $.80 per month (Kelly, 2013).

The capture of revenue from carbon emissions is far more difficult to estimate though potentially far larger. The demand for fossil fuels and hence the demand for emissions from fossil fuel combustion is highly inelastic, meaning that a small reduction in quantity leads to a large change in price, though it is very difficult to say by how much. Estimates of short run price elasticity of demand (E_d) average about 0.23 (Stern, 2006), with considerable variation depending on use. This means that a 1% increase in price would decrease demand by 0.23%, or that a 1% decrease in supply would increase price by 4.3%. E_d increases in the long run, as consumers have time to adapt, with estimates ranging from .4 for gasoline to .7 for electricity (Carbon Tax Center, 2011). However, as caps grow tighter, people would have to forego increasingly important uses of fossil fuel, which would lead to increasingly inelastic demand and higher prices (Kirk, 2010). For example, a 9% decrease in supply in US between 1978 and 1980 induced a 108% price increase, suggesting an E_d of ~.08 (British Petroleum, 2012). Predictably higher prices on the other hand may lead to more rapid technological advances and societal adaptations that increase long run elasticity. Large price increases in the past have caused serious economic problems, but these transferred income from oil consumers to oil producers. In the case of the VCAT, all income would remain in the state, and could be targeted towards solving any problems that arise. The major impact would be a shift towards less energy intensive consumption and production.

In 2002 Vermont's Governor Howard Dean issued an Executive Order establishing goals for GHG emission reductions of 25% below 1990 levels by 2012, 50% by 2028 and 75% by 2050. Vermont has missed the 2012 target, and to achieve the 2028 target would require emission reductions of approximately 4.3% per year from 2013 levels.[11] Assuming an elasticity of demand for CO_2 emissions of about 0.23 (Stern, 2006), a roughly $19 per barrel tax would reduce oil consumption by 4.3%. Since a barrel of oil contains approximately .42 tons of CO_2 (Ferguson et al., 2009), this corresponds to a carbon permit auction price of roughly $44/tCO_2$, which would generate revenues in the first year of approximately $332 million.[12] Price inelastic demand means that revenues would increase in future years as the number of permits declined. Since a large share of Vermont's emissions come from gasoline and a negligible share from electricity, we conservatively assume a long run elasticity of 0.4 (Carbon Tax Center, 2011), which means that in 2028, oil prices would have to increase by 108%, carbon permit prices would sell for $108 ton, and revenue would be on the order of $430 million per year. [13]

However, according to the IPCC, reductions of 75% in the developed nations by 2050 still pose a high risk of catastrophic climate change (defined as greater than 2 °C) (IPCC, 2013). To keep atmospheric carbon concentrations and hence the severity of climate change from increasing indefinitely, global society must reduce emissions by at least 80%, and global equity considerations would demand that Vermont reduce emissions by much more. How quickly we can achieve this will determine the final atmospheric concentration and the risk of catastrophic change. Hansen et al. (2008) argue that we should aim for 350 parts per million (ppm) atmospheric CO_2, less than current levels, which would require even more rapid reductions. Legal obligations to future generations would force the VCAT to undertake sharper reductions than those proposed by Governor Dean, hence generating greater revenue, unless costs to current society proved catastrophic. Such costs depend extensively on the development and adoption of new technologies and new infrastructure, and hence on the expenditure of VCAT revenue, as will be discussed below.

Three initial estimates of potential revenue capture from the incorporation of other assets into the VCAT bear mentioning. The auction value of broadcast airwaves in Vermont is estimated at $375 million per year while the annual increase in land values is estimated at $330 million. A 0.25% tax on financial transactions could generate $269 million (Flomenhoft and Baehr, 2008). To put these numbers in context, Vermont collected about $1.16 billion in taxes in 2013 (O'Sullivan et al., 2014).

[11] Vermont emissions were about 8 million metric tons (MMT) in 1990, 8.11 MMT in 2011 and an estimated 8 MMT for 2012 (ANR). Our calculations assume that emissions fell an additional 0.1 MMT in 2013, reaching 7.89 MMT.

[12] The equation for price elasticity of demand is $E_d = (\Delta Q / Q)/(\Delta P / P)$, hence $\Delta P = P(\Delta Q / Q) / E_d$. If $\Delta Q / Q = -4.3\%$, $E_d = .23$, and the price of oil is about ~$100 barrel, then ΔP = ~$19/barrel. ($19/barrel) / (.42 tCO_2/barrel) = $44/$tCO_2$. A 4.3% reduction in emissions from 7.89 MMT = $44 / tCO_2 * 7.87 MMT = ~$332 million.

[13] Estimates of long run $E_d = .4$ for gasoline are point estimates based on current consumption and small reductions. Furthermore, the steady decrease in supply would mean that the short run elasticity estimates would apply to recent reductions, and the long run estimates only to earlier reductions. On the other hand, alternative energy costs are falling rapidly. Any estimate of E_d for large reductions over long time periods is little better than a guess. Nordhaus (2007) estimates that we would require a global tax of ~$500/tC, or about $136/$tCO_2$ to achieve a similar level of reduction.

4.3. How Should Revenue Be Spent? Dividends or Investments

An ongoing debate among proponents of CATs and carbon cap and auction systems is whether the revenue should be invested by the VCAT trustees for the common good, or distributed equally as a dividend to all citizens (Barnes and McKibben, 2009; Boyce and Riddle, 2007; Costanza and Farley, 2009; Kirk, 2010). If the central purpose of the VCAT is to promote ecological sustainability and just distribution then these options should be evaluated according to those criteria. Political feasibility is also important. The VCAT bill currently mandates that 25% of revenue be returned as a dividend.

If VCAT takes inalienable property rights seriously, and reducing pollution to sustainable levels in the short run has unacceptable costs, then investment may be necessary. Investing VCAT revenue in developing and adopting green technologies could dramatically speed up the emissions reduction process. Currently, efficiency measures in the power sector in Vermont currently cost about $0.04/kW h, compared with a retail electricity price over $0.13/kW h (Efficiency Vermont, 2015). One influential report estimates that by 2030 it would be possible to reduce global emissions 58% over the business as usual scenario, corresponding to a 38% reduction over current emissions, at a net savings (Naucler and Enkvist, 2009). However, the private sector has perversely failed to take advantage of such savings. Reinvesting the revenue from carbon auctions into energy efficiency measures in the power sector may have five to seven times greater impact on reducing carbon emissions than the price signal alone (Cowart, 2008). The private sector has not eliminated negative-cost carbon emissions presumably because it would require significant up-front investments (Naucler and Enkvist, 2009). VCAT revenue could help finance these activities. Also, as discussed above, both the public and private sector currently fail to invest adequate resources in green technologies, and when the private sector does so, it creates artificial scarcity through price rationing. Recycling VCAT revenue back into RD&D for open source green technologies could increase the long run price elasticity of emissions and thus reduce costs for any given level of reductions. This would allow a rapid increase in reductions (i.e. a tightening of caps or an increase in taxes) without causing unacceptable economic hardships. Vermont currently auctions off 99% of its RGGI permits and invests 98% of the proceeds in energy efficiency (RGGI Inc., 2011).

In distinct contrast, a dividend would likely be spent on increased consumption. An estimated 65% of Vermonters' consumption expenditures are spent on goods and services from out of state (Hoffer and Kahler, 2000), where there may be no restrictions on throughput. A cap and dividend therefore is likely to reduce emissions by much less than a cap and invest approach.

However, if the goal of the VCAT is primarily just distribution, then a cap and dividend may be more appropriate. While the rich clearly spend absolutely more on most types of throughput than the poor, the poor spend a far higher percentage of their incomes on throughput. Financing investments in the common good using VCAT revenue would be similar to financing them with a regressive income tax. In contrast, a cap and dividend scheme would systematically redistribute wealth from the upper income brackets to the lower ones. At the national level, one study found that a cap and dividend policy for carbon would redistribute wealth from the wealthiest 40% to the poorest 60% (Boyce and Riddle, 2007).

The distributional impacts have led many people to favor a cap and dividend approach to carbon auctions both because it is more fair and also because it is widely considered more politically feasible, as everyone would receive a dividend payment. However, Table 1 shows the results from a 2010 statewide survey (N = 530) asking Vermonters "If individuals and companies in Vermont were charged money for polluting the atmosphere, how do you think that money should be spent?" Coupled with the fact that 98% of Vermont's RGGI revenue is currently spent on energy efficiency, a cap and investment strategy appears politically feasible.

Table 1
Results from a 2010 Vermonter Poll Survey on the allocation of VCAT revenue (Kirk, 2010).

"If individuals and companies in Vermont were charged money for polluting the atmosphere, how do you think that money should be spent?"	
Divided up and returned to each Vermonter as a payment check	5.8%
Invested into preserving natural resources like clean air and clean water for the public's benefit	64.2%
Invested into providing social wellbeing like education and healthcare for the public's benefit	14.2%
A combination of a check and investment in public benefits	15.8%

However, it is not necessary to choose between ecological sustainability and just distribution. In fact, the availability of so many negative-cost approaches to protecting the environment means that an effective cap and invest policy could potentially make the poor even better off than a cap and dividend. Preliminary results from RGGI suggest that every dollar invested in energy efficiency and renewable energy yields $3–$4 in savings; in other words, such investments are equivalent to tripling or quadrupling RGGI revenue. Households see significant savings of 15–30% on their energy bills, and thus capture much of that revenue directly (RGGI Inc., 2011). People fail to pursue these initiatives in part due to a lack of information, and acquiring information is costly. A VCAT however could make efficiency investments with positive returns the default alternative. It could pay for an audit for home owners (saving them the costs of acquiring information), offer financing at or below the estimated rate of return on efficiency investments, and move ahead with retrofits unless the homeowner actively opts out. Research in behavioral economics have shown such 'opt out' approaches to be highly effective without reducing freedom of choice (Ariely, 2008; Thaler and Sunstein, 2008). To address income distribution, interest rates and repayment schedules could be more lenient for low-income homeowners, ensuring them a dividend.

5. VCAT, Conventional Economic Incentives, and Design Principles for Common Pool Resources

Several policies suggested here for managing the VCAT, such as cap and auction schemes or taxes on rent are relatively conventional economic incentives that have been widely utilized without first establishing a CAT. Why bother then to establish a CAT? It is also worth asking the extent to which the VCAT conforms to the eight design principles for successfully managing common pool resources (i.e. rival but non-excludable resources) suggested by Elinor Ostrom and her colleagues. The answers to these questions are related.

To begin with, conventional economic incentives generally prioritize efficient allocation over sustainable scale and just distribution, while the VCAT prioritizes the latter two, as called for by many ecological economists (e.g. Daly, 1992). In addition, the VCAT creates an umbrella institution that simultaneously manages numerous resources, which otherwise require separate policies. Implementing the policies one by one is an enormous challenge that raises transaction costs. Since ecosystem functions are generated by a particular configuration of ecosystem structure, regulations or economic incentives affecting only a subset of resources is generally insufficient to maintain all desired ecosystem functions. Furthermore, explicitly turning rights to these resources over to citizens helps generate citizen support for the policy. Other advantages of VCAT over conventional incentives arise from its application of Ostrom's design principles, listed below in bold.

By declaring certain assets the shared property of all Vermonters, the community of beneficiaries has *clearly defined boundaries*, and all Vermonters will have an incentive to *monitor* their fellow citizens and ensure that no individuals takes what belongs to all. Those who do take more than their share are likely to be first rebuked by their compatriots, and if rebuke fails, reported to the law—an example of *graduated sanctions*. As Wilson et al. (2013) write, when citizens have "a sense of ownership, monitoring and graduated sanctions take place spontaneously." (p. 529). Cap and auction schemes ensure that everyone who

uses common assets must pay the same price, with resulting revenue spent on the common good, while taxes on rent ensure that no one captures unearned profits from common assets; both policies ensure *proportional equivalence between benefits and costs*. Existing legal structures provide *conflict resolution mechanisms* that are widely perceived as fair. Implementation of the VCAT should pay close attention to two other principles: *collective choice arrangements* and *minimal recognition of rights to organize*, both of which relate to the unwillingness of people to accept rules imposed from above. With town meetings, accessible state government, a viable third party and very active civil society, government in Vermont exemplifies these principles, and communication between the board of trustees, town meetings and civil organizations should be built into the VCAT. However, we must also recognize that the VCAT is designed to protect the rights of future generations, which clearly cannot help formulate rules and goals. The need to respect ecological limits must therefore be non-negotiable. Finally, the VCAT explicitly proposes limits on waste emissions that cross state borders, ranging from greenhouse gasses to nitrogen runoff. *Appropriate coordination* between Vermont and the RGGI states currently exists for greenhouse gasses, but this is only one of many border-crossing pollutants. Our hope is that the VCAT can serve as a model for CATs at a larger scale, such as the global atmospheric CAT proposed by Ostrom and her colleagues (Barnes et al., 2008).

6. Summary and Conclusions

Society currently faces serious ecological and economic challenges that are not being addressed by either the public or private sector. With a legal mandate to ensure both sustainable throughput and just distribution, the VCAT could address these challenges. The VCAT would regulate access to rival resources, protect and provide non-rival resources without price rationing, naturally internalize externalities by shifting the decision unit from the individual to society, and capture rent for society as a whole (Barnes, 2006).

These results of course hinge on the VCAT's immunity from influence by the private sector and by future politicians influenced by the private sector. Short of a constitutional amendment, this may be difficult. However Social Security and Medicare are examples of institutions that may have achieved an adequate level of immunity. Alternatively, if society could implement laws that forced the public sector to fulfill VCAT's role, a common asset trust would be unnecessary (Raffensperger et al., 2009). The public trust doctrine (Wood, 2014) states that governments already have the legal and fiduciary responsibility to protect and restore common assets. A CAT can thus be seen as one possible way of implementing this responsibility in a way that minimizes transaction costs and is relatively immune from inappropriate manipulation.

There are no perfect solutions to society's most serious challenges, but the proposed CAT has enormous potential to improve the situation. Perhaps the greatest value of the VCAT is as a pilot study, that, if successful, can be replicated and expanded at different scales.

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References

Adger, W.N., Luttrell, C., 2000. Property rights and the utilisation of wetlands. Ecol. Econ. 35, 75–89.
Alberola, E., Chevallier, J., Chèze, B., 2008. Price drivers and structural breaks in European carbon prices 2005–2007. Energy Policy 36, 787–797.
Anderson, T.L., 2004. Donning Coase-coloured glasses: a property rights view of natural resource economics. Aust. J. Agric. Resour. Econ. 48, 445–462.
Andrews, E.L., 2007. Government cannot halt oil incentives, judge rules, New York Times. New York Times, New York.
Arezki, R., Brueckner, M., 2014. Effects of international food price shocks on political institutions in low-income countries: evidence from an international food net-export price index. World Dev. 61, 142–153.
Ariely, D., 2008. Predictably Irrational. Harper Collins, New York.
Ayres, R.U., van den Bergh, J.C.J.M., Lindenberger, D., Warr, B., 2013. The underestimated contribution of energy to economic growth. Struct. Chang. Econ. Dyn. 27, 79–88.
Barnes, P., 2006. Capitalism 3.0. A Guide to Reclaiming the Commons. Berrett-Koehler Publishers, San Francisco.
Barnes, P., McKibben, B., 2009. A simple market mechanism to clean up our economy. Solutions 1, 30–38.
Barnes, P., Costanza, R., Hawken, P., Orr, D., Ostrom, E., Umana, A., Young, O., 2008. Creating an earth atmospheric trust. Science 319, 724.
Barnett, H., Morse, C., 1963. Scarcity and Growth: The Economics of Natural Resource Availability. John Hopkins University Press, Baltimore, MD.
Berazneva, J., Lee, D.R., 2013. Explaining the African food riots of 2007–2008: an empirical analysis. Food Policy 39, 28–39.
Berkes, F. (Ed.), 1989. Common Property Resources – Ecology and Community Based Sustainable Development. Belhaven Press, London.
Bernstein, J., McNichol, E., Nicholas, A., 2008. Pulling Apart: A State-by-state Analysis of Income Trends.
Bollier, D., 2002. Silent Theft: The Private Plunder of Our Common Wealth. Routledge, New York.
Boyce, J.K., Riddle, M., 2007. Cap and Dividend: How to Curb Global Warming While Protecting the Incomes of American Families. Political Economy Research Institute, University of Massachusetts, Amherst, MA.
British Petroleum, 2012. Statistical review of world energy, full report 2012Online: http://www.bp.com.
Bromley, D.W., 1978. Property rules, liability rules, and environmental economics. J. Econ. Issues 12.
Bromley, D., 1989. Entitlements, missing markets, and environmental uncertainty. J. Environ. Econ. Manag. 17, 181–194.
Bromley, D., 1991. Environment and Economy: Property Rights and Public Policy. Blackwell, Oxford.
Calabresi, G., Melamed, A.D., 1972. Property rules, liability rules, and inalienability: one view of the cathedral. Harv. Law Rev. 85, 1089–1128.
Carbon Tax Center, 2011. FAQsOn-line: http://www.carbontax.org/faq/.
Ciracy-Wantrup, S.V., Bishop, R.C., 1975. Common property as a concept in natural resource policy. Nat. Resour. J. 15, 713–727.
Cleveland, C.J., 1991. Natural resource scarcity and economic growth revisited. In: Costanza, R. (Ed.), Ecological Economics: The Science and Management of Sustainability. Columbia University Press, New York, pp. 289–317.
Cleveland, C.J., Costanza, R., Hall, C.A.S., Kaufmann, R., 1984. Energy and the United States economy: a biophysical perspective. Science 225, 890–897.
Coase, R., 1960. The problem of social cost. J. Law Econ. 3, 1–44.
Coase, R., 1988. The Firm, the Market and the Law. University of Chicago Press, Chicago.
Cobb, C., 2014. Ecological and Georgist economic principles: a comparison. In: Farley, J., Malghan, D. (Eds.), Beyond Uneconomic Growth. Edward Elgar, Northampton, MA (in press).
Costanza, R., Farley, J., 2009. What should Be done with the revenues from a carbon-cap-and-auction system? Solutions 1, 33.
Costello, C., Gaines, S.D., Lynham, J., 2008. Can catch shares prevent fisheries collapse? Science 321, 1678–1681.
Cowart, R., 2008. Carbon caps and efficiency resources: how climate legislation can mobilize efficiency and lower the cost of greenhouse gas emission reduction. Vt. Law Rev. 33, 201–223.
Daly, H.E., 1977. Steady-state Economics: The Political Economy of Bio-physical Equilibrium and Moral Growth. W. H. Freeman and Co., San Francisco.
Daly, H.E., 1990. Towards some operational principles for sustainable development. Ecol. Econ. 1–6.
Daly, H.E., 1992. Allocation, distribution, and scale: towards an economics that is efficient, just, and sustainable. Ecol. Econ. 6, 185–193.
Daly, H.E., 1996. Beyond Growth: The Economics of Sustainable Development. Beacon Press, Boston, MA.
Daly, H.E., Cobb Jr., J.B., 1994. For the Common Good: Redirecting the Economy Toward Community, the Environment, and a Sustainable Future, 2nd ed. Beacon Press, Boston.
Daly, H.E., Farley, J., 2010. Ecological Economics: Principles and Applications, 2nd ed. Island Press, Washington, DC.
Demsetz, H., 1967. Toward a theory of property rights. Am. Econ. Rev. 57, 347–359.
Efficiency Vermont, 2015. Savings claim summary. Efficiency Vermonton-line: https://http://www.efficiencyvermont.com/docs/about_efficiency_vermont/annual_summaries/2013_savingsclaim_summary.pdf.
Ellerman, A.D., Joskow, P.L., 2008. The European Union's Emissions Trading System in Perspective. Pew Center on Global Climate Change, Washington, DC.
Farley, J., 2008. The role of prices in conserving critical natural capital. Conserv. Biol. 22, 1399–1408.
Farley, J., 2010. Conservation through the economics lens. Environ. Manag. 45, 26–38.
Farley, J., Costanza, R., 2010. Payments for ecosystem services: from local to global. Ecol. Econ. 69, 2060–2068.
Farley, J., Perkins, S., 2013. Economics of information in a green economy. In: Robertson, R. (Ed.), Building a Green Economy. Michigan State University Press, East Lansing, Michigan.
Farley, J., Batker, D., de la Torre, I., Hudspeth, T., 2010. Conserving mangrove ecosystems in the Philippines: transcending disciplinary, institutional and geographic borders. Environ. Manag. 45, 39–51.

Farley, J., Schmitt Filho, A., Burke, M., Farr, M., 2014. Extending market allocation to ecosystem services: moral and practical implications on a full and unequal planet. Ecol. Econ. http://dx.doi.org/10.1016/j.ecolecon.2014.06.021 (in press).
Farnsworth, E., Tidrick, T.H., Smathers, W.M., Jorda, C.F., 1983. A synthesis of ecological and economic theory toward a more complete valuation of tropical moist forests. Int. J. Environ. Stud. 21, 11–28.
Feeny, D., Berkes, F., McCay, B., Acheson, J., 1990. The tragedy of the commons: twenty-two years later. Hum. Ecol. 18, 1–19.
Ferguson, R.C., Nichols, C., Leeuwen, T.V., Kuuskraa, V.A., 2009. Storing CO_2 with enhanced oil recovery. Energy Procedia 1, 1989–1996.
Flomenhoft, G., Baehr, A., 2008. Valuing Common Assets for Public Finance in Vermont. Vermont Green Tax and Common Assets Project, MPA Program and Gund Institute, University of Vermont, Burlington, VT.
Frank, R., 1999. Luxury Fever: Why Money Fails to Satisfy in an Era of Excess. Free Press, New York.
Gaffney, M., 2009. The hidden taxable capacity of land: enough and to spare. Int. J. Soc. Econ. 36, 328–411.
Georgescu-Roegen, N., 1975. Energy and economic myths. South. Econ. J. 41, 347–381.
Grantham, J., 2011. Time to wake up: days of abundant resources and falling prices are over forever. GMO Quarterly Letter. GMO, (April, on-line: https://http://www.gmo.com/America/CMSAttachmentDownload.aspx?target=JUBRxi51IlDP3z3Mx7hvxzesmSHxWZlwIOChFSF4nHpjoAkwvu9nJlsKspecUozvlGzfFU3HkYFeRCGfqHG8MfaCB6QEY1SD).
Hall, C.A.S., Lambert, J.G., Balogh, S.B., 2014. EROI of different fuels and the implications for society. Energy Policy 64, 141–152.
Hansen, J., Sato, M., Kharecha, P., Beerling, D., Berner, R., Masson-Delmotte, V., Pagani, M., Raymo, M., Royer, D.L., Zachos, J.C., 2008. Target atmospheric CO_2: where should humanity aim? Open Atmos. Sci. J. 2, 217–231.
Hardin, G., 1968. The Tragedy of the Commons. ,pp. 1243–1248.
Heller, M., Eisenberg, R., 1998. Can patents deter innovation? The anticommons in biomedical research. Science 280, 698–701.
Hoffer, D., Kahler, E., 2000. The Vermont Job Gap Study: The Leaky Bucket: An Analysis of Vermont's Dependence on Imports. Peace & Justice Center, Burlington, VT.
Hudson, M., 2012. The Bubble and Beyond. ISLET.
IPCC, 2007. Climate change 2007: the physical science basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge.
IPCC, 2013. Climate Change 2013. The Physical Science Basis Summary for Policymakers. United Nations, (on-line: http://www.ipcc.ch/).
Kahn, J.R., Franceschi, D., 2006. Beyond Kyoto: a tax-based system for the global reduction of greenhouse gas emissions. Ecol. Econ. 58, 778–787.
Kelly, B., 2013. Common Property Rights and Adaptive Governance: A Case Study of Groundwater in Vermont, Community Development and Applied Economics. University of Vermont, Burlington, VT.
Kemkes, R.J., 2008. Policy tool choice for ecosystem service provision: payments and public information(Masters Thesis) Community Development and Applied Economics. University of Vermont, Burlington.
Keppler, J.H., Cruciani, M., 2008. Rents in the European power sector due to carbon trading. Energy Policy 38, 4280–4290.
Kirk, D., 2010. Allocating Vermont's Trust; Dividends or Public Investment From Carbon Cap and Auction Revenues, Community Development and Applied Economics. University of Vermont, Burlington, p. 113.
Kocieniewski, D., 2010. As oil industry fights a tax, it reaps subsidies, New York Times. New York Times, New York.
Kubiszewski, I., Farley, J., Costanza, R., 2010. The production and allocation of information as a good that is enhanced with increased use. Ecol. Econ. 69, 1344–1354.
Lessig, L., 2004. Free Culture: How Big Media Uses Technology and the Law to Lock Down Culture and Control Creativity. Penguin Press.
Levine, A.S., Frank, R.H., Dijk, O., 2010. Expenditure cascades. Available at SSRN: http://ssrn.com/abstract=1690612 (accessed 3/15/11).
Limburg, K.E., O'Neill, R.V., Costanza, R., Farber, S., 2002. Complex systems and valuation. Ecol. Econ. 41, 409–420.
Macinko, S., Bromley, D.W., 2004. Property and fisheries for the twenty-first century: seeking coherence from legal and economic doctrine. Vt. Law Rev. 28, 623–661.
Martinez Alier, J., 2003. The Enviromentalism of the Poor. Edward Elgar, London.
Massanari, J., 2007. Maximizing the Public and Private Benefits of Vermont's Forests: Finding a Balance Between the Production of Forest Products and the Provision of Ecosystem Services, Community Development and Applied Economics. University of Vermont, Burlington, p. 132.
Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington, DC.
Muradian, R., 2001. Ecological thresholds: a survey. Ecol. Econ. 38, 7–24.
Muradian, R., Corbera, E., Pascual, U., Kosoy, N., May, P.H., 2010. Reconciling theory and practice: an alternative conceptual framework for understanding payments for environmental services. Ecol. Econ. 69, 1202–1208.
Napolitano, S., Schreifels, J., Stevens, G., Witt, M., LaCount, M., Forte, R., Smith, K., 2007. The U.S. Acid Rain Program: key insights from the design, operation, and assessment of a cap-and-trade program. Electr. J. 20, 47–58.
Naucler, T., Enkvist, P.A., 2009. Pathways to a Low-carbon Economy — Version 2 of the Global Greenhouse Gas Abatement Cost Curve. McKinsey & Company.
Nordhaus, W., 2007. Critical assumptions in the Stern Review on climate change. Science 317, 201–202.
O'Sullivan, S., Pustejovsky, R., Pome, E., Wongus, A., Willhide, J., 2014. State Government Tax Collections Summary Report: 2013. In: Bureau, U.S.C. (Ed.), United States Census Bureau (on-line: http://www2.census.gov/govs/statetax/2013stcreport.pdf).
Ostrom, E., 1990. Governing the Commons: The Evolution of Institutions for Collective Action. Cambridge University Press, Cambridge.
Ostrom, E., 2002. The Drama of the Commons. National Academy Press, Washington DC.
Pearce, D.W., Turner, R.K., 1990. Economics of Natural Resources and the Environment. Harvester Wheatsheaf, Hertfordshire England.
Picketty, T., 2014. Capital in the 21st Century. Harvard University Press.
Porto, C., 2010. Carbon market data releases 2009 EU ETS results. Carbon Capitalist.
Raffensperger, C., Weston, B., Bollier, D., 2009. Define and develop a law of the ecological commons for present and future generations. Vermont Law School Climate Legacy Initiative Recommendation No. 1.
RGGI Inc., 2011. Investment of proceeds from RGGI CO2 allowances. Regional greenhouse gas initiativeOnline: http://www.rggi.org/docs/Investment_of_RGGI_Allowance_Proceeds.pdf.
Rockstrom, J., Steffen, W., Noone, K., Persson, A., Chapin, F.S., Lambin, E.F., Lenton, T.M., Scheffer, M., Folke, C., Schellnhuber, H.J., Nykvist, B., de Wit, C.A., Hughes, T., van der Leeuw, S., Rodhe, H., Sorlin, S., Snyder, P.K., Costanza, R., Svedin, U., Falkenmark, M., Karlberg, L., Corell, R.W., Fabry, V.J., Hansen, J., Walker, B., Liverman, D., Richardson, K., Crutzen, P., Foley, J.A., 2009. A safe operating space for humanity. Nature 461, 472–475.
Romero, S., Andrews, E., 2006. At Exxon Mobil, a record profit but no fanfare, New York Times, Late Edition — Final ed, New York.
Saez, E., 2013. Striking it richer: the evolution of top incomes in the United States (updated with 2011 estimates). University of California-Berkley Working Paper. University of California, Berkley (Available on-line: http://emlab.berkeley.edu/~saez/saez-UStopincomes-2011.pdf. Accessed July 27, 2013).
Samuelson, P.A., 1954. The pure theory of public expenditure. Rev. Econ. Stat. 387–389.
Sandler, T., 1993. Tropical deforestation: markets and market failures. Land Econ. 3, 225–233.
Sandler, T., 1998. Global and regional public goods: a prognosis for collective action. Fisc. Stud. 19, 221–247.
Simpson, R.D., Toman, M.A., Ayres, R.U., 2005. Scarcity and Growth Revisited: Natural Resources and the Environment in the New Millennium. Resources for the Future, Washington, DC.
Smith, R., 1981. Resolving the tragedy of the commons by creating private property rights in wildlife. CATO J. 1, 439–468.
Snyder, J., 2007. 1872 mining law triggers modern-day lobbying duel, The Hillon-line: http://thehill.com/business-a-lobbying/3349-1872-mining-law-triggers-modern-day-lobbying-duel (Washington DC).
Steffen, W., Grinevald, J., Crutzen, P., McNeill, J., 2011. The Anthropocene: conceptual and historical perspectives. Philos. Trans. R. Soc. A Math. Phys. Eng. Sci. 369, 842–867.
Stern, N., 2006. Stern Review: The Economics of Climate Change. Cambridge University Press, Cambridge.
Thaler, R.H., Sunstein, C.R., 2008. Nudge: Improving Decisions About Health, Wealth, and Happiness. Yale University Press, New Haven.
Vermont House Bill 385, 2011. An act relating to establishing a Vermont common assets trust. http://www.leg.state.vt.us/database/status/summary.cfm?Bill=H.0385&Session=2012.
Wackernagel, M., Schulz, N.B., Deumling, D., Linares, A.C., Jenkins, M., Kapos, V., Monfreda, C., Loh, J., Myers, N., Norgaard, R., Randers, J., 2002. Tracking the ecological overshoot of the human economy. Proc. Natl. Acad. Sci. 99, 9266–9271.
Weber, S., 2004. The Success of Open Source. Harvard University Press, Cambridge, MA.
Wilkinson, R., Pickett, K., 2009. The Spirit Level: Why Greater Equality Makes Societies Stronger. Bloomsbury Press, New York.
Wilson, D.S., Ostrom, E., Cox, M.E., 2013. Generalizing the core design principles for the efficacy of groups. J. Econ. Behav. Organ. 90, S21–S32 (Supplement).
Woerdman, E., Arcuri, A., Clò, S., 2008. Emissions trading and the polluter-pays principle: do polluters pay under grandfathering? Rev. Law Econ. 4.
Wood, M.C., 2014. Nature's Trust: Environmental Law for a New Ecological Age. Cambridge University Press, New York.

Public Goods vs Common Goods

Discussion

James Quilligan:

"The simplest way of contrasting a public and common good is to ask: does this particular resource require management as a social mandate or as an expression of mutuality and collaboration? In other words, is this property best maintained by government or the public? This is a useful starting place, yet it raises further questions. What exactly do we mean by 'public' and public goods? Postwar economists such as Paul Samuelson identified the non-rivalrous qualities of public goods and James M. Buchanan and Vincent Ostrom described their non-excludable aspects.

The biophysical needs, communicative capacities and shared standards of people who use and depend on vital resources (like food, water, air, knowledge, community networks and social technologies) are not expressed through government-stimulated spending and consumption. In essence, state provision of public goods fails to account for the higher total net benefit that consumers would receive through the self-organized and socially negotiated protection, production and use of their own resources.

Since the 1980s, the state has concerned itself principally with increasing the rights of private property, free markets and free trade.1 This has shifted the meaning of 'public' even further away from common property. With the advent of neoliberalism, public sector now refers, not to citizens with shared meanings and norms for their mutual resources, but to the government that promises to improve their individual well-being through privatized goods disguised as public goods. In a mystifying sleight of hand, the resources we use in common are identified as public goods and then deregulated and turned over to the private sphere for production and distribution. As in the shell game of the magician, common goods disappear through the adept switching of categories: forget where you saw it before, which legal container now holds the good? Examples of this commons/public/private rebranding include water, food, forests, energy, health services, schools, culture, indigenous artifacts, parks, community zoning, knowledge, means of communication, currency, and ecological and genetic resources. To call such goods 'public' (by qualifying them as non-rivalrous and non-excludable) is to carry the Keynesian denial of common goods even deeper into the fog of social unreality now clouding our eyes: the neoliberal game in which all goods ultimately become private goods. Not only does the commons vanish through this legal and linguistic shuffle, even the word 'public' is stolen from the people. Public no longer signifies the communities who manage their local resources and express social or ecological demand for them; public now means the central governing authority to whom we have surrendered the control of these resources.

To call government the ‘public sector’ is to relinquish our epistemological frame of reference, countervailing authority and collective potential for governing and valuing our own resources. In theory, public still means people; in practice, public means government decoupled from the people’s social/ecological rights to their common goods.

...

The use of ‘for the common good’ as a synonym for state interests thus creates a conflict for commoners, who would like to define common goods as things that benefit everyone. The compromised meaning of this phrase not only makes the commons vulnerable to conceptual and legal ambiguity; it also reifies the power of the political class that is already defining its own governmental programs for the masses through private and public goods. ‘Common goods’ always refer to the collaborative preservation and production and collective rights of use by the people; ‘for the common good’ almost always entails public limitations or prohibitions on collective property by the state. So when commoners use these terms, they need to ask themselves: is the specific policy, institution or resource that is defined as ‘for the common good’ something with which everyone agrees, has equal access, shares the same burden of costs, and is life-enhancing for all? In other words, does the claim ‘for the common good’ benefit all people and species -- or is it simply a public good?

...

Many alternative communities have developed their own sets of norms and rules to oversee their collective resources sustainably. Whether these commons are traditional (rivers, forests, indigenous cultures) or emerging (solar energy, social innovation, internet), self-organizing communities take collective action to preserve their local resources, both for themselves and for future generations. These resource communities express the core principles of production and management that are idealized in neoliberalism -- spontaneous, self-regulating freedom (markets) and rule-based equality (state enforcement). Yet when consumers become co-producers of the goods and services they receive and organize, their mutual, integrative work transcends privatization, centralization and the idea that institutional change can come only from the top of a social hierarchy.

When the users of resources are directly involved in the process of production, their local ideas, learning, imagination, deliberation and self-corrective action are embodied directly in their collaborative activities. Unlike commercial delivery chains or the bureaucratic provision of public goods and services by the state, the cooperative production of value and governance by resource users preserves the autonomy of individual choice. The decentralized, self-governing systems of co-production1 also offer fairer access to resources (and thus higher efficiency) than can be gained through distributive enterprises operated as private monopolies or state hierarchies. Hence, common goods that are managed directly and locally are a realm of production and governance existing beyond the public good of the modern division of labor.

...

When people across a community of practice or region take on the responsibility to sustain

their own resources, they may formalize this through a social charter. The charter outlines a group's rights and incentives for a shared resource. It describes patterns of relationships between the resource and its users, managers and producers. Social charters have been developed for forests, pastures, irrigation systems, water, fisheries, internet, knowledge, genetic resources, public health, energy, landscapes, historic sites and other domains.

To make them operational, resource users and producers develop a legal entity called a commons trust. Trusts are generally created to preserve depletable resources (natural, material), but many replenishable commons (social, cultural, intellectual, digital, solar) can also benefit from trusts that ensure their regeneration. Trustees set a cap on the extraction or the use of a resource according to non-monetized, intergenerational metrics such as sustainability, quality of life and well-being. Having protected a commons safely for future generations, the trust may rent a proportion of the resources beyond the cap to the private sector or to state businesses and utilities for extraction and production. A percentage of this rent is taxed by the state and redistributed to citizens as dividends or subsistence income, with emphasis on the poor and marginalized.

...

What segment of society could best sponsor commons/common goods apart from private and public goods? In recent decades, civil society has increasingly identified itself as a 'third sector' beyond the market and state. By defining the interests and advocating for the rights of the unrepresented, global networks, nongovernmental organizations, citizens associations and social movements have become a genuine voice of global public opinion. Indeed, many of the interests they are pursuing -- food, water, clean air, environmental protection, green energy, free flow of information, social technologies, human rights and indigenous peoples' rights -- are commons.

et these self-selected groups do not carry the authority of global representative democracy, since public opinion lacks the electoral legitimacy of people's votes and thus does not increase their political equality. Without a credible political mandate, civil society often challenges the distribution of global power but rarely its underlying structure. In affirming and upholding the constitutional premises of neoliberalism (including the primacy of individual rights, private property and sovereign borders), most civil society organizations maintain a deep commitment to the division of labor between producers and consumers and thus to the enclosure of the commons. This leaves civil society co-dependent on business and government and vulnerable to exploitation. Rather than a true opposition party, civil society faces a huge challenge in establishing itself as a transformational alternative.

Here is where civil society can learn from commons groups the importance of involving resource users in the process of production. As noted earlier, the commons involve producers who consume their own goods. When resource users are also co-producers, their motivations, knowledge and skills become part of the production praxis, leading to new ways of interacting and coordinating social and economic life. Civil society must apply this principle in its own work.1 By operating both as resource users and as producers, bringing direct political power to

local stakeholders, civil society groups can integrate the range of collective rights, legitimacy and power that exists beyond the state. Very quickly, through discovering their natural role in the global commons movement, the world's civil society organizations would develop a more dynamic basis for collective action, social solidarity and direct democracy than presently exists.

As catalysts for the integration of producers and consumers, many civil society organizations will evolve into commons trusts or form partnerships with them. The increased participation and political choices offered to citizens by these trusts will transform economic, social and political decision-making at all levels of commons (local, state, interstate, regional, and global). This will resolve the present contradiction between the internationalist ideals of civil society groups for redistributing social and natural resources, and their institutional fears of overturning constitutional restrictions on the equitable access, protection and use of these commons. By fostering the collective production and governance of common goods through new forms of trusteeship (instead of private/public ownership), the unelected associations and self-appointed movements of civil society will no longer be unaccountable to the people they claim to help and protect.

Discriminating common goods from public goods is crucial in recognizing our essential rights to the commons as global citizens. Presently, people's rights to global citizenship are not acknowledged or affirmed because citizen representation does not go beyond the state level. As national citizens, we empower governments through an implicit social contract, bestowing legitimacy and authority upon the state in return for the public goods of protection, security, infrastructure and other services. In surrendering our deeply personal, subjective power of decision-making to government (which redeploys this power to grant corporations the right to produce and dispense private goods), many people have lost their sense of identity and purpose.

Yet it's human beings as a collective who are sovereign -- not their governments. The inalienable rights of peoples originate, not in authority over a territorial area, but through a customary or emerging identification with an ecology; a form of collective labor; a social technology; a community need or shared conviction; a cultural resource area; an ethnic, religious and linguistic affinity; or an historical identity. When groups of people recognize that the capacity of their commons to support life and development is in decline, they may claim long-term authority over resources, governance and social value as their planetary birthrights, both at a community and global level. These natural rights to every resource -- the atmosphere, oceans, forests and species; food, water, energy and health care; technology, media, trade and finance -- arise from a community's dependence on a particular commons for survival and security and its obligations for the welfare of future generations. The human need for sustenance and livelihood vests these local groups with a new moral and social responsibility: to engage resource users directly in the preservation, access and production of their own commons, and extend these rights of resource sovereignty to the communities of practice that exist at all levels of production and management."

Source

Draft of a to be published essay in a book on the Commons by the Heinrich Boll Foundation.

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ROUTLEDGE HANDBOOK OF FOOD AS A COMMONS

Edited by Jose Luis Vivero-Pol, Tomaso Ferrando, Olivier De Schutter and Ugo Mattei

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Chapter 24

FOOD AS COMMONS

Towards a new relationship between the public, the civic and the private

Olivier De Schutter, Ugo Mattei, Jose Luis Vivero-Pol and Tomaso Ferrando

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Why this book?

This book was motivated by the need to approach with a fresh look what we regard as perhaps the most embarrassing predicament of the Anthropocene/Capitalocene (Capra and Mattei, 2015, Altvater et al., 2016, Moore, 2017). We live in an era with roughly the same number (about one billion) of over-fed people and of people lacking access to nutritious food (which means that do not know in the morning if they will be able to feed themselves and their children during the day). Our era also stands out by the remarkable amount of food that is wasted in some parts of the world and by the unprecedented number of livestock that populates this planet (Patel and Moore, 2017). Moreover, in the current phase of neoliberal capitalism that dominates in the Anthropocene/Capitalocene, the ecological footprint is out of control; some rich people (the majority in the Global North and the elite in the Global South) can enjoy every day food shipped from thousands of miles away on gas gulping aircrafts and boats that pollute the environment beyond imagination. Such luxury, the result of the worldwide colonization of diets, would be impossible without a very significant environmental subsidy; if all the externalities had to be internalized, eating Nile Perch would be unaffordable to most people everywhere. The subsidy is ultimately paid by the poor in the South and, in general, will certainly be paid by future generations. Unless we deal with and avoid the hidden social and environmental costs that are so far unaccounted for in the hegemonic food system (TEEB, 2018)

While the rich eat healthy fruit salads of organic mangoes in Stockholm and Palo Alto, poor people (in the North and in the South) are fed, when at all, with industrially made high-calorie junk food, such as chicken nuggets or cheeseburgers, that produce, among other things, resistance to antibiotics that are widely given to the unlucky martyrs of this capitalist food chains. This ultra-processed food (Monteiro et al., 2018) produced by the Big Food industry is basically made up of food components from cash crops (e.g. maize, wheat, soybean) that are extracted, ultra-processed and re-amalgamated again or that feed industrially-raised animals that are then slaughtered in the millions after having suffered beyond imagination and produced massive amounts of greenhouse gas. These horrors are not the response to the needs of the billions of people who live in the Anthropocene/Capitalocene. They are the necessary and inevitable imperatives of capitalist extraction in a context where food is understood not as the fundamental depository of use value, but as a commodity considered in its exchange value only. Food as a

commodity is exclusively represented through a quantitative approach which has its own scientific measure system: the calories, which fuel both cars and human bodies to ensure they are fit for work. Quality is expelled from this approach and so is any non-mechanistic systemic vision of the food chain. Introducing the commons as a way of thinking is an attempt to introduce quality and holistic and systemic thinking as well as a phenomenological, rather than positivistic, approach in addressing the catastrophic consequences of capitalist logic applied to food. The capitalist food industry in its full reach is actually the horror story this book has tried to tell (though incompletely) in order to bankrupt the current system and seek new avenues. This book is thus part of a broader search for sustainable institutional arrangements that, as humankind, we urgently need to develop before it is too late for us and for the planet (Capra and Mattei, 2015).

This collection of essays explores the consequences of the commodification of food, and it seeks to identify whether food can instead be redefined as a "commons", and what this redefinition might entail. This may sound like a provocative thesis. First, the commodification of food has such a long and hegemonic history that it has become difficult to even imagine that it could be conceptualized differently; recent archaeological discoveries suggest that the production and storage of food at the individual household level, rather than at the level of the larger social group – the tribe or the community –, started some 6,000 years ago, with the first urban settlements in Mesopotamia, which corresponds to modern-day Iraq (Shepperson, 2017). Obviously, capitalism, and corporate-capitalism in particular, has imposed the logic of exchange value to such an extent that these remote episodes of commodification may seem of mere archaeological interest in a phenomenology of the present; yet they do illustrate, at the same time as the historical weight of the dominant paradigm, the possibility of alternatives (Polanyi, 1957). Secondly, food is par excellence a good that is both excludable and rival; access can easily be fenced off from food as a material object and what one person eats is not left to be consumed by others. Therefore, following the classic typology of Paul Samuelson (1954), food is a private good and there would, in principle, be no reason to believe that market mechanisms would not be appropriate to ensure optimal allocation of resources for its production.

These are precisely the misunderstandings that the essays on this book aim to dissipate. Redefining food as a "commons" is not to negate that either food itself (the calories and micronutrients we ingest) or most of the factors required for its production (including in particular land and human labour) can be privatized and that they have been so historically. It is to suggest, rather, that treating food *as a mere commodity*, while ignoring its multiple dimensions and the various other functions it fulfils, stifles our institutional imagination as to how its production and consumption could be governed. That would not only ignore the various social innovations that today, often at the grassroots level, are challenging this approach, at least implicitly. It would also be problematic on efficiency and equity grounds if the purpose is to save capitalism from itself, and on structural grounds in a full-fledged critique based on the material conditions of the present. In these conclusions, we explore the problems associated with treating food as a commodity to be distributed by market mechanisms. We then ask whether turning to state bureaucracy offers a better solution. Next, we turn to the idea that framing food as a commons may be an alternative to both. We conclude with a proposal to redefine the relationships between the state, the community and the market (or the respective logics of the public, the civic and the private) in order to create the space necessary for commoning practices to expand.

Why food cannot be treated as a mere commodity

Treating food as a mere commodity implies that the choices about how much to produce and what to produce are meant to respond to demand. In the perfectly functioning markets that neoclassical economic models still rely on, supply follows price signals; higher prices caused by

a rise in demand therefore should lead to increase production, in turn bringing prices down to an "equilibrium" price (which Smith called the "natural" price). However, this idealized view presents a number of problems.

Food markets' imperfections

First, it is entirely unrealistic. Food markets are, in fact, imperfect to the point of caricature. Concentration of power has significantly increased at various segments of food chains, both as a result of the industrialization of agricultural production and of food processing and as a result of globalization. In the mid-twentieth century, the problem of concentration concerned primarily the big commodity traders – ADM, Bunge, Cargill or Louis Dreyfus – dominating the networks of international trade, particularly for the major cereals. Today, concentration has increased significantly not just in the middle segment, but also at the two ends of the chain. On the side of the input providers, the 130 billion USD-valued merger between the US agro-chemical giants Dow and DuPont Pioneer (now Corteva), combined with Bayer's buyout of Monsanto for 67 billion USD and ChemChina's acquisition of Syngenta for 43 billion USD (and the planned merger with Sinochem) will result in 70% of the total agrochemical industry being in the hands of only three megacorporations (IPES-Food, 2017). On the side of retailers, global retailers, using their superior logistical abilities and bargaining power in upstream markets, now increasingly supply not only rich consumers – ten supermarkets supply half the food in the European Union, according to recent estimates (Oxfam, 2018) – but also the urban middle class in emerging economies (Reardon and Berdegué, 2002; Reardon et al., 2012).

Moreover, concentration at one segment of the chain leads to concentration at the other segments. Large retailers tend to prefer to source from large wholesalers and large processing firms; this allows them to reduce transaction costs and to have access to a diversity of product types in a "one-stop shop" ; the invoicing system is formalized, allowing the retailers to discharge their accounting obligations for value-added tax accounting and product liability; and the packaging and branding of products is superior to that which smaller processors or wholesalers would be able to achieve. This leads to what some authors have called a "mutually reinforcing dual consolidation": the more large retailers dominate consumers' markets, the more large commodity buyers tend to dominate the upstream markets.

Imperfect markets are not a new phenomenon, of course; economist Joan Robinson had already conceptualized such imperfections in the 1930s. But the positive feedback loops (or self-reinforcing mechanisms) that now exist between the ability of the largest and more powerful players of the food systems to control the logistics and strengthen their dominant position (as buyers) by extracting favourable conditions from their suppliers or (as sellers) from their clients, are now threatening to put the system off balance (IPES-Food, 2017). Indeed, this process leads to a race towards the bottom: it results in lower wages for farmworkers and in a lower remuneration for independent agricultural producers that supply raw materials. Large buyers can obtain from sellers a number of concessions that reflect their dominant buyer power, such as discounts from the market price that correspond to the savings made by the seller due to increased production or passing on to the seller certain costs associated with functions normally carried out by the buyer, such as grading of livestock or stocking of shelves. These concessions only make it more attractive for the retailers to source from these dominant buyers, since they may benefit from this superior buyer power that such larger suppliers have. It also further strengthens the position of the dominant buyers, who can acquire a competitive advantage over less dominant buyers in downstream markets, leading to acquisition by larger agribusiness firms of dominance on both the buying and selling markets.

The end consumer may benefit from these trends, both because of the economies of scale achieved by the dominant players and because the abuse of buyer power may lead to lower prices at the end of the chain. But such gains are purely quantitative and arguably are paired with important qualitative losses. As to small food producers, they systematically lose. These farmers buy their inputs at retail prices and they sell their produce at wholesale prices. Moreover, as a narrow set of large firms increasingly act as gate-keepers to the high-value markets of rich countries, small-scale farmers find it increasingly difficult to join these supply chains and the gap is growing between large and small producers in a context in which both categories of producers compete for access to resources, credit and political influence. Larger producers have easier access to capital and thus to non-land farm assets such as storage, greenhouses or irrigation systems. They can more easily comply with the volumes and standards requirements that the agrifood companies – the commodity buyers, the processors and the retailers, depending on which sources directly from the producer of raw materials – seek to impose. Small farmers can only compensate for these disadvantages by their lower labor costs, or because they are a less risky sourcing option to the buyers, since the larger farmers have more market options and thus can be less reliable. The disturbing consequence is that small farmers pay a high entry fee into global supply chains; because of these structural obstacles they face, they can only compete by a form of self-exploitation for instance by agreeing to low wages for those (often family members) working on the farm and by agreeing to be locked into a situation of high dependency towards the buyer. This is one major reason why undernutrition persists in many parts of the developing world, often as a result of extreme deprivation in rural areas. Only a small segment of the farming population still manages to thrive in an increasingly competitive environment, in which farmers can survive only by achieving economies of scale. They must get big or they must get out; many stay small and barely survive.

The idealized picture of well-functioning agricultural and food markets driven by price signals is unrealistic in another way; most food producers don't respond easily. Often price increases lead them to make production choices that, six or eight months later, lead to oversupplying the markets, which generates the price slumps that eventually result in a loss of income for them, since all farmers respond to the same price signals. Rather than fixing the issue and improving the market, pure price signals degenerate in the "hog cycle" well known to agricultural economists (Haas and Ezekiel, 1926, Hanau, 1928, Coase and Fowler, 1935). Or, instead, farmers cannot adapt. When the prices of coffee or cocoa go down on international markets, for instance, the small producers of coffee or cocoa beans do not reduce production: they increase it in order to compensate for the resulting losses and because they have to meet a number of expenses – for education, healthcare or housing – that cannot be reduced. Often, switching to something else is simply not an option, since they depend on the soil, weather conditions, access to knowledge and seeds and markets, which are fixed. While the "hog cycle" is more a characteristic of commodity markets dominated by large and relatively highly capitalized producers and the second problem (called the "commodity problem") is more usual for tropical crops and for relatively smaller-sized farms, what both cases have in common is that prices cannot efficiently direct production. To believe they could do so entirely ignores both the agronomic and the economic *modus operandi* that are typical of agricultural production.

Obliterating inequalities

A second problem with this idealized view that sees food as a commodity that should be produced and allocated on the basis of price mechanisms alone is that such a view is blind to the impacts of inequalities. Inequalities within countries are reaching levels unheard of since the 1930s, and despite all the talk about globalization allowing nations to catch up, even inequalities

between countries remain high (Atkinson, 2015; Bourguignon, 2015; Stiglitz, 2015). However, as long as food supply is driven by market demand (and that is what drives food production since food is treated as a commodity), it is the purchasing power of the rich, not the essential needs of the poor, that directs how resources are used – which foodstuffs are produced, under which conditions and for which markets. Food prices do not necessarily reflect human needs. Rather, prices are an indicator of demand, as expressed by those with purchasing power; the richer you are, the more votes you have in influencing the allocation of resources. As noted by Scitovsky, the representation of the world into prices and its commodification means that the marketplace is analogous to a plutocracy; it is "the rule of the rich", he wrote, "where each consumer's influence on what gets produced depends on how much he spends" (Scitovsky, 1992: 8). This is perfectly illustrated by the surface of land required in Argentina or Brazil to produce soy or maize for animal feed in industrial livestock processes or by the deforestation resulting from oil palm plantations in Indonesia or Malaysia to compensate for the diversion of colza or sugar beet for energy in Europe. In a globalized world in which food is traded across borders and investments flow freely, the poor may be priced out from the use of resources, while the purchasing power of the rich may guide the direction of agricultural development.

Such distortions are also the price we pay for inequality. Indeed, the reason that large areas of farmland can be dedicated to producing feedstock to satisfy the overconsumption of meat in affluent societies or to fuel their cars, is because consumers in rich countries can command the resources that will allow their lifestyles to continue unchallenged. This fundamental inequity is reflected in the fundamental structure of property and contract law, though these areas of law generally obfuscate their complicity in achieving such a result (Mattei and Quarta, 2018). Similarly, the huge amounts of retail and consumer waste in rich countries is correlated with the fact that, as incomes have grown, the proportion of the household budget spent on food has diminished.[1] This correlation highlights the limits of the reasoning according to which the expansion of trade in agricultural commodities leads to efficiency gains by encouraging a division of labor according to comparative advantage; in fact, the expansion of trade has also resulted in the luxury tastes of the richest parts of the world being allowed to compete against the satisfaction of the basic needs of the poor (Lambin and Meyfroidt, 2011). This trend is particularly concerning in terms of competition for natural resources needed for food production, particularly land. While it is true that a purely Malthusian view of land as finite oversimplifies the issue of competition for scarce resources, as the productivity of land can be increased to a certain extent and as some land can still be brought into production, recent research has highlighted the considerable social and ecological costs of doing so. Once these tradeoffs are taken into account, this research shows, there is significantly less cropland available for future expansion than has been traditionally assumed in most scenarios (Lambin, 2012; Lambin et al., 2013). Here, again, the structure of property rights on land facilitates and legitimizes these impacts, in the name of its apparent neutrality, as already noted by J.R. Commons in 1927 in his *Reasonable Value: A Theory of Volitional Economics* (see Hiroyuki, 2018; see also De Schutter, 2015).

Dismissing the planetary boundaries

A third problem with treating food as a mere commodity is that the economic logic guiding production choices – including the allocation of resources and research and development programs of large firms – entirely ignores the ecological logic. Agricultural production that maintains soil health and resilience in the face of a changing climate should prioritize diversity through mixed cultures and frequent rotations, biological control of pests (rather than reliance on pesticides) and minimize the use of external (non organic) inputs (IPES-Food, 2016).

But the markets command to do the exact opposite; the negative externalities resulting from unsustainable forms of agricultural production and from a heavy reliance on fossil energy are not counted in the costs of production and farmers are pressured to become providers of cheap raw materials to the food manufacturing industry, since that's how profits are made for shareholders – by "adding value". The result is industrialized farming on large areas of land to allow for the mechanization of production.

The environmental impacts are now well understood, but they have not led to questioning the mechanism through which production choices are guided by an exclusively profit-maximizing logic, incentivized by legal and financial systems (Clapp and Isakson, 2018). The spread of monocultures, though they allowed and were allowed by mechanization, resulted in a significant loss of agrobiodiversity; crop species, such as indigenous leafy vegetables, small-grained African cereals, legumes, wild fruits and tree crops, are now gradually disappearing as they are displaced by the production of rice, maize and wheat (Jacobsen et al., 2013). Indeed, biodiversity loss, for which the spread of industrial agriculture is chiefly responsible (FAO, 1997: 33, FAO, 2010: 15–16), is the domain in which the world has moved furthest beyond the "safe operating space" for humanity (Steffen et al., 2015). Largely as a result of unsustainable farming practices, an estimated 33% of soils worldwide are moderately to highly degraded due to erosion, nutrient depletion, loss of organic matter, acidification, salinization, compaction and chemical pollution (FAO, 2015). The resulting loss of natural soil fertility forced an ever-greater reliance on chemical (nitrogen-based) fertilizers to maintain yields (Loveland and Webb, 2003), but this in turn polluted freshwater (Parris, 2011) and as phosphate and nitrogen water pollution reaches the oceans, natural fertilization processes are stimulated spurring algae growth that absorbs the dissolved oxygen required to sustain fish stocks (Paerl and Huisman, 2012, Chislock et al., 2013).

Moreover, mainstream food systems are now a chief contributor to the growth of greenhouse gas emissions. In 2005, it was estimated that agriculture accounted for approximately 10-12% of total man-made greenhouse gas emissions, in the form of nitrous oxide from the use of fertilizers, methane from flooded rice fields and livestock and carbon dioxide from the loss of soil organic carbon in croplands and, due to intensified grazing, on pastures (Smith et al., 2007). But it is not agricultural production alone, it is food production more broadly – food processing and packaging and the logistics of food distribution – that consumes large amounts of energy; approximately 2,000 litres per year in oil equivalents are required to supply food for each American, which accounts for about 19% of the total energy used in the United States (Pimentel et al., 2008). Indeed, the production of fertilizers, herbicides and pesticides, the tillage, irrigation and fertilization and the transport, packaging and conservation of food all require considerable amounts of energy, so that as much as one-third of greenhouse gases from human activity are linked to how food systems developed (HLPE, 2012; Vermeulen et al., 2012; FAO, 2017). Not only is food production itself threatened by the pressures it exercises on ecosystems, including by the apparently uncontrollable growth of emissions responsible for global warming, but it also has developed a huge dependency on fossil energies – the gas needed for the production of fertilizers and the oil needed for machinery and the processing and transport of food –, which makes it unsustainable.

The statist alternative

Food, therefore, cannot be treated as a mere commodity. Indeed, as abundantly shown by the materials in this book, accepting such a purely quantitative (and reductionist) framing of food produces catastrophic results on efficiency, equity and sustainability grounds. This is not to imply, however, that such governance should be centralized in hands of a state bureaucracy. In the

commons approach, in fact, the state, just like the capitalist market, is more part of the problem than of the solution. Indeed, state bureaucracies are notoriously ill-equipped to ensure an effective coordination of complex systems, such as food systems. Although states can and must fulfil a number of roles that are essential both for the smooth functioning of markets and for social justice – from providing infrastructures and enforcing food safety regulations and from combating cartels and abuses of dominant positions to ensuring redistribution through taxes and subsidies –, their centralized knowledge cannot be a substitute for the dispersed knowledge and practices of the actors of food systems, whose relationship to the context in which they operate and ability to adapt to changing local circumstances are an essential element of the resilience of the system; for all the naivete of their belief in markets, this, at least, was a key insight of libertarians such as Hayek or (Michael) Polanyi, whose ideas about the virtues of "spontaneous" or "polycentric" orders (Hayek, 1960; Polanyi, 1951) are now echoed in references to polycentric governance in Elinor Ostrom's work (Ostrom, 1990) or in Yochai Benkler's discussion of commons-based peer production (Benkler, 2006). As much as these authors disagree on essential aspects of how societies should be governed, they share the core intuition at the basis of the Hayek-Polanyi line of libertarianism; that the pretence of the state to have privileged access to the kind of knowledge that is required to steer society is similar in kind to, and hardly less preposterous than, the pretence of divine monarchs of the past to have a direct relationship with God. States are not gods and they do not have god-like powers to know what each individual should be ordered to do in order for the common good to emerge.

Nor is this all. The claim of state bureaucracies to command the course of societies also fails on empirical grounds. Recent scholarship has highlighted the extent to which political elites are attentive to the expectations of economic elites, rather than to those of ordinary citizens. These "political elites" include, in particular, elected representatives and not just the technocrats populating public administrations; the problem, it seems, is not so much (or not only) that administrations have too much power and that they escape the control of politicians, but that the politicians themselves are captured (Gilens, 2012; Gilens and Page, 2014).[2] The disproportionate influence which corporations exercise in the political system is only marginally related to the selling out of politicians, whether in the extreme form of corruption or in the more subtle and socially acceptable forms of electoral campaign financing and revolving doors. It has to do, primarily, with the ability of corporations to serve politicians with a convincing narrative, which portrays them as champions of the 'low-cost' economy, in which efficiency gains associated with economies of scale and the division of labour across different jurisdictions in global supply chains allow them to serve mass consumption, provided they are left free to organize production and are not forced to internalize the full range of negative externalities caused by their operations.

Political elites are also poorly equipped to respond to concerns about long-term ecological impacts of industrial production models. In part, this is due to the short-termism associated with electoral cycles; it is this "democracy failure", this gap between the myopic preoccupations of electoral politics and the requirements of intergenerational justice, which had led a number of authors to propose that democracy be "circumscribed" or made more "reflexive" by introducing a longer-term perspective in the form, for instance, of the establishment of a "higher chamber" of non-elected experts with a veto power that they are to exercise as representatives of future generations (Bourg and Whiteside, 2010). Perhaps even more importantly, recent research in cognitive psychology examining risk perception has highlighted that elites are hard-wired to ignore environmental risks that could question their individualistic and meritocratic worldview – one which, as they occupy a dominant position within society, they are likely to adhere to. Indeed, this research shows that information about risks associated with unsustainable types of food production, particularly environmental risks, should be processed by various groups of the

population in order to reduce the cognitive dissonance between the data with which they are provided and the cultural values they entertain (Kahan et al., 2007). The so-called "White male effect" in risk perception is such that, for those occupying a dominant position in society, more and better information improving their scientific literacy or their numeracy does not lead them to assess risk in accordance with the warnings of scientists in areas, such as climate change, where the risk tends to be underestimated: quite to the contrary, it seems that they would rather use this gain to strengthen their scepticism, as if unwilling to recognize information that runs counter to their interests (Kahan et al., 2011). While this may be comforting to the individual (and may be said, therefore, to be "rational" from the individual's point of view, as the discomfort of cognitive dissonance is minimized), the consequences for society are clearly sub-optimal, presenting us with a collective action problem which Kahan et al. (2011) have called the "tragedy of the risk-perception commons"; it calls for a science of communication about risk that can take into account the fact that we live in culturally diverse and pluralistic societies and that each sub-group within society may have to be addressed differently for social norms within the sub-group to evolve (Higgs, 2015).

A final limitation of reliance on state action to transform food systems is that, as anticipated many years ago by what social psychologists labelled "reactance" theory (Wicklund, 1974), individuals resist adopting conduct that they perceive to be imposed on them from without. In response, researchers now insist on a shift of attention from extrinsic to intrinsic motivations. The work of Richard Ryan and Edward Deci provides perhaps the most explicit attempt to demonstrate the importance of intrinsic motivations in explaining individual behavior (Ryan and Deci, 2000a and 2000b; Moller et al., 2006). The so-called "self-determination theory" they pioneered emphasizes that lasting behavioural change depends on individuals acting on the basis of their own values and deeply held beliefs, rather than external rewards or penalties. Interventions "from above", whether in the form of top-down regulation or in the form of economic incentives, may be insufficient to disrupt routines in eating behaviour and to bring about change at the desired scale. State bureaucracies, using tools of regulatory injunctions or economic incentives, treat individuals like objects, rather than as subjects of their own history (Arendt, 1958) and members of a broad and universal community of citizens. Individuals on whom rules are imposed, to whom subsidies are promised or who are threatened with having to pay taxes will comply with the rule, capture the subsidy or avoid paying the tax – but they will otherwise pursue their own life objectives, deviating as little as possible from such objectives that they have set for themselves. In contrast, behavioural changes that rely on the *intrinsic* motivations of the individual shall be resilient; because they are based on the individual's identity or self-image or on the values that the individual treats as his/her own, such changes will persist in time, even though the context (and the external incentives it provides) may have evolved. To change the food system is is thus essential to work against the fragmentation of individual identities and strengthen the imaginary of community as a source of reward and space of emancipation.

Food as commons

It is thus that we arrive at the conclusion that, because of the failures of both "the market" and "the state", a different dimension, that of the commons, should be introduced to approach the predicaments of the Anthropocene/Capitalocene that the global food catastrophe shows in all its immediate drama. As already shown in the introduction and unfolded in multiple chapters, the commons present a complex epistemology. Considering the commons as a sort of civic sector, capable of coexisting with the fundamental capitalist institutions, already betrays a political choice that is questionable and indeed has been questioned (Hardt and Negri, 2009; Mattei, 2011;

Dardot Laval, 2015; De Angelis, 2017). Moreover, a number of understandings co-exist as to what is implied by reframing food as a commons. While all these understandings share the view that neither unaccountable markets nor state bureaucracies are appropriate mechanisms to exclusively guide production choices, to allocate resources or to ensure equitable access to food, they range from the least to the most radical versions. The revival of commoning practices, indeed, has two distinct sources. Some stem from social innovations, which emerged in a relatively recent past, primarily in urban settings and at the initiative of upper-middle class activists. Others develop in traditional communities that have hitherto resisted the full commodification of food, and maintained customary forms of governance of natural resources as well as non-commoditised means of food production and distribution despite the expansion of the capitalist frontier. It would go beyond the ambition of this chapter to deepen the inquiry as to how to subsume the practice (customary and contemporary) of commoning into a broader theory of the commons. However, we do offer a few hints in the concluding section.

Food as commons and the right to food

One approach – the least radical – is to insist on the need to guarantee the right to food as a human right, whereby an absolute human need (see Chapter 7 in this volume) is framed as a mandatory entitlement. The right to food is the right of every individual, alone or in a community with others, to have physical and economic access at all times to sufficient, adequate and culturally acceptable food that is produced and consumed sustainably, preserving access to food for future generations (Committee on Economic, Social and Cultural Rights, 1999: paras. 6-7). Thus understood, the right to food can be secured (i) by obtaining incomes from employment or self-employment; (ii) by social transfers from the state or from family and community networks; or (iii) by own production, for individuals who have access to land and other productive resources. Through these channels, that often operate in combination with one another, the right to food should ensure that each person has access to a diet that, "as a whole … contains a mix of nutrients for physical and mental growth, development and maintenance, and physical activity that are in compliance with human physiological needs at all stages throughout the life cycle and according to gender and occupation" (id., para. 9). Thus, a convenient way to summarize the normative content of the right to food is by referring to the requirements of availability, accessibility, adequacy and sustainability, all of which must be built into legal entitlements and secured through accountability mechanisms.

Such an entitlements approach suggests that states be held accountable in a range of areas which influence the ability for each individual to have access to a healthy diet – from minimum wage legislation to social protection floors and from access to productive resources for food producers to the provision of subsidized food items in support of poor consumers or directly providing food to those who cannot afford it through food banks or food pantries. The right to food thus may serve to control state bureaucracies as well as to ensure that markets are not allowed to deprive people of access to at least the amount of food essential to lead active and healthy lives. However, it also has a number of limitations. It does not question the commodification of food, the production of which still relies on market mechanisms (and on price signals in particular) and access to which still depends on purchasing power; although, in a perspective built on the right to food, food buyers shall be supported in having access to food by being guaranteed decent wages or social protection, the dominant paradigm for food production and access remaining unchallenged. This approach can thus perfectly co-exist with capitalist markets (Ferrando, 2016).

Moreover, the language of human rights and the mechanisms through which human rights are monitored and enforced remain specialized, sometimes perceived as neglectful of social

and economic justice (Moyn, 2018) and Western-centric; the language is that of human rights experts and it is experts who populate the mechanisms with all the political limits of professionalism (Sarfatti-Larson, 1977). Even the most robust legal and policy frameworks designed to support the right to food may lack any self-instituting dimension; they tend to proritize individual above collective rights, they impose obligations mostly on states and not on other individuals or corporate actors and they require the prior approval of states to become operational (it is in that sense that they remain state-centric) (Charvet and Kaczynska-Nay, 2008; Claeys, 2014). For all these reasons, human rights, although they ensure an indispensable protective function, may also be seen in other respects as disempowering – as robbing rights-holders from their ability to define the objectives of their struggles for justice and to define the pathways towards realizing them (Kennedy, 2002, 2012; Hopgood, 2013).

Food as commons and customary forms of tenure

But may human rights reinvent themselves? Are we now witnessing a form of "re-commonification" at work in this field of law? Indeed, the revival of the "commons" based on the recognition of customary forms of tenure and governance of resources that traditional communities have developed, forms a remarkable development in recent international law. Indigenous or traditional communities have, until now, lived at the external limits of the market society. Their livelihoods have been supported by the organisation of solidarity and care within their community (see, for example, Chapter 8 in this volume) and their livelihoods exhibit a non-instrumental relationship to Nature, one that recognizes our interdependence with Nature and does not see it simply as a resource to exploit or as a free dumping site (Chapter 4 in this volume). The common property regimes that these groups rely on are increasingly referred to in recent instruments, with a view to ensuring that such regimes shall be protected from encroachment. They are spectacularly endorsed, for instance, in the *Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (VGGT)*, adopted in 2012 by the Committee on World Food Security (CFS). These guidelines note that "there are publicly-owned land, fisheries and forests that are collectively used and managed (in some national contexts referred to as commons)", and that "States should, where applicable, recognize and protect such publicly-owned land, fisheries and forests and their related systems of collective use and management, including in processes of allocation by the State" (guideline 8.3).

Two years after the adoption by the CFS of the VGGT, another intergovernmental committee of the FAO, the Committee on Fisheries (COFI), adopted the *Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication* (SSF guidelines). The guidelines, the outcome of a three-year-long participatory process conducted between 2010 and 2013, encourage states to recognize forms of co-management of fisheries based on customary forms of tenure: "Local norms and practices, as well as customary or otherwise preferential access to fishery resources and land by small-scale fishing communities including indigenous peoples and ethnic minorities, should be recognized, respected and protected in ways that are consistent with international human rights law" (guideline 5.4). This illustrates a significant shift in perspective. In contrast to the dominant view, according to which a clarification and strengthening of access rights, including by the use of transferable fishing quotas, would increase economic efficiency and avoid overfishing (see, for instance, World Bank, 2004 or Cunningham et al., 2009), the SSF guidelines suggest that priority should go to improving access to fishing rights to the communities who need it most – and who could be best placed to manage the common-pool resources concerned and to monitor catches at the local level.

The shift to co-management of fisheries vesting collective rights with fishing communities is also based on the broadly positive assessment made of the establishment of fishing zones (whether in lakes or coastal areas in seas), reserving fishing in these areas for local communities, allowing them to manage access rights (Sharma, 2011; Special Rapporteur on the right to food, 2012, para. 58; Ratner et al., 2014). A 2011 study comparing 130 co-management schemes (covering 44 developed and developing countries) thus demonstrated how local communities have often been able to develop legitimate institutions of self-governance and establish sustainable approaches to managing fishing intensity and ecosystems impacts, provided strong community leaders emerge and robust social capital exists to monitor compliance with individual or community quotas (Gutiérrez et al., 2011). Other studies highlighted that co-management schemes could be successful, provided certain conditions are present (Townsend, 2008; Béné et al., 2009), including, in particular, an enabling institutional enviroment at the national level (Nielsen et al., 2004; Lewins et al., 2014) and a tradition of cooperation within the community (Jamu et al., 2011). The SSF guidelines express this new consensus.

Finally and most recently, the revival of the commons in international human rights law can be seen in the proposal for a *Declaration on the rights of peasants and other people working in rural areas*, initially submitted by Bolivia within the Human Rights Council, and strongly inspired by the *Via Campesina*, the transnational network of small-scale food producers (for background of this attempt, see Claeys, 2015 and Golay, 2015). At the time of writing, the proposal was under negotiation within an Intergovernmental Working Group of the Council. Article 5(1) of the draft Declaration refers to the right of peasants and other people working in rural areas 'to have access to and to use the natural resources present in their communities that are required to enjoy adequate living conditions' and to their right 'to participate in the management of these resources and to enjoy the benefits of their development and conservation in their communities'. Under the heading 'Right to land and other natural resources', Article 17(1) provides that 'Peasants and other people living in rural areas have the right, *individually and collectively*, to the lands, water bodies, coastal seas, fisheries, pastures and forests that they need to achieve an adequate standard of living, to have a place to live in security, peace and dignity and to develop their cultures' (emphasis added); and in wording clearly inspired by the 2012 VGGT, Article 17(3) adds:

> States shall provide legal recognition for land tenure rights, including customary land tenure rights, not currently protected by law. All forms of tenure, including tenancy, must provide all persons with a degree of tenure security that guarantees legal protection against forced evictions. States shall recognize and protect the natural commons and their related systems of collective use and management.[3]

Thus, a counter-movement is emerging within international human rights law, as a reaction to the push towards privatization and enclosures of which, for centuries, international law has been an instrument (see also Bakker, 2007). Needless to say, the long history of plunder (Mattei and Nader, 2008) and of constantly changing legal lingo deployed for centuries to hide its establishment and continuation, should warn us against the risks of patronizing and essentializing the "local communities" by old and new carriers of the white man's burden. It is a fact that the corporate-driven transformation of land tenure systems from commons institutions (serving the long-term interest of a community that includes future generations) into capitalist institutions (serving the imperatives of capital accumulation for private individuals in this generation) has erased our capacity to study and understand the most resilient institutional alternatives (Ferrando, 2017). The regeneration of commons institutions of land tenure may be

the most crucial prerequisite of a meaningful institutionalization of the idea of food as commons (Chapter 21 in this volume). The establishment of this conversation in international law is therefore welcomed; though in the absence of a systemic critique and a comprehensive reconfiguration of the premises of the international legal system, it still seems highly insufficient.

Food as commons and social innovations

Contemporary developments within human rights support, therefore, some form of re-commonification. But they still do so largely in a defensive mode, rather than in a mode that empowers. In contrast, the more radical approach to "re-commoning" insists on the self-instituting dimension that human rights lack. In all world regions, a range of social innovations are developing that re-invent how food is produced, processed, distributed and valued, developing alternatives to the dominant paradigm that sees (and treats) food as a commodity. These innovations include community gardens maintained by neighbors, community-supported agriculture, in which the risk is shared between the farmer and the eaters and in which the eaters express solidarity with the farmer; vegetables grown for the community members to pick, referred to as "incredible edibles"; cooperative supermarkets or social groceries. Such social practices challenge not only the dominant representation of food as a commodity, but also the representation of the individual that accompanies it – a representation both implicit and powerful, indeed, powerful precisely *because* often left implicit. These social practices refuse to see individuals in Hobbesian terms, as guided by appetites and aversions, and constantly searching to satisfy the former and to avoid the latter, for the selfish maximization of their utility. C.B. Macpherson perfectly summarized the relationship between that view of the individual and the bourgeois society that was emerging as Hobbes was writing the *Leviathan* in the mid-seventeenth century:

> We live in a market society. Our behaviour, our values, are largely shaped, directly or indirectly, by the requirements of the market. We are bourgeois men. So were the men Hobbes described and analysed. ... His scientific method required him to build up a model of man and of society, and the models he constructed were bourgeois models. Since the main body of his science was produced by deduction from these models, it is a science of bourgeois society.
>
> *(Macpherson, 1968: 11–12)*

This science of society we inherited from Hobbes is as much normative as it is positive; by becoming the dominant reconstruction of how we (i.e. some people in Western civilization at a specific moment of history) have come to act with one another, it also prescribes how we should behave.

Instead, these social innovations introduce a diagonal dimension between the horizontality of market relationships mediated by prices and the verticality of the state imposing regulations on the individual; on this diagonal axis, individuals relate to one another not as market agents seeking to conclude a transaction, nor as competitors, but as members of a community collaborating in pursuing a collective action for the commonwealth. Food is a "commons" in that its production and distribution responds to a logic of solidarity and mutual help, rather than to a logic of competition and exclusion, because people recognize mutual neediness and the essentiality of eating (again Chapter 7 in this volume). Even more importantly, the rules governing food production and allocation are set by the individuals who are involved in this collective action: as such, it is not only the state bureaucracy that is democratized and held accountable, it is society

itself that is democratized, as the rules resulting from self-governance replace the rules of the market (see for example Chapter 14, Chapter 15 or Chapter 19 in this volume). Thus private law, after the parenthesis of modernity, is recognized again as the *law of the privates* that, outside of the reductionism of possessive individualism, self-regulate their transacting in the interest of nature and community (see Capra and Mattei, 2015). This bottom-up generated law of the commons serves a crucial counter-hegemonic function (Mattei and Quarta, 2018).

This perspective overlaps only partly with the analysis provided by Elinor Ostrom of "common pool resources" in her seminal contribution of 1990 (Ostrom, 1990). For what we have in mind when referring to food as a commons is not a physical entity exploited according to rules a community has chosen for itself. More precisely, this is not the *only* form that "commoning" may take; the term encompasses a much broader set of social innovations by which relationships around food are redefined, by the social actors themselves, who occupy a space between the state and the market, escaping both bureaucratization and commodification, a space that these actors seek to democratize by inventing the rules by which it shall be governed (Dardot and Laval, 2015; Hardt and Negri, 2009). Although the re-writing of the rules carried out by innovative civic food actions and alternative imaginations can include food being traded for profit (therefore still working as a tradeable good, but not only and not primarily) (Vivero-Pol, 2017a), the commodification of food erases any trace of commonality, as philosopher Michael Sandel (2013) explained for other goods. As a phenomenological expression, food plays multiple functions depending on specific circumstances and commodification is incompatible with this plurality.

Food as commons moves us far away from the positivistic approach that dominates Ostrom's work as well as that of modern social science. Indeed, like water, food entirely defeats the neat separation between the subject and the object, the positive and the normative and the objective scientific description and the subjective political preferences. We are the food we eat as well as the water we drink. We cannot observe food from a perspective detached by the material conditions in which we operate. Similarly, food and the food system are co-defined by natural circumstances, human decisions and anthropocentric practices. The commons approach shows us that there is no resource (private, public or collective) that becomes such without human inputs and therefore dependent on political conditions and choices (food as a social construct). There is no abstract subject separated from an abstract object. The commons allow us to observe food, as everything else, in an ecological way that connects the dots of the interdependent material conditions that compose the web of life. There is no luxury without starvation, no starvation without luxury; that is the challenge of the commons to the transcendent and naturalizing vision of positive science.

A prospective scenario: the tri-centric scheme to steer a different transition pathway

Deconstructing food as a commodity and reconstructing it as a commons requires establishing a tri-centric governance system recombining market rules, public regulations and self-regulated collective actions, re-arranged to maximize the potential of each. Food would be produced, consumed and distributed by agreements and initiatives formed by state institutions, private producers and companies, together with self-organized groups under self-negotiated rules. Those agreements would include not only private–public partnerships (PPPs), but also public-commons partnerships (PCPs), a new institution that deserves to be further explored (Piron and Cogolati 2016) and that the city of Turin (Italy) and its *administrazione condivisa* exemplifies

(Bottiglieri et al. 2016). Those governing agreements serve commoning practices by enabling access and promoting food through a multiplicity of open structures and peer-to-peer practices enabling sharing and co-producing food-related knowledge and edible products. The development of this tricentric governance would combine civic collective actions for food, an enabling state and socially-responsible private enterprises (see Figure 24.1).

The civic collective actions for food are already happening, with people producing food by themselves or getting organized in food buying groups, community-supported agriculture or sharing meals clubs. The fast-growing constituency involved in this transition can value food as a commons (Chapter 22 in this volume). It calls for a different kind of state, with different duties and skills to steer that transition. Such a state would aim at partnering and at stimulating social and just innovation, rather than at steering by command-and-control via policies, subsidies, regulations and the use of coercion. That would be a "partner state" acting as an enabling supervisor and considering food as a public good (Chapter 5 in this volume). The private sector itself should be supported in its diversity, as there is a need to count on a different breed of private enterprises in order to satisfy the needs unmet by collective actions and state guarantees. This private sector shall be driven by a different ethos while making profit, bound by the requirements to contributing to social aims and the satisfaction of the needs of the community rather than moved by the goal of profit-maximization at any cost. In that sense, the market would be seen as a means towards an end (wellbeing, happiness, social good) with a primacy of labor and natural resources over capital. We will expand on these three roles below.

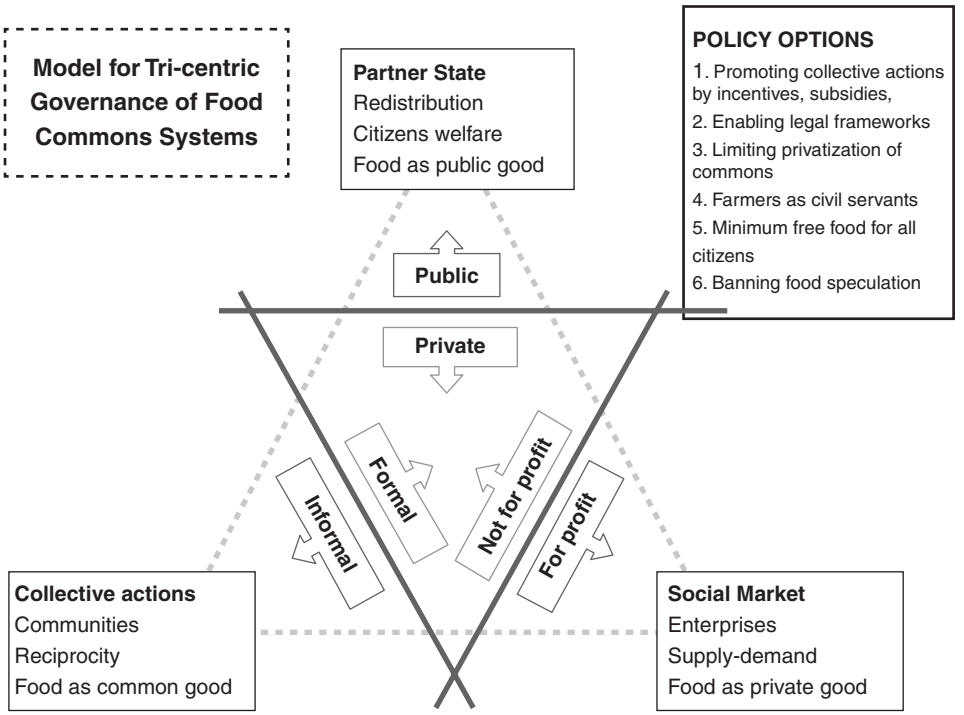

Figure 24.1 The ideational tri-centric governance model for transition in food systems.

Source: Vivero-Pol (2017b).

Civic collective actions to govern food as commons

Civic food networks generally emerge at the local level and aim to preserve and regenerate the commons that are important for the community. There have been two streams of civic collective actions for food running in parallel. In rural areas, small-scale food producers, relying on low-input or agroecological production, seek to develop types of farming (as well as local processing and marketing) that evade the constraints of long supply chains controlled by large food manufacturers or retailers. In urban and peri-urban areas, alternative food networks (AFNs) are emerging, for instance in the form of community-supported agriculture (CSAs) or urban agriculture. These AFNs are led, on the one hand, by concerned food consumers who want to reduce their food footprint, produce (some of) their own food, improve the quality of their diets and free themselves from corporate-retail control and, on the other, by the urban poor and migrants motivated by a combination of economic necessity and cultural attachments. Over the last 20 years, these two transition paths have been growing in parallel, both increasingly relying on the vocabularies of food sovereignty and agroecology. They remain to a certain extent disconnected, however, divided by geographical and social boundaries. But the maturity of their technical and political proposals and reconstruction of "rururban" connections have paved the way for a convergence of interests, goals and struggles. Large-scale societal change requires broad, cross-sector coordination. It is to be expected that the movement for the revival of peasant agriculture and AFNs will continue (and need) to grow together, beyond individual organisations, to knit a new, more finely meshed and wider food commons capable of confronting the industrial food system for the common good (Ferrando and Vivero-Pol, 2017).

The partner state to govern food as a public good

The state has an essential role to play in providing an enabling framework for re-commonification. The transition towards a food commons regime will need a different kind of state, however, with different duties and skills to steer that transition. These desirable functions are shaped by partnering and innovation rather than command-and-control via policies, subsidies, regulations and the use of force. This enabling state plays a role as shaper and creator of markets and facilitator for civic collective actions to flourish. This state presents characteristics that borrow both from the partner state (as theorized by Kostakis and Bauwens, 2014) and from the Entrepreneurial State (as described by Mazzucato, 2013). The partner state has democratic public authorities playing a sustaining role (enabling and empowering) in the direct creation by civil society of common value for the common good. Unlike the Leviathan paradigm of top-down enforcement, this type of state sustains and promotes commons-based peer-to-peer production. Among the duties of the partner state, Silke Helfrich[4] mentioned the prevention of enclosures, triggering of the production/construction of new commons, co-management of complex resource systems that are not limited to local boundaries or specific communities, oversight of rules and charts, care for the commons (as mediator or judge) and initiator or provider of incentives and enabling legal frameworks for commoners governing their commons. The entrepreneurial state, meanwhile, fosters and funds social and technological innovations that benefit humanity as public ideas that shape markets (e.g., in recent years, the Internet, Wi-Fi, GPS), funding the scaling up of sustainable consumption (like the Big Lottery Fund supporting innovative community food enterprises that are driving a sustainable food transition in the UK) and developing open material and non-material resources (knowledge) for the common good

of human societies. Public authorities will need to play a leading role in support of existing commons and the creation of new commons for their societal value.

The non-profit maximizer private sector

The private sector presents a wide array of entrepreneurial institutions, encompassing family farming with just a few employees (FAO, 2017), for-profit social enterprises engaged in commercial activities for the common good with limited dividend distribution (Defourny and Nyssens, 2006) and transnational 'too-big-to-fail' corporations that exert near-monopolistic hegemony on large segments of the global food supply chain (van der Ploeg, 2010). The latter are managed on behalf of unknown (or difficult to track) shareholders whose main goal is to maximize their (short-term) profits rather than equitably produce and distribute sufficient, healthy and culturally appropriate food to people everywhere. The challenge for the private sector is to adjust direction, to be driven by a different ethos while making profit – keeping, indeed, an entrepreneurial spirit, but also focusing much more on social aims and satisfying needs. Or, put the other way around, the private sector role within this tri-centric governance will operate primarily to satisfy the food needs unmet by collective actions and state guarantees. The market will be seen as a means towards an end (wellbeing, happiness, social good, climate change mitigation, etc.) with a primacy of labour and natural resources over capital. Thus, this food commons transition does not rule out markets as one of several mechanisms for food distribution; it does reject market hegemony over our food supplies, however, emphasizing that other avenues are available.

Local transitions towards the organisation of local, sustainable food production and consumption are taking place today across the globe (e.g. Ghent in Belgium,[5] Torino in Italy,[6] Toronto in Canada,[7] Fresno in the US[8]). Inspired, often unwillingly, by principles along the lines of Elinor Ostrom's (1990, 2009) poly-centric governance, food is being produced, consumed and distributed by agreements and initiatives formed by state institutions, private producers and companies, together with self-organised groups under self-negotiated rules that tend to have a commoning function by enabling access to and promoting food in all its dimensions through a multiplicity of open structures and peer-to-peer practices aimed at sharing and co-producing food-related knowledge and items. The combined failure of state fundamentalism (in 1989) and so-called 'free market' ideology (in 2008), coupled with the emergence of these practices of the commons, has put this tri-centric mode of governance back on the agenda.

The transition period for this regime and paradigm shift should be expected to last for several decades, a period where we will witness a range of evolving hybrid management systems for food similar to those already working for universal health/education systems. The era of a homogenized, one-size-fits-all global food system will be replaced by a diversified network of regional foodsheds designed to meet local needs and re-instate culture and values back into our food system (The Food Commons, 2011). The Big Food corporations will not, of course, allow their power to be quietly diminished, and they will, inevitably, fight back by continuing to do what has enabled them to reach such a dominant position today: legally (and illegally) lobbying governments to lower corporate tax rates and raise business subsidies, combating the adoption of restrictive legal frameworks (related to GMO labelling, TV food advertising, local seed landraces, etc.) and generally using the various powers at their disposal to counter alternative food networks and food producing systems. To emphasize, the confrontation is likely to continue over decades: paralleling and reversing the industrialization and commodification path that led us to this point is not a matter of days. Imagination and motivation are essential, along with a self-reflective attitude that allows the movement to get stronger and more aware.

Conclusions

This book has a double purpose with regard to the valuation of food and the exploration of alternatives. The authors and editors aimed to get free from the mental straitjacket imposed on thinkers, practitioners and activists by the dominant narrative of capitalism, founded on neoclassical economics and absolute propietary schemes, which has done so much to delay the search for alternatives to the multiple crises our societies are facing at the begininng of 21st century. By proposing that food could be valued, enacted, produced, distributed and governed as a commons, we want to reject the historical and present commodification of food. We are tired of the practice of simplification, expropriation and appropriation that deprives such an essential resource of its multiple non-economic dimensions and that treats it according to an economic logic in disregard of its ecological impacts. Secondly, we want to lay the foundations for an alternative normative imagination of food and food systems: a vision deeply rooted in history – though disruptive and innovative – at the same time that enables the exploration of other policy options to build just, sustainable and democratic food systems.

As the British economist John Maynard Keynes once wrote in what has since become a cliché in the social sciences, "[t]he difficulty lies not so much in developing new ideas as in escaping from old ones" (Keynes, [1936] 2016). In that sense, we have tried to get rid of the entrenched understanding of food as a commodity (and as a private good in economic terms). In doing so, we have posited that commons are at the same time a very ancient and rather innovative framework to govern natural resources that are essential to human survival. Thus, food commons can easily be perceived as an emancipatory alternative, a knowledge carrying a moral purpose to combat exclusion and create conditions for human flourishing (Wright, 2013) or a disruptive narrative that challenges the power relations in the industrial food system and deepens food democracy.

The challenge for the future is to develop political, cultural and institutional conditions that allow the aggregate of predicaments addressed by the label "*food as commons"* to imagine and materialize solutions capable of making the global (dis)order regain a modicum of decency and legitimacy. The narrative of food as commons may unlock practices and policies that were discarded, forgotten or simply not permitted by the hegemonic mainstream because they were not aligned to the capitalist mantra. Such practices and policies have been generally dismissed as too radical, too naïve or too expensive.

Modernity, through the ideological and repressive apparatus of the State (Althusser, 1973) made of law, education and scientific professionalism, has systematically transformed commons into capital in a very successful way; it achieved this transformation successfully not only for food itself, but also for land, seeds and labour, and increasingly for knowledge, water and even, with the introduction of "rights to pollute", clean air. Individualization and competition have been the outcome of and the fuel for this process. Food, an absolute and universal need for humans, has shared the fate of every other commons (assuming that we can disentangle them from each other). It has been transformed into capital to be understood as an abstract naturalized entity, disembedded from its social relations, places of production and consumption and separated from the material conditions of life that can be produced and reproduced only within the capitalist logic.

This logic has divided the world into two spheres, the public (state) and the private (market), while insisting that these spheres are of an ontologically different nature and that their various combinations exhaust the repertoire of institutional possibilities. Where, however, there is neither state nor private property (which, however, always requires the state even to exist), there are the commons. The commons were described by Garrett Hardin as places of no law and then rescued, a generation later, by Elinor Ostrom through the idea of material common-pool

resources better run by communities, as something worth scientific inquiry. Both Hardin and Ostrom, however, share the same positivistic logic aimed at an objective ontology of the commons. For them, the commons were ontological; for us, the commons are phenomenological; they are located in place and time and continuously re-created and co-constructed by the inextricable ecology of the web of life.

The binary logic of modernity was easy to challenge when it became abundantly clear that the private and the public sectors do share the very same logic of plunder through mechanisms, such as revolving doors, regulatory capture and the military industrial complex already denounced by President Eisenhower in 1955 (Mattei and Nader, 2008). The insurrection of the Zapatistas in Chiapas and the struggle against the privatization of the provision of water services in Cochabamba opened the way for the global challenge of the conspiracy between political institutions and global transnational corporations that victimize the commons. Significantly, food and water have long been priority issues in the Global South. The last round of extraction and commodification that we are experiencing in its full-fledged forms today (i.e. land and water grabbing in the Global South (De Schutter, 2011), fish stocks overexploitation, pollution of the sea with plastic and the atmosphere with industrial by-products) started after the global crisis of 2008 and is becoming truly global in its victimization, also involving the weak inhabitants of the Global North plundered of every previous conquest of democracy and public welfare. In this grim global scenario, the commons provide an inspirational and aspirational tool of resistance and a theoretical challenge to the binary vision of the state and market duopoly. The theoretical challenge must be morphed into institutions, policies and laws to provide a generative alternative to the current extractive scenario (Capra and Mattei, 2015). Practices of collective food production, sharing and consumption, customary and contemporary, stemming from subsistance agriculture as well as from the new possibilities offered by the internet-based circular economy have to be promoted and developed as a robust counter-narrative.

Again, there are different levels of ambition. Some of the civic alternatives that are in the process of being developed as local forms of direct participation in the administration of certain cities (e.g. Naples, Ghent, Barcelona, Brussels, Turin, Porto Alegre, most of them being termed as commons alternatives) are already tailored to food predicaments in order to make the civic sector more robust. Think about the possibility to apply the participatory logic developed in the case of the Naples acqueduct to food supply (private or public) or to the case of the Mondeggi Bene Comune and the establishment of a commonly managed farm based on the principles of agroecology, accessibility, anti-patriarchy and decolonization (Chapter 21 in this volume). In this case, an institutionalized "civic sector" could complement rather than substitute the public and the private, perhaps ultimately providing some desirable transformations. It is, however, crucial to understand that a thriving social solidarity economy, if it is not supported by a strong educational effort, is at high risk of being itself co-opted by the state or the market, as it happened to ideas such as the Green Economy, organic food or the distribution of surplus food through partnerships between large retailers and charities. Capitalism has a fantastic mimetic power and unless confronted with permanent political pressure from social movements, is very unlikely to allow genuine alternatives to coexist with its loyal cronies.

A more ambitious move is therefore to deploy the *fundamental need* of food as a powerful counter-hegemonic weapon in an international war of narratives of the Gramscian type. Politically speaking, this is not a reformist but rather an openly revolutionary approach (either counter- or alter-hegemonic). The civic constituencies in both the Global North and the Global South might be mobilized on an issue as universal, direct and dramatic as hunger. Most revolutions started on issues of food scarcity and food rebellions are still taking place in recent years throughout the world (Holt-Gimenez and Patel, 2012). Such a war of narratives, positions and

cultural hegemony requires subjectivities endowed with an aspirational vision and an inspirational plan. The vision is not abstract but rather embeddeed in the material conditions of the Anthropocene/Capitalocene, whose structural imperatives are leading to a catastrophe which appears increasingly inevitable; four out of nine planetary boundaries have already been surpassed (Steffen et al., 2015) and an increasing number of people live unbearable lives of deprivation and domination. Since the early times of the Huguenot constitutional theory, a right/duty to resist is triggered in front of a model of sovereignty leading to the destruction of the political community (Menkel-Meadow, 2012). The ecological thinking embedded in the commons provides a standard of evaluation of law and policy in the political choice that is open to everybody: obey or resist. Resistance against ruinous laws or policies, if it remains an individual act, may at best give us a hero often dead or imprisoned. Collective resistance can change the world, which makes it crucial to work hard in a process of collective subjectivization based on eco-literacy and systemic thought, the only way to even see through the fog of the capitalist propaganda. It is our hope that the alternative imaginations of food and food systems offered in this book may contribute to the kind of vision and horizon that are needed to subvert the deadly logic of global state-corporate capitalism.

Notes

1 A 2011 study prepared at the request of the FAO estimates that 1.3 billion tonnes of food produced for human consumption -- about one third of the total -- are lost or wasted (Gustavsson et al. 2011). The levels of waste per capita of households are much higher in rich countries than in developing countries; while consumers in Europe and North America waste 95–115 kg/year, this figure is only 6–11 kg/year in Sub-Saharan Africa and South/Southeast Asia.
2 Public choice theory provides, in this regard, a description of politics that is not without foundation (Buchanan and Tullock 1958, Stigler 1971) and should call for a reaction precisely from those, the believers in the strength of democracy, who are suspicious of its normative prescriptions.
3 Article 21(3) uses a similar formula with respect to access to water: 'States shall respect, protect and ensure access to water, including in customary and community-based water management systems ....'
4 In a text quoting her to be found here: http://wiki.p2pfoundation.net/Partner_State (accessed on 27 July 2018).
5 https://stad.gent/smartcity-en/news-events/expert-michel-bauwens-researches-ghent-%E2%80%98commons-city-future%E2%80%99 (accessed on 21 August 2018).
6 https://iucfood.wordpress.com/2017/08/06/making-sustainable-food-policies-a-reality-first-ipes-food-local-lab/ (accessed on 21 August 2017).
7 http://tfpc.to/ (accessed on 21 August 2017).
8 http://www.thefoodcommons.org/ (accessed on 21 August 2017).

Bibliography

Althusser, L. 1973. *Lo Stato e i suoi apparati*. Editori Riuniti, Roma.
Altvater, E., Crist, E., Haraway, D., Hartley, D., Parenti, C. and McBrien, J., 2016. *Anthropocene or Capitalocene?: Nature, History, and the Crisis of Capitalism*. Pm Press, Oakland.
Arendt, H. 1958. *The Human Condition*. Chicago: University of Chicago Press.
Atkinson, A.B. 2015. *Inequality. What Can Be Done?*., Harvard University Press, Cambridge.
Bakker, K. 2007. The 'Commons' versus the 'Commodity': Alter-globalization, Anti-privatization and the Human Right to Water in the Global South. *Antipode*, 39 (3), 430–455.
Béné, C., Belal, E., Ousman Baba, M., Ovie, S., Raji, A., Malasha, I., Njaya, F., Na Andi, M., Russell, A. and Neiland, A. 2009. Power Struggle, Dispute and Alliance Over Local Resources: Analyzing 'Democratic' Decentralization of Natural Resources through the Lenses of Africa Inland Fisheries. *World Development*, 37 (12), 1935–1950.
Benkler, Y. 2006. *The Wealth of Networks: How Social Production Transforms Markets and Freedom*, Yale University Press, New Haven.

Bottiglieri, M., Pettenati, G. and Toldo, A. 2016. *Toward the Turin Food Policy. Good Practices and Visions*. Milan: FrancoAngeli.

Bourg, D. and Whiteside, K. 2010. *Vers une démocratie écologique. Le citoyen, le savant et le politique*, Seuil, Paris.

Bourguignon, F. 2015. *The Globalization of Inequality.*, Princeton University Press, Princeton.

Buchanan, J. and Tullock, G. 1958. *The Calculus of Consent: Logical Foundations of Constitutional Democracy*. Liberty Fund, Indianapolis.

Capra, F. and Mattei, U. 2015. *The Ecology of Law*. Berrett Khoeler, Oakland.

Charvet, J., and Kaczynska-Nay, E. 2008. *The Liberal Project and Human Rights: The Theory and Practice of a New World Order*. Cambridge University Press, Cambridge.

Chislock, M.F., Doster, E., Zitomer, R.A., and Wilson, A.E. 2013. Eutrophication: Causes, Consequences, and Controls in Aquatic Ecosystems. *Nature Education Knowledge* 4 (4), 10.

Claeys, P. 2014. Vía Campesina's Struggle for the Right to Food Sovereignty: From Above or from Below? In *Rethinking Food systems. Structural Challenges, New Strategies and the Law*, eds. N.C.S. Lambek, P. Claeys, A. Wong, and L. Brilmayer, 29–52. Dordrecht, Heidelberg, New York, London: Springer.

Claeys, P. 2015. Food Sovereignty and the Recognition of New Rights for Peasants at the UN: A Critical Overview of La Via Campesina's Rights Claims over the Last 20 Years. *Globalizations*, 12 (4), 452–465.

Clapp, J. and Isakson, R. 2018. *Speculative Harvests. Financialization, Food, and Agriculture*. Halifax, Nova Scotia: Fernwood Publishing.

Coase, R. and Fowler, R.F. 1935. Bacon Production and the Pig-Cycle in Great Britain. *Economica*, 2 (6), 142–167.

Committee on Economic, Social and Cultural Rights. 1999. *General Comment No. 12: the Right to Food*. UN doc. E/C.12/1999/5.

Committee on World Food Security. 2009. *Reform of the Committee on World Food Security*. U.N. Doc. CFS:2009/2Rev. 2.

Cunningham, S., Neiland, A.E., Arbuckle, M. and Bostock, T. 2009. Wealth-Based Fisheries Management: Using Fisheries Wealth to Orchestrate Sound Fisheries Policy in Practice. *Marine Resource Economics*, 24 (3), 271–287.

Dardot, P. and Laval, C. 2015. *Commun. Essai sur la révolution au XXIème siècle*. La Découverte, Paris.

De Angelis, D.M., 2017. *Omnia sunt communia: On the Commons and the Transformation to Postcapitalism*. Zed Books Ltd, London

De Schutter, O. 2011. The Green Rush: The Race for Farmland and the Rights of Land Users. *Harvard International Law Journal*, 52 (2), 503–559

De Schutter, O. 2015. The Role of Property Rights in the Debate on Large-Scale Land Acquisitions. In *Large-Scale Land Acquisitions: Focus on South-East Asia, International Development Policy series No. 6*, eds. C. Gironde, C. Golay, and P. Messerli, 53-77. Geneva: Graduate Institute Publications, Boston: Brill-Nijhoff.

Defourny, J. and Nyssens, M. 2006. Defining social enterprise. In *Social Enterprise. At the Crossroads of Market, Public Policies and Civil Society*, ed. M. Nyssens, 3–26. London: Routledge.

FAO. 1997. *The State of the World's Plant Genetic Resources for Food and Agriculture*. Food and Agriculture Organization of the United Nations, Rome.

FAO. 2010. *Second Report on the State of the World's Plant Genetic Resources for Food and Agriculture.* Food and Agriculture Organization of the United Nations, Rome.

FAO. 2015. *Status of the World's Soil Resources*. Food and Agriculture Organization of the United Nations, Rome.

FAO. 2017. *The Future of Food and Agriculture. Trends and Challenges*. Food and Agriculture Organization of the United Nations, Rome.

Ferrando, T. 2016. Il Sistema Cibo Bene Comune. In *Beni Comuni 2.0. Contro-egemonia e nuove istituzioni*, eds. A. Quarta and M. Spanò. Milan: Mimesis.

Ferrando, T. 2017. Land Rights at the Time of Global Production: Multi-Spatiality and 'Legal Chokeholds'. *Business and Human Rights Journal*, 2 (2), 275–295.

Ferrando, T. and Vivero-Pol, J.L. 2017. Commons and 'Commoning': a 'New' Old Narrative to Enrich the Food Sovereignty and Right to Food Claims. In *Right to Food and Nutrition Watch 2017*, ed. FIAN International, 50–56. https://www.righttofoodandnutrition.org/commons-and-commoning-new-old-narrative-enrich-food-sovereignty-and-right-food-claims (Accessed on August 21, 2018).

Gilens, M. 2012. *Affluence & Influence: Economic Inequality and Political Power in America*. Princeton University Press, Princeton.

Gilens, M. and Page, B. 2014. Testing Theories of American Politics: Elites, Interest Groups and Average Citizens. *Perspectives on Politics*, 12 (3), 564–581.
Golay, G. 2015. *Academy In-Brief No. 5: Negotiation of a United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas*. Geneva Academy of International Humanitarian Law and Human Rights, Geneva.
Gustavsson, J. et al. 2011. *Global Food losses and food waste. Extent, causes, and prevention*. Swedish Institute for Food and Biotechnology (SIK) and FAO, Rome.
Gutiérrez, N. L., Hilborn, R. and Defeo, O. 2011. Leadership, Social Capital and Incentives Promote Successful Fisheries. *Nature*, 470 (7334), 386–389.
Haas, G.C. and Ezekiel, M. 1926. *Factors Affecting the Price of Hogs*. US Department of Agriculture, Washington DC.
Hanau, A. 1928. Die Prognose der Schweinepreise. *Vierteljahrshefte zur Konjunkturforschung/Sonderhefte*, 18 (1930), 46.
Hardt, M. and Negri, A. 2009. *Commonwealth*. Harvard University Press, Cambridge.
Hayek, F. 1948 (1937). Economics and Knowledge. In *Individualism and Economic Order,* 33-46. Chicago: Chicago University Press.
Hayek, F. 1960. *The Constitution of Liberty*. Chicago University Press, Chicago.
Higgs, S. 2015. Social Norms and Their Influence on Eating Behaviours. *Appetite*, 86, 38–44.
HLPE. 2012. *Food Security and Climate Change*. HLPE Report No. 3. High-level Panel of Experts on Food Security and Nutrition Rome. Committee on World Food Security.
Hiroyuki, U. 2018. John R. Commons's Criticism of Classical Economics. *Journal of Economic Issues*, 52 (2), 396–404.
Holt-Gimenez, E. and Patel, R. eds., 2012. *Food Rebellions: Crisis and the Hunger for Justice*. Food First Books, Oakland.
Honneth, A. 2017 (2015). *L'idée du socialisme* (orig. *Die Idee des Socialismus*). Gallimard, Paris.
Hopgood, S. 2013. *The Endtimes of Human Rights.*: Cornell University Press, Ithaca.
Horkheimer, M. 1930 (1974). *Débuts de la philosophie bourgeoise de l'histoire* (orig. *Anfänge der bürgerlichen Geschichtsphilosophie*). Payot, Paris.
Human Rights Council. 2017. *Draft Declaration on the Rights of Peasants and Other People Working in Rural Areas*. Presented by the Chair-Rapporteur of the Working Group, U.N. Doc. A/HRC/WG.15/4/2.
IPES-Food. 2016. *From Uniformity to Diversity. A Paradigm Shift from Industrial Agriculture to Diversified Agroecological Systems*. International Panel of Experts on Sustainable Food Systems, Brussels.
IPES-Food. 2017. *Too Big to Feed. Exploring the Impacts of Mega-Mergers, Consolidation and Concentration of Power in the Agri-Food Sector*. International Panel of Experts on Sustainable Food Systems, Brussels.
Jacobsen, SE., Sørensen, M., Pedersen, S.M. and Weiner, J. 2013. Feeding the World: Genetically Modified Crops versus Agricultural Biodiversity. *Agronomy for Sustainable Development*, 33 (4), 651–662.
Jamu, D., Banda, M., Njaya, F. and Hecky, R.E. 2011. Challenges to Sustainable Management of the Lakes of Malawi. *Journal of Great Lakes Research*, 37 (1), 3–14.
Kahan, D.M., Braman, D., Gastil, J., Slovic, P. and Mertz, C.K. 2007. Culture and Identity-Protective Cognition: Explaining the White Male Effect in Risk Perception. *Journal of Empirical Legal Studies*, 4 (3), 465–505.
Kahan, D.M., Wittlin, M., Peters, E., Slovic, P., Ouellette, L.L., Braman, D. and Mandel, G. 2011. *The Tragedy of the Risk-Perception Commons: Culture Conflict, Rationality Conflict, and Climate Change*. Cultural Cognition Project Working Paper No. 89.
Kennedy, D. 2002. The International Human Rights Movement: Part of the Problem? *Harvard Human Rights Journal*, 15, 101.
Kennedy, D. 2012. The International Human Rights Regime: Still Part of the Problem? In *Examining Critical Perspectives on Human Rights*, eds. Dickinson, R., Katselli, E. Murray, C. and Pedersen, O.W., 19–34. Cambridge: Cambridge University Press.
Keynes, J.M. (1936) 2016. *General Theory of Employment, Interest and Money*. Atlantic Publishers & Dist, New Delhi.
Kostakis, V. and Bauwens. M. 2014. *Network Society and Future Scenarios for a Collaborative Economy*. London: Palgrave MacMillan.
Lambin, E. and Meyfroidt, P. 2011. Global Land Use Change, Economic Globalization, and the Looming Land Scarcity. *Proceedings of the National Academy of Sciences*, 108, 3465–3472.
Lambin, E. 2012. Global Land Availability: Malthus versus Ricardo. *Global Food Security*, 1, 83–87.

Lambin, E., Gibbs, H.K., Ferreira, L., Grau, R., Mayaux, P., Meyfroidt, P., Morton, D.C., Rudel, T.K., Gasparri, I. and Munger, J. 2013. Estimating the World's Potentially Available Cropland Using a Bottom-Up Approach. *Global Environmental Change*, 23 (5), 892–901

Lewins, R., Béné, C., Baba, M.O., Belal, E., Donda, S., Lamine, A.M., Makadassou, A., Mamane Tahir Na., A., Neiland, A.E., Njaya, F., Ovie, S., and Raji, A. 2014. African Inland Fisheries: Experiences with Co-Management and Policies of Decentralization. *Society and Natural Resources*, 27 (4), 405–420.

Lind, D. and Barham, E., 2004. The Social life of the Tortilla: Food, Cultural Politics, and Contested Commodification. *Agriculture and Human Values*, 21 (1), 47–60.

Loveland, P.J and Webb, J. 2003. Is There a Critical Level of Organic Matter in the Agricultural Soils of Temperate Regions a Review. *Soil and Tillage Research*, 70, 1–18.

Macpherson, C.B. 1968. Introduction. In *Leviathan*, Hobbes, T. London: Penguin Books.

Mattei, U. and Nader, L. 2008. *Plunder: When the Rule of Law is Illegal*. Blackwell, Oxford.

Mattei, U. 2011. *Beni Comuni. Un Manifesto*. Laterza, Bari.

Mattei, U. and Bailey, S. 2013. Social Movements as Constituent Power. The Italian Struggle for the Commons. *Indiana Journal of Global Legal Studies*, 20 (2), 965–1013

Mattei, U.and Quarta, A. 2018. *The Turning Point in Privale Law. Ecology, Technology and the Commons*. Edward Elgar, Cheltenham.

Mazzucato, M. 2013. *The Entrepreneurial State. Debunking Public vs. Private Sector Myths*. London: Anthem Press.

Menkel-Meadow, C. 2012. Introduction and Coda: International Dispute Resolution. In *Complex Dispute Resolution: Volume III*, ed. Carrie Menkel-Meadow, #. Farnham: Ashgate Press.

Moyn S. 2018. *Not Enough: Human Rights in an Unequal World*. Harvard University Press, Cambridge.

Moller, A.C., Ryan, R.M. and Deci, E. 2006. Self-Determination Theory and Public Policy: Improving the Quality of Consumer Decisions Without Using Coercion. *Journal of Public Policy and Marketing*, 25 (1), 104–116.

Moore, J.W. 2017. The Capitalocene, Part I: On the Nature and Origins of Our Ecological Crisis. *The Journal of Peasant Studies* 44 (3), 594–630.

Monteiro, C.A., Cannon, G., Moubarac, J.C., Levy, R.B., Louzada, M.L.C. and Jaime, P.C. 2018. Ultra-Processing. An Odd 'Appraisal'. *Public Health Nutrition* 21 (3), 497–501.

Nielsen, J.R., Degnbol, P., Viswanathan, K.K., Ahmed, M., Hara, M., Raja Abdullah, N.M. 2004. Fisheries Co-Management—an Institutional Innovation? Lessons from South East Asia and Southern Africa. *Marine Policy*, 28 (2), 151–-160.

Ostrom, E. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. New York: Cambridge University Press.

Ostrom, E. 2009. *A Polycentric Approach for Coping with Climate Change*. Policy Research working paper WPS 5095. Washington, DC: World Bank. https://openknowledge.worldbank.org/bitstream/handle/10986/9034/WPS5095_WDR2010_0021.pdf (Accesed on August 12, 2018).

Oxfam. 2018. *Ripe for Change. Ending Human Suffering in Supermarket Supply Chains*. OXFAM. https://policy-practice.oxfam.org.uk/publications/ripe-for-change-ending-human-suffering-in-supermarket-supply-chains-620418.

Paerl, H.W. and Huisman, J. 2012. Climate Change: Links to Global Expansion of Harmful Cyanobacteria. *Water Research*, 46, 1349–1363.

Parris, K. 2011. Impact of Agriculture on Water Pollution in OECD Countries: Recent Trends and Future Prospects. *International Journal of Water Resources Development*, 27, 33–52.

Patel, R. and Moore, J.W. 2017. *A History of the World in Seven Cheap Things: A Guide to Capitalism, Nature, and the Future of the Planet*. Univ of California Press, Berkeley.

Pimentel, D., Williamson, S., Alexander, C., Gonzalez-Pagan, O., Kontak, C. and. Mulkey, S. 2008. Reducing Energy Inputs in the US Food System. *Human Ecology*, 36, 459–471.

Piron, J. and Cogolati, S. 2017. *Vers des partenariats publics-communs*. June 2017. http://www.etopia.be/spip.php?article3209 (Accessed on August 21, 2018).

Polanyi, M. 1951. *The Logic of Liberty*. Liberty Fund, London. Reprinted by Routledge.

Polanyi, K. 1957. The Economy as Instituted Process. In *Trade and Market in the Early Empires: Economies in History and Theory*, eds. K. Polanyi, C. Arendberg and H. Pearson, 244. Free Press, New York.

Ratner, B.D., Åsgård, B. and Allison, E.H. 2014. Fishing for Justice: Human Rights, Development, and Fisheries Sector Reform. *Global Environmental Change*, 27, 120–130.

Reardon, T. and Berdegué, J.A. 2002. The Rapid Rise of Supermarkets in Latin America. Challenges and Opportunities for Development. *Development Policy Review*, 20 (4), 317–334.

Reardon, T., Timmer, C.P. and Minten, B. 2012. Supermarket Revolution in Asia and Emerging Development Strategies to Include Small Farmers. *Proceedings of the National Academy of Sciences*, 109 (31), 12332–123337.

Ryan, R.M. and Deci, E.L. 2000a. Internal and External Motivations: Classic Definitions and New Directions. *Contemporary Educational Psychology*, 25 (1), 54–67.

Ryan, R.M. and Deci, E. 2000b. Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being. *American psychologist*, 55 (1), 68–78.

Samuelson, P.A. 1954. The Pure Theory of Public Expenditure. *Review of Economics and Statistics*, 36 (4), 387–389.

Sandel, M.J. 2013. *What Money Can't Buy: The Moral Limits of Markets*. Farrar, Straus and Giroud, New York.

Sarfatti-Larson, M. 1977. *The Rise of Professionalism: A Sociological Analysis*. University of California Press, Berkeley.

Scitovski, T. 1992. *The Joyless Economy: The Psychology of Human Satisfaction*. Oxford: Oxford University Press.

Sharma, C. 2011. Securing Economic, Social and Cultural Rights of Small-Scale and Artisanal Fishworkers and Fishing Communities. *Journal of Maritime Studies*, 10 (2), 41–62.

Shepperson, M. 2017. *How Ancient Lentils Reveal the Origins of Social Inequality*. The Guardian, 11 October 2017.

Smith, P., D. Martino, Z. Cai, D. Gwary, H. Janzen, P. Kumar, B. McCarl, S. Ogle, F. O'Mara, C. Rice, B. Scholes and O. Sirotenko. 2007. Agriculture. In *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, eds. B. Metz, O.R. Davidson, P.R. Bosch, R. Dave and L.A. Meyer, #. Cambridge and New York: Cambridge University Press.

Special Rapporteur on the right to food. 2012. *The Fisheries Sector and the Right to Food*. Interim Report of the Special Rapporteur on the right to food, Olivier De Schutter, to the 67th session of the General Assembly, UN doc. A/67/268.

Steffen, W., Richardson, K., Rockström, J., Cornell, S.E., Fetzer, I., Bennett, M.E., Biggs, R., Carpenter, S.R., de Vries, W., de Wit, C.A., Folke, C., Gerten, D., Heinke, J., Mace, G.M., Persson, L.M., Ramanathan, V., Reyers, B. and Sörlin, S. 2015. Planetary Boundaries: Guiding human development on a changing planet. *Science*, 347 (6223), DOI:10.1126/science.1259855

Stigler, G.J. 1971. The Theory of Economic Regulation. *The Bell Journal of Economics and Management Science*, 2 (1), 3–21.

Stiglitz, J. 2015. *The Great Divide*. W.W. Norton and Company, New York.

TEEB. 2018. *Measuring what matters in agriculture and food systems: a synthesis of the results and recommendations of TEEB for Agriculture and Food's Scientific and Economic Foundations report for The Economics of Ecosystems and Biodiversity*. UN Environment, Geneva.

The Food Commons. 2011. *The Food Commons 2.0. Imagine, Design, Build*. October 2011. http://www.thefoodcommons.org/images/FoodCommons_2-0.pdf (accessed on August 21, 2018).

Townsend, R., Shotton, R. and Uchida, H., eds. 2008. *Case Studies in Fisheries Self-Governance*. FAO Fisheries Technical Paper No. 504. Food and Agriculture Organization, Rome.

van der Ploeg, J.D. 2010. The Food Crisis, Industrialized Farming and the Imperial Regime. *Journal of Agrarian Change* 2(10): 98–106.

Vermeulen, S.J., Campbell, B.M. and Ingram, J.S.I. 2012. Climate Change and Food Systems. *Annual Review of Environmental Resources*, 37, 195–222.

Vivero-Pol, J.L. 2017a. Food as Commons or Commodity? Exploring the Links between Normative Valuations and Agency in Food Transition. *Sustainability*, 9 (3), 442.

Vivero-Pol, J.L. 2017b. *How Do People Value Food? Systematic, Heuristic and Normative Approaches to Narratives of Transition in Food Systems*. PhD Thesis. October 2017. Faculty of Bioengineers. Universite catholique de Louvain, Belgium. https://dial.uclouvain.be/pr/boreal/object/boreal:191763

Wicklund, R. A. 1974. *Freedom and Reactance*. Oxford: Lawrence Erlbaum.

World Bank. 2004. *Saving Fish and Fishers: Toward Sustainable and Equitable Governance of the Global Fishing Sector*. World Bank, Washington, DC.

Wright E.O. 2013. Transforming Capitalism through Real Utopias. 2011 Presidential Address. *American Sociologist Review*, 78, 1–25.

ROUTLEDGE HANDBOOK OF FOOD AS A COMMONS

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Chapter 1

INTRODUCTION

The food commons are coming …

Jose Luis Vivero-Pol, Tomaso Ferrando, Olivier De Schutter and Ugo Mattei

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1
INTRODUCTION
The food commons are coming …

Jose Luis Vivero-Pol, Tomaso Ferrando,
Olivier De Schutter and Ugo Mattei

Seeing with new eyes

Since the fall of the Berlin Wall, only one vision has become hegemonic worldwide. The marginalization of any alternative to the single thought, also known as the end of history (Fukuyama, 1989; IUC, 2009), has quickly generated what is known as neoliberalism, the new form of hybridization between public sovereignty and private corporations that has come to dominate contemporary structures of global governance (Harvey, 2007). This arrangement, with a crucial role for the military industrial complex, has not only produced new forms of world disorders. It has also disrupted the fundamental understanding of modernity, that of a neat distinction between a public and a private sector. The new hybrid corporate power, the current form of capital accumulation, now runs the world within a logic of global sovereignty that defeats every form of democratic control. Every single aspect of human life has been attracted within this bio-political machinery so that the very human being is now commodified like every other aspect of nature. The most tangible manifestation of this process is in the domain of two of the fundamental building blocks of human life: water and food. These two essential components of life are now almost entirely transformed into commodities, leading to forms of domination and subordination that are difficult to overestimate. The consequences of the current extractive system are so deep as to produce a new geological era, the so-called Anthropocene (Crutzen, 2006; Purdy, 2015) or Capitalocene (Moore, 2017), which is likely to destroy the very conditions of life and human civilization (Brown, 2008; Capra and Mattei, 2015).

It is as a reaction to the massive abuses visited upon nature and community by the imperatives of reproduction of the dominant structure of power that the commons have re-emerged. This notion has the ambition to ground a counter-narrative and a political and institutional organization capable of shifting our pattern of development from an extractive and individual into a generative and collective mode. It is not, however, a new notion, as the commons have long constituted one way to organize and govern the relationship between society and nature resources (Sahlins, 1972; Mauss, 2002; De Moor, 2011; Ferrando and Vivero-Pol, 2017). The re-birth of the commons as an alternative, generative vision against neoliberal corporate plunder started with two heroic battles in the Global South. One emerged in 1994 in Chiapas (Mexico) with the Movimiento Zapatista as a reaction to the entry of the North American Free Trade Agreement (NAFTA) into force. It was ignited by the impossibility for local farmers to survive

with dignity in the global corporate food system (in its broader sense). The other arose in Cochabamba (Bolivia) in 2001, triggered by the need to defend water against corporate privatization by an American company with the support of the national government. In both cases, the commons were invoked to defend local communities against governments transformed into cronies of global corporate interests. Food and water, components of our very physical existence, have therefore been at the origins of the re-birth of the commons as a strategy of defence and (hopefully) of transformation: defence against ongoing commodification of commons still owned or governed collectively, and transformation to re-invent or design de novo forms to use, steward and share resources important for the community outside the market and state logic. Interestingly, however, while the notion of water as a commons is now widely recognized and has grounded many battles even in the Global North (Barlow and Clarke, 2017; Bieler, 2017), food as a commons has not been a conscious target of political battles and civic claims (Ferrando, 2016); indeed, it has not even been a paradigm of research (Vivero-Pol, 2017a).

Yet, we believe food can also be valued and governed as a commons and that approaching it under this intellectual framework offers important insights into a possible alternative vision coherent with the needs of reproduction of life rather than of capital. This book aims to open that discussion in the belief that we can obtain for food at least some of the (though partial) successes that we have been able to obtain with water.

Valuing food as a commodity is at odds with human history

Capitalism has been thriving and reproducing a troublesome relationship with food and food systems. The contemporary food regime of corporations and financial investors is such that while many eat poorly and badly, others have access to all the food they desire: purchasing power is what separates the two. Moreover, industrial production and global distribution of food are major driving forces in pushing the environment beyond its planetary and ecological boundaries, mortgaging the livelihood of future generations. This scenario is characterized by extreme inequality and power imbalances. At its centre is the idea that food is an object for sale (a commodity) and the food system is nothing but an opportunity to extract private value. In such a context, achieving the universal right to adequate food (a legal entitlement), food and nutrition security (a global public good) or food justice and food sovereignty inevitably appears a long-term vision at best, a utopian goal at worst. It is therefore essential to broaden political imagination: to explore and practice alternative paradigms of food and visions of food systems capable of overcoming the normative, technical, political lock-ins the industrial food system has created (IPES-Food, 2016). The paradigm of food as a commons, as a way to value food and to govern its production and allocation, will unlock our imagination, encouraging us to design other types of policies and legal frameworks for the food system that have been so far disallowed because they were not aligned to the dominant narratives of capitalism (Wright, 2013).

The aim of this book is to investigate the multiple enclosures at the basis of the dominant industrial food regime and to explore how such enclosures could be challenged by re-describing and re-conceptualizing food as a commons. As in many other areas of people's livelihoods, enclosures, plunder and exclusions have occurred through legislation, pricing, patents, discourses and public violence (Mattei and Nader, 2008). As a consequence, the opportunities for the production, transformation and consumption of food as a commons have been marginalized and repressed. The social construction of food as a commodity, in fact, denies its non-economic attributes (as vital fuel for our bodies, as a human right, as a product of Nature, or as an element of our culture) in favour of an exclusive focus on its tradable features, such as its external appearance and packaging, taste, or shelf-life, but first and foremost, its price and calorie content.

Inevitably, this leads to neglect social and relational properties of food, alongside an emphasis on cheap calories and the dismissal of the ecological role of food systems in stewarding biodiversity and nature's inherent connection with society and the organization of the economy (Díaz et al., 2018; Moore, 2017).

From the scientific and industrial revolutions of the 18th century to the present day, capitalist thinking and its practices have increasingly transformed food – an essential element of life – into a private, mono-dimensional commodity for mass consumption in a globalized market. Over the last decade, however, there has been an increased recognition that this view of food as a commodity, as a social construct, can be challenged. Food can be re-conceptualized differently: it can be valued and governed as a commons, and it is constructed as such in a range of initiatives in all world regions.

A subversion of the food paradigm that sustains the current mainstream food system, when it happens, will shed light on the conflict between the hegemonic economic epistemology (an epistemology in which the commons lead to the "tragedy" of overexploitation, and in which private property and allocation through market mechanisms predominate) and the non-dominant alternatives (political, historical, legal and radical–activist approaches to the commons), which have been gaining legitimacy in recent decades.

The framing of food as a commodity, the production of which responds to price signals and the allocation of which depends on purchasing power, is increasingly being challenged. Alternative framings have been proposed, often implicitly, by a range of grassroots movements and customary indigenous traditions all over the world. Small-scale farmers, peasants and fisherfolk, farmworkers, conscious eaters and regulators, food security activists, academics and human rights advocates, among others, are developing alternative food paradigms in multiple loci (urban and rural areas in the Global South and North) by defending the public nature of many food-producing resources such as seeds, water, land and agricultural knowledge. The de-commodification and commoning of food (and of the whole food system as the broader objective) will open up a transition towards a plurality of new food regimes. As a result, features other than exchange value shall be given greater recognition: food, under these competing paradigms, is re-conceptualized as essential to the satisfaction of a human need (nutrition + culture + community), with justice, democracy and the inherent recognition of the ecological limits and moral obligations as pivotal elements. Food systems will emerge in various forms, and the individual freedom to extract nature and maximize profits will be deemed incompatible with the common good of people and the planet (Patel and Moore, 2018).

This book aims to enrich the debate on food as a commons between and within disciplines, niches of resistance (transition towns, food sovereignty, de-growth, open knowledge, commons) and organizational scales (local food systems and national policies, South–South collaborations and international governance and agreements). It asks two questions: What would food policies look like, once we shift to the paradigm of food as a commons? And how do we get there?

The thriving commons as a civic counter-movement to the global food crises

The commons are back … if they were ever gone. The multiple crises the world has faced in the last decades have prompted scholars, policy makers and activists to seek solutions that enable us to live a satisfying, fair and sustainable life within planetary boundaries. The reappearance of the commons represents a promising transformative pathway to replace the neoliberal model. Historically, the commons have been associated with a record of resilience, collective governance and sustainability. They provide an inspirational narrative based on solid moral grounds. Commons thinking offers a counter-claim to the idea that society is and should be composed

of atomized individuals, acting as rational agents seeking to maximize their individual utility and competing against other individuals in order to thrive as a separate individual rather than as a member of an ecological collectivity.[1] However, the narrative of the commons was marginalized in the 20th century by the ascent of possessive individualism (Macpherson, 1971), rational choice (Schelling, 1984), the diffusion of the individualistic ethos and domination proper of colonialism, the objectification of nature, social Darwinism (Leonard, 2009) and the famous fable of the "tragedy of the commons" (Hardin, 1968). Unlike these, the commons discourse recognizes that people shall live their lives as aware individuals deeply embedded in, and not acting against, social relationships and the environment. Moreover, individuals' active participation is essential to realizing collective and personal goals, moving away from a purely individual rights-based, market-based and private-property worldview.

From a historical perspective, treating food as a pure commodity devoid of other important dimensions is an anomaly. For centuries, food was cultivated in common and considered a mythological or sacred item; it was allocated according to need, rather than on the basis of the ability to pay. In different times and geographies, food shaped civilizations and socio-economic transformations. Often, it was considered so important in terms of culture, religion and survival that its production and distribution were governed by non-market rules; production, distribution and consumption were collective activities, done in common rather than alone or within the nuclear family (Diamond, 1997; Fraser and Rimas, 2011; Montanori, 2006). Food-producing commons were ubiquitous in the world, and history records are full of commons-based food production systems ranging from the early Babylonian Empire (Renger, 1995), ancient India (Gopal, 1961), the Roman Empire (Jones, 1986), Medieval Europe (Linebaugh, 2008) and early modern Japan (Brown, 2011). Food was considered a commons as well as a public tool, with diverse and certainly evolving proprietary schemes ranging from a private good given for free to idle Temple priests, a resource levied by kings and feudal lords as well as a public tool used by Roman emperors, Mayan dignitaries and the British government to prevent disturbances and appease the revolting crowds (Jones, 1986; Schuftan, 2015; Kent, 2015). Food always carried many dimensions, and, except in recent history, it was never reduced to a tradeable priced good.

However, in the Western context, the idea of the commons was gradually abandoned: the enclosures movement, which started in England in the 16th century, and the abolition of the poor laws by the Poor Law Amendment Act in 1834 symbolize this shift (Polanyi, [1944] 2001). The commons re-entered the political and social agenda only in the 1980s, as a countermovement to – as society's self-defense against – the commodification process that accelerated in the last quarter of the 20th century (Appadurai, 1986). For decades, the commons have been dismissed as a failed system of governance and resource management (Bloemen and Hammerstein, 2015). They have now been gradually rehabilitated in the legal, political and economic domains, especially in the environmental and knowledge realms (Benkler, 2013; Capra and Mattei, 2015). Today, there is a growing recognition that the hegemonic market–state duet, with their capitalist system and individualistic ethos, is inadequate to tackle the global and multiple disruptions that living beings and the planet confront on a daily basis.

All over the world, socio-economic imaginations are regaining ground as alternative narratives and praxis to the hegemonic neoliberal version of capitalism (e.g., happiness, de-growth, *buen vivir*, resilience, transition, sharing economy, peer-production). Moreover, innovative commons-based initiatives are mushrooming, with examples ranging from the local level (e.g., the maintenance of communal forests owned by parishes in Galicia villages), to the national level (e.g., the path-breaking initiative promoted by the government of Ecuador to collectively design public policies that can support knowledge commons [Vila-Viñas and Barandiaran, 2015]), to the regional level (e.g., the first European Citizens' Initiative, which demanded that water be

treated as a public good and commons [Bieler, 2017] or the European commoners establishing a European Commons Assembly). Some commoners organize to defend old commons from current modes of enclosure and commodification (e.g., land grabbing or privatization of municipal water services), while others are inventing new commons in the knowledge domain (Creative Commons Licenses, online services and digital content) and in the cities (food councils, commoning disused public squares and abandoned buildings, sharing meals with neighbours and the broader community). In all these cases, the theory and praxis of the commons (Quarta and Ferrando, 2015) operate as counter-hegemonic or alter-hegemonic, gathering around a diffused dissent and the desire for new forms of imagination (Vivero-Pol, 2017a).

The multiplicity of commons: different vocabularies, understandings and practices

Before embarking on the reading of this volume, it is important to highlight that the commons continue to have different readings (Mattei, 2013), each with its different trajectories and implications. Legal, political, economic, cultural and ecological approaches talk about commons and inform knowledge and ideologies, which are then reflected in the creation of different schools of thought and vocabularies that examine, interpret and influence our understanding of the nature of the commons. As resources that are important for human beings, commons have "multiple personalities" (Wall, 2014) and therefore multiple phenomenologies (Mattei, 2012) and vocabularies to describe them. This is not an anomaly but rather a characteristic of societies already highlighted, among other theories, by legal pluralism (Engle-Merry, 1988) and institutional diversity (Ostrom, 1990). The plurality of definitions of the commons in the public and academic discourses renders it difficult to reach a consensus on which resources, situations and policy decisions are deemed to be considered as commons or for the common good. This situation affects food directly, with its consideration as a commons strongly contested in academic and political domains (Vivero-Pol, 2017b). One source of discrepancy of understanding the commons stems from the fact that collective ethical notions of what a commons is according to different communities (commons as a social construct) have developed in parallel with theoretical approaches proposed by influential thinkers (in particular among economists of the institutionalist branch) and with political decisions made by elites (experimenting with a political approach to commons).

Different academic disciplines have addressed the commons by relying on the epistemologies (cognitive tools and accumulated knowledge) that characterize each, be that economics, law, history or political science. These epistemologies have been blended with dominant ideologies and politics, as academia is often influenced by the ruling elites (Wallerstein, 2016). Other versions of the commons emerge from grassroots activists, the "commoners" who develop a range of practices questioning, mostly implicitly, the dominant understanding of food as a commodity. These varied approaches to a complex, place-based and multi-faceted theme have shaped the different meanings and implications of the commons that we have at present. These understandings have evolved into an interdisciplinary approach (Laerhoven and Berge, 2011) that now seeks to expand beyond the academic walls to incorporate the meanings of commoners, combining different sources of knowledge in a transdisciplinary perspective (Dedeurwaerdere, 2014). However, various definitions of the commons still co-exist: the debate today is not only between an individualistic approach, in which the allocation of goods occurs through a combination of the state and the market, and an approach that makes room for the commons; it is also a debate within the community of scholars and activists who rely on the commons as to how to define the commons, how to govern them and which political implications follow from this counter-hegemonic paradigm (Benkler, 2013; Hess and Ostrom, 2007).

Therefore, with such a rich array of proponents and practitioners, the academic theory of the commons cannot be considered uniform, coherent or consolidated. However, diversity should not be perceived as a threat. On the contrary, the existence of colliding theoretical approaches underlines tensions and fault-lines, revealing the different epistemic regards to resources and practices that are essential to human societies and individuals.

The different meanings of the commons to economists and policy makers

Commons as public goods

In its most widespread and general meaning, a common good describes a specific resource that is shared with and benefits all or most members of a given community. Commons, owned in common or shared within the community, satisfy needs that go unmet by either markets or institutions. However, in the economic and political parlance, commons are identified (and named) as public goods in some cases or as common-pool resources in others. On the one hand, political scholars define public goods as those material and immaterial goods deemed to be desirable by the public (Hampson and Hay, 2004) because of the utilities they generate in favour of the society (Ver Eecke, 1999). Although their nature as public good does not automatically imply their open accessibility to all, goods like water, pollination, soil fertility and sunlight are often considered commons and public goods as they are fundamental to the idea that life is not for sale (Shiva, 2005; Patel, 2007). On the other hand, the notion of commons (or common-pool resources, as termed by Elinor Ostrom) is different from public goods in neoclassical economics parlance. The term commons is often utilized to define a large set of human and natural systems that is

> sufficiently large that it is difficult, but not impossible, to define recognized users and exclude other users altogether. Further, each person's use of such resources subtracts benefits that others might enjoy. Fisheries and forests are two common-pool resources that are of great concern in this era of major ecological challenges. Others include irrigation systems, groundwater basins, pastures and grazing systems, lakes, oceans, and the Earth's atmosphere.
>
> *(Ostrom, 2009)*

Throughout the world, natural fisheries, common grazing pastures, forests and biodiversity are examples of open-access resources prone to the tragedy of the commons, a fable that was proposed by Garrett Hardin (1968) and gained ample support at the end of 20th century. However, Hardin's generalized postulates were not based on sufficient evidence. When such evidences were gathered and analyzed by Elinor Ostrom (1990), the weaknesses and inconsistencies of the tragedy were exposed and debunked, leading Hardin to recognize the limits of his approach (Hardin, 1994). Unfortunately, however, Hardin's tragedy, with all its limits of reductionism, proved to be of exceptional predictive power if the commons idea is opened enough to include our whole world. Global corporations today roam it to satisfy the unlimited short-term profit motive that is codified in their DNA, the corporate charter. They act exactly like the self-interested farmers in Hardin's parable, enjoying a space of *no law* because the national legal systems are (captured and) ill-equipped to limit corporate power and its exceptional volatility. Land grabbing, water privatization and many other issues directly connected to food plunder cannot be understood outside of such clear perception (Ferrando, 2017). Ostrom's critique of Hardin, by theoretically denying the tragedy, may in practice shield the corporate entities that as a matter of fact cause it in the global arena. This is perhaps the main reason why the commons

should not be approached as a positive object that can be defined ontologically. The political dimension cannot be overlooked. This is why the economic approach, as that of other social sciences, provides little understanding and no political agency. A true genuinely phenomenological social theory capable of developing a *total critique* is needed (Unger and Crawford, 1996).

Although the literature on public goods and common-pool resources is extensive and diverse, such literature typically relies on the standard economic definition of public goods, which is based on the two ontological characteristics of non-rivalry and non-excludability (Samuelson, 1954; Buchanan, 1965; Musgrave, 1959). A public good is a good that is both non-excludable and non-rivalrous, in that individuals cannot be effectively excluded from its use and use by one individual does not reduce availability to others. A pure public good is an extreme case of a positive externality. There is, in general, no profit motivation to lead private firms to supply a socially efficient quantity of such goods (in other terms, markets undersupply such goods). In many cases, markets for public goods will not even exist (i.e., clean air). Private goods, however, cannot be enjoyed simultaneously by many people, and individuals can be prevented from using them either by physical means or by property rights (including intellectual property rights such as patents). Pure public goods provided by the government are usually financed from tax revenues. Different funding options result in different economic outcomes in terms of the distribution of the cost burden between taxpayers and users of the good or service.

Commons: a political construct to govern resources or to radically transform the system?

Because of their non-excludable character, public goods result in a collective action problem: all those who benefit from the provision of a local public good find it costly to contribute and would prefer others to pay for the good instead. If everyone follows the selfish dominant strategy, hoping to freely ride on the contributions of others, then the good is not provided or is underprovided. Yet, everyone would be better off if everyone contributed. Institutions allow for the overcoming of such collective action problems by imposing compliance with formal or informal rules with the aim of producing socially optimal outcomes (Ostrom, 2005). Another problem that has gained particular relevance in the recent period is that "public" no longer means the communities who manage their local resources but rather the central governing authority that controls these resources. In theory, public still means people; in practice, public means government decoupled from the people's social/ecological rights to their common goods (Quilligan, 2012).

Very often, public goods and commons are used as interchangeable terms, the former mostly used in the economic and political realms and the latter predominant in the social and environmental sciences domains. However, in both economic and political terms, food could be considered as an essential resource that requires management as a social mandate in order to guarantee the right to food for all: due to its vital role in allowing people to lead active and healthy lives, its access cannot be made conditional on purchasing power (De Schutter and Pistor, 2015). As such, considering and governing food as a commons would simply mean recognizing food for what it is. Some authors, like Giacomo Pettenati et al. (this volume), have also gone as far as claiming that the uniqueness of food is such that the whole food system should be re-imagined as a commons. Others, like Cristian Timmermann (this volume), have also suggested the condition of food and nutrition security (FNS) should be considered a global commons or a global public good as it is beneficial for the community, the nations and the planet in general. FNS as a state of affairs is not rivalrous (my own food and nutrition security does not prevent you from having yours), but it is definitely excludable (as we can see at present, with over 800 million people with no food security at all), although ethically abominable.

The transformative and imaginative potential of the commons has been synthetized by the idea of the commons as a political tool and horizon. Such understanding of the commons is currently adopted by two different intellectual streams, which differ from each other on the basis of the primary subject of analysis: the resource or the governing community.

Those who focus on the properties of the resource recognize that rivalry and excludability can be molded by societal norms and technology but at the same time accept that commons are defined by these two features (Kaul et al., 1999; Kaul et al., 2003). Actually, it is not rare to find scholars using the terms public goods and commons interchangeably, especially when dealing with global public goods and global commons (Buck, 1998; Brousseau et al., 2012). For this stream, global commons are resources that provide benefits that are strongly universal in terms of countries, or whose benefits extend to all population groups and generations (Hjorth Agerskov, 2005); they have been the building blocks of different civilizations (Wolf, 2012). Examples range from clean air, weather data collection or internet, to stable currencies or standardized norms (e.g., ISO system). This understanding of global commons requires little more than forms of intergovernmental cooperation, voluntary guidelines to corporate actors and minor adjustments in policies and international law. Moreover, the transformative power of collective arrangements by people or communities outside the market and state duopoly is not contemplated here. Resource-based commons can co-exist with neoliberal markets, given their focus on non-appropriable resources (those termed as market failures) and the benefits they provide. That explains why global commons–global public goods have been increasingly embraced by the "institutional mainstream", as they can easily fit the dominant narrative of capitalism (Birdsall and Diofasi, 2015). In the European Commission, global public goods are now the subject of a thematic programme of the Development Cooperation Instrument.

For scholars and activists in the second stream, commons are not about the nature of a good but rather the way in which societies organize around essential goods that are produced, reproduced and managed collectively (Workshop on Governing Knowledge Commons, 2014). By commons, they do not mean things (rivers, forests, land, etc.), information or knowledge content or places defined by their material properties. They mean a way of doing things together in order to strengthen democratic self-determination. In this view, commons are self-regulated social arrangements to govern material and immaterial resources deemed essential for all and are place- and time-restricted and vary according to different societies, circumstances and technological developments. Commons can be distinguished from non-commons by the institutionalized sharing of resources among members of a community (Madison et al., 2010), what is often known as "commoning". It is "commoning" together that confers on a material, or non-material, common resource its commons consideration (Dardot and Laval, 2014). Commoning is about human/nature relationships (Bollier and Helfrich, 2015), and therefore the human-made consideration of what a commons is requires a specification for each place in our own time (Friedmann, 2015).

Commoning, as a form of governance, differs from the market allocation mechanism based on individual profit maximization and state governance based on command and control. It demands new institutions, goal setting and forms of interaction, thereby forming the bedrock to support a new moral narrative, a new transition pathway, a new economic model and a new relationship with nature and the planet Earth. Commons are a system of decision-making, collective ownership and value-based purposes that challenge the for-profit ethos of the market and the state's pretense to a monopoly on the definition of the common good and to acting "parens patriae" in the name of the whole polity. Commons are not about maximizing individual utilities, selfish individualism or legitimizing the use of force but rather collective decisions, institutions, property and shared goals to maximize everybody's wellbeing.

Transformative-wise, those two streams present diverging characteristics: the resource-based scholars see the commons as self-regulated forms of governance that can co-exist with current forms of free-market and capital accumulation of private-property regimes and absolute sovereign states (e.g., see a critique of the approaches defended by neo-institutionalists or neo-hardiniens in Caffentzis, 2012). Conversely, the governance-based proponents conceive of the commons as a transformative narrative, rooted in history but innovative enough to challenge the hegemonic duopoly formed by the neoliberal market and the state (Dardot and Laval, 2014; Wall, 2014; Capra and Mattei, 2015) This stream directly collides with the basic foundations of capitalism, such as the primacy of individual property over other rights, the sovereignty of the individual consumer over collective wellbeing, the lack of limits to resource accumulation and competition as the main driver of progress rather than cooperation (McCarthy, 2005; Hardt and Negri, 2009; Jeffrey et al., 2012; Verhaegen, 2015). Commons hold different values, goals, narratives, ethical principles and functioning from the capitalist market. From the very moment that we accept that the community has an instituting power to create a commons (resource, property regime, governing institution and purpose), we accept that the community is bestowed with legal and political powers to regulate the resources important to it, making commoning transformational and counter-hegemonic, since the state aims to retain those instituting powers to issue policies and enact laws and the market aims to retain its supremacy to allocate and govern scarce resources.

The charter to navigate the chapters

This book presents a different normative view of food, as a commons instead of a commodity, based on the recognition of the multi-dimensional nature of food and its essential role for humans, as well as on the praxis carried out by customary food practices, rural or indigenous, and contemporary civic food actions, urban or consumer-driven. The different understandings of food as a commons are place- and time-situated, with meanings and governing institutions created specifically by each polity, and thus there is no one interpretation of that concept. They converge, however, in their refusal to treat food exclusively as a monetized commodity. Far from being concerned about the lack of homogeneity, the editors value those discrepancies positively as there cannot be just one monolithic narrative about the polysemic concepts of food and commons.

With their diversity of approaches and their multiplicity of angles, the various chapters enrich the debate on food as a commons between and within disciplines, niches of resistance (transition towns, food sovereignty, de-growth, open knowledge, commons) and organizational scales (local food, national policies, South–South collaborations and international governance and agreements), exploring the different dimensions that reframe food as a commons and deploying a wide array of practical initiatives in rural and urban settings, in the Global South and the Global North, that actually materialize this narrative.

It is not our intention to provide an academic definition of what we consider "food as a commons" (although some authors in this book have already provided their own understandings). In that sense, we defend those understandings of "food as a commons" that are related to food democracy, food justice, food sovereignty or right to food practices. Said otherwise, we believe that valuing food as a commons informs the idea that communities should invent new ways of guaranteeing access to adequate and preferred food for all by setting up social innovations of various sorts, "de-commodifying" food and creating in the process a sort of "socio-diversity" of food alternatives that create multiple food systems that value food differently. And yet, all those alternatives oppose and deny the mono-dimensional valuation of food as a for-profit commodity.

For us, it is essential to understand that the concept of commons is socially and environmentally relational and cannot thus be understood without the particular value-based relations between the community and nature and within the community itself (Bollier, 2016; Verhaegen, 2015). Commons encompass networking, bond-creation, social learning among citizens, empowerment, caring and emancipatory meanings through community praxis. Actually, as historian Peter Linebaugh (2008) said, the concept of commons is best understood as a verb, and commoning can be understood as a means to rediscover the embeddedness of the individual in society and nature (Clausen, 2016). As a matter of fact, people, communities, activists, scholars and practitioners all over the world engage with commons on a daily basis. They live in both urban and rural settings and they protect, produce and imagine conceptions of the world that go beyond the dominant paradigm of privatization and exclusion (Walljasper, 2010). In that sense, we agree that "each commons is also somebody else's commons" (Shiva, 2005) and that in the web of life what is connected to a certain community is always connected to others (both human and non-human) beyond that community.

The choice of the chapters and the authors was not an easy task. It was certainly influenced by our networks and positioning as academics from the Global North. For this reason, there is no pretension of exhaustivity, but rather the desire to see analogous projects thriving elsewhere. Furthermore, chapters do not represent all the existing debates around food and food systems as a commons, and they are inherently contextual and inspired by the histories and experiences of their authors. We are aware that much more can and must be said about the intellectual, practical and methodological shift that is brought by the de-commodification of food. We hope that this collection can help to open up spaces and carve cracks in the mainstream, presenting other ways of engaging with food and food systems.

Rebranding food and alternative narratives of transition

The first part of the book sets the stage. Its five chapters directly challenge the commodity-based nature of the mainstream narrative around food and food systems and invite the readers to imagine alternative scenarios. Here, the authors explore different theoretical approaches to normative views of food, as a commons or as a public good, that reject the absolute commodification of food, understood as the hegemonic cultural narrative that impinges the mainstream food system and the productivist paradigm. Those approaches are based on the multiple dimensions of food; the non-Christian cosmologies; the de-commodification of food by also de-commodifying the components that produce that food; the open-source, peer-to-peer ethos and the sharing economy; and the emergent political construction of global public goods.

In the opening piece, José Luis Vivero-Pol departs from the multiple understandings of food to underline the reductionism resulting from the consideration of food as a commodity: such a framing, he argues, obscures other non-economic dimensions of food quite relevant to humans. For him, it is not enough to say that food is not a commodity, but it is essential to discuss its role as life enabler, natural resource, human right, cultural determinant, tradeable good and public good. All these dimensions must be taken into consideration if we are to radically shift the terms of the debate around food as a commons, but none of them is visible when we accept the monodimensional valuation of food as a commodity.

In the second contribution, Giacomo Pettenati, Alessia Toldo and Tomaso Ferrando engage in a dialogue with the idea of food as a commons presented in the introductory chapter but offer an additional provocative twist. In their opinion, it is not enough to focus on food as the product of the food system. On the contrary, the de-commodifying power of the commons must redesign the entirety of the food system and, as such, redefine each single element that

composes it. In their eyes, food cannot be dissociated from the deeper and broader socio-economic–ecological food system that generates it. Therefore, land, seeds, gender, energy, labour, landscape, the convivial act of eating, food waste and all other components of the food system must be re-thought, re-imagined and practiced according to the radical and ecological paradigm of commoning and the commons. Otherwise, no real transformation can be achieved.

On a similar line, Marina Chang's chapter refines the idea of food system as a commons and enriches it with insights from critical feminism and non-Western traditions. In her chapter, she constructs a holistic, interconnected and intersectional idea of care as the core of growing a commons food regime in order to create synergistic outcomes in a world held together by an array of disciplines, organizations, institutions, movements and forms of discursive power, and at a multitude of sites across the social domain. Growing a care-based commons food regime, she concludes, is like entering a new epoch of history: the pattern is not written, but we make history by living, experiencing, generating, reproducing and protecting the food commons towards ecological and just food systems.

In their chapter, Alex Pazaitis and Michel Bauwens converge on food through their thinking about prefigurative social order, technological innovation and commons-based peer production. In the context of a productive civil society of contributors with an ethical market economy and an enabling partner state, they claim, a set of policies that target the empowerment of social production may lead to an open-source agricultural revolution. Through the construction of an integrated ecosystem and the enactment of specific policies that favour the transition, the different dynamics of Commons-Based Peer Production and the emerging political economy could thus be brought together and facilitate the construction of a commons-based sustainable agricultural system. Contrary to the mainstream food system in which resource accumulation, heavy subsidies for unsustainable and unhealthy practices and exploitation for profit without including the true account of food becomes the norm, a commons-based food system revolves around collective governance, rational utilization of natural resources (considering the livelihood of future generations) and a fair distribution of revenues and food products.

In the last contribution of the first section, Cristian Timmermann closes the circle of narratives of transition by focusing on food security as one of the most debated and – often – abused concepts in the domain of food systems studies. For Timmermann, food security brings a number of benefits to humanity from which nobody can be excluded and which can be simultaneously enjoyed by all. As such, an innovative understanding of food as a commons must be accompanied by an innovative understanding of food security as a public good that can be deployed to assess policies and decisions affecting food production, distribution and access. The author offers a five-fold theory of food security as a public good based on normative rationale and political implications, unfolding one of the multiple dimensions of food (as posited by Vivero-Pol in this volume). He also highlights the advantages of a shifting paradigm with regards to not only food but also the broader intellectual and policy framework.

Exploring the multiple dimensions of food

The second part of the book explores the multiple dimensions of food and how they have been constructed through continuous interaction with and clashes between nature, authority, market, history and communities. Recasting food as a commons enables us to better value and protect the multi-dimensionality of food and thereby to reverse the mono-dimensional approach to food as a commodity that still prevails. The various dimensions of food explored in these chapters in no way preclude or restrain other dimensions of food that could go beyond the ones presented here. Actually, Cristina Tirado (this volume) already proposes a seventh dimension

of food as a medicine to be added to the six dimensions mentioned by Jose Luis Vivero-Pol (this volume).

In Chapter 7, John O'Neill approaches these interactions through the lenses of the conflict between conceptions of food as a vital human need and food as a commodity. In response to the consolidation of the "new" moral economy of the market and the paradigm of food as a commodity, egalitarian forms of mutual aid were developed and grounded in the acknowledgement of mutual dependence and common neediness. He explores how the first theorists of the market economy obscured the claims of need and replaced mutual dependence with individual competition. Today, although often invisible, the practices of mutual aid in working-class communities and the arguments for universal social protection remind us of the possibility of other readings of food that are rooted in the acknowledgment of the vulnerability that characterizes states of dependency as those that every human has with regard to food: we all need to eat food every day.

In Chapter 8, George Kent infuses his studies on community-based food systems with the notion of food as a commons and highlights the benefits that can be derived if we organize communities in ways that facilitate positive social interaction, minimize exploitation and indifference, and encourage caring for the others, whether your relatives, neighbours or more distant humans. By setting up community-level food projects and treating food as a commons, he claims, food systems can facilitate people's working and playing together and, in that way, support their caring about one another's wellbeing. In a world made up of strong local communities with strong local food systems, we can grow a global food system that works well for both living beings and the planet. His approach is certainly bottom-up, departing from local communities, and then networking with other similar caring niches. However, this can only occur once we realize that the food system is not a terrarium that can be objectified and studied but rather a complex set of socio-ecological relations in permanent flux that shapes communities and the space around them, at the same time that it is shaped in turn by these communities.

Departing from the recent initiatives of infant and young child feeding in emergencies (IYCF-E) and the SafelyFed scheme of communal support for breastfeeding mothers in situations of need, Penny Van Esterik offers in Chapter 9 a reflection on food as a cultural core. In a society that tends to donate industrial infant formula, purchases breastmilk for profit and proposes individualistic solutions to infant food security, she claims, the creation of collective spaces for mothers and the satisfaction of their needs represents a paradigm change that has significant implications on both society and individuals. More importantly, the discourse of food as a commodity makes culture in the global food system invisible and devalues nurturing practices such as postpartum care, home cooking, regional food preservation techniques, gardening, food sharing through feasting and commensality. Whatever has a value but is not priced by the market gets obscured. On the contrary, food and food systems as a commons make culture and diversity visible, away from standardization and homogenization. Van Esterik makes a call for ethnographies of community-based food commons, which would make visible how the commons work in different cultural settings and the link between food and societies.

Finally, Noah Zerbe's contribution in Chapter 10 provides the reader with a genealogy of the idea of food as a commodity, another food dimension worth exploring because it became hegemonic in the global food system of the 21st century. In order to better understand the need for transition and where the possibilities lie, Zerbe traces the commodification of food in political and economic terms from the colonial food regime, through the rise of the United States, and then to the consolidation of the current neoliberal food regime. Through a combination of legal, political and economic elements, he shows how the strengthening and global expansion of neoliberal capitalism, with its associated narratives of enclosing the commons, absolute proprietary rights, individualism and the moral supremacy of market rules over other allocation

mechanisms, has fundamentally modified the global food regime, resulting in the transformation of food from a vital component of life into an instrument for speculative investment and profit maximization. In the industrial, neoliberal food system, food is produced to earn profit and not to feed people adequately. It is only by knowing the premises and processes that shaped the narrative behind the dominant food regime, he claims, that alternative imaginations and new forms of resistance can be organized.

Food-related elements considered as commons

Policy makers and academics are moving from the stringent and binary division of the world into public and private goods to a looser but more practical definition of the circumstances that take into consideration utility rather than ownership, as highlighted by the example of the so-called global commons, which would remain undersupplied in the absence of robust cooperation mechanisms. This move is nothing but a reflection of the multiple experiences on the ground by grassroots organizations, civic collective actions and customary societies that value food in its multiple dimensions and not just based on its market price. Regarding food and its system of production, some material and non-material elements are already considered, although only to a certain extent and in certain contexts, to fall beyond the public/private division and are associated with the ideas of commons, while the status of others is contested (genetic resources, wild foods and water) or generally regarded as private goods (agro-chemical inputs, labour, etc.). This section presents immaterial knowledge commons (traditional agricultural knowledge, public science and gastronomy) that are considered and practiced as a commons in current food systems. Moreover, two material food producing inputs, the normative valuation of which is quite contested by the neoliberal hegemonic narrative, namely genetic resources and water, are also discussed in detail, with cases studies on South Africa, Germany and the International Treaty on Plant Genetic Resources for Food and Agriculture. The aim of this part is to contribute to an expansive understanding of food as a commons that departs from the reductionist idea of food as an object and connects multiple layers and scales.

The first chapter in this part is authored by Victoria Reyes-García, Petra Benyei and Laura Calvet-Mir, three experts of traditional agricultural knowledge (TAK). Their contribution engages with the idea that TAK can be governed as a commons. They understand commons as resources used by a group of people who have self-designed a set of rules to manage the social dilemmas derived from their collective use. Knowledge commons in this case illustrate well the political construction of commons, regardless of the nature of the resource, by people's instituting power. To illustrate the governance of TAK under the commons framework, they present two case studies in which TAK is shared by communities of users who operate at different scales, local and global (through a web-based platform). Valuing TAK as a commons, they conclude, is not just an intellectual exercise but a political stand against the commodification of knowledge by close intellectual property rights (e.g., seed patents).

Chapter 12, by Molly Anderson, further explores the links between food, knowledge and commons. She challenges the ongoing privatization of food and agriculture scientific knowledge, highlighting the fact that the private sector has been assuming a greater proportion of research funding and, as a consequence, is taking advantage of the strengthening of intellectual property rights to recoup its investments. The chapter explores those mechanisms as ways to commodify knowledge. These trends, she claims, are dangerous because they limit the quality and scope of scientific knowledge about food and agriculture, which not only rests upon millennia of uncompensated public participation but also helps the public to adapt to changing environmental conditions, caused in large part by private sector activities and externalization of

costs. However, she concludes, these trends are not inevitable, and shifts in public policies and investment can build on existing models of knowledge commons to allow scientific knowledge of food and agriculture to be recognized and governed as a global public good.

A third food-related element discussed in this section is gastronomy, as the way in which food is combined and presented as an object of aesthetic and culinary consumption. In light of the increased spectacularization of food, Christian Barrère posits in Chapter 13 that modern Western societies present themselves as democratic and, along those lines, pretend to export worldwide their model of gastronomy, even in countries that have mainly been characterized by very different gastronomic trajectories. However, the combination between gastronomy and commodification makes contemporary highly marketed gastronomy anything but democratic. On the contrary, it is based on an aristocratic framework that under-values popular gastronomies and celebrates sophistication of recipes, scarcity and high value of foodstuffs, richness of setting, etc. It is thus time to imagine a new pathway for multiple gastronomies that breaks with joint market–elitist gastronomy and recognize the popular, open-knowledge and shared bases of gastronomy and cuisine. A possible solution, Barrère concludes, may reside in the mix of recipes and cultures that accompanies multi-culturalism and cross-boundaries dialogues. Circulation and coexistence of popular gastronomies, as much as the people who create them, become therefore the pillars on which to build a new model of gastronomy, more democratic, ecological and pluralist.

In Chapter 14, Christine Frison and Brendan Coolsaet enrich the conversation with a discussion of the possibility of governing plant and animal genetic resources for food and agriculture as commons. With the help of two case studies, the Global Seed Commons established under the International Treaty on Plant Genetic Resources for Food and Agriculture and the reintroduction and "commonification" of a traditional pig breed by a local community enterprise in Schwäbisch Hall, Germany, the authors conclude that innovative legal frameworks and governance arrangements inspired by the philosophy of the commons can facilitate access to and sharing of genetic resources for food and agriculture, hence helping to ensure the transition towards more ecological and just agri-food systems.

With their chapter on water, food and climate commoning in South Africa, Patrick Bond and Mary Galvin push the reader to think about food in close connection with water, climate change and bottom-up forms of organization, tensions and resistance. Using the case of South Africa's most deprived urban areas as an example, the authors show that commoning is not simply a matter of technicist collective resource management but rather a political ideology in which socio-ecological contradictions inevitably emerge. In particular, the illegal reconnection of water pipes by poor households and the support to those unable to pay for water that took place in South Africa during the period of the most intense drought, combined with pressure to commercialize water resources and its accompanying social contestation, lead them to reflect on the strong potential for commoning as a catalyst of self-regulated collective action, social contestation and the making of new rules from bottom up.

Commoning from below: current examples of commons-based food systems

Although the almost complete commodification of food has pervaded most national food systems and the global dynamics, there are still numerous examples where the underlying narrative about food is not based in its commodity properties or the value-in-exchange only. Those examples range from customary indigenous food systems that are resisting the privatization waves of the globalizing neoliberal doctrine to the contemporary civic movements that are trying to regain control of decision-making in local, urban and regional food systems. In this book, we have called those examples "commoning from below", i.e., contemporary examples of food

systems that are based on a non-commodified understanding of food. These national examples prove the existence of narratives of food transition other than the productivist discourse of commodified food, and how these narratives are being constructed and revised by a dialectical process between governmental policies and civic collective actions. The examples from Cuba, Canada, Ireland and Hungary show that, like any other social process, this commoning from below is not exempted from power tensions, inequalities and flaws. Although limited and at times contradictory, the four experiences reveal that alternative considerations of food are possible and already practiced, although in some cases with less transformative implications than imagined. Nevertheless, all of them share two important features: the valuation of the multiple meanings of food to people and the questioning of the balance of power in the food system, where the market and the state are no longer seen as the two only actors. People organizing themselves to produce, transform and consume food outside of market-driven and state-driven structures emerge as the third pillar of a tricentric food system where healthy and fair food is guaranteed to every human being. Throughout the world, rural and urban communities are constructing and performing forms of social innovation where food is not only an object of consumption but is recognized in its multiple dimensions.

Peter M. Rosset and Valentín Val take the readers to Cuba in Chapter 16. They present the way in which the "campesino a campesino" agro-ecological movement may be strengthened by the adoption of the methodology of and assumptions about food as a commons. They analyze the horizontal, peasant-to-peasant learning and sharing methodology through the lenses of its communal and collective visions of food. Their conclusion, which opens to dialogue and recognition of the common struggles of food sovereignty and "food-as-a-commons" movements, is that a commons-based vision of food and the food systems are more effective at achieving food sovereignty than conventional practices based on more individual and capitalist views of food.

In Chapter 17, Hugo Martorell and Peter Andrée change geography and approach to present the case of the national food policy in Canada. In their account, we discover that networks and coalitions of civil society organizations are actively working towards integrating values of food as a commons and a public good, with a focus on strengthening their role in food governance, from local urban policy councils to national institutions. They thus draw on some of the experiences of the commoning of food governance that have been instituted in different provinces and territories and reason on the opportunities and tensions that emerge when a polycentric and self-organized commons-based governance is combined with the role of public authorities as facilitators. In their conclusions, they propose that a Canadian food policy should build on provincial and territorial food security networks and existing governance arrangements in order to increase the population's access to healthy food. However, scaling these diverse arrangements at a federal level would bring into play ideological and operational tensions and new challenges to be addressed.

Then, we move to Ireland and a different topic in Chapter 18. Tara Kenny and Colin Sage deal with a theme of extreme topicality and relevance for both public and private actors involved in the food system in Europe: the commodification of food surplus as charitable provision. Through the analysis of some initiatives undertaken in Ireland, the authors discuss the implications and hurdles that charitable food provisioning may interpose to the transition towards a commons-based food system. Without dismissing the importance of feeding people and addressing hunger at a time of austerity, the authors highlight the intrinsic inequality and unsustainability that characterize a system based on excesses and volatile solutions to hunger, using the left-overs of an industrialized food system. A radical transition, they conclude, would rather require moving beyond the current two-tiered food system and its schizophrenia. The paradigm of commons and its focus on multi-dimensional, multi-stakeholder, local and resilience-enhancing systems would thus represent an ally in this shift.

In Chapter 19, the final chapter of this part, Bálint Balázs describes the thriving community-based food self-provisioning in Central and Eastern European countries as socially inclusive practices that involve all strata of society and are deeply rooted in customary traditions. Based primarily on bartering and gifting relations between families, relatives and neighbours, these emerging food systems build and strengthen communities, at the same time saving money and empowering households by not just playing the consumer's role but also self-producing part of its food needs. These practices are based on inherited traditions and have become an important non-market source of local food that reflects the principles of sustainability and preferred local gastronomies (two dimensions of food not always valued in monetary terms). The "re-commonification" of food systems in Central and Eastern European countries, Balázs concludes, has a solid foundation and promising future, as it is propelling high proportions of the population along a sustainable pathway towards new food regimes.

Dialogue of alternative narratives of transition

The 2008 and 2011 food price peaks were two important events that positioned food at the very top of political agendas at national and international levels. Concerns about the food supply required to feed a growing population with diminishing natural resources under highly unpredictable climatic conditions have triggered thousands of events, debates, innovative actions and policies aimed at securing more and better food for all. Yet, hunger is still prevalent and obesity is rampant, in both the Global North and the Global South. How to transit from our unsustainable and unfair industrial food system towards a better one for the people and the planet is nowadays a major topic for politicians and citizens alike.

The fifth part of this volume engages with alternative scenarios and imaginations and explores the convergences, current and potential synergies and elements of tension and possible conflict between the food commons narrative and other relevant counter- and alter-hegemonic narratives that currently confront the industrial food system, such as the food sovereignty movement, the urban food initiatives, the anti-land grabbing constituency or the climate and health constituencies, since the multiple crises (i.e., food, climate, biodiversity, health, energy) seem to be strongly interconnected. Since the food system is the most important transformer on Earth, the way we regard food is linked to possible solutions to all other planetary crises. The aim here is to stress the links between competing narratives about food and existing struggles and attempts to imagine just and ecological food systems. The editors' hope is that the vocabulary and imaginary of food as a commons will help strengthen the actions of movements and individuals who are already deploying intellectual and practical tools to challenge the contradictions and socio-environmental injustices of the dominant food system. That is why this dialogue of alternatives of transition is deemed so relevant: only through a convergence of constituencies, recognizing the diversity of approaches but the unicity of goals, can the mainstream food system, which is both unsustainable and unfair, be changed into an alternative system that guarantees food for all within the planet's boundaries. Of all the possible interlocutors, we have chosen three. However, we believe that this volume, as much as the rationale of commons and commoning, must be seen as a continuous and dynamic process that is constantly enriched, redefined and strengthened by dialogues with other collectives and constituencies combating the inequalities of the current dominant industrial food system.

The first dialogue, contained in Chapter 20, is to do with food justice and food sovereignty. There, Eric Holt-Giménez and Ilja van Lammeren engage with the question of whether food as a commons can advance food sovereignty. In their response, the authors recognize that the link between a global call for food commons and the struggle for food sovereignty may seem

straightforward. However, they conclude this is true only when they are superficially analyzed and that both concepts are highly complicated on the ground. In their conclusions, they suggest that a nuanced approach to understanding the commons as a contested terrain of struggle is needed to help determine whether and to what extent a food commons as a strategy for food sovereignty can serve not only as a utopic beacon but also as an effective form of transformative resistance. It is thus up to the advocates of food and food systems as a commons to think about the practical and political implications that the paradigmatic shift may produce. As editors, we welcome the invitation and look forward to building collectively a better understanding of the concrete opportunities and limits that lie behind the ideas proposed in this volume, and to engaging with food sovereignty activists and scholars on how to further develop the links between both narratives.

Then, in Chapter 21, Chris Maughan and Tomaso Ferrando look at ongoing struggles for land as a commons in the United Kingdom and Italy to make the case that the fight for food as a commons cannot be detached from the struggle for a de-commodification of all the elements that compose food systems. In this contribution, they explore concrete examples in which the paradigm of the commons has been utilized to support the struggle for land and soil as key components in the creation of ecological and democratic food systems. In their analysis, civil society–led processes that aim to regain land for the collectivity may thus provide important connective tissue between the radical outliers of food commoning and broad-based support for food systems that nourish the collective, rather than enriching the few.

In the third conversation (Chapter 22), Maria Fonte and Ivan Cucco use the aspirational paradigm of the commons to engage with the potential and limits of local food systems. On the one hand, localism can help with transitioning towards a more equitable, ethical and sustainable agro-food system. However, the idea of localism can also support protectionism and neo-ruralist ideologies that reinforce bounded, defensive and spatial strategies. A true emancipation, they claim, can only take place when food ceases to be perceived as a commodity and is understood in its multi-dimensional value, namely natural and economic resource, right, culture and place-based identity. In their reading, food as a commons plays a crucial political role in the construction of a real utopian project to achieve an aspirational and inspirational fair and sustainable food system. Re-thought and re-imagined, food regains its multi-dimensional value and becomes the basis of heterogeneous ecosystems and communities of people and nature, in which social justice and democratic powers may prevail and where a non-capitalist or post-capitalist economy is achievable.

In the final contribution of this part (Chapter 23), Cristina Tirado-von der Pahlen explores how climate change impacts the multiple dimensions of food, proposing a new conceptual health-related dimension to add to the theoretical approach to food dimensions presented in this volume: food can also be valued as a medicine. Moreover, departing from the consequences of climate change effects over human health, nutrition and food security, she highlights the relevant role the industrial food system has in global warming and the obesity pandemic that is ravaging all countries, either in high-income Western nations or the impoverished Global South. The current way of producing and consuming food, including food waste and high meat consumption, is the biggest contributor to greenhouse gas emissions and is also the biggest user of water resources, biodiversity destruction and soil pollution. As the main goal of the global food system shall be to nourish everybody adequately, respecting the limits of natural renewable resources and stewarding the food-producing resources, there is a need to shift the normative consideration of food from an only-for-profit good to a sustainable resource that delivers healthy diets for all without mortgaging the planet. At the end of the chapter, Cristina proposes multiple leverages to transit from the current unsustainable and unhealthy food system towards a food commons system, establishing a dialogue between the most progressive policy and legal ideas from the academic mainstream with the most palatable proposals from the commoners' side.

Un-common exploration of food commons

Through history, with differences in time and space, food has been transformed from the common concern of a community into the individualized concern of human consumers. This is a process of transformation of commons into capital that was already studied by Karl Polanyi. In his book, *The Great Transformation* ([1944], 2001), Polanyi analyzed the commodification of three former commons, namely labour, money and land, and identified "disembedded" capitalism as the root cause of the tensions between markets and democracy. This decoupling generated, through plunder and exploitation, a deeply internalized "extractive" vision of the legal order (Capra and Mattei, 2015; De Schutter and Pistor, 2015). Polanyi then proposed a pathway to "re-embed" markets within society. In the last thirty years, neoliberalism has all but precluded every alternative to a few global extractive giants entrusted with feeding the world with obscene profits and completely anti-ecological practices. Reversing this trend is a matter of survival of life on its planet and must become perhaps the single most important matter of discussion in public conversation in the decades to come.

Yet it is not. The chapters included in this collection are all efforts to think collectively about this fundamental question: How should we change the system in order to transform the excessive accumulation of capital into revamped, sustainable commons (Mattei and Quarta, 2018)? The scholarly community has the duty and responsibility to develop better alternatives to the current disasters and not to consider natural or normal the situation we have inherited. Political choices are open, and we believe the contributors of this collection have offered some important materials to inform them.

Note

1 This idea is epitomized by the Latin sentence "*Homo homini lupus*", created by Plautus (254–184 BC) and rendered popular by Thomas Hobbes (1588–1679). The opposite narrative of cooperation, collectivism and solidarity is, however, defended by authors such as de Waal (2006, 3), Bowles and Gintis (2013) or Kropotkin (1902).

Bibliography

Appadurai, A. 1986. Introduction: Commodities and the politics of value. In Appadurai, A., ed. *The social life of things: Commodities in cultural perspective*, 3–63. Cambridge, UK: Cambridge University Press.

Barlow, M., and Clarke, T. 2017. *Blue gold: The battle against corporate theft of the world's water*. London: Routledge.

Benkler, Y. 2013. Commons and growth: The essential role of open commons in market economies. *University of Chicago Law Revue* 80(3): 1499–1555.

Bieler, A. 2017. Fighting for public water: The first successful European Citizens' Initiative, "Water and sanitation are a human right". *Interface: A Journal for and About Social Movements* 9(1): 300–326.

Birdsall, N., and Diofasi, A. 2015. *Global public goods for development: How much and what for.* CDG Notes. Washington, DC: Centre for Global Development. https://www.cgdev.org/publication/global-public-goods-development-how-much-and-what (accessed on July 15, 2018).

Bloemen, S., and Hammerstein, D. 2015. *The EU and the commons: A commons approach to European knowledge policy.* Commons Network in cooperation with Heinrich Böll Stiftung. Berlin/Brussels. http://commonsnetwork.eu/wp-content/uploads/2015/06/A-Commons-Approach-to-European-Knowledge-Policy.pdf (accessed on July 14, 2018).

Bollier, D. 2016. *State power and commoning: Transcending a problematic relationship.* A Report on a Deep Dive Workshop convened by the Commons Strategies Group in cooperation with the Heinrich Böll Foundation. http://commonsstrategies.org/state-power-commoning-transcending-problematic-relationship/ (accessed on July 15, 2018).

Bollier, D., and Helfrich, S. 2015. Overture. In Bollier, D., and Helfrich, S., eds. *Patterns of commoning*, 18–31. Amherst, MA: Commons Strategy Group and Off the Common Press.

Bowles, S., and Gintis, H. 2013. *A cooperative species: Human reciprocity and its evolution*. Princeton, NJ: Princeton University Press.

Brousseau, E., Dedeurwaerdere, T., and Siebenhuner, B. 2012. *Reflexive governance for global public goods.* Cambridge, MA: MIT press.

Brown, L. R. 2008. *Plan B 3.0: Mobilizing to save civilization (substantially revised)*. New York: WW Norton & Company.

Brown, P. C. 2011. *Cultivating commons: Joint ownership of arable land in early modern Japan*. Honolulu: University of Hawaii Press.

Buchanan, J. 1965. An economic theory of clubs. *Economica* 32: 1–14.

Buck, S. J., 1998. *The global commons: An introduction*. Washington, DC: Island Press.

Caffentzis, G. 2012. A tale of two conferences: Globalization, the crisis of neoliberalism and question of the commons. *Borderlands* 11(2). http://www.borderlands.net.au/vol11no2_2012/caffentzis_globalization.pdf (accessed on July 15, 2018).

Capra, F., and Mattei, U. 2015. *The ecology of law: Toward a legal system in tune with nature and community.* Oakland, CA: Berrett-Koehler Publishers.

Clausen, L. T. 2016. Reinventing the commons: How action research can support the renewal of sustainable communities. In Hansen, H. P., Nielsen, B. S., Sriskandarajah, N., and Gunnarsson, E., eds. *Commons, sustainability, democratization: Action research and the basic renewal of society*, 29–52. New York and London: Routledge.

Crutzen, P. J. 2006. The "Anthropocene". In Ehlers, E., and Krafft, T., eds. *Earth system science in the Anthropocene*, 13–18. Berlin; Heidelberg: Springer.

Dardot, P., and Laval, C. 2014. *Commun, essai sur la révolution au XXI° siècle*. Paris: Le Découverte.

De Moor, T. 2011. From common pastures to global commons: A historical perspective on interdisciplinary approaches to commons. *Natures Sciences Sociétés* 19(4): 422–431.

De Schutter, O., and Pistor, K. 2015. Introduction: Towards voice and reflexivity. In Pistor, K., and De Schutter, O., eds. *Governing access to essential resources*, 3–15. New York: Columbia University Press.

De Waal, F. 2006. *Primates and philosophers: How morality evolved*. Princeton, NJ: Princeton University Press.

Dedeurwaerdere, T. 2014. *Sustainability science for strong sustainability*. Cheltenham, UK: Edward Elgar.

Diamond, J. 1997. *Guns, germs and steel: A short history of everybody for the last 13,000 years*. London: Vintage.

Díaz, S., Pascual, U., Stenseke, M., Martín-López, B., Watson, R. T., Molnár, Z., Hill, R., Chan, K. M., Baste, I. A., Brauman, K. A. and Polasky, S. 2018. Assessing nature's contributions to people. *Science* 359(6373): 270–272.

Engle-Merry, S. 1988. Legal pluralism. *Law & Society Review* 22(5): 869–896.

Ferrando, T. 2016. Il Sistema Cibo Bene Comune. In Quarta, A., and Spanò, M., eds. *Beni Comuni 2.0. Contro-egemonia e nuove istituzioni*. Milan: Mimesis.

Ferrando, T. 2017. Land rights at the time of global production: Multi-spatiality and "legal chokeholds". *Business and Human Rights Journal* 2(2): 275–295.

Ferrando, T., and Vivero-Pol, J. L. 2017. Commons and "commoning": A "new" old narrative to enrich the food sovereignty and right to food claims. *Right to Food and Nutrition Watch* 2017: 50–56. https://www.righttofoodandnutrition.org/files/02.rtfanw-2017_eng_17_12_article-5_web_rz.pdf (accessed on July 15, 2018).

Fraser, E. D. G., and Rimas, A. 2011. *Empires of food: Feast, famine and the rise and fall of civilizations.* London: Arrow Books.

Friedmann, H. 2015. Governing land and landscapes: Political ecology of enclosures and commons. *Canadian Food Studies* 2(2): 23–31

Fukuyama, F. 1989. The end of history? *The National Interest* (16): 3–18.

Gopal, L. 1961. Ownership of agricultural land in ancient India. *Journal of the Economic and Social History of the Orient* 4(3): 240–263.

Hampson, F. O., and Hay, J. B. 2004. Review essay: Viva Vox Populi quick check. *Global Governance* 10(2): 247–264.

Hardin, G. 1968. The tragedy of the commons. *Science* 162(3859): 1243–1248

Hardin, G. 1994. The tragedy of the unmanaged commons. *Trends in Ecology and Evolution* 9(5): 199.

Hardt, M., and Negri, A. 2009. *Commonwealth*. Cambridge, MA: Harvard University Press.

Harvey, D. 2007. Neoliberalism as creative destruction. *The Annals of the American Academy of Political and Social Science* 610(1): 21–44.

Hess, C., and Ostrom, E., eds. 2007. *Understanding knowledge as a commons: From theory to practice*. Cambridge, MA: MIT Press.

Hjorth Agerskov, A. 2005. *Global public goods and development: A guide for policy makers*. World Bank seminar series, Global Development Challenges Facing Humanity, May 12, Kobe and Hiroshima Universities. http://siteresources.worldbank.org/EXTABOUTUS/Resources/PublicGoods.pdf (accessed on July 15, 2018).

IPES-Food. 2016. *From uniformity to diversity: A paradigm shift from industrial agriculture to diversified agroecological systems*. Report 2. International Panel of Experts on Sustainable Food systems. http://www.ipes-food.org/images/Reports/UniformityToDiversity_FullReport.pdf (accessed on July 24, 2018).

IUC. 2009. *At the end of the end of history: Global legal standards: part of the solution or part of the problem*. The IUC Independent Policy Report, prepared by a group of lawyers at the International University. https://hal.archives-ouvertes.fr/hal-00404895/document (accessed on July 24, 2018).

Jeffrey, A., McFarlane, C., and Vasudevan, A. 2012. Rethinking enclosure: Space, subjectivity and the commons. *Antipode* 44(4): 1247–1267.

Jones, A. H. M. 1986. *The later Roman Empire, 284–602: A social, economic, and administrative survey*. Baltimore, MD: The Johns Hopkins University Press.

Kaul, I., Grunberg, O., and Stern, M. A. 1999. *Global public goods: International cooperation in the 21st century*. New York: Oxford University Press

Kaul, I., Conceição, P., Le Goulven, K., and Mendoza, R. U., eds. 2003. *Providing global public goods: Managing globalization*. New York: Oxford University Press.

Kent, G. 2015. Food systems, agriculture, society: How to end hunger. *World Nutrition* 6(3): 170–183.

Kropotkin, P. 1902. *Mutual aid: A factor of evolution*. Reprinted in 2009. London: Freedom Press.

Laerhoven, F., and Berge, E. 2011. The 20th anniversary of Elinor Ostrom's governing the commons. *International Journal of the Commons* 5(1): 1–8.

Leonard, T. C. 2009. Origins of the myth of social Darwinism: The ambiguous legacy of Richard Hofstadter's social Darwinism in American thought. *Journal of Economic Behavior and Organization* 71: 37–51.

Linebaugh, P. 2008. *The Magna Carta manifesto: Liberties and commons for all*. Oakland, CA: University of California Press.

Macpherson, C. B. 1971. *The political theory of possessive individualism (Hobbes to Locke)*. Oxford: Clarendon Press.

Madison, M. J., Frischmann, B. M., and Strandburg, K. J. 2010. Constructing commons in the cultural environment. *Cornell Law Review* 95(4): 657–709.

Mattei, U. 2012. First thoughts for a phenomenology of the commons. In Bollier, D., and Helfrich, S., eds. *The wealth of the commons: A world beyond market and state*. Amherst, MA: Levellers Press. http://wealthofthecommons.org/essay/first-thoughts-phenomenology-commons (accessed on July 15, 2018).

Mattei, U. 2013. *Bienes Comunes*. Madrid: Editorial Trotta.

Mattei, U., and Nader, L. 2008. *Plunder: When the rule of law is illegal*. London: John Wiley & Sons.

Mattei, U., and Quarta, A. 2018. *Punto di svolta. Ecologia, tecnologia e diritto privato. Dal capitale ai beni comuni*. Aboca Museum.

Mauss, M. 2002. *The gift: The form and reason for exchange in archaic societies*. London and New York: Routledge.

McCarthy J. 2005. Commons as counterhegemonic projects. *Capitalism, Nature, Socialism* 16(1): 9–24.

Montanori, M. 2006. *Food is culture: Arts and traditions on the table*. New York: Columbia University Press.

Moore, J. W. 2017. The Capitalocene, part I: On the nature and origins of our ecological crisis. *Journal of Peasant Studies* 44(3): 594–630

Musgrave, R. A. 1959. *The theory of public finance*. New York: McGraw-Hill.

Ostrom, E. 1990. *Governing the commons: The evolution of institutions for collective action*. New York: Cambridge University Press.

Ostrom, E. 2005. *Understanding institutional diversity*. Princeton, NJ: Princeton University Press.

Ostrom, E. 2009. *A polycentric approach to climate change*. Policy Research working paper WPS 5095. Washington, DC: World Bank.

Patel, R. 2007. *Stuffed and starved: Markets, power and the hidden battle for the world food system*. Melbourne: Black Inc.

Patel, R., and Moore, J. W. 2018. *A history of the world in seven cheap things: A guide to capitalism, nature, and the future of the planet*. Berkeley, CA: University of California Press.

Polanyi, K. [1944] 2001. *The great transformation: the political and economic origins of our time*. Boston, MA: Beacon Press.

Purdy, J. 2015. *After nature: A politics for the Anthropocene*. Cambridge, MA: Harvard University Press.

Quarta, A., and Ferrando, T. 2015. Italian property outlaws: From the theory of the commons to the praxis of occupation. *Global Jurist* 15(3): 261–290.

Quilligan, J. 2012. Why distinguish common goods from public goods? In Bollier, D., and Helfrich, S., eds. *The wealth of the commons: A world beyond market and state*. Amherst, MA: Levellers Press. http://wealthofthecommons.org/essay/why-distinguish-common-goods-public-goods (accessed on July 15, 2017).

Renger, J. M. 1995. Institutional, communal, and individual ownership or possession of arable land in Ancient Mesopotamia from the end of the fourth to the end of the first millennium BC *Chicago-Kent Law Review* 71(1): Article 11.

Sahlins, M. 1972. *Stone age economics*. Chicago and New York: Aldine-Atherton, Inc.

Samuelson, P. A. 1954. The pure theory of public expenditure. *The Review of Economics and Statistics* 36(4): 387–389.

Schelling, T. C. 1984. Self-command in practice, in policy, and in a theory of rational choice. *The American Economic Review* 74(2): 1–11.

Schuftan C. 2015. Climate, development. Food prices and food wars. *World Nutrition* 6(3): 210–211

Shiva, V. 2005. *Globalization's new wars: Seed, water and life forms*. New Delhi: Women Unlimited.

Unger, R., and Crawford, M. 1996. *Women and gender: A feminist psychology*. New York: McGraw-Hill, 2nd edition.

Ver Eecke, W. 1999. Public goods: An ideal concept. *Journal of Behavioral and Experimental Economics* 28(2): 139–156.

Verhaegen, E. 2015. La forge conceptuelle. Le "commun" comme réinterprétation de la propriété. *Recherches sociologiques et anthropologiques* 46(2): 111–131. http://rsa.revues.org/1547 (accessed on July 15, 2018).

Vila-Viñas, D., and Barandiaran, X. E. eds. 2015. *Flok society: Buen conocer*. Creative Commons BY-SA and GFL. http://book.floksociety.org/ec/ (accessed on July 8, 2018).

Vivero-Pol, J. L. 2017a. Food as commons or commodity? Exploring the links between normative valuations and agency in food transition. *Sustainability* 9(3): 442.

Vivero-Pol, J. L. 2017b. The idea of food as commons or commodity in academia: A systematic review of English scholarly texts. *Journal of Rural Studies* 53: 182–201.

Wall, D. 2014. *The commons in history: Culture, conflict, and ecology*. Cambridge, MA: MIT Press.

Wallerstein, I. 2016. The scholarly mainstream and reality: Are we at a turning point? In Wallerstein, I., ed. *Modern world-system in the longue durée*, 219–228. London: Routledge.

Walljasper, J. 2010. *All that we share: How to save the economy, the environment, the internet, democracy, our communities and everything else that belongs to all of us*. New York: The New Press.

Wolf, M. 2012. The world's hunger for public goods. *Financial Times*, January 24, 2012. https://www.ft.com/content/517e31c8-45bd-11e1-93f1-00144feabdc0 (accessed on July 15, 2017).

Workshop on Governing Knowledge Commons. 2014. *An introduction to knowledge commons*. http://knowledge-commons.net/downloads/Knowledge%20Commons%20Description.pdf (accessed on July 15, 2018).

Wright, E. O. 2013. Transforming capitalism through real utopias. 2011 Presidential Address. *American Sociologist Review* 78: 1–25.