

FOOD SOVEREIGNTY AND ITS DISCONTENTS

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Abstract

The global food crisis is a clear signal that old belief systems no longer apply. Innovative ideas are necessary to make agriculture simultaneously more inclusive, sustainable and productive. Hybrid models of problem-oriented collaboration involving competent and committed actors in civil society, farmer organizations, government, academia and business are increasingly crucial in tackling the global challenges of agriculture. They create demand-driven agricultural innovation systems that respond to the needs of small-scale farmers to produce more with less through homegrown innovation. The Food Sovereignty movement could play a crucial role in this endeavour because the agro-ecological practices it advocates must be part of a comprehensive approach to sustainable intensification. Unfortunately, the movement still prefers political confrontation to cooperation on the ground, and its baseline assumptions of agriculture are defensive, not progressive. This article shows why these baseline assumptions are misleading even if they sound intuitively right. Sub-Saharan Africa has become a net importer of food because ideology has always mattered more in agricultural policy than the knowledge gained from farmers' experience in the field and from agricultural research. The Food Sovereignty movement is right about the mistakes of neoliberal economic ideology, but it is silent about the fact that most famines actually occurred under socialist and communist regimes that pursued the goal of food self-sufficiency. The concept of Food Sovereignty still contains too much old left-wing ideology and too little creative thinking on how to make better use of today's global new knowledge economy to promote sustainable development. The movement could either become an obstacle to future food security, if it sticks to its ideology-based and confrontational rhetoric, or part of the solution, if it decides to extend collaboration beyond like-minded groups and engage in joint pragmatic action.

1. Introduction

'Food Sovereignty' is the new battle cry of those who dream of an alternative to the global food system, which they believe is ruled by multinationals that neither address the needs of producers nor care about the preferences of consumers [1]. Food Sovereignty advocates want agriculture to be exempted from trade liberalization and consider new agricultural technologies to be incompatible with traditional practices [2, 3]. They claim that

their alternative is based on a system-oriented agroecological approach that makes use of 'ecological interactions and synergisms between biological components to maintain the soil fertility, productivity and crop protection of the agricultural system' [3]. This is probably meant to sound a bit vague because there is wide disagreement about what such a 'holistic' system looks like. Agroecology is primarily a scientific discipline that studies the effect, impact or change that is created by introducing an agricultural innovation in the field. No matter whether this innovation is a new crop rotation system or a genetically modified crop [4]. It studies the impact on a plot level or an agro-ecosystem level, but it usually refrains from broadly prejudging the consequences of such potential changes on a global food systems level. After all, agroecology wants to be a science and not a social movement. Yet, well-known scholars in agroecology seem to have become bored with field research and have acquired a taste for political activism [2, 3]. The number of publications that put agroecology into a global political context has increased almost exponentially in recent years [4].

Based on the findings of this mostly non-empirical research, Food Sovereignty activists promote a wide range of local initiatives in developed and developing countries that aim to bring like-minded producers and consumers closer together in efforts to regain power over the control of food [4]. Most of these projects, however, rely either on state subsidies or have a generous private sponsor. Moreover, if farmers aim to sell their products for a premium price outside their community, they depend heavily on the good will of those who certify, package and market their products. For example, retailers are willing to offer favourable terms as long as the projects can be used as showcases in their marketing efforts, enabling them to portray themselves as supporters of fair and sustainable agriculture [5]. Once favourable terms cease to be granted or subsidies are reduced, enthusiasm for this kind of consumerism-based food sovereignty would probably subside too.

The Food Sovereignty movement still has a chance to avoid being remembered as just another 'let them eat cake' movement if it is able to separate science from politics. Sustainable agro-ecosystem management practices are important, but so are investments in user-friendly new agricultural technologies, product innovation, rural infrastructure and post-harvest technologies. Since the private sector has developed many new prod-

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ucts and services which are useful and could be tailored to the needs of small-scale farmers, food sovereignty activists should collaborate with innovative companies rather than simply denouncing them as representatives of 'the corporate regime'. The common goal should be to support small-scale farmers in their efforts to adopt innovative practices and techniques that allow them to produce more with less in a sustainable way. Incentives to adopt innovation in a farming community increase if local farmers themselves are involved in the testing of the effectiveness of the innovative product or practice and its application and adaptation to the local agroecological context. This would allow small scale-farmers with poor access to outside resources to become more productive and more open to experimenting with new approaches [6]. The next step is to enable them to jointly invest in post-harvest facilities and marketing in the region. The additional revenues generated through market integration would then be likely to be reinvested in on- and off-farm activities. Off-farm employment in remote and poor rural areas often contributes significantly to improving local food security even if the employed people do not produce food themselves [7]. It would jump-start a process of rural empowerment and endogenous development which would result in an increase in domestic food production that would eventually help food-importing and rapidly urbanizing countries in sub-Saharan Africa to feed themselves to a large extent. The Food Sovereignty movement should welcome this objective and therefore engage in cooperation rather than confrontation with the existing food system.

Unfortunately, the concept of Food Sovereignty is still too ideologically rigid to give real support to innovative endeavours that primarily aim at improving the economic situation of the poor and therefore their access to food. For them access to food is an economic concept that is linked to the official definition of 'Food Security'. While 'Food Security' tries to operate within the existing world food system, 'Food Sovereignty' tries to change the system [1]. To be more precise, the Food and Agriculture Organization (FAO)'s definition of Food Security aims at ensuring access to sufficient, nutritious and safe food, whereas food sovereignty relates to the ownership and rights of food growers and local communities [8]. It is not clear, however, why the term Food Security should not include these aspects too so long as they are ensuring access to food. Yet, for the Food Sovereignty movement Food Security smacks of 'neoliberalism' because it implies that access is primarily ensured through trade and exchange. They call it 'economic rationalism' as opposed to 'green rationalism', which stands for radically different understandings of the environment, human-environment interactions, and human society [9]. But Food Sovereignty activists have a hard time explaining this greenish alternative apart from using fuzzy terms such as 'system-oriented' and arguing that we should produce food with nature and not against nature. While even large agribusiness companies adopted a system-oriented approach a long time ago, they consider agriculture to be a struggle against nature rather than being in harmony with nature. Even small-scale farmers would probably agree with them because if you grow crops in a field, you want only the crops to grow and bear fruit, while all insects and plants that prevent them from doing

so have to be removed. As cruel as this may sound for a romantic urbanite, agriculture is impossible without this type of warfare against the unwanted organisms in the field.

There are also some inconsistencies with regard to the sovereignty of a farming community. Such a community may completely decouple itself from trade and exchange with the outside world and thus be perfectly autonomous in its right to control, produce, and consume local food. But this implies that all the techniques and means to produce, process and preserve food are already in the hands of this community (which would probably have happened through trade at an earlier stage). Yet, if the community lacks the means and technologies to attain a level of agricultural productivity that lifts food production above the subsistence level, it may still be called 'food sovereign'. At the same time the community may still be profoundly food insecure because as soon as there is crop failure through natural biotic and abiotic stress factors, or war with another community that competes for scarce natural resources, it would quickly run out of stock and suffer from hunger and malnutrition. This vulnerability of people who are disconnected from markets explains why roughly 80% of the people who suffer from hunger and malnutrition are found in remote villages in poor developing countries not in cities [10]. They are disconnected from trade not because they think this will lead to more sustainable agriculture or because they believe that this is a better lifestyle, but because their demands for better access to outside resources are ignored by their government since policy makers are mainly concerned with the needs of the politically relevant urban constituency. In the absence of a dependable infrastructure and sufficient purchasing power, the private sector also fails to invest in these remote regions, because they lack incentives to do so. Many outsiders visiting these remote villages are impressed by the solidarity they find in the village community. But again, this solidarity is not a question of values but a question of survival. Since they cannot expect anything from the outside world everyone must contribute his or her share to the maintenance of public goods and services [11].

One might object to this pessimistic view of life in the countryside in developing countries and argue that many historical cases of autonomous community farming proved to be sustainable and that we can learn from them. Elinor Ostrom for example was fascinated by remote villages in the Swiss Alps that were governing the local commons sustainably without much trade and exchange with the outside world and without relying exclusively on private property rights [12]. Yet, this lack of contact with the outside world also prevented these villages from adopting new techniques and innovative practices that would have enhanced their agricultural productivity. Moreover, local investment in innovation was also neglected because of the absence of ownership rights. As a consequence agricultural productivity largely stagnated.

The sustainable equilibrium in the villages was therefore only possible if the surplus population (the population that could not be fed with the available resources and

traditional techniques) could be exported as mercenaries to foreign armies or as non-farm labourers to lowland industrial centres. As such they contributed later on to the viability of the village institutions thanks to remittances. These remittances then allowed the villagers to buy food from elsewhere during periods of scarcity. But does this mean that they have lost their food sovereignty? Today, more than 215 million people have decided to leave their home countries and settle as migrants elsewhere [13]. Many did so because they lacked economic opportunities back home or even because they wanted to escape food insecurity. Climate change is likely to increase the number of dislocated people in future. How shall we cope with these huge challenges? Even food sovereignty activists would admit that it is no longer a good idea to encourage the male offspring who can no longer be fed by their own community to join a foreign army as mercenaries. Nor are there any new territories that could accommodate these huge numbers of migrants. The only possibility is to create urban centres of economic growth in the home countries themselves [14]. But these centres must also rely on a robust and productive countryside that is able to partly support the urban economy with food, feed, fibre, and fuel. This would require investment in agriculture.

Food Sovereignty advocates in the west could contribute to this development if they overcome their dualist mindset of 'community versus the market' or 'people versus profit' [15] or at least refrain from exporting these ideas to developing countries. Small-scale subsistence farming in developing countries is not an end in itself, as they believe, but a precarious situation that often makes it difficult for families to feed their children properly throughout the year; not to mention enabling them to get a good education and have a better life in future. They did not choose to become small-scale farmers because they like the lifestyle that comes with it. In fact, they may encourage their offspring to abandon farming, get a proper education, and then build up a successful business through trade, entrepreneurship, and innovation. This could contribute much more to the well-being of the farming village (by reinvesting or through remittances) than if the children simply continued the work of their parents. They could serve as engines for local endogenous development and thus make the region more self-confident and less dependent on development assistance and emergency food aid. The state of food sovereignty would thus also be improved as a positive side effect.

This paper shows why the baseline assumptions of the Food Sovereignty Movement about trade, business, technology, and our world food system are fundamentally wrong. At the same time, it argues that the movement could still play a crucial role in facilitating sustainable change by shifting from confrontation to cooperation. But for that to happen, public leadership is required. During the past decade politicians in affluent countries were largely concerned with confirming popular stereotypes and passing useless or even harmful regulation that made innovation in agriculture unnecessarily expensive and enhanced public distrust in modern agricultural biotechnology. The paper describes the harm done to society

and the environment by clinging to old belief systems that see technological and economic change in agriculture as the problem rather than part of the solution. But it also offers a new perspective on how to reconcile the different views and embark on joint action.

2. Wrong Baseline Assumptions

The line of argumentation of the Food Sovereignty advocates contains implicit baseline assumptions about the world food system which are hardly ever questioned because they are taken for granted. These assumptions refer to the alleged effects of the Agreement on Agriculture (AoA) of the World Trade Organization (WTO) on agricultural trade (2.1), to the view that hunger is a distribution rather than a production problem (2.2), and the hope that proper respect of the human right to food could effectively address the problem of access to food (2.3).

2.1 *The WTO Agreement on Agriculture (AoA) massively increased trade in agricultural goods*

La Via Campesina, the organization that coined the term Food Sovereignty, was founded in 1993 in Mons, Belgium and currently counts 148 organizations from 69 countries as its members. It is probably safe to argue that the reason for its creation are to a great extent linked to the fears of highly subsidized and well-protected farmers in affluent Europe to become victims of agricultural trade liberalization. This assumption is confirmed by the recent Nyéléni Europe Forum 2011. It is meant to follow the 2007 Nyéléni Declaration on Food Sovereignty in Mali but is mostly focused on the European agricultural policy [16]. Yet, the Spanish name of the organization also refers to its partial roots in Latin American [17]. At any rate, the concern about the future of farming was raised in developed and developing countries when the US and the EU finally settled their differences regarding agricultural trade reform in the so-called Blair House Accord in November 1992. This broke the impasse in the agricultural negotiating group and the Uruguay Round was finally concluded in December 1993; and eventually led to the establishment of the WTO in 1995. This successful conclusion of the Uruguay Round was also a result of the end of the Cold War and the reduced need for a national strategy to ensure food self-sufficiency.

Agricultural trade protectionism through tariff trade barriers and farm subsidies could no longer be justified with arguments of national security because the communist threat was gone. Moreover the resulting food surpluses became increasingly expensive to get rid of by export subsidization, which amounted to food dumping in developing countries. These problems finally led to a shift in agricultural policy away from production-tied subsidies towards support for multifunctional agriculture through direct payment [18]. The intended purpose of multifunctional agriculture was to promote not only the economic but also the social and environmental dimensions of agricultural sustainability. Direct payments were also recognized as legitimate

subsidies in the so-called Green Box (describing non-actionable subsidies) under the AoA. The AoA also left many doors open for developing countries to preserve their policy space (Article 6.2 of the AoA) [19]. In addition to benefiting from Special and Differential Treatment (Development Box), developing countries were allowed the flexibility of ceiling bindings, longer implementation periods, and lower reduction commitments in tariffs; least developed countries were subject to tariffication and binding but exempt from reduction commitments [20]. As for developed countries, the AoA allowed for some tricks (e.g. dirty tariffication, tariff escalation, tariff dispersion) to ensure that the tariffication of non-tariff trade barriers into equivalent bound tariff rates did not force developed countries to reduce support and protection for domestic agriculture in any significant way. All in all, many scholars in law and economics concluded that the AoA was legitimizing agricultural protectionism rather than further opening agriculture to international trade [20, 21].

This is also reflected in the fact that growth rates in agricultural trade have not increased significantly for food crops since the AoA was passed. While farm products accounted for more than 30% of all merchandise trade globally in the 1960s, its share has decreased to just 9% since the beginning of the new millennium [22]. Growth in total agricultural trade over the past four decades nevertheless increased, not because of trade liberalization but because of technological change: improvements in transportation and handling, such as containerization and refrigeration, facilitated shipments of out-of-season produce from distant origins, and communication and logistical improvements enabled shippers of bulk agricultural commodities, like grains, to respond more easily to market demands for specific types, grades, and qualities [23].

2.2 Hunger and Malnutrition are a Distribution not a Production Problem

One significant change since the Cold War has been the severe cuts in public sector research and development (R&D) on the national and international level even though they would have been perfectly legitimate subsidies under the AoA and the WTO Agreement on Subsidies and Countervailing Measures (SCM) [24]. This lack of priority for public sector R&D was justified by the assumption that the Green Revolution had already accomplished its goal. It made most food abundant and caused global food prices to decline to a level that many thought would ruin farm livelihoods and be harmful to the environment. Yet, this view largely ignored the fact that the Green Revolution was far from having achieved the goal of global food security. Even though the percentage of the population that was undernourished decreased from 24% in 1970 to just 14% in 1990, the total number remained stubbornly around 800 million people [25]. The decline in public sector R&D spending and the support for extensive agriculture in Europe since the 1990s helps explain why annual agricultural productivity growth in Europe declined from an average of 4% between 1960–1990 to an average of just 0.6% between 2000–2010. As a result, the EU has become the largest importer of food and feed in the world. It imported the equivalent of 35 million hectares of arable land in 2007–2008 which is roughly the size of Germany. That is an increase of almost 40% (amounting 10 million

hectares) since 1990. The European media would never call this land-grabbing – but it is difficult to find another name for it [26].

In response to a decline in the percentage of the global population that was undernourished, politicians lost interest in investing in agriculture in the 1990s. Their widespread belief that improvements in science and technology led to global overproduction of food at the expense of the poor and the environment in developing countries turned out to be misguided. No one anticipated in the 1990s, that the economic rise of India and China, the two most populous countries in the world, would lead to such a global boost in demand for food, fibre and fuels. Therefore the popular argument that the food security problem is not a production problem but a distribution problem may have once made sense, but today it has become nonsense. Why? First of all, the distribution problem argument ignores the fact that most of the hungry and malnourished people live in remote areas that are difficult to reach because of a lack of reliable infrastructure. So it would be very difficult to feed people in such regions over a long period of time. Moreover, a system for distribution of free food would probably not be welcomed by the farmers in the affected regions because they need to sell their food. They cannot compete with free food. The argument that we should just use the overproduction in food-surplus countries and distribute it in food-scarce developing countries is therefore dangerous and might make these regions even more dependent on food imports in the long term. Many European countries have demonstrated and still demonstrate the negative effects of artificially cheap food imports when they apply export subsidies to get rid of agricultural overproduction on the world market. This food dumping has the same effect on local food prices in developing countries as food aid shipments over a long period; it leads many farmers to abandon their business entirely [27]. Their own governments further worsened the situation by designing food policies that tended to tax productive farmers, subsidize consumer prices and crowd out private sector investment in agriculture. This partially explains why most countries in sub-Saharan Africa have turned from net food exporting into food importing countries [27]. In other words, it undermined their food sovereignty. Yet, the movement explicitly reject food dumping, the argument that food security has nothing to do with agricultural productivity and incentives still implies that it can be addressed through proper local distribution systems that are not linked to markets but to the respect of the human right to food. That is how the following statement of the organization ‘La Via Campesina’ when it first defined the term ‘Food Sovereignty’ in 1996 must be interpreted:

“Food is a basic human right. This right can only be realized in a system where food sovereignty is guaranteed. Food sovereignty is the right of each nation to maintain and develop its own capacity to produce its basic foods respecting cultural and productive diversity. We have the right to produce our own food in our own territory. Food sovereignty is a precondition to genuine food security.” [28]

The definition implicitly assumes that local food production and consumption can ensure food security and therefore the human right to food. It completely ignores that developing countries, in particular, go through a process of rapid urbanization. So the share of non-farm activities is constantly increasing, which means that a smaller share of the population needs to produce more food with less input. How is the 'food sovereign' community which is focused on self-sufficiency supposed to feed this rapidly growing urban population? Do they think that the human right to food applies only to those who produce their own food within the self-sufficient community?

2.3 If we simply respect the human right to food we would be able to solve food crises

The Food Sovereignty Movement insists on the right to produce 'our own food in our territory' [28]. It implies that every country is capable of producing and distributing sufficient food for its inhabitants (and thus of meeting the human right to food) without any need to resort to agricultural trade. This has actually been tried many times in the history of humankind, by many governments, and mostly led to widespread hunger and starvation because the virtual absence of cross-border trade in agriculture prevented not just the inflow of food products but also the entry of new knowledge and technology that could make agriculture more productive. It did not permit private actors to sell surplus agricultural products abroad in return for obtaining goods and services that were scarce in the domestic agricultural economy. Since farming was no longer a business, the incentives for farmers to produce more and respond to consumer preferences disappeared. There are plenty of examples in history that illustrate how famines occur due to a lack of understanding of the economic forces of demand and supply. A well-documented great famine occurred after the communists took over Russia at the end of World War I. After mass starvation became obvious Lenin had to introduce the so-called 'New Economic Policy' that legalized profit-oriented agricultural production again. Most famines actually happened in socialist authoritarian systems such as China, India, Ethiopia and most recently Zimbabwe and North Korea. These governments designed highly centralized public food production and distribution systems to ensure food self-sufficiency. These highly protectionist agricultural policies combined with a lack of protection for private ownership of land brought private investment in agriculture to a halt and consequently led to a decline in agricultural productivity and food production. The goal was to reinstate social justice and enforce the human right to food, the result was hunger and starvation. It is a great irony that the Special UN Rapporteur for the Human Right to Food from 2000–2008 was Jean Ziegler, a self-styled intellectual with no competence in the field of food policy whatsoever but many friendship ties to the dictators of socialist authoritarian regimes in Africa and Latin America. His rigid socialist ideology has not budged an inch since the 1970s. The enemy is capitalism and the salvation lies in communism. It was therefore quite clear that he would focus on the mistakes of neoliberal ideology as practiced by the International Monetary Fund (IMF) and the World Bank. The scapegoats are the usual suspects such as speculators and the corporate world, especially

agribusiness. Socialist and communist regimes and the famines they have caused do not appear on his radar screen.

This blindness to the failures of left-wing policies in coping with food security also applies to the advocates of Food Sovereignty. Not a single document in the Food Sovereignty literature actually refers to these tragedies caused by communist and socialist regimes, because their enemy is the 'neoliberal' food regime. The storyline that is repeated over and over again is that the United States imposed a food regime on the rest of the world after World War II through the establishment of the neoliberal Bretton Woods Institutions. If the world 'neoliberal' means that the free market should be in charge of the production and distribution of food, then this has definitely nothing to do with Cold War agricultural policies, where the state was primarily in charge of agriculture. Even the Green Revolution had nothing to do with the private sector but was in every sense a public sector initiative [5, 20]. One might call the economists of the Bretton Wood institutions 'neoliberal' because of the conditionalities they imposed on indebted Third World governments during the implementation of structural adjustment programmes. They regarded the state as the problem and not as part of the solution and the standard recipe to development and growth was to slim down the state budget even if the cuts impaired the state of domestic agriculture, public health and education. IMF experts who were trained in comparative static neoclassical economics also ill-advised developing country governments in focusing almost exclusively on exports of labour-intensive commodities with predictable decreasing marginal revenues instead supporting the private sector in the development of new goods and services with increasing returns. They were also unable to recognize the role of universities as engines of social and economic change [29]. Finally, in the field of export-oriented agriculture, they ignored the fact that small-scale farmers in remote areas face much higher risks in export-oriented agriculture than farmers in more favourable areas [30]. But this kind of neoliberalism was typical of the 1980s and reflected flawed textbook economics. Today it is rather passé because many countries are starting to adopt new industrial policies that can hardly be compared with laissez-faire Thatcherite capitalism [31]. But even today's pragmatic policy makers in emerging economies recognize that the public good of food security can only be secured by a state that generates sufficient tax revenues to invest in agricultural development and improved access to nutritious food. For them the human right to food may be fulfilled by an affluent state that has the means and infrastructure to protect its most vulnerable citizens through a social security and public health system to ensure sufficient access to nutritious food. But this is impossible for other states that do not have the necessary means; they can nevertheless improve access to food by investing in domestic agriculture. Calling for the global right to food is easy if it is voiced from the safe haven of an affluent country. But it will not change the situation in poor countries.

3. Is Food Sovereignty a Lifestyle phenomenon?

Considering its rather nostalgic views and its attachment to old left-wing ideas, it would be easy to discard the Food Sovereignty Movement as a sort of relic from the past millennium that has not yet woken up to the new reality of the global knowledge economy. Yet, the term 'Food Sovereignty' is very popular and widely considered to be 'progressive' because it is linked to a lifestyle that would express personal values about the way food should be produced in a sustainable way. It coincides with a general public fatigue with agricultural modernization in affluent countries and the subsequent rise of many different identity-based social movements over the past decade (anti-biotech, slow food, organic, gender, community food security (CFS), etc) that can easily be mobilized under the umbrella term Food Sovereignty. All these anti-globalization movements claim to offer an alternative to the existing world food system that is considered to be controlled by large multinationals which take advantage of open markets at the expense of endangered community-based life styles and the environment [32, 33]. The alternative system is conceived to embody a local-, family-, and community-based ethic that stresses the values of sustainability, independence, environmental protection and local food production for local consumption. The vision is that everyone feels happy and fulfilled in their own community with plenty of fresh and nutritious food at its disposal. As a pleasant side effect, Food Sovereignty on the community level would also eliminate global hunger and save the environment [1, 2].

In this wonderful utopia there is not much room for pragmatic practitioners in agriculture who raise difficult questions about the practical feasibility of extending community-based agriculture to a global scale, or point to historical and empirical insights about the origins of food insecurity and famines. Slow progress based on trial and error and critical assessment is boring, especially for young people who dream of revolution. Like the Marxists in the 19th century they believe that they know what has to be done and think that people must first become aware of their false consciousness and then be weaned off the current unsustainable food system. This has to be achieved by means of symbolic public protest, position papers and dramatic documentaries. The dream is to reconcile nature with agriculture, regain control over food, protect farmers from international trade, defeat large agribusiness companies, stop the use of genetically modified crops, increase public health as well as the quality of food and of the environment through organic farming and, finally, to ensure that no one on this planet ever again has to suffer from hunger and malnutrition [1,2,3]. At first glance, this too sounds intuitively right, but it ignores the fact that agriculture has always been a fight against nature. After all, the farmer wants certain plants to grow in his or her cultivated field and not others. There is no way you could start a dialogue with the unwanted plants as to whether they would be willing to leave under certain circumstances. You have to remove them against their will. Since the beginning of the Neolithic Age societies have been moving from a nomadic or a hunter-gatherer mode of living based on equality and

reciprocity towards an agriculture-based sedentary life that produces social inequalities and hierarchies [34, 35]. The brutal large landowners in feudalist and colonial times can hardly be compared with today's multinationals. They may be profit-seeking, but they are also anxious about their public reputation and have to comply with the law. Multinationals are not just rent-seekers but invest in R&D and innovative goods and services that might eventually benefit the public at large. Moreover they produce a lot of positive spillovers for smaller companies and are engaged in public-private partnerships that aim at empowering farmers in the developing world [36]. Yet, that does not help them much in the face of global resentment against those who produce unwanted change. As the prescient Joseph Schumpeter had already noticed in the 1940s, one of the problems of technological and economic change is that benefits are taken for granted while risks are increasingly considered to be unacceptable in highly developed societies [37]. Affluent societies do not remember anymore how they developed and the extent to which previous generations suffered to solve the big problems of economic and technological development. It was this change that resulted eventually in more social mobility and the empowerment of the masses. Many of the poorest countries have not even started this process, but are nevertheless expected to adopt a very costly agricultural compliance system that corresponds with western views of value-based sustainable agriculture.

3.1 Food Sovereignty as Anti-Biotech

Because the goals of the Food Sovereignty movement are so numerous and ambitious, it is not surprising that the movement is very heterogeneous. It is largely united by what it opposes rather than what it stands for and what changes it envisions for the future. In view of their defensive argumentation one wonders whether the countless self-appointed food sovereignty advocates ranging from Prince Charles to Vandana Shiva to José Bové are just anxious to defend their privileged lifestyles, which they consider sustainable, against the forces of change, which they consider unsustainable. The current World Food System has grown over centuries and is not the product of a deliberately enforced global ideology that aims at enriching the powerful and exploiting the poor. Numerous columnists in the big national dailies all over the world, however, have embraced this reductionist view of 'people versus profits' because it is so convenient – after all it is not really about addressing today's agricultural problems, but about saying something that sounds meaningful within one's own peer group. You don't need to bother about facts and history; it is enough to learn who stands for the corporate (evil) system and who stands for the 'alternative' (good) system. An Internet search will provide you with everything else you need to know. It helps communities of like-minded people to create an echo chamber in which they can feel reassured about their views even though they lack any concrete experience with any of the systems [38].

The heroes of the movement have become so popular because they learned a lot from the strategy of former president George W. Bush. He knew that a lie can be-

come a truth in public if it is repeated over and over again [39]. Vandana Shiva has honed this PR strategy to perfection when it comes to the false claim that farmers that adopt Bt cotton in India are more likely to get into debt and eventually commit suicide. By repeating the message again and again she created a persistent narrative that became a public truth that no one needed to verify any longer, and it was then also taught in school as an example of the socioeconomic risks of genetically modified (GM) crops [40]. Yet, she must be well aware that large-scale surveys have shown that fewer and not more farmers commit suicide after they have adopted Bt cotton [41].

These empirical studies showed that Bt cotton in India was widely adopted by small-scale farmers not because they were fooled by seed companies but because they had better yields, needed less chemical input and thus generated more revenues and suffered less from health and environmental problems [42]. The success of Bt cotton explains why more than 90% of the farmers who have adopted GM crops worldwide are small-scale farmers [43]. This also applies to Burkina Faso, the only country in francophone Africa that decided to ignore France's advice and approved GM Bt cotton for commercial cultivation [44]. As in India, Bt cotton was a boon in Burkina Faso, especially to small-scale farmers. But these are obviously not the small-scale farmers the Food Sovereignty advocates want to hear about. They might argue that Bt cotton is not about food anyway. It is true that so far the only transgenic crops that have been approved were not meant for direct human consumption, with the exception of virus resistant papaya in Hawaii, which has already been consumed in the United States for more than a decade. So why do we still have to wait for GM food crops that have a real value for poor food consumers? The case of vitamin A rich 'Golden Rice' shows clearly that it is not patents, but costly and time-consuming regulation that prevents poor consumers and producers from gaining access to beneficial GM crops [45].

The Golden Rice consortium has already spent 12 years since the first proof-of-concept trying to comply with national and international regulatory requirements. The costs so far amount to about US\$ 25 million. The project would have been dead a long time ago without the strong will of the researchers involved to make it happen and the generous support of public and private institutions. In the private sector, only very big companies can afford to spend that amount of money and time on such burdensome regulatory procedures whereas the small innovative companies either disappear or become part of the large ones because they cannot afford to go it alone. So the result is increasing concentration in industry created by the opponents' call for ever more redundant regulation. Risk studies on GM crops have been carried out over and over again in the European Union and its Member States, and nothing suspicious has yet been found. Yet the Precautionary Principle as defined in the Cartagena Protocol on Biosafety of the UN Convention on Biological Diversity ensures that decisions continue to be postponed. This protocol was celebrated as one of the major achievements of food activists opposing the 'corporate' regime in agriculture. As a consequence of preventive regulation,

plant biotechnologists at universities have become rather disinterested in going beyond proof-of-concept and developing useful products for the poor in cooperation with public and private institutions. This stands in strong contrast to the original purpose of the Biosafety Protocol, which has its foundation in Article 19 of the UN Convention on Biological Diversity (CBD). In Article 19, the purpose of the Protocol was described as enabling the safe transfer of biotechnology. But the way it has ultimately been interpreted serves the opposite purpose. It prevents technology transfer. Does this mean that there are no environmental and socioeconomic risks involved in GM agriculture? Of course not, and that is why millions of dollars have been spent on public risk assessment of GM crops over the past decade. The European Commission recently published a report called A Decade of EU-funded GMO research (2001-2010) [46]. The report does not just cover a decade but actually looks at the past 25 years of EU risk research on GMOs (funded with an amount of EUR 300 billion) involving more than 500 independent research groups. The overall conclusion of this large-scale assessment is that biotechnology in general, and GMOs in particular, are not per se more risky than conventional plant breeding technologies. Another very important conclusion is that modern biotechnology will help address to the main sustainability challenges of the future, especially when it comes to adaptation to and mitigation of climate change in agriculture. Yet, this report was hardly discussed in the media and consequently had no impact on public policy in Europe.

The US government may have been in a position to do some capacity building in Europe on the risks and benefits GM crops in view of its considerable experience with commercial cultivation over the past decade. Instead, it is starting to question its own more permissive regulation of GM crops, which has led to a protest letter addressed to the US Environment Protection Agency (EPA) by the leading researchers in the field [47]. The researchers are concerned that the anti-science attitude of the Bush administration is continuing in the Obama administration, but this time not against climate change but agricultural biotechnology. The Food Sovereignty advocates, however, are celebrating this as a victory against the corporate food regime in the United States.

3.2. How pandering to Western stereotypes can be rewarding for activists in developing countries

Many Third World activists like Vandana Shiva seem to have a more significant influence on European regulation of GM crops than any sort of empirical studies. She has a charisma that even besotted the conservative Bavarian president Horst Seehofer when he attended one of her speeches in front of thousands of Bavarian believers. After the event, he decided to change his mind about agricultural biotechnology and become a strong opponent of GM crops. This also had consequences for Germany as a whole, because the hapless German minister of agriculture, Ilse Aigner, a former political trainee of Seehofer, was then asked by him to ban the only approved GM crop in Germany

(MON810) [48]. Shiva illustrated with her magic charisma that it is not facts, but a good narrative that moves people and thus politics and regulation. She knew that catering to Western anxieties and stereotypes about the 'corporate' regime and its victims in developing countries can be more rewarding in terms of media attention than fighting for the real local concerns as expressed by the hard-working poor Indian population, whose main wish is to have better access basic resources to do business and make a decent living. Their bottom-up social movements usually demand land rights, protection from abuse, and access to knowledge, finance and technology – banning GMOs is not one of their priorities unless they get paid for it by the Europeans.

The Chipko movement in India provides an example of how Shiva managed to change the original meaning of a successful local movement so that it appeals to Western stereotypes and the sense of collective guilt over the past. The Chipko movement was led by women in Uttar Pradesh at the foot of the Himalayas who defended their right to use their forest resources. They protested against the takeover by a foreign logging company that was granted a logging licence by the Uttar Pradesh government, and thus endangered their right to use their forest as they pleased. They protested by hugging trees so that they could not be cut down. Shiva presented this movement to the west as an example of how eco-feminism can help create a more sustainable and fair world. As a result, a 'tree-hugging' movement emerged in the United States, which wanted to imitate this form of protest to protect mother earth. The irony of this rewriting of history is that the women who protested back then for their rights to use the forest resources are still prevented from using them because their area has been converted into a protected nature reserve (to honour their pioneering action for eco-feminism?) [49]. Shiva is however not an exception, but represents a new type of political entrepreneur in developing countries who first struggles as a local activist for a genuine local concern (e.g. land rights), but once in the limelight of the mass media, becomes infatuated with the sudden celebrity status in the west (or simply needs funding from Western NGOs) and eventually abandons the local struggle in favour of fervent speeches before western audiences, embracing a narrative that addresses western concerns and lifestyles [50, 51].

Looking at the history of the meaning of 'Food Sovereignty' a similar trend can be observed. The original principles of Food Sovereignty as defined by La Via Campesina at the World Food Summit in Rome in 1996 show this clearly. Even though the organization was already dominated by western organizations (in terms of funding) at that time, there were still principles that referred to the particular grievances of marginal farmers in developing countries (agrarian reform, social peace, political participation) [18]. Yet, today, the meaning of food sovereignty is primarily associated with multi-functional agriculture, sustainable food systems and community food security (CFS) in highly subsidized western countries [52]. All kinds of intellectual acrobatics and conspiracy theories are then applied to explain why such a costly approach would also be worth adopting in developing

countries. The authors themselves have never done empirical research on the problems farmers face in developing countries, but are mostly quoting the Food Sovereignty literature to underpin the validity of their arguments [1, 2]. As with the Chipko movement, it is remarkable how popular food writers in the United States are rewriting the history of countless farmer movements in Latin America to make them poster children of the Food Sovereignty movement [53].

The belief that poor small-scale farmers in developing countries would share the lifestyle view of farmers in affluent countries ignores the fact that many of these poor countries must first start to address the productivity leap in agriculture. It was the big increase in productivity, thanks to technology change, that enabled the United States and Europe in the 19th century to feed their growing population and facilitate the emergence of an empowered middle class that would create an inclusive and prosperous economy, and a vibrant democracy. This still needs to happen in Africa.

4. The history of food and agriculture in the context of Food Sovereignty

4.1 Did the problems with food start with the rise of the United States and global capitalism?

The food sovereignty literature reveals a conspicuous absence of the history of food and agriculture before World War II, except from the point of view of class struggle [54]. History in the official narrative of the Food Sovereignty movement starts instead with the Cold War and the US government's decision to sponsor the Green Revolution. The Green Revolution was originally conceived as part of a containment strategy implemented by the US government to prevent non-aligned developing countries from becoming communist. The goal was to support their efforts to become more food secure [55]. This also included the development of high yield varieties (HYV) of food crops that are essential to the developing world. At a later stage, the Consultative Group of Agricultural Research (CGIAR) was put in charge of implementing the Green Revolution through its numerous international agricultural research centres in the developing world. Researchers at these centres focused on the breeding of varieties that were primarily suitable for agriculture in favourable areas. The new varieties were responsive to fertilizers and grew especially well in irrigated areas. The improved seeds were first tested by national agricultural research institutes and then distributed to farmers. Since there was little interaction with domestic producers and consumers, the varieties bred were often not well-accepted in marginal agricultural lands and consumers complained about the lack of taste [56].

Even though the large productivity gains in agriculture and the resulting low food prices are acknowledged by food sovereignty advocates, they criticize the Green Revolution for having led to monoculture practices, the loss of biodiversity and the abandonment of local varieties. In addition, they correctly noted that the widespread use of fertilizer and pesticides has caused environmental and public health problems. Yet, they cannot blame the

private sector for that, because the Green Revolution was a public sector initiative. The environmental problems of industrial agriculture were recognized early by Rachel Carson. She became an icon of the counter-movement against intensive agriculture with her book 'Silent Spring' written in the 1950s [57]. This book created an awareness of the negative consequences of the use of chemicals in agriculture and sparked the first environmental movement in the United States. If Food Sovereignty activists today could be bothered to read her book, they would notice, however, that she was opposed neither to business nor technology. She praised the public and the private sector researchers who jointly developed insect sterilization techniques, as well as the first microbial Insecticides based on the effect of *Bacillus thuringiensis* (Bt). She was strongly in favour of bacterial warfare in agriculture because in contrast to chemicals, insect pathogens are harmless to non-target insects. She was also a scientist who wanted to reach out to all parties to find a joint solution. For her, the popular argument in the food sovereignty movement that 'we have to do farming with nature not against it' would simply have revealed the ignorance of the Food Sovereignty movement about the reality of farming.

The end of government efforts to promote a Green Revolution coincided roughly with the end of the Cold War. Non-aligned developing countries were no longer considered to be strategic allies and there was a general agreement that the purpose of the Green Revolution had already been achieved. As a consequence the United States and Europe significantly cut funding for international and national agricultural research [58]. Taxpayer preferences (protecting local farmers and the environment) and consumer preferences (food safety standards, demand for organic food) gained priority in agricultural and development policy. The subsequent introduction of direct payments with the purpose of making agriculture more extensive also led to a large shift of agricultural research activities from the public sector to the private sector. Unlike the public sector, however, the private sector is concerned with the development of proprietary technology in order to reimburse the fixed costs spent on R&D. This forced CGIAR centres increasingly to seek collaboration with the private sector when it came to further improving the crops that are important to poor consumers and producers in developing countries. This was not necessarily a bad thing because the private sector was able to bring in a lot of valuable knowledge and experience to biotechnology research and product development [36, 59]. However, these public-private partnerships did not gain widespread acceptance in development cooperation and are highly distrusted by the Food Sovereignty movement, which believes that there is no need for private sector technology in agriculture. The reason why the Food Sovereignty movement resents public-private partnerships has a lot to do with its highly selective and short historical memory. Agriculture in the 19th century is described either as a form of class struggle or a centre-periphery-system in which European colonial powers exploited the labour and natural resources of their colonies [59]. But there was also a process of rural empowerment during this period, which is easily ignored by the Food Sovereignty experts who are still strongly attached to the

social theories of the 1970s, such as the dependence theory that basically assumes that certain regions are rich because others are poor. The empowerment of farmers in remote regions in the United States and Europe happened through the establishment of agricultural research institutes that collaborated closely with the farmers and local entrepreneurs in the regions concerned to make agriculture more productive, to develop innovative products and technologies and help the region organize itself economically and socially [60]. This resulted in social mobility and enhanced self-confidence of the country-dwellers. It also helped to create an entrepreneurial middle class that contributed to the political stabilization of the young democracies by making use of the system of checks and balances.

4.2 Learning from the 19th century

Efforts to modernize agriculture started in Europe in the 19th century when it became obvious that population growth and increasing affluence would cause demand for food to exceed supply and thus result in peaking prices of food that would hurt the working poor most, and cause food riots and political instability. While large-scale plantations based on cheap labour or slavery in European colonies had previously been able to deal with increasing demand for food in Europe, the abolition of slavery and the political empowerment of the exploited local populations made it increasingly difficult to rely on food imports from colonies to produce sufficient food for the population of Europe. It should be noted that the concern for food security at that time certainly did not include food for the local populations in colonies. They largely had to rely on subsistence agriculture that made them very vulnerable to hunger and starvation. But since life-expectancy was low and child mortality high the population at least grew slowly, so that pressure to increase local food production in these regions was less acute. It is however a fact that throughout history, rulers cared only for the food security of those who ensured their political legitimacy within the traditional patron-client system of feudalism, and of the army which would protect their lives and properties. People living outside the centres of power could not count on the protection of the state and were largely left to their own devices [61]. Humanitarian assistance was provided by privately organized local religious institutions and charities that were not part of a formal government system [62]. But these private institutions were often unable to cope with natural catastrophes or wars that destroyed harvests, spread diseases and consumed all the people's savings and stocks. Religion was then often the only way to make sense of cruel fate. It could be attributed to a revengeful and all-powerful God rather than to particular human decisions [63].

Despite the many reforms resulting from the new ideas of enlightenment, cross-regional food trade in the early 19th century was still marginal and food preservation and storage was time-consuming. The regular acquisition and consumption of food was still one of the major

challenges for households. Especially during the winter, there was no way to save people in the countryside from hunger and malnutrition once they ran out of food stocks. Food insecurity was therefore always one of the major reasons why people in marginal farming communities migrated to cities where they could not expect respect for their rights as human beings and where they were likely to be exploited as cheap manual labour [64]. But at least there was a better likelihood that they would have access to food throughout the year and possibly obtain a tiny additional income of which they could send a share home to their families. As for the freshness and variety of food, this was primarily a pleasure enjoyed by the ruling elite that was supplied with fresh products from their dependent farmers and a variety of exotic food products from overseas. In fact the term fresh was probably alien to people at that time because the refrigerator had not yet been invented, which made freshness a permanent anxiety of the emerging middle class [65]. As for the variety of food, poor people had to put up primarily with simple staple grain meals unless there was some surplus from a seasonal harvest. The threat of starvation was real, especially during winter time [66]. The consumption of wine, beer and spirits was also mostly the privilege of the ruling elite and they were able to appease and control their subjects through the sponsoring of festivals with free beer [67].

This feudal system was cruel and unfair and there was no way for the poor to change their situation and ensure that their children would have a better future; they were born into their situation and destined to stay there. The emergence of modern science, the development of new technologies in agriculture, energy, transport and communication and more open markets in Europe in the 19th century changed all this. Society members became more socially mobile and political participation of the emerging middle class made governments more responsive to the needs of the common people. At the same time, policy makers had to deal with increasing economic inequality especially between rural and urban areas. In the United States this problem was first addressed by enacting the Land Grant College Act in 1862 (followed by many subsequent acts to strengthen and refine the idea). It provided the land and the funds to set up higher institutes of learning in each state including the impoverished rural states in the Midwest. The primary purpose of the land-grant colleges was to teach economically relevant knowledge in the fields of agriculture and the mechanical arts and to do applied research in the service of the local farming community. These early public universities were strongly embedded in their local environment. Their purpose was not to lecture farmers but to learn from the way they dealt with agricultural problems and developed agricultural innovation. County agents were the mediators who introduced farmers to new techniques and practices by demonstrating them in the field next to the traditional practices. At the same time, they brought useful knowledge gained from farming and agricultural business activities back to the universities [68]. This fruitful exchange led to endogenous economic development and helped to reduce economic inequality between rural and urban regions significantly. The concept was then also adopted by many European countries.

A second challenge governments had to face at that time was rapid population growth due to advances in the sciences that improved standards of hygiene and increased life expectancy as well as average incomes. The resulting increase in demand for fuel, fibre and food (largely agricultural products back then) came first at the expense of forests. Eventually it became clear that expansion of agricultural land and consumption of wood for fuel would accelerate deforestation to an extent that would make it difficult to cope with future challenges. Science was therefore increasingly put to use to develop new technologies that allowed farmers to produce more with less and to overcome the many constraints of food production and preservation. It was then that Gregor Mendel discovered the laws of plant genetics, which improved breeding and eventually led to the first hybrid variety in the 1920s. This was the beginning of the modern seed industry that invested in improved seed. It benefited from the natural protection of intellectual property provided by hybrid varieties because the crop yield decreased significantly when the next generation seed was used due to heterosis effect, so new seed always had to be bought from the seed company [69]. Seed sovereignty advocates such as Vandana Shiva curse this development because it resulted in dependence of the farmers on the seed industry. Moreover, according to her these cultivars would have eliminated many valuable landraces that had been traded and exchanged by farmers for thousands of years [70]. She ignores completely, however, the fact that most farmers were not happy with the seed of landraces because they grew unevenly in the field and did not result in good yields. Hybrid seeds gave farmers more certainty about the size of the harvest, generated more revenue and saved a lot of labour. Switzerland consists largely of small-scale farmers but none of them would want to go back to landraces. Shiva should ask herself why even farmers in India ignore her.

The practice of science in the 19th century moved from merely being a hobby of wealthy European aristocrats towards an organized system of scientific training and (mostly) experimental research at universities. Governments set up new universities with the explicit purpose of supporting the local private sector in its endeavour to produce new goods and services that would meet the needs of society, create employment and generate profits that could then be reinvested in the further improvement of these goods and services [62].

None of these policies had anything to do with pressure from neoliberals to give markets a free rein. Instead they adopted a pragmatic approach to agricultural development based on a system of trial and error that primarily aimed at finding solutions to problems in business and government. There were already ideological battles at universities, taking place between those biologists who primarily wanted to collect, categorize and preserve natural species according to binomial nomenclature of Linnaeus (botanists and naturalists) and those who wanted to change them to serve human needs (plant and cattle breeders). But there was also fruitful cooperation and governments were still mustering sufficient leadership to continue to support agricultural research and development despite some public opposition, especially from the

aristocrats who never had to bother about the scarcity of food [64]. This was true then and is true today. Prince Charles illustrates this attitude today perfectly. He wants everyone to live like he does enjoying fresh organic food from his large estate in Cornwall (for which he also receives roughly £200,000 in government subsidies according to the Global Subsidies Institute). Unfortunately, not everyone can afford to stop working and live as he does. The planet would be ruined within a very short time if that were the case. Nevertheless he continues to argue that there is no need to increase agricultural productivity by investing more in agricultural R&D and that poor farmers in developing countries are good representatives of food sovereignty because they grow the food they eat. Consequently, they must share our distaste for technological change and we should therefore primarily protect their lifestyle (even though they are unlikely to have the privilege to choose between different life-styles). The well-meaning but ill-informed attitude of the Prince of Wales stands in strong contrast to those prevalent in the 19th century, when even aristocrats recognized that technological and economic change was the only way to create more with less, which was necessary in the face of a growing population and widespread social inequity.

5. The state of agriculture in 2011

Today we face similar challenges to food security to those we faced in the 19th century due to the large emerging economies such as China, India, Indonesia and Brazil which are now becoming industrialized countries. But this time we need to cope with the challenge on a global scale, not just on a European scale and the ongoing world food crisis provides evidence that so far policy makers in national and international institutions have failed to address this global problem effectively. The short and long-term responses to the first food crisis in 2008 were conventional and ineffective. In the short term, food exporting countries imposed export restrictions to keep domestic food prices stable at the expense of food importing countries that faced food riots due to the resulting price peaks. In the long term, most countries have so far failed to increase public sector R&D to boost productivity again. Instead they have invested in the expansion of land under cultivation. Between 2008 and 2010, arable land expansion increased by 12.5% compared to the historical average of 3.5% [71]. This is unsustainable from a social and environmental point of view because it increases land grabbing in poor developing countries and encourages deforestation.

The EU where most advocates and sponsors of the Food Sovereignty movements are located has caused the greatest damage with its Common Agricultural Policy promoting unsustainable extensification instead of sustainable intensification. Together, its 27 Member States have become the world's largest net importer of agricultural produce, and therefore the largest user of agricultural land that is not its own. Since 1990, food imports to the EU have increased by more than 40% largely because its annual productivity growth rate declined from an average of 4% between 1960–1980 to an average below 0.6%, in the case of wheat, from 2000–2010 [72]. Imports increased not just because of the focus on the promotion

of organic farming and other extensive forms of agriculture, but also of the goal of increasing the share of biofuels in car tanks for which domestic crop production is far from sufficient. Yet European policy makers show no inclination towards a change of mind.

The EU is sticking to its objective of increasing the share of biofuels (biodiesel and bioethanol) consumed in road transportation, even if the fuel will have to be imported from developing countries. France defends the Common Agricultural Policy which mainly benefits its large-scale farmers through subsidies that help to crowd out private sector activities in the countryside and Germany continues to try to increase the share of organic farming to 20% of total agriculture [73]. They do so by invoking the term Food Sovereignty. On the other hand hardly any politicians dare to address the economic and ethical need to increase agricultural productivity in Europe. More spending for agricultural R&D aimed at product innovation is not high on the political agenda. In fact, product innovation in the private sector is hampered because of preventive regulation that tends to increase concentration in industry, because the small companies cannot afford long delays in the approval of a new crop or to spend millions of dollars on often redundant biosafety risks assessments. Sadly, this dysfunctional regulation (especially when it comes to GM crops) is also increasingly being exported to developing countries (especially in Africa) in the name of capacity building. And once the regulatory frameworks are adopted in the countries of destination, they ensure the approval process is so burdensome and costly that new technologies will never reach the stage of commercial release and thus cannot contribute to an increase in agricultural productivity [74]. In other words, European NGOs and government agencies, supported by 'resistance' celebrities such as José Bové, Prince Charles and Vandana Shiva, have become attached to a vision of Food Sovereignty that shows a preference for extensive but highly subsidized agricultural systems and a general hostility towards innovation, technology and entrepreneurship in agriculture. This has decreased productivity in Europe and led to an increase in imports of food and feed from developing countries and thus contributed to the increase in world food prices. The export of this false vision of Food Sovereignty to Africa via trade policies and foreign aid is harming entrepreneurial farmers who want to grow and escape poverty through agricultural innovation. They do not care so much about seed sovereignty as about improvement of seed quality because productivity still matters to African agricultural systems which did not benefit from the earlier Green Revolution.

The false vision also undermines the process of empowerment of African women because of the emphasis on cultural rights and traditional practices, and the negative view of economic and technological change. This focus on preservation ultimately strengthens traditional male-dominated power structures and prevents women from escaping their predestined submissive role in society. Women in rural communities prefer innovation to tradition. They want to be taken seriously

as entrepreneurs and not treated as aid recipients who gratefully accept the wisdom of eco-feminism and other theories that concern the affluent west [75].

Such misguided belief systems have also spread to the United States, where the Food Sovereignty movement has become hugely popular mainly thanks to successful food writers who are more familiar with cooking than agriculture. All these trends may simply reflect the anxieties of affluent urban societies about food safety and the environment, but the negative consequences of this sort of lifestyle politics largely have to be endured by poor food-importing developing countries.

5.1. *The Reality of Global Food Demand and Supply*

Global population is expected to increase from 7 billion in 2011 to 9 billion by 2041 and by 2050 grain demand is projected to increase by 50% (25% for feed, 25% for food). Meat consumption is predicted to increase by 75% [71]. At the same time, land and water resources will become increasingly limited and climate change will lead to increasing crop failure in the affected countries, due to an increase in biotic and abiotic stress factors. Finally, waste in the food supply chain, starting with post-harvest losses at the farm gate (5–30%) and ending with consumer waste (10–30%) has hardly been addressed either in organic or in conventional agriculture [76, 77]. When it comes to efforts to make agriculture more productive, waste saving and, at the same time, more environmentally sustainable, the much criticized industrial soybean production has actually achieved some of the greatest improvements. From 1987–2007 the industry cut greenhouse gas emissions massively and reduced energy consumption and loss of topsoil by half by using no-tilling practices. Moreover it contributed to a significant reduction in water and land use thanks also to productivity increases [78]. In livestock farming the biggest success for environmental sustainability was a genetically modified enzyme called Phytase added to the diet of the animals. The enzyme enabled them to absorb phosphorus more effectively. As a consequence, phosphorus effluent was greatly reduced in pig farming (by 40–60%) and chicken farming (20–30%) [79]. The major reasons for these achievements were not specific agro-ecological measures but technological change that also made sense from an agro-ecological point of view. Technological change will also be crucial when it comes to the reduction of post-harvest losses (storage and preservation technologies) and consumer waste (sensors and microchips in food packages) [80]. All these technologies are being developed in the agribusiness and there is a need to explore how cheap and user-friendly versions can be developed and tailored to the needs of small-scale farmers in Africa.

5.2. *Demand-Driven Innovation Systems for Small-Scale Farmers in Africa*

Industrial agriculture may appropriate in some areas of the world and, in future, it will play an increasingly important role in feed the growing cities. However, small-scale farming is of much greater importance in efforts to fight poverty, improve nutrition, promote sustainable agricul-

ture and facilitate rural empowerment in developing countries. This is especially true for Africa where small-scale farms account for more than 90 per cent of Africa's agricultural production [81]. However, there are great misunderstandings in the west about small-scale agriculture as practised in developing countries. The Wikipedia definition says "Small-scale agriculture is an alternative to factory farming or more broadly, intensive agriculture or unsustainable farming methods that are prevalent in primarily first world countries". Such a definition clearly reveals the view in affluent societies that farming is an alternative lifestyle that resists the economic pressure to produce more food with less means. The reality of small-scale agriculture in Africa has nothing to do with such views. First of all, the problem with small-scale farms in Africa is not that they are getting bigger but that they are getting smaller. In view of the lack of off-farm employment opportunities and the impossibility of selling the land and moving to the city, farming families divide their land among their offspring from generation to generation. The result is ever smaller plots with ever lower productivity, less access to resources and less food available to feed even the nuclear family [82]. African farming families have no choice. They need structural change because they need to grow in order to produce more food to overcome their food insecure situation and generate additional revenues through cash crops. This would allow them to invest in a better future for their children. It is very unfortunate that the current Special UN Rapporteur on the Human Right to Food, Olivier de Schutter continues to apply the Wikipedia definition of small-scale agriculture to the African context. Like his predecessor Jean Ziegler, he had no prior field experience in the area of food and agriculture. It is therefore not surprising that his analysis about the roots of the food crisis is unconvincing. In his recent paper *The New Green Revolution: how twenty-first-century science can feed the world* [83] he argues that "small-scale farms use land and water more efficiently, and economists have long demonstrated the inverse relation between farm size and land productivity". This may apply to some farmers with adequate access to resources, but it does not make sense in the context of small-scale African agriculture where agricultural productivity and the diversity of food have decreased in many regions because of a lack of ability to cope with the many biotic and abiotic stress factors.

De Schutter is right when he argues that improved agro-ecological approaches can contribute to more sustainable management systems in African small-scale agriculture. But he is dangerously wrong in portraying the problem of African agriculture as a fight between the presumed 'good' forces (agro-ecology, small-scale agriculture, public sector research, IAASTD report, etc) against the presumed 'evil' forces (biotechnology, agribusiness, private sector research, large farms). In every successfully managed and sustainable agro-ecosystem there are small and big players, modern techniques combined with traditional methods, agro-ecology combined with improved seed varieties, public and private sector activities as well as a wide range of off-farm employment opportunities. Depending on the economic, social and environmental circumstances, a different combination of the practices, services and products might emerge. At any

rate, farmers must have the opportunity to learn about new possibilities to enhance the quality and quantity of the food they produce and have a chance to experiment with different combinations at local farm field schools. They would thus become active participants in demand-driven innovation systems where they essentially contribute with their own local knowledge towards finding innovative and locally adapted solutions to agricultural problems [84].

Small-scale farmers would thus gain much more by learning from best practices than from reading the reports of western NGOs and government bureaucracies that confuse the situation of highly subsidized western farmers with the precarious situation of small-scale farmers in Africa. China could serve as an example showing how investment in small-scale agriculture can reduce poverty and increase productivity through innovation in management and technology. Its rural development policies since the 1980s put great emphasis on the importance of entrepreneurship and innovation. The creation of thousands of township and village enterprises (TVEs) played a key role in the rural empowerment process. Most TVEs have become private enterprises that are active in the supply of agricultural inputs as well as in the creation local food processing capabilities. Moreover they offer business support services for local farmers [85]. The Chinese government supports these entrepreneurial activities through fiscal policy incentives as well as infrastructure projects. Thanks in part to TVEs, Chinese agriculture accounts for 25% of Chinese GDP and 66% of all rural economic output [86]. Overall, agricultural GDP growth per capita in China over the past 30 years was 4.6% and annual income increase per farmer household was 7%. As a result, China's 200 million small-scale farmers (average farm size 0.6 hectares) are able to feed a population of 1.3 billion and China's poverty incidence decreased from 31% in 1978 to just 2.5% in 2008 [87]. The Chinese, however, were not following a particular neoliberal or 'food sovereignty' approach but simply focused on how to solve the problems of small-scale farmers effectively. Its pragmatic approach could serve as a template for African policy makers. Sub-Saharan Africa, however, will not be able to follow the Chinese model in a literal way because its agro-ecological and socioeconomic conditions are very different. Its decisions will not be about irrigated rice and wheat farming systems, but diverse and often rain-fed farming systems that are adjusted to the local circumstances and involve a mix of food and cash crops, livestock and fisheries, as well as many off-farm employment opportunities that support agricultural market development [84].

The guiding philosophy should however also be based on inclusive agricultural development and growth like in China. The hybrid approach that involves public and private stakeholders could work in Africa very well if African governments (a) force aid agencies and foreign NGOs to work more with local business and universities and respond to their special requests, (b) provide adequate support for domestic agricultural research and education with strong local private sector involvement, (c) invest in rural infrastructure and business development, and (b) create commercially viable clusters of rural innovation.

There are already plenty of examples where this approach has worked successfully in Africa. The Uganda Rural Development and Training Program (URDT) has created the African Rural University for Women with the aim of developing a new generation of visionary women leaders in Rural Development (<http://www.urdt.net/>). Women play a central role in African agriculture and their valuable traditional knowledge largely shapes local agricultural practices as well as food processing and marketing activities. But they are also more open to change and innovation because their role in traditional communities is still highly constrained to household activities. The URDT involves them in every step of agricultural innovation. It introduces new agricultural techniques, vocational skills, and the possibility to interact with international experts and scientists through an 'Appropriate and Applied Technology Program'. All types of innovations can be tested in the experimental farm fields of the school, and by means of 'Back home' projects the students subsequently make their families and the communities familiar with what they have learnt in school. Such Farm Field schools can be based at a local university or simply constitute a local learning centre or market point that farmers can visit to purchase agricultural inputs, sell their harvest on the market, try useful new inputs products (e.g. microinsurance products, improved seed varieties, new crop rotation techniques etc) and exchange experience and innovative practices with other farmers.

One highly successful example is the One Acre Fund in Kenya and Rwanda (<http://www.oneacrefund.org/>). It is a non-profit organization that again started not with theory but with talking to farmers to find out what they need in order to make their farms more productive and innovative. It then created a service model tailored to farmerst needs. Its primary focus is to search for life-changing agricultural technologies that are already out there in the world and then break them down to a 'farmer-usable' form. Groups of farmers receive in-kind loans of seed and fertilizer from the organization at locations that are within walking distance of their fields. The field officers are recruited from the farmers themselves and their task is to provide in-field training and to support to other farmers in their efforts to test out innovation at low risk. The model seems to work well. Farmers who joined the One Acre Fund were able to increase their yields 2–3 fold, achieved a doubling in farm profit per planted acre and were almost always able to repay their loans after harvest (98% repayment rate) [84].

Another trend to make agricultural R&D more demand-oriented and more focused on product development is the crop or agricultural research networks that were largely spin-offs from the international agricultural research centres known as CGIARs in the 1980s and 1990s. The ongoing ICT revolution enhances the role of these networks of collaboration. Such networks make it much easier to organize experts and practitioners on particular crop-related problems around the world to exchange knowledge and experience and focus on problems articulated by local farmers and policy

makers. They comprise researchers from all the different fields including agroecology, molecular biology and social sciences, as well as local and international practitioners who deal with the successful application and commercialization of the different crop-related innovations. The annual meetings of the crop research networks are held in particular developing countries where the crop is prominent and the farmers are accustomed to working with research institutes and therefore engaged in the development and testing of local innovation. Together they identify the most urgent problems, review the current state of knowledge and technology, set research priorities accordingly and then contact the relevant actors in civil society, business and government to help them translate crude proof-of-concepts for innovative prototypes that result from research into useful new products and services for small-scale farmers. These crop research networks have become very pragmatic, innovative and problem-oriented over the past two decades, because Northern stakeholders have largely withdrawn funding for agricultural research and were gradually being replaced by private foundations and more Southern stakeholders which were less reluctant to embrace agricultural innovation and more interested in private sector collaboration. The resulting public-private partnerships turned out to be much better at creating new useful products and services than the previously purely public agricultural research institutes.

The Cassava Biotechnology Network (CBN) was one of the networks that initiated organizational change in international agricultural research. It was established in 1988 and its main purpose was to make use of modern biotechnology to genetically improve cassava planting material and thus the harvests of African small-scale farmers who are highly dependent on this food crop. Originally the main sponsors were European donor agencies. But because of the controversial word 'biotechnology' and the decreasing European public interest in international agricultural research in the 1990s, they decided to gradually withdraw funding from the network. Research on GM cassava within CBN made up only 5% of its budget. It was applied only if no other approach worked to the satisfaction of the farmers. But in a highly politicized and polarized public debate on sustainable agriculture in Europe, even 1% would have been a political and reputational risk. The withdrawal of European donors had the great advantage that CBN became more focused on the needs of local farmers and involved them in all stages of product development. These interesting changes in agricultural research have scarcely been touched upon by social science researchers. Entering the words 'crop research networks' or 'agricultural research networks' yields only publications from the 1980s and 1990s. This illustrates how western funding priorities also determine international social science research priorities. Even though such networks have also contributed significantly to women's entrepreneurship and empowerment in developing countries, these developments have largely been ignored by the field of gender studies. For example, CBN developed tissue culture laboratories that were sufficiently adjusted to local needs and skills, affordable and user-friendly to be run by local women farmers' groups. These

women were initially reluctant to embrace this innovation because they thought it would only be appropriate for western scientists in white coats. But then they realized that this new tool helps them to address concrete local problems and to add value to their traditional knowledge about local cassava planting material. They made use of the preferred local planting material, but also adopted improved cassava varieties from the agricultural research centre nearby and subsequently cloned it in the tissue culture laboratory. Thanks to this type of reproduction, good cassava planting material became widely available in the region concerned. These women were and are not just improving the local economy by selling new useful products, but have also gained self-confidence as innovators and successful businesswomen [60].

All these examples show that it is nonsense to separate community development from market development. Women who are active in small-scale farming could not care less about eco-feminism and other concerns of the civil society and environmental studies communities in affluent countries. They want access to resources to find practical solutions for local problems and they want to grow and ensure that their children will have more options in life and a better future [88].

6. Conclusions

Raj Patel wrote in his book 'Stuffed and Starved' that something must be wrong in the current world food system when people are starving in some parts of the world while being overfed and therefore suffering from obesity in other parts. Both starvation and obesity mostly affect the poor. He is therefore right that the world food economy should not just serve the privileged but also benefit the poor and marginalized [89]. This challenge must be addressed by investing in the entrepreneurial skills and the innovative capacity of the poor themselves. They must be supported in their efforts to create new local markets in collaboration with the existing players in the public and the private sector and become better integrated into the existing supply chains. This form of inclusive agricultural development has already proved successful in many parts of the world. Unfortunately, it is not high on the agenda of the Food Sovereignty movement, which is increasingly dominated by the privileged in affluent countries who would like everyone to practice their rather expensive alternative lifestyles. This food sovereignty advocates often own a well-tended and well-subsidized organic farm that makes them feel more connected to the rural people and more morally satisfied when enjoying the fresh, balanced and healthy food of their country estate. Food Sovereignty today tends to be more about the lifestyle of Prince Charles than the lives of small-scale farmers in Africa who lack access to basic input and output markets and where children are most vulnerable to hunger and starvation. Small-scale farmers in the marginal regions of Africa would not consider their situation as a freely chosen lifestyle. Unlike small-scale farmers in affluent countries who primarily aim at maintaining the status quo of a highly subsidized agricultural system, small-scale farmers in Africa need change to make their agricultural systems more productive and

sustainable. Otherwise they will abandon farming and move to the overcrowded cities that are often ill-prepared to accommodate them [90]. For them, the right to food means primarily the right to not be ignored. They have gained a lot of knowledge and experience in how to make the best of extremely scarce resources, and necessity has made them skilled in finding innovative local solutions. But in order to enhance the value of their knowledge, they need to become better connected to markets and knowledge outside their own region. They must be allowed to test and experiment with new agricultural practices and technologies and be supported in their efforts to tailor them to local needs. Few farmers, however, can afford to take the risk of trying new things because crop failure due to inappropriate use of the new product, or unpredictable stress factors, would result in increased household food insecurity and debt. But local farmers who take this risk gain valuable knowledge and expertise with innovative practices from outside. They can then combine the new insights with their local knowledge to address local agricultural problems more effectively. They become trusted agents of change in the region demonstrating to other local farmers how the new practice or product could benefit them too. Women farmers, particularly, tend to be more open to innovation and exchange because they are eager to change their low status in traditional male-dominated farming communities and gain more economic freedom [88]. They associate the adoption of new technologies and the creation of new markets with rural empowerment and a better life for their children as the case studies discussed in this paper demonstrate [60, 84].

Patel is aware of the fact that the notion 'Food Sovereignty' should not be defined by the privileged and it that it should be sufficiently flexible to adapt to specific local needs that may or may not be connected to technological and economic change. Despite being celebrated as one of the advocates of 'Food Sovereignty' he seems to be a rather cautious cheerleader. He notes that the definition of 'Food Security' has broadened from being merely about producing and distributing more food, as in the 1970s, to more differentiated concerns regarding nutrition, social control and public health. He attributes this change largely to the successful campaigns for Food Sovereignty by La Via Campesina in the 1990s. At that time, it largely reflected the dissatisfaction with the IMF/World Bank structural adjustment programs that tended to disenfranchise poor small-scale farmers and made many African countries more and not less food insecure. Today, the movement has become more cacophonous and inconsistent according to Patel [91]. In particular, the Nyéléni Declaration of 2007 suggests that la Via Campesina is increasingly dominated by stakeholders that represent anxious farmers in affluent countries who worry about their future access to subsidies, and affluent urban consumers who want fresh local and organic food and are willing to pay a higher price for it. He correctly recognizes that Food Sovereignty should not be about the right to maintain privileges but to facilitate the respect of the rights of those who are currently ignored by national and international food policy makers [91]. These rights can best be ensured in Africa through social and economic change and rural empowerment. The process of empowerment, however, should not start with teaching a theory but with practice. This pragmatic approach was successfully applied in rural China and has proved very prom-

ising in various African initiatives to empower small-scale farmers. It is based on bringing knowledge to farmers through local farm field schools, experiment stations, market points and many other services discussed in this paper. This also eventually helps to create urban centres in rural areas that facilitate more off-farm employment and decrease the pressure to move to the overcrowded capital cities. Sustainable change in Africa is therefore possible but the stakeholders involved in the global debate on the future of food and agriculture need to finally move from fruitless confrontation to imaginative cooperation. A hybrid model is required that includes different stakeholders with different types of expertise from civil society, business, academia and government to make small-scale farming in Africa more productive and more sustainable. Policy makers need to provide the necessary incentives to facilitate this type of cooperation beyond like-minded groups. A good start would be the shared acceptance of the fact that farmers should no longer be treated as passive aid recipients but as active entrepreneurs. This insight guided agricultural policy in the United States in the 19th century when the land grant college system was introduced to support farmers in the neglected Midwest with new institutions and technologies that would help them to improve their precarious economic situation and lift their rural regions out of poverty through entrepreneurship and innovation. Europe learned from this successful experiment and achieved the same results when similar programmes were implemented in one form or another. As a result, national food sovereignty greatly improved and the risk of hunger and starvation was largely eliminated from the countryside. It is therefore learning from experience and not a particular ideology that will help us overcome the current global food crisis.

7. References

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