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## Food and agricultural systems for the future: science, emancipation and human flourishing

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*Abstract.* It has been proposed that the policies and practices of *food sovereignty*, unlike those of today's hegemonic food/agricultural system, provide the means for satisfying and safeguarding the right to *food security* for everyone everywhere. My principal objective in this article, which gains its significance in the light of an explanatory critique of the current system, is to explore how scientific research – using what kinds of methodologies, and building on what experiences and of whom – can constructively inform these practices and policies, and contribute towards appraising this proposal.

*Key words:* food security, food sovereignty, agroecology, explanatory critique, concrete utopianism, scientific methodologies, values of social justice, *diálogo de saberes*.

### Food security

Food security, “a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life,”<sup>1</sup> is endorsed as a fundamental human right in many international conventions and agreements. Moreover, State signatories to the *International Covenant on Economic, Social and Cultural Rights* assume the legal responsibility to implement specific and effective programs to ensure the realisation of this right progressively and as rapidly as possible for citizens who currently are not its beneficiaries.<sup>2</sup> Nevertheless, not only do vast numbers of people continue to suffer from hunger and malnutrition within the current food/agricultural system, but also safeguards for the food security of many others are becoming increasingly precarious.

Industrial programs of agricultural production (and, also, processing and distribution) dominate today's hegemonic food/agricultural system. My aim in this article is not to explore the intricacies of this complex and variegated system or to contribute towards a historically informed political economy of agriculture. It is to explore, in the light of an explanatory critique of this system, how scientific research – using what kinds of methodologies, and building on what experiences and of whom – can constructively inform the proposed alternative food system based on the idea of ‘food sovereignty’. To this end, it will

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<sup>1</sup> FAO (Food and Agricultural Organisation of the United Nations): <http://www.fao.org/cfs/cfs-home/en/>.

<sup>2</sup> *International Covenant on Economic, Social and Cultural Rights*: <http://www.ohchr.org/en/professionalinterest/pages/cescr.aspx>, article 11.

suffice to highlight some of the well known features of programs of the hegemonic system: they tend to rely on the use of petrochemical-derived inputs including agrottoxics, mechanisation, monocultures, often exploited farm labor, technoscientific innovations, and increasingly GMOs; and to be market-driven, managed or advised by ‘technical/scientific’ agricultural experts, largely controlled by large international agribusiness corporations, and strengthened by export-oriented government policies. Small holder (family) farming continues to have an important role in this system, for actually it produces the greater part of the crops that provide food for human consumption;<sup>3</sup> but its existence has been becoming increasingly precarious in the face of the expansion of large scale industrial farming. This system has not brought about food security for everyone; and, given how its mechanisms function, there is no indication that it might do so. The mechanisms in question derive from the system tending to prioritise profits rather than the rights and well being of everyone, and sometimes at the expense of them. They underlie food becoming a commodity that many poor people cannot afford, and that is making many more highly vulnerable to local shortages (or unaffordable prices) caused by market-based decisions<sup>4</sup> – e.g., producing for export rather than local consumption and sometimes using croplands, not for producing foodstuffs, but for biofuel production and land speculation. Most of these people have become vulnerable because they were displaced from their lands (as interests of agribusiness take over more and more lands that were being used for small holder farming) and hence they ceased to be able to produce their own food. All of this is exacerbated by environmental and social disruption, the changing patterns of consumption of newly affluent peoples, and the progressive elimination of the conditions for practicing non market-oriented forms of farming, the culturally valued ways of life that sustain them, and the time-tested knowledge that has informed them.

The persistence of hunger and food insecurity ethically (and legally) demands redress. Thus, following the critical realist logic of explanatory critique,<sup>5</sup> since the hegemonic system contributes causally to generating and maintaining food insecurity, *ceteris paribus* an alternative food/agricultural system should be positively valued, and efforts to develop and implement it supported in solidarity with those making the efforts – provided that its trajectory points in the direction of being sufficiently productive and appropriately organised to feed and nourish everyone everywhere, while reducing such harmful consequences of the current system as being unsustainable and contributing significantly to the build up of greenhouse gases in the atmosphere. Note that the premise of the explanatory critique is that the hegemonic food system is a principal (co)cause of the persistence of food insecurity and that developments (including reforms) within it could not resolve food insecurity. That premise is contested. FAO, e.g., has maintained that the right to food security can only be fully implemented if small holder

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<sup>3</sup> FAO 2014a; 2014b.

<sup>4</sup> Lacey and Lacey 2010.

<sup>5</sup> Lacey 2007.

family farming is strengthened.<sup>6</sup> To this end, it recommends that governments switch their priorities to support family farming rather than developments of large-scale, export-oriented agribusiness practices. Here, FAO effectively identifies the cause of the failure to implement the right to food security adequately, not in the core mechanisms of the hegemonic system itself, but in the weakness of one of its dimensions (family farming). For it, far-reaching reforms of the system itself hold the key to resolving the problem.<sup>7</sup>

If this view were well supported empirically, it could be argued that there is no need to look for an alternative food/agricultural system. Often, however, proponents of the hegemonic system attempt to undercut the explanatory critique by claiming, ‘no alternatives’ – ‘there are (and can be) no alternatives’ – i.e., no alternative forms of agricultural production and no alternative food system that could match the current one (as it is actually developing by making use of on-going technoscientific innovations) in meeting the needs for food and nourishment of the world’s growing population. ‘No alternatives’ is a factual claim, open to empirical inquiry. What evidence supports it? Certainly currently proposed alternatives could not eliminate food insecurity immediately for everyone. Their potential to relieve food insecurity generally could only be shown following an extensive period of research and development, and fundamental change of political and institutional (including university) priorities. But, since the real is not reducible to the actual<sup>8</sup> and the possible is not exhausted by the trajectory defined by actual hegemonic institutions, this does not imply that there could not be an alternative that would be actualised if the appropriate conditions were introduced. It also does not imply that there are no alternatives (that are not subject to the logic of the hegemonic system) that are actually redressing food insecurity in particular locales. Empirical evidence for ‘no alternatives’ would have to be obtained from research and development that produced evidence that proposed alternatives have *real* limitations. However, these proponents of the current system do not themselves engage in this kind of research and development, as distinct from that aiming to produce technoscientific innovations that can inform practices of the current food/agricultural system; and they tend to ignore evidence that alternative approaches are actually redressing food insecurity in some locales, and do not explore the possibilities for expansion that they may afford. Clearly, if there were convincing evidence supporting ‘no alternatives’, that would help to legitimate the current system, and thereby deflect attention from its ethically and legally unacceptable effects. However, its absence does not lead these proponents to problematise the system’s legitimacy, pending more discussion and investigation; they take it for granted, and so it appears that they so persistently assert ‘no alternatives’, and that there is scientific backing for it, just so that attention is deflected away from these effects.

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<sup>6</sup> FAO 2014a.

<sup>7</sup> FAO’s position merits further discussion, but there is no space to engage in it in this article. See FAO 2014c; Nicholls 2014.

<sup>8</sup> Hartwig 2007e.

## Food Sovereignty

I will now focus specifically on the proposed alternative food/agricultural system that is based on the aspiration for food sovereignty, introduced by the international network of movements of small holder, family and cooperative farmers, *La Via Campesina*,<sup>9</sup> which I take to be an instance of concrete utopianism.<sup>10</sup> The aspiration for food sovereignty is articulated within actual social movements, and it shapes their practices, policies, and struggles to gain space to develop. These are struggles not only to eliminate food insecurity, but also (dialectically linked with this) to further a conception of human relations with nature that does not reduce to control or domination, and to strengthen values linked with this conception that could underlie universal emancipation and general human flourishing. They have drawn support from a growing number of academic and field-based agricultural scientists, NGOs and some government programs, and notably in the reports presented to the Human Rights Council of the United Nations written by Olivier de Schutter, UN Special Rapporteur on the Right to Food, 2008–2014.<sup>11</sup>

Food sovereignty refers to the *aspiration* for smallholder (family, cooperative) farmers, and their communities, organisations and movements, in collaboration with other bodies and governments in their countries and regions: (i) to determine the form of their food system and to control all aspects of its functioning; (ii) to produce sufficient and healthy food in culturally appropriate and ecologically sustainable ways, normally in or near their locales; (iii) to utilise and develop agroecological approaches to production; (iv) to protect farmers' right to seed, land, water and fair markets, as well as to strengthen their communities, livelihoods and social and environmental sustainability; and (v) for the development of regional, national and international policies that would democratise the administration of food systems and further the realisation of (i)–(iv). This formulation represents my encapsulation of common themes drawn from a variety of sources.<sup>12</sup> It is a provisional one, however, for 'food sovereignty' is open to contested and evolving interpretations.

The appeal of the food sovereignty movement is closely connected with its holding the view that furthering this aspiration represents *the path* towards implementing and safeguarding the right to food

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<sup>9</sup> See <http://viacampesina.org/en/>; Martínez-Torres and Rosset 2010; 2014.

<sup>10</sup> Hartwig 2007b.

<sup>11</sup> de Schutter 2010; 2014.

<sup>12</sup> Sources include documents of *La Via Campesina* and Brazilian movements that support agroecology [including MST (*Movimento dos Trabalhadores sem Terra*) – <http://www.mstbrazil.org/>; <http://www.mst.org.br/>, and *Movimento dos Pequenos Agricultores* – <http://www.mpabrazil.org.br/>]; La Via Campesina 2010; Wittman, *et al.* 2010; Martínez and Rosset 2010; 2014; Perfecto *et al.* 2010; Rosset 2009; Food First, <http://foodfirst.org/>; presentations to the international conference “Food Sovereignty: A critical dialogue”, Yale University, September 14–15, 2013 – <http://www.yale.edu/agrarianstudies/foodsovereignty/papers.html>.

security first for their own members and others similarly situated, and secondly for everyone everywhere. Food sovereignty is often referred to as a *right*; and, certainly if it is true that the aspiration represents the path to food security, it would properly be claimed as a right, derived from being a necessary condition for implementing fully the right to food security. For present purposes, however, I will only discuss food sovereignty as an *aspiration*. What are the grounds for holding the view that furthering the aspiration for food sovereignty provides the key to safeguarding food security for everyone? Note that this view presupposes a claim something like the following [A]:

[A] A food system could be developed that over the long term would implement and safeguard the right to food security for everyone everywhere, provided that appropriate public policies were introduced that would include strengthening small holder (family and cooperative) farming and support for the development of agroecological approaches and for prioritising scientific research that might inform them. It would have at its core *a multiplicity of complementary locally-specific, locally-chosen, locally-directed, agroecological approaches* to food production, that would simultaneously be: (a) highly productive of nutritious foodstuffs, environmentally sustainable and protective of biodiversity; (b) more in tune with communities of rural people and the variations of their values and interests with place and culture; (c) applicable in contexts (including urban ones) where the methods of the current system have little applicability – and so particularly well suited to contribute to food security by ensuring that rural populations would be well fed and nourished, and able to resist the further consolidation of current patterns of hunger; and (d) when accompanied by appropriate locally-oriented distribution methods, able to play the major role in redressing the condition of food insecurity throughout the world.

Aspiring to food sovereignty neither presupposes nor provides a ground for holding that [A] *has actually been vindicated*. In combination with the explanatory critique of the hegemonic system, however, it does support that [A] should be rigorously investigated empirically, and a measure of priority accorded to doing so. Moreover, aspiring to food sovereignty gains impetus from the well-documented fact that agroecological practices have actually provided the means to bring about greater food security for a growing number of farming communities in a variety of locales.<sup>13</sup> This fact provides compelling evidence for the less far-reaching claim [A<sub>1</sub>].

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<sup>13</sup> Many examples can be found in Altieri 1995; Vandermeer 2011; the references in de Shutter 2010; 2014 – and (in Brazil) AS-PTA (an organisation that supports family farming and agroecology), [aspta.org.br](http://aspta.org.br); Peterson and Dias 2007; Peterson 2009.

[A<sub>1</sub>] The potential of the practices of agroecology extends beyond the locales of their current successes; these practices can be developed and more widely implemented so that their capacity to provide means for redressing food insecurity becomes greater.

At present, the extent of this potential remains open. Whether it extends only to some groups in some contexts but not to others (e.g., large urban populations), or that eventually its actualisations could end up supporting [A], could only be settled in the long term by the accumulating tests of practice and empirical inquiry. In the short term, however, [A<sub>1</sub>] supports that it is reasonable to endorse the aspiration of food sovereignty provisionally, and to attempt to develop and implement its programs and practices wherever they promise to be effective (while monitoring the attempts so that any limitations that may emerge can be taken into account).

### ***Food Sovereignty and the values of social justice, sustainability, popular participation and universal well being.***

Although aiming for food security is indispensable to it, the aspiration for food sovereignty does not derive simply from means-ends considerations. It is enmeshed in a more encompassing set of values, that are embodied in the approaches referred to in [A], that I call *the values of social justice, sustainability, popular participation and universal well being* (or, for short, ‘*the values of social justice*’).

According to *La Via Campesina*, the agricultural practices of food sovereignty ‘teach respect for Mother Earth’, and thus incorporate human stances towards nature – respect, preserve, restore, sustain, cultivate, contemplate, appreciate, enjoy, love, harmonise with, mutually enhance – that (unlike unqualified control or domination that treat nature instrumentally and exploitatively) protect environmental sustainability, preserve biodiversity, and ensure that the regenerative powers of nature are not further undermined and restored wherever possible. They also depend on the agency of farmers themselves, their intelligent initiatives, knowledge, perceptiveness, capacity to learn, to cooperate, and to make their own judgments and decisions; involve the recovery of ancestral farming knowledge, appropriating elements of agroecology and other means that strengthen their cultural and traditional heritages; guarantee a life with dignity for themselves and future generations of rural peoples; nurture “new social relations free of oppression and inequality between men and women, peoples, racial groups, social and economic classes and generations”;<sup>14</sup> and contribute to the solutions of the food, climate, and other crises that currently confront humanity.<sup>15</sup> Not all groups within *La Via Campesina* identify and articulate their values in the same way (and with the same emphases and rankings), or succeed equally well in expressing the values they articulate in their lives and practices; and, above all, there is

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<sup>14</sup> Nyéléni Declaration (International Forum for Food Sovereignty hosted by *La Via Campesina* in Nyéléni, Mali, 2007), quoted in Martinez-Torres and Rosset 2014, 984.

<sup>15</sup> Much of this formulation paraphrases material from Martinez-Torres and Rosset 2010.

considerable culturally-based variation in the language and imagery used to do so that I cannot begin to reproduce here. Elsewhere I have drawn up a list of the values of social justice in a more academic-philosophical language.<sup>16</sup> Sometimes a list of this kind can be helpful as a means to bring into philosophical discussion values that in the academy are often treated as unintelligible ('unrealistic' or 'outmoded'), and to enable academics to begin to dialogue with groups like *La Via Campesina*. It cannot replace the variety of articulations found within food sovereignty groups,<sup>17</sup> however, and it cannot substitute for entering into dialogue with them in attempts to understand and grasp the possibilities of food sovereignty.

I draw special attention to agency, because the 'sovereignty' of farmers, their communities and movements, and the enhanced agency required to claim and exercise it, are at the heart of the aspiration to food sovereignty.<sup>18</sup> Exercising agency is integral to human flourishing. Human beings are agents, beings with capacities for self-consciousness, self-reflection and self-determination – and capacities for acting according to their own reflectively endorsed values (and the goals and ideals informed by them) and their own intelligent assessments of prevailing actualities and the possibilities that they afford; and, consequently, for entering into intelligent dialogue and participation in practices in which they engage constructively with others. Agency is the distinctive human capacity shared by all human beings. For its full-blown exercise, however, certain conditions are required. It can be enhanced – or diminished – by people's relations with others and with the natural/biological/ecological environment, and their places in social institutions.

Effective agency is intertwined with environmental sustainability (especially when future generations are considered), and sustainability and relations of solidarity mutually reinforce one another, so that agency is enhanced in vital communities. Agency is diminished where a society is structured so that many people are excluded from roles in decision-making and from having secure access to the conditions needed to maintain their well-being. Furthermore, the agency of marginalised peoples has been further diminished by the way in which their traditional forms of knowledge has been disregarded, silenced, condescended to, and often violently eliminated from the spaces they occupy. Diminished agency is linked with the sense of being subject to the pushes and pulls of forces outside of one's control and often understanding, where one's own perceptiveness, knowledge, values and agency can play little role in the unfolding of one's life and habitat. The experience of diminished agency underlies the importance, for members of food sovereignty movements, of enhancing their agency through their own leading participation in the communal practices and popular movements aiming to redress the sufferings that they are experiencing, and to determine the conditions that shape their lives – and this includes

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<sup>16</sup> Lacey 2002, 23–24; Lacey 2014b.

<sup>17</sup> E.g., the groups that endorsed the Nyélini Declaration and those that attend annual 'Terra Madre' meetings organised by *La Via Campesina* (see also the sources listed in Note 12).

<sup>18</sup> For elaboration, see Lacey 2002, 16–17.



recovering their traditional forms of knowledge (and histories) and knowledge gaining practices and to bringing them into dialogue (*'diálogo de saberes'*) with the forms of knowledge to be found in other communities, including modern scientific knowledge (without being subordinated to it).<sup>19</sup> The values of social justice are incompatible with the values that are embodied in the institutions of capital and the market,<sup>20</sup> including in the dominant food system. Where they are successfully established, the programs and practices of food sovereignty simultaneously aim to strengthen food security and to express the values of social justice and contribute to their further embodiment. Indeed, the possibility that food sovereignty might open a path from [A<sub>1</sub>] towards the vindication of [A] can be entertained, largely *because* they both express the values of social justice, and contribute to their further embodiment.

### ***Food Sovereignty and scientific investigation***

Attempting to bring the alternative food/agricultural system into being obviously would require time, social organisation, political support and struggle. It would also need to be informed by the results of appropriate kinds of investigation. The principal aim of this article is to consider the questions:

What kinds of scientific investigation – using what methodologies – could contribute towards:

- (1) producing knowledge that could inform the multiplicity of approaches referred to in [A]; and
- (2) appraising the potential expanded scope of [A<sub>1</sub>] – appraising whether the trajectory of expansion could be from [A<sub>1</sub>] towards vindicating [A], or whether there are inherent limits to the possible expansion of the range and capacity of these approaches?

These questions are about investigating phenomena and possibilities of the lifeworld – an *open system*.<sup>21</sup> Appropriate methodologies must involve contact with the practices of food sovereignty and the experiences of its practitioners and be able to take into account that objects such as seeds are simultaneously of many kinds (“laminated systems”<sup>22</sup>), whose possibilities cannot all be encapsulated within a single theoretical framework.<sup>23</sup> Engaging in research using them requires that investigators be open to learning unfamiliar idioms and recognising possibilities that may be expressed using them, and aware (and accepting) of cultural differences and able to dialogue across differences. There is an important role for professionally trained scientists in investigating these questions; but science does not inform the practices of food sovereignty under the authoritative direction of ‘scientific experts’. Rather,

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<sup>19</sup> Santos 2014.

<sup>20</sup> Lacey 2002.

<sup>21</sup> Hartwig 2007a.

<sup>22</sup> Hartwig 2007d.

<sup>23</sup> Lacey 2005, ch. 7.

the question, ‘How can science inform the practices of food sovereignty?’, is reciprocally intertwined with ‘How can its encounter with these practices enrich the ways in which science is conceived and conducted?’. This is both to locate science within the *diálogo de saberes*,<sup>24</sup> and to recognise a place for the *diálogo* within scientific methodologies.<sup>25</sup> Science cannot remain unaffected by the encounter with food sovereignty. Otherwise it will lack the methodologies needed to investigate salient phenomena, and it will not be able to draw on the experiences needed to provide evidence for claims about the possibilities of expanding the scope of [A<sub>1</sub>].

In mainstream scientific institutions, what counts as ‘scientific’ research usually does not recognise such methodologies.<sup>26</sup> Rather, it tends to be assumed in them that ‘scientific’ research is primarily conducted in (or in contact with) laboratories or other *closed systems*,<sup>27</sup> and/or by ‘qualified’ scientists from certified institutions; that producing knowledge is an activity distinct and separate from the practices in which it may be ‘applied’; and that knowledge is produced that credentialed scientific experts then convey to those engaged in the practices, e.g., to farmers prescribing to them how to improve their farming practices. Agrottoxics and GMOs are among the products of this kind of science. Its methodologies are designed to investigate the underlying molecular structures of phenomena and objects (e.g., seeds and plants), their physicochemical mechanisms, laws expressing relations among quantities, and how control may be exercised and intensified by means of technical interventions – dissociating from the contexts of the origins of the phenomena, and from their uses, conditions of use, and consequences in the lifeworld. I call them *decontextualising methodologies*.<sup>28</sup> They are deployed in, e.g., the disciplines of molecular biology and biotechnology that provide indispensable input to leading trends of the current food/agricultural system.

In science policies today, and in mainstream scientific institutions, ‘science’ tends to be identified with the use of decontextualising methodologies. But, ‘science’ *should not be thought of* in this way. A fundamental aim of scientific research is to discover the generative mechanisms of phenomena and of the possibilities they afford;<sup>29</sup> and the generative mechanisms of phenomena in the lifeworld are not limited to those that can be investigated using the decontextualising methodologies of physics, chemistry and biology. Those of the possibilities, e.g., of seeds in sustainable agroecosystems, and conditions, consequences and risks of the commercial uses of GMOs (and other technoscientific innovations) include

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<sup>24</sup> Martinez-Torres and Rosset 2014; Santos 2014.

<sup>25</sup> Lacey and Lacey 2010, 196.

<sup>26</sup> Lacey 2014c.

<sup>27</sup> Hartwig 2007a.

<sup>28</sup> Lacey 2014a; 2014c.

<sup>29</sup> Hartwig 2007c.

mechanisms that derive from ecological and social relations, historical circumstances, and human interventions, more generally, from the contexts of their use.

Scientific research *should be thought of* in a more encompassing way, as systematic empirical inquiry conducted using whatever methodologies and experiences are apt for gaining understanding of the kinds of phenomena and objects being investigated, the possibilities they afford, and their full causal networks.<sup>30</sup> Then, ‘scientific’ methodologies include, not only decontextualising ones – e.g., the methodologies of molecular biology, genetics and biotechnology that are apt for investigating the technical possibilities of GMOs and appraising their efficacy – but also other kinds that are needed to investigate the consequences of using GMOs in the lifeworld, the causes of widespread hunger, and the possibilities of agroecological practices.<sup>31</sup> The questions (1) and (2) raised above can only be answered when scientific research is thought of in this more encompassing way, and the *diálogo de saberes* plays a role within its methodologies, as will be illustrated in the following discussion of agroecology.

## **Methodologies of agroecology**

Agroecological practices admit of the multiplicity, variability and responsiveness to different culturally informed aspirations of the approaches that are required in [A]. ‘Agroecology’ is used to designate both a type of farming and a scientific field,<sup>32</sup> and also a movement and political project.<sup>33</sup> *As practice*, agroecology aims to achieve a balance among such dimensions of agroecosystems as productivity, sustainability (i.e., robustness, resilience and adaptiveness of agroecosystems, and conservation of biodiversity), health of members of the farming communities and their surroundings, and strengthening of local people’s culture and agency.<sup>34</sup> Agroecology is a form of family/small holder/cooperative farming that uses organic and ecologically sustainable methods. And, for the food sovereignty movement, not only that; it integrally includes the last-mentioned (social, political) dimension, where the values of social justice come to the fore. This needs to be emphasised, for sometimes proponents of reforming the hegemonic system, e.g., FAO,<sup>35</sup> ignore this dimension and treat agroecology as one of the methods of family farming that can be incorporated into that system, just one among many sustainable, organic

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<sup>30</sup> Lacey 2005, ch. 3; Lacey 2014b; 2014c.

<sup>31</sup> Lacey 2005, ch. 7; 2014c.

<sup>32</sup> Altieri 1995; Vandermeer 2011; Lacey 2005, ch. 10.

<sup>33</sup> Wesel *et al.* 2009; Martinez-Torres and Rosset 2014.

<sup>34</sup> Altieri 1995.

<sup>35</sup> See Notes 3 and 7.

practices informed by ‘green technologies’. So understood, agroecology would be open to being subordinated to the interests of capital and the market, thus cutting its links with the values of social justice, and the central role it accords to the agency of farming practitioners and to the *diálogo de saberes*.<sup>36</sup> In addition, for the proponents of food sovereignty, the origins of agroecology lie in traditional farming practices and it remains in continuity with them.<sup>37</sup> The crop products of agroecology, e.g., are characteristically both ‘foodstuff and means of production’,<sup>38</sup> unlike those of industrial and GMO-oriented farming, where the sources of foodstuffs and seeds for future plantings are separated. Crop plants, grown from seeds selected in traditional ways (and contemporary refinements of them), tend to be integral parts of sustainable agroecosystems that generate products that meet local needs, and cultivating them is compatible with local cultural values and social organisation. The seeds planted are characteristically selected from crops harvested by farmers themselves (when appropriate, supplemented by seeds selected by other farmers from their crops) with procedures time-tested to manage and conserve biodiversity and to introduce new varieties that are suitable to grow in, e.g, unfavourable soils and new and/or changing environments.

Agroecology, *as science*, investigates the agroecosystems in which agricultural production and the distribution of its products take place, their components, and the possibilities they afford, usually with the goal of informing improved methods of agroecological practice that serve to generate a community’s desired balance of the several dimensions of agroecological farming. The methodologies of agroecology need to be able to deal with all of the components of agroecosystems and relations among them – where the components of agroecosystems include *underlying objects*: minerals and microorganisms in soils; genetic, physiological and anatomical structures of plants, causes of diseases of plants and animals; the *farmers themselves*: the well being of their communities, their aspirations, values and cultures; *objects of familiar experience*: seeds, soils, plants, animals, insects, fungi, human beings, sources of water, buildings, farming implements, machines, division of agricultural fields; and *totalities*: systems, ecosystems, social/economic/cultural systems with mechanisms that enable them to be more or less robust, resilient and adaptive. Hence, agroecology is an inter- and multi-disciplinary field of investigation – drawing on (at least) mainstream agricultural sciences, ecology, economics, and public health sciences – as well as on indigenous and traditional local knowledge (that has met the ‘test of time’), and the on-going adaptations made by farmers to the changing and unpredictable contingencies with which they have to cope regularly. The *diálogo de saberes* is an indispensable component of agroecological methodologies. The decontextualising methodologies of mainstream biological, chemical and soil sciences are needed to investigate ‘underlying objects’; but other methodologies need to be apt for

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<sup>36</sup> Gusmán and Woodgate 2013; Nicholls 2014.

<sup>37</sup> Altieri 1995; Gusmán and Woodgate 2013.

<sup>38</sup> Kloppenburg 2010; Lacey 2005, ch. 7 (and references provided in this chapter).

investigating (among other things) seeds as constituents of agroecosystems and as objects of value that may have economic, legal, cultural, aesthetic, cosmological or religious significance. The results of agroecological research are articulated in organised bodies of knowledge (hypotheses) that *include* both generalisations and ‘local profiles’. Generalisations about the tendencies, functioning, and possibilities of agroecosystems, their components and relations among them; methods for reclaiming degraded lands; and the conditions that make conservation of biodiversity more likely. Local profiles and historical narratives (that vary with cultural, geographic, economic, ecological and other conditions) serve as the basis for defining the balance desired by local communities among the various dimensions of agroecosystems.<sup>39</sup>

In order to procure empirical data that are relevant for generating and testing such results, the collaboration of researchers and farmers, who work the agroecosystems, is essential. Farmers, with their experience, their practical and observational skills and improvisational experimental attitudes, typically have a more complete grasp of the agroecosystems in which they work, the variety of their organic and inorganic components, their spatiotemporal variations and histories, of the practices that can be sustained and that maintain biodiversity in them – and of the interests, capabilities, values and aspirations of the people in them, whose values and cultures are to be strengthened. Furthermore, sometimes the effectiveness of traditional methods is improved by techniques developed in the course of farmer-scientist collaboration, e.g., ‘participatory breeding’ of crop plants that has enabled, e.g., drought-resistant varieties of maize to be developed using traditional methods of selection, aided by techniques of genomic analysis.<sup>40</sup> Consequently, sharp lines cannot be drawn between the researcher and the farming practitioner, between formally trained scientists and the bearers of traditional knowledge, and between the practices of obtaining knowledge and the farming practices themselves.

### **Appraising the potential scope of agroecological developments**

Addressing item (2) requires (among other things), first, taking into account the novel possibilities that are regularly opened up by agroecological research and practice; and, second, identifying the social and economic conditions that would have to be established in order to take significant steps from [A<sub>1</sub>] towards vindicating [A]. Regarding the second, two possibilities cannot be ruled out *a priori*. On the one hand, research might show that conditions (e.g., labor intensiveness) needed for agroecological farming, and the distribution of its products (e.g., markets), cannot be reproduced on a scale large enough to supply sufficient food for large cities. If this were the case then, if food security were to be generally safeguarded, some (perhaps extensive) elements of industrial (perhaps including

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<sup>39</sup> Lacey 2005, ch. 10.

<sup>40</sup> Lacey 2005, 213.

GMO-intensive) farming would have to be pursued, in addition to the ‘multiplicity of complementary locally-specific, locally-chosen, locally-directed agroecological approaches’, referred to in [A]. On the other hand, the hegemonic food/agricultural system may have so undermined the conditions needed for implementing agroecology widely (by degrading soils, reducing biodiversity, impoverishing the seed stock, wiping out traditional knowledge, displacing rural populations, controlling access to farm lands, etc) that restoring them may have become beyond reach (except in very special circumstances) because of the resources and time frame that would be needed. Current uncertainty about these matters, however, does not provide a reason to refrain from exploring the potential of agroecology to expand, to develop new methods and modes of organisation for its practices, and for it to be deployed in new contexts (including urban ones) with new participants. It does not need to be settled *now* whether or not expanded programs and practices of food sovereignty could contribute eventually to safeguarding food security *generally*. That certainly could not happen without developments that would require time, organisation of farmers, education of urban consumers, resources and preparation of farmlands, new public policies, and the formation of practitioners. Nevertheless, that does not challenge the fact that expanding the range of successes of agroecology *now* contributes to safeguarding food security for more people. Furthermore, current successes are the indispensable seeds for future growth – even if it were to turn out that, as the successes expand, we come to understand that the potential for growth would stop short of vindicating [A]. Thus, something important would be gained and nothing important lost, except for major beneficiaries of the hegemonic food system, by pursuing the programs of food sovereignty, .

Still, it is important to ask about how to appraise (albeit provisionally) the extent of the potential for the aspiration for food sovereignty to be realised. That would involve identifying relevant causal factors – and they are not restricted to biological, technological and economic ones – and requires methodologies that can take account of the potential causal impact of the dual motivations: safeguarding food security, and furthering the embodiment of values of social justice. [A] cannot be realised, unless farmers are motivated to adopt the practices of food sovereignty. Strong motivation is required, for the obstacles are great, and cannot be overcome simply by receiving better technical advice about how to use the latest innovations. Sometimes the obstacles appear to be overwhelming – e.g., the seemingly unstoppable thrust of agribusiness and large-scale industrial farming (strengthened by national and international policies) that would usurp all arable land; the discomfort and insecurities resulting from going against the ‘common sense’ of our times (endlessly affirmed in the media and repeated by those in its grip) that insists that there are no possibilities outside of the trajectory shaped by the institutions of capital and the market; the fear (reinforced in Brazil, e.g., by the brutal advance of agribusiness into indigenous lands, and many acts of violence against people involved in agrarian struggles, including assassinations)<sup>41</sup> that the interests of capital and the market will tolerate no competitors and use their

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<sup>41</sup> See sites of MST: <http://www.mstbrazil.org/news/oppression-of-mst-and-social-movements>; and *Comissão Pastoral da Terra*: <http://www.cptnacional.org.br/index.php/noticias/conflitos-no-campo/2042-conflitos-no-campo-brasil-2013>

power to destroy or marginalise any attempts to compete; feeding large non-rural populations; issues about markets and trade; becoming caught up by the lure of advertising and the image of the ‘good life’ that it conveys, or becoming resigned to the conviction that outside of the hegemonic system farmers cannot take care of the needs of their families. In addition, there are the costs of the transition to agroecology, difficulties of access to the required kinds of seeds, and loss of traditional knowledge about managing sustainable agroecosystems.

Adhering to the values of social justice is the key source of the hope – that has to be gained and remain unstifled in the face of these obstacles – that significant steps from [A<sub>1</sub>] towards vindicating [A] may emerge in the food sovereignty struggles, the hope that it is not a *fait accompli* that industrialised, market-oriented agriculture will remain dominant, and that food sovereignty is not just a relic of the past out of place in the contemporary world, that it has the capacity to grow and expand in ways appropriate to our times. And, the unleashing of agency – imagination, intelligence, perceptiveness, and the possibilities that are opened by effective solidarity – that comes with such hope can generate the capacity to confront the obstacles, to seek for new solutions to the problems confronted, to be open to recognise new roles for participants, to attract new adherents and collaborators, and to effectively push claims for obtaining public support. Committed action/organisation that produces successes itself creates conditions for further expansion of the scope of [A<sub>1</sub>] that could not have been foreseen beforehand.<sup>42</sup> Hope, expressed in commitment and solidarity and nourished by the *diálogo de saberes*, can have causal consequences. Hope does not guarantee certainty of success, or provide evidence that success is genuinely possible – it is not a substitute for evidence. Nevertheless, without it any movement from [A<sub>1</sub>] towards vindicating [A] is impossible.

Those who affirm ‘no alternatives’, often claiming the authority of science, ignore the potential causal role of hope; and, assuming that ‘no alternatives’ means ‘no one single alternative that can be adopted everywhere’, ignore research that addresses what the possibilities of a ‘multiplicity of complementary locally-specific, locally-chosen, locally-directed approaches’ might be. Yet, if science is to be able to gain understanding of phenomena in the lifeworld, it must deal with all the causal factors operating in it. Hope is one of them. Investigation, which takes the potential causal role of hope into account, supports that programs of food sovereignty can contribute to expanding the scope of [A<sub>1</sub>] – but it does not settle whether or not that expansion could eventually result in vindicating [A]. Settling that would require engaging in the practices of food sovereignty and empirically monitoring their outcomes locale by locale, and finding out what (if any) their significant *real* limits may be. No doubt, many in the scientific mainstream would question the ‘scientific’ credentials of this kind of investigation and very few would consider it a high priority.

The proponents of food sovereignty see themselves as confronting the choice: *either* to be resigned to a life, marked by food and other insecurities and not shaped by the values that they adhere to,

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<sup>42</sup> Martinez-Torres and Rosset 2014. See also Lacey 2002, 18–20.

or to engage in the struggle for food sovereignty. Holding the values of social justice does not ensure that the practices of food sovereignty can result in abolishing food insecurity for everyone. Nevertheless, it can nourish the hope (and the committed action that it engenders) that is a key causal factor in expanding the potential applicability of food sovereignty. The explanatory critique made of the actual hegemonic food system draws us into solidarity with this struggle – one way to express this solidarity is by engaging in the kind of research that I have sketched – and hence to aim to express the values of social justice more fully in our own lives. Could it be that solidarity with the movements for food sovereignty will be the source of a new way of living for all of us?

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