

# Another Technoscience is Possible

Agricultural Lessons for the Posthumanities

Edited by Gabriela Méndez Cota

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## Introduction: The Posthuman Life of Agriculture: Local Knowledges, Open Source Lives

When Foucault introduced the concept of biopolitics, he referred to a historically specific power agenda involving a particular approach to life. This approach was at the root of the modern sciences of biology and political economy, both of which set out to describe, explain and manage their objects of study as abstract processes of production and reproduction. Agricultural science must be situated in relation to the biopolitical agenda of 'applying' the modern scientific approach to the management of social life. **The scientification of agriculture** took place in the United States towards the end of the 19th century, through a process that entailed both a delegitimation of farmer-generated knowledges and **the production of new, modern subjectivities**. While farmers were being reconceptualized as entrepreneurs in need of scientific education and advice, newly trained agronomists devoted themselves to designing fertilizers, pesticides and hybrid seeds with the goal of maximizing

yields. Public institutions were created which coordinated agricultural production with both science and trade policy. Agricultural science was thus inseparable from the process which transformed much of US agriculture into transnational agribusiness, and local farming networks all over the world into consumer endpoints of a globalized food industry.

More than 20 years ago [Jack Kloppenborg](#), a rural sociologist and long-standing advocate of farmer-generated local knowledges, wrote that 'agricultural science as currently constituted provides neither a complete, nor an adequate, nor even a best possible account of the sphere of agricultural production' (2009: 248). Agriculture has been reduced by agriscience to the exploitation of land through intensive monoculture farming. Oriented towards the conquest of foreign markets, agricultural production has been made to depend on mechanization, agrochemicals, and the constant replacement of improved crop varieties. A cultivar with improved disease or insect resistance performs well for a few years (typically 5-9), after which yields begin to drop, productivity is threatened by weeds or pests that have become resistant to agrochemicals, and a more promising cultivar comes to replace the previous one (Altieri, 2001). In recent years, the efficiency of commercial 'inputs' has decreased and the yields of key crops have in some places been leveling off. Mainstream agroscientists believe that this is happening because the maximum yield potential of current varieties is being approached, and therefore genetic engineering must be applied to the task of redesigning crops. Critics of agriscience, however, argue that such a solution would only make things worse, since it would amount to an intensification of the

conventional destructive paradigm (Altieri, 2001). It is well-known today that chemical-intensive monoculture farming has everywhere led to soil erosion, water pollution and numerous other serious damages, such as the loss of plant and animal species, the destruction of natural pest control mechanisms, the consequent proliferation of new pests and 'super weeds', and **global warming**. While contemporary biotechnology is being promoted by some as the only rational solution to both food security and environmental disaster, many point out that in a form of capitalism dominated by intellectual property rights it will most likely elevate input costs for small and medium-scale farmers to such an extent that the amount of energy they invest will constantly threaten to surpass the energy they harvest. Such a situation will in turn favor further concentration of agribusiness in the hands of a few transnational corporations.

Since the 1960s, activists and academics have increasingly denounced the link between hegemonic forms of science and the social and environmental destruction caused by industrial capitalism. As Kloppenburg states, 'the agricultural sector provides a uniquely appropriate concrete terrain for the testing of a whole range of theoretical propositions' and for 'the necessary work of developing and elaborating the here-and-now prefigurative norms of what might one day be a transformed science' (2009: 261). Feminists, social researchers of science and technology, poststructuralist anthropologists, and increasing numbers of **life scientists** have shown, in a number of ways, how modern agriscience has involved a neglect of physical, biological, political and social contexts, and an alienation of subjects from the intimacy of their labor processes (Kloppenbug, 2009: 254). Of particular

interest here is the critical work which has explicitly positioned the biopolitical paradigm of industrial agriculture not first and foremost as an economic kind of imperialism, but more profoundly as an epistemic and culturally specific kind of imperialism. In his deconstructive analysis of 'rural development' discourse, anthropologist **Arturo Escobar** emphasizes the role of unjustified assumptions regarding Western science, progress and the economy, particularly as they were mobilized during the Green Revolution by 'a father/savior talking with selfless condescension to a child/native' (1995: 159). He refers to Norman Borlaug, the **American crop scientist who was awarded the Nobel Peace Prize**, and who proudly asserted that agricultural science had been able to displace 'an attitude of despair and apathy that permeated the entire social fabric of these countries only a few years ago' (158). In Escobar's analysis, Bourlaug's patronizing judgement reflects the complex social fact that anything that is situated outside the market economy, such as the local networks of reciprocity which have always sustained rural livelihoods, has been constructed within the discursive regime of 'development' as posing a (feminized) threat of engulfment and irrationality.

In a related account of the Green Revolution, Mexican post-development theorist and activist **Gustavo Esteva** has characterized the failure of the Green Revolution to bring long-term productivity and social well-being as much more than a technical failure. In Mexico, revolutionary agricultural policies which came to support the Green Revolution had the goal of transforming '**peasants**' into capitalist farmers for the sake of 'national development'. However, in the end imported machines could not harvest crops due to local soil conditions and dependence on fertilizers and

irrigation turned out to be both expensive and environmentally destructive, but worst of all, Esteva says, was that campesinos were turned into passive observers of a process in which their only participation amounted to carrying bags of fertilizers to the land (1996: 257, 264). This was not simply a technical mistake, Esteva insists; this was 'knowledge imperialism', the failure 'to host the otherness of the other'. At a time when modernizing narratives of 'development' were refashioning pre-war colonialist discourse, the use of physicalist and probabilistic discourse, a purely instrumental conception of nature and work, the implementation of statistical calculations disconnected from local conditions, and the reliance on models without recognizing any historical specificity were all ways of enacting a biopolitical agenda in the service of global capitalism.

After 30 years of 'deconstructive' interventions into the hegemonic forms of science, it seems clear today that the epistemic credentials of Western science 'are no longer completely secure' (Kloppenburger, 2009: 260). A 'reconstructive' task is now required, Kloppenburger argues, in order to show that another agriculture is possible as well as desirable. Disagreements remain over whether science should self-reform yet retain its status as a unique and superior form of knowledge, or whether it should radically transform itself and work on a true dialogue with 'local knowledges'. For Kloppenburger it seems clear that an alternative agricultural paradigm requires dialogue, and that dialogue requires that science recognizes its own limits, its own contingent trajectory in a continuous social struggle 'not only to define science in a particular way, but also to exclude other ways of producing knowledge from that definition' (251). More so because, after 30

years of epistemological and ethical critique of Western science, the contest has only started over the meaning of an alternative agriculture, which still is above all a contest regarding who will have 'the power to speak authoritatively in that debate, who is to have a voice at all' (250). This brings us once back to the theme of biopolitics in the context of neoliberalism.

The continuing dominance of a biopolitical approach to social organization, including agriculture, is made evident today by the relation between contemporary life sciences – or rather, technosciences – and neoliberal capitalism. In a period of economic growth based on the extraction of fossil fuels, agriscience was more attuned to geochemical sciences than to life sciences. Life sciences came to take over the scene of agricultural research only after the oil crises of the 1970s, hand-in-hand with neoliberalism and its new discursive regime. Melinda Cooper (2008) has argued that neoliberalism involves a distinctive form of biopolitics. She has differentiated between welfare or state biopolitics, based on a contract between the state and the laboring body, and neoliberal biopolitics, a project that displaces the welfare contract by eroding its 'constitutive mediations' (9). Such mediations were the gendered boundaries between (paid) production and (unpaid) reproduction, and they ensured that labor and life were not entirely conflated. In other words, the exclusion of female labor from the realm of production in welfare biopolitics was also the model for constructs such as 'human rights' and 'development', two projects closely aligned with but not entirely reducible to the capitalist profit-making imperative. Under neoliberalism, by contrast, the incorporation of reproduction into the sphere of production ultimately eliminates the ontological ground of non-economic values in the

discursive organization of the social, including 'life itself' (Franklin, 2000). As Eugene Thacker has pointed out, biotechnology produces 'a body that never stops laboring[, which] is also a biology defined by production' (2005: 38-39).

Biotechnology relocates production 'at the genetic microbial and cellular level, so that life becomes, literally, annexed within capitalist processes of accumulation' (Cooper, 2008: 19). Cooper's suggestive diagnosis in this regard is that we are living through an era of capitalist delirium which is characterized by an attempt to overcome, through a speculative reinvention of the future, the ecological limits of economic growth. She pays special attention to the resonance between neo-vitalist scientific paradigms and the financialization of the global economy. The understanding of life as intrinsically expansive, non-deterministic, and autopoietic seems to have gone hand-in-hand with the global imposition of the debit form of money as 'a process of continuous autopoiesis, a self-engendering of life from life, without conceivable beginning or end' (35-38). The problem with this more-than-rhetorical shift is the same old problem that was already highlighted by Marx, namely, that the production of life under capitalism is premised on the devaluation, or even destruction, of life itself.

The biopolitics of neoliberal technoscience has become an urgent matter of concern across all disciplines. Donna Haraway (1997) famously insisted that while it signals a dangerous penetration of capitalism into the core of 'life itself', technoscience simultaneously provokes a re-politicization of everything that was previously de-politicized through its association with 'nature'. One of the ways in which technoscience re-politicizes nature is by disrupting 'the separation

between the technical and the political', 'the separation of expert knowledge from mere opinion as the legitimizing knowledge for ways of life' (Haraway, 1997: 23). Thus, the life sciences have become a crucial site for the mobilization of marginalized knowledges and practices of life which promote care for life in a complex ecological sense – as opposed to the capitalist exploitation of 'life itself'. In sympathy with Haraway's strong call to engage critically, rather than apocalyptically, with technoscience, I would like to suggest here that an ongoing struggle for self-critique in agricultural science is an indication that biopolitics, like capitalism itself, is not a monolithic 'system', nor is it a sort of deterministic 'program'. The life sciences are a hegemonic terrain, and epistemological critiques of reductionism, novel interdisciplinary and even anti-disciplinary collaborations, as well as experiments informed by holistic approaches to life, should all be considered as crucial aspects of them, as happening within the life sciences rather than as somehow occurring 'outside' of them. If we assume that it is possible to live through biopolitics in more or less critical ways, we might do well to consider local agricultural knowledges and livelihoods, particularly as they evolve in tension with mainstream agricultural science, as sources of guidance for what a different, more caring 'management of life' could be, one positioned against professional or disciplinary boundaries.

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The process of editing this Living Book has been quite a strange experience for me. Most of the material I found in my exploration of open access agricultural science is

something I disagree with rather strongly. The dominant arguments seem to confirm that mainstream agricultural science has changed little after thirty years of consistent critique from both academic and activist quarters. Such a finding has left me with the rather unexciting task of having to repeat denunciations that have been made for decades. As much as I wish to do something different than just repeat, it so happens that the modern scientific voice of decontextualized rationality is still around, not just in the form of casual opinions that a few random people hold, but as deeply seated and deeply consequential assumptions within agricultural research. One more or less implicit assumption in much of the research I encountered when browsing through scientific databases is that agricultural laborers are scarce, irrelevant or even an obstacle for agriculture.

Where farmers are found to be scarce, researchers propose **tools, such as robots, in order to substitute them**. Where farmers cannot be easily dispensed with, research is concerned with accurately **describing their attitude and behavior** so as to persuade them more effectively to engage in commercial activity, or with developing tools for improving their productivity by **improving their knowledge**. In such research one seems to hear echoes of post-war developmentalist narratives, yet one can also observe the displacement of developmentalist biopolitics by an increasing interest in information technologies, including **global surveillance projects**, with a view to developing a **remotely controlled agriculture** of 'precision'. In some cases, the drive to achieve full technological automation is so strong that farmers are implicitly framed as **simply irrelevant** for cutting-edge agricultural research. More interesting (though not strictly agricultural) pieces of

research include a description of the **agricultural pilot's audiological profile**, which suggested to me that the deafening noise of industrial machines such as tractors and planes might have rendered us deaf to what farmers have to say.

The findings I have just summarized indicate that it remains a challenge for agricultural science to acknowledge the value and complexity of farmer-generated knowledge. While about 60% of the world's cultivated land is still farmed by traditional or subsistence methods, mainstream agriscientists continue to regard such methods as 'primitive', and to assume that the economic and technological integration of local farming systems into the global trade system is the rational step towards increased production and social well being (Altieri, 2001). **Agroecologists**, by contrast, argue that traditional cropping schemes may contain important ecological clues for the development of an alternative agricultural paradigm. **Their research** has foregrounded the complexity, efficiency and overall productivity of traditional cropping systems and methods such as agroforestry, minimum tillage, cover cropping and living mulches. Anthropologists and other ethnoscientists have also found that farmers are keen observers of their natural surroundings and that they skillfully mobilize large bodies of empirical knowledge in their agricultural operations. Moreover, it has become apparent that they are generally eager to innovate and to try out experimental techniques which merit being described as forms of research (see e.g. González, 2001). The serious engagement with such forms of research has contributed since the 1980s to the construction of a 'farmers first approach' in which '[t]he route to solutions to problems at the whole-farm level—at the local system level—runs not through agricultural

scientists, but through those who think in terms of whole farms, those whose experiences are of whole farms, and whose knowledge has been developed by the integration of hand, brain, and heart in caring labor on whole farms--that is, through farmers.' (2009: 255)

Today it is no secret that contemporary mainstream agrosience is inextricable from agribusiness, and that it has little to do with 'the knowledge contained in the heads of farmers and agricultural workers' (Kloppenburg, 2009: 248-249). At the same time, the environmental call for 'sustainability' has cleared a space for the growth of alternative agroscientific paradigms such as agroecology. An important lesson that the latter has drawn from traditional farming practice is the importance of an explicit refusal to position the short-term maximization of yield as an overriding goal of agriculture. Attuned to the priorities of rural livelihoods, agroecology has learned to focus on the long-term sustainability of production through ecological interactions guided by local, historically specific systems of knowledge generated by farmers themselves. Nevertheless, in the current neoliberal climate it is also important to remember that any call for 'sustainability' is vulnerable to (mis)appropriation 'as agribusiness mobilizes its resources in an attempt to dominate discourse and to make its meaning of "alternative agriculture" the universal meaning' (Kloppenburg, 2009: 256). Numerous critics have pointed out that 'sustainability' talk tends to presuppose a view of nature according to the urban-industrial system, the active principle of which is a modern conception of the human agent with selfish interests and purposes. We must remain vigilant of how this humanist conception, and particularly its extreme, neoliberal avatar, slips through activist calls to achieve

'sustainability'. We must remain critical of the fact that even within the agroecological paradigm, 'biodiversity' is often construed as a reservoir of value, since this is one of the arguments which have most effectively pushed for the recognition of indigenous and peasant communities in rain-forest areas 'as owners of their territories', '[if] only to the extent that they accept to treat it – and themselves – as reservoirs of capital' (Escobar, 1995: 203). In the same vein, their knowledge is positioned as a 'resource' for us to combat the environmental damages which threaten hegemonic forms of life. The 'tropical farmer' emerges within agroecological discourse as a neoliberal construct, as the subject who knows and who will save us from the consequences of our own actions. It is because s/he has managed to survive under conditions of low-quality soils, low capital and low institutional support, in other words, because s/he knows how to be self-reliant in conditions of austerity, that the tropical farmer deserves attention today. From this perspective, the idea that a 'farmers first' approach truly reverses the conventional, humanist and developmentalist narratives is nothing short of naive. As we know from deconstructive theory and practice, crudely oppositional narratives will reproduce rather than transform dominant narratives, and the same goes for the agroecological demand that 'the poor but efficient teach the opulent but wasteful' (Altieri, 2001).

We are witnessing an unprecedented enclosure of agricultural reproduction, either by means of patents on transgenic life forms or by means of sterilization technologies which prevent farmers from re-using seed. Some researchers emphasize that such a process has been facilitated by the failure of public educational institutions to provide an alternative to a commercial

logic in knowledge production (Kloppenburger, 2010: 154). At the same time, the growing limits on academic freedom are motivating new alliances between scientific communities and social movements. These alliances need to mobilize more than the humanist construct of 'farmers' rights', for the latter have so far been subjected to trade and patenting laws, perhaps partly for the same reason as indigenous communities and 'tropical farmers' can easily be framed as neoliberal subjects. The lesson to be learned from this, Kloppenburger argues, is that the struggle for agricultural livelihoods, for the life of seeds and plants, as well as for local and scientific knowledge, must find another, more radical and effective way to counteract the enclosure of life. He calls for us to break, in practice, with the principle of exclusion that governs property relations. For another agriculture to be possible, knowledge producers, science scholars as well as farmers, must create the conditions to enact the principle of sharing as opposed to the principle of exclusion. He calls for the creation of a 'protected commons' of crop genetic resources through an open source biology modelled on the free software movement. Like programmers, he says, farmers have found their traditions of creativity and free exchange being challenged by the hegemonic 'permission culture' and have begun looking for ways not just to protect themselves from enclosure but also to reassert **their own norms of reciprocity and innovation.**

My selection of articles for this Living Book seeks to show that agricultural science is already being transformed. However, beyond simply illustrating something that goes on 'out there' anyway, I wish to argue on the one hand that an examination of

contemporary agricultural research holds the promise of a renewed dialogue between the sciences and the humanities, and on the other hand that such a dialogue is necessary for a transformation of the politics of knowledge production within technoscientific capitalism. Philosophy, or the humanities in a broad sense, have already performed an important critical task from within the sciences themselves, a crucial aspect of which has been the exposure of humanism as a metaphysics of patriarchal capitalism. When I refer to 'the posthuman life of agriculture' or to 'agriculture and posthuman values', I mean the self-critique of science which takes the form of a critique of humanism on an epistemological, ontological and ethico-political level. In the context of contemporary biopolitics, posthumanism can be interpreted as an intensified sort of modernist ideology, as an obsession with microscopic entities, as humanism gone mad with technoenthusiasm. Yet posthumanism should also be interpreted as a radical critique of humanism, a decentering of the abstract human subject as the controller of the universe orientated towards an ethical alternative to capitalist hegemony. Struggles for non-human life forms and for non-expert knowledge knowledge practices are a breeding ground for progressive sorts of posthumanist interventions. These interventions require that we pay close attention to the work of politically committed scientists, and that we participate in the dialogue they are seeking to create with local knowledges. In other words, if another technoscience is possible, the humanities must continue to articulate their self-critique with the self-critique of Western science and to be willing to 'interbreed' with local knowledges as part of the struggle for an alternative agriculture.

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## Readings

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Ecosystem Services and Agriculture: Tradeoffs and Synergies

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Potential Greenhouse Gas Mitigation through Temperate Tree-Based Intercropping Systems

Vincent Thieu, Gilles Billen, Josette Garnier and Marc Benoit

Nitrogen Cycling in a Hypothetical Scenario of Generalised Organic Agriculture in the Seine, Somme and Scheldt Watersheds

Acácio A. Navarrete, Fabiana S. Cannavan, Rodrigo G. Taketani and Tsiu M. Tsai

A Molecular Survey of the Diversity of Microbial Communities in Different Amazonian Agricultural Model Systems

Wagner Bettioli, Raquel Ghini, José Abrahao Haddad Galvao, Marcos Antônio Vieira Ligo and Jeferson Luiz de Carvalho Mineiro

Soil Organisms in Organic and Conventional Cropping Systems

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Auma

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Creative Commons: Non-Proprietary Innovation Triangles  
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# Attributions

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