Published in final edited form as:

J Environ Stud Sci. 2014 December ; 4(4): 364–367. doi:10.1007/s13412-014-0184-x.

Review of Abby Kinchy's "Seeds, science and struggle: the global politics of transgenic crops":

Cambridge, MA: MIT Press, 2012

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At a time when the politicization of science is increasingly becoming a concern around environmental issues like climate change or hydraulic fracturing, Science and Technology Studies scholar Abby Kinchy centers her thoughtful analysis of transgenic crops, "Seeds, Science, and Struggle," around the somewhat antithetical concept of *scientization*. We often hear about how science is not being communicated or "believed in" by policy makers, but taking genetically engineered (GE) crops as a fascinating case study, Kinchy demonstrates an alternative picture of science and regulation. *Scientism* is when we treat decision making on a new technology as objective, value free, and best based on scientific evidence of quantifiable risks, while avoiding relevant ethical, cultural, and social dimensions. Because of scientization, we tend not to ask ourselves "What is the purpose or end goal of this technology?" or "What kind of world or type of agriculture do we want?" Instead, we want to know, "Is there sufficient evidence of biological or ecological harm from this particular agricultural technology?" Kinchy's book, based in the fields of science and technology studies, sociology and anthropology, draws on ethnographic, multi-sited and historical methods to focus on two cases. She uses these cases, canola in Canada and maize in Mexico, to illuminate how scientization influences this public debate on GE crops in the global food system.

The concept of scientism is not novel. Kinchy made use of it in her own previous work on biotechnology (Kleinman and Kinchy 2003) and outlines its historical trajectory beginning with social theorist Max Weber's *rationalization* in an early chapter of the book. However, its application to the conversation about the global politics of transgenic crops is welcome and needed. During moments of contention about technologies like GE crops, industry tends to assert strong science, which can exclude less powerful actors rather than being a neutral

source of evidence. Meanwhile, activists often look to broaden the debate about new technologies to incorporate social issues. However, even concerns like property rights and seed saving can be co-opted and scientized, quantified, and placed into a similar risk-based framework. Kinchy argues that social movements are most successful when they reverse scientization, reduce the importance of science in decision making, and highlight ideas of power and values.

Importantly, “Seeds, Science, and Struggle” is one of the most comprehensive and best-communicated stories about transgenes for an interdisciplinary audience I have encountered. In my undergraduate days, I took a course on plant biology and a course on the politics of food simultaneously that both covered GE crops from their own perspectives, and I remember hoping for a resource that could help with uniting the two, or at least had a command of and could speak to science and social concerns. Kinchy’s book does exactly that, in this case, with a focus on the social but a solid understanding of biology. As Kinchy writes, the risk of biological or ecological harm from GE crops—and the social arrangements that allow it—were integrated as early as during the first anti-GE movements in the 1970s and 1980s, meaning that work on the topic is weakened by avoiding one of these fundamentally interrelated perspectives.

In the introductory Chapter 1, Kinchy spends time on the *scientization* of politics concept and outlines theories about how activists interact with science-based institutions and the public. She also introduces the issue of GE crops and her two high-profile cases from the mid-2000s of GE corn in Mexico and GE canola in Canada. These are comparative cases set in different cultural, political, and economic contexts, emphasizing that the book is about *transnational-genics*. Kinchy also poses the research questions of, “How do different groups view these GE crops or *genes out of place*? How are those understandings constructed, and what can these diverging perspectives tell us about the social organization of agriculture?” Uniquely, for research on transgenic crops, she follows her questions directly to farmers and antibiotech activists in place, as opposed to focusing on formal politics and regulation.

Building upon this, Chapter 2 continues to flesh out the concept of scientization and also develops an understanding of scientization and neoliberalization as recent interconnected global shifts. Kinchy historicizes and outlines neoliberalism’s consequences for agriculture and the role of science in the process. All matters come to be worked out through science and the market, cultural and ethical consequences are designated to a separate domain as “political,” and the state cannot intervene without scientific evidence for the need to do so—all factors which favor industry, normalize the development of GE crops, and promote private rather than public plant breeding. In addition, this largely historical chapter provides thorough overviews of Mexican maize and Canadian canola, how the two crops came to dominate in those countries, their cultural and economic significance, trade relationships, and GE regulations or lack thereof.

Chapter 3 is set in place at a public symposium on GE maize in Oaxaca, where Kinchy provides both historical context for Mexico’s maize activism and her empirical findings on interactions among social movements, farmers, and experts. Here, Kinchy explains one of the book’s key terms, *epistemic boomerang*, coined to describe situations when local

citizens or NGOs go outside their normal political channels to mobilize experts and scientific research in order to voice their concerns to the international community. She uses the epistemic boomerang to talk about local responses to concerns about Mexican maize contamination from genes out of place. However, the activists' method of forming an epistemic boomerang grew out of the scientific zeitgeist and to some extent, relies on the scientization of the issue in question for hope of being effective. As she writes, "It may seem ironic that an activist network opposed to one of the major recent developments in science and technology would choose to use scientific expertise as a resource in their struggle" (p. 72)—falling directly in line with Ulrich Beck's famous premise in *Risk Society* (1992), which suggests that we fear risks of modern science and technology while also relying upon them for so much, including their own tools for risk assessment. This chapter raises important questions about how social movements' success and credibility are influenced by their decisions to draw upon science and expert allies or to include sociocultural implications in their platforms.

In a continuation of the Mexican GE maize case, Chapter 4 focuses on the monitoring of genes out of place as a political act despite its neutral, scientific appearance. As Kinchy writes, "Who monitors, where they monitor, the methods of analysis used, the publication of findings, and the ends to which the results are used are all points of contention." The chapter includes a wonderful review of the science and technology studies literature, including diverse topics such as risk monitoring; civil society research and *popular epidemiology*; the global heterogeneity of who is at risk and how risk is defined (i.e., a positive test for transgene contamination to scientists or a visibly deformed corn plant to local farmers); the increasing public scrutiny of science; and David Hess's idea of *epistemic modernization*, which describes the opening up of scientific agendas, concepts, and methods to diverse social groups, with knowledge perspectives that differ from those of mainstream scientists and economic and political elites (Hess 2007).

Kinchy writes that her *epistemic boomerang* is a form of epistemic modernization, begging the question: How does this choice by a social movement to mobilize experts have the potential to play directly into the hands of traditional science and the power players of scientism? Also, like in the case of NGO-led studies of maize contamination, research produced through an epistemic boomerang may be rejected from institutional science as weak or not methodologically sound. This chapter also draws upon Hess' concept of *reconstruction*, or the ways in which more marginalized groups reconstruct sciences and technologies in reference to their social identities.

Kinchy then applies epistemic modernization and reconstruction to an analysis of the NGO and community group Network in Defense of (native) Maize—including its ability to draw on both scientific knowledge and indigenous knowledge, like the idea that maize has a soul that can be corrupted; its decision to forgo national-level work for the community and field scales; and its role in the growth of alternative pathways in Mexican agriculture. This chapter does a phenomenal job of addressing how an antibiotech social movement's claims, members, and audience can be seen as drawing on either established science or myths and legends, suggesting that these are not so easily parsed out into a simple binary. Monitoring for GE contamination in Mexico also provides an opening for Kinchy to examine how a

social movement often has “various factions that differ in their relationships to dominant institutions and favor different strategies for pursuing social change” (p. 77), including their willingness to defer to experts or side with more or less scientifically credible claims.

Chapter 5 follows GE crops to Canada and centers on the 2004 court ruling there in favor of Monsanto Canada and against Percy Schmeiser, a Canadian canola farmer. The outcome was that planting seeds containing patented genes—even if the genes traveled by wind and pollen drift—is a case of patent infringement. Since the thread of scientism weaves through the entire book, Kinchy’s focus here is on how issues like property rights and seed saving that are often considered to be quite political were actually scientized in this case, relying on expert testimony and scientific evidence and making it difficult for non-experts to shape its outcome. At the same time, this landmark case provides an example of how a social movement can use science in the courtroom to its benefit, and how such an event can galvanize public scrutiny of a science and technology issue. In similar style to the rest of the book, this chapter begins with rich context on biotechnology patents and seed saving, proceeds with theory on social movements, the law, and science, and next incorporates Kinchy’s interview data with the farmer himself and historical trial briefs and judgments from the court case. Its conclusion provides a detailed discussion of the “patenting life” debate, and the role of scientific evidence and experts in legal disputes.

Chapter 6 transitions to the tension between GE crops and organic agriculture by focusing on a second lawsuit beginning in 2002, organized by Canadian organic canola farmers. The case questioned whether a GE crop is a patented invention that should be monitored, controlled, and compensated for by the company that introduced it—or if the genes out of place are now simply “part of the environment.” Agribusiness claims whichever side is advantageous in a case, but certified organic products must be GE-free at the responsibility of Canadian (and American) organic farmers themselves. Kinchy explains that since governments use a science-based approach to regulation, which leads to very little of it, activists have turned to market-based forms of governing GE crops like organic standards, labeling, and voluntary seed withdrawals. Indeed, this is often the tactic taken today in American agriculture policy. Allowing for consumer choice is the foremost argument used by pro-monitoring advocates in a neoliberal environment where the mention of regulation will diminish interest. This chapter also raises the question of whether activists for environmental issues like GE contamination should seek legal compensation through a means such as tort claims, because this frames the problem as the burden of an individual farmer rather than as a collective, socio-ecological, and systemic one. Kinchy also returns to the conversation from Chapter 5 about whether legal action is a politically valuable path for social movements, and explores how this varies for the different actors within a movement. The chapter also touches upon the ubiquitous debate within environmental and social movements as to whether an emphasis on consumer behavior can lead to fundamental change for the political economic and regulatory system, or if the focus on the market-based solutions and consumers obscures more important struggles.

Throughout the book, these are two of Kinchy’s motivating questions: What can be achieved by a social movement that chooses to employ scientific evidence as its weapon to challenge the prevailing social order? What are the strategies for drawing upon science, and when, if

ever, are they successful? She concludes in Chapter 7 that a shift away from scientism in technology governance is needed. Public participation and social risk impact assessments are two productive, though imperfect, steps toward protection against the potential social harms from new technologies. Highlighting the experiences of farmers, she suggests, could also move us beyond the present risk-centered debate between activists who mobilize fears about the harms of consuming GE foods, and industry which looks to debunk those as irrational and unscientific.

Notably, Kinchy defines scientization but not science. When and why do social science, qualitative evidence, and moral arguments sometimes fit into the category of scientific criteria for GE crop regulation and other times fall under the evaded social, cultural, political, and economic dimensions? Kinchy's story could have also touched upon "undone" science within agriculture, areas of agricultural research and development that are incomplete, under-funded, or ignored (Hess 2009; Frickel et al. 2010). If we were supporting more research on organic and other "alternative" types of farming, might these seem like the future instead of the current paradigm that favors biotech and industrial methods?

A rather short book at just 164 pages (excluding notes and references), "Seeds, Science, and Struggle" concisely covers an incredible breadth and depth of information on the GE crop debate and science and technology studies. Like concision sometimes implies, the ethnographic writing and data are not the most colorful or descriptive, but the book is extremely well organized, concepts are clearly explained, and theory and data expertly speak to each other. Though the debates and cases covered are not news to anyone engaged with the topic, the approach is refreshing. Kinchy demonstrates an impressive and balanced understanding of GE crops, while still emphasizing the importance of power and the social in our decisions and conversations about science, technology, and specifically, global agriculture.

The book is well set up for a global systems perspective on how GE crops have different meanings, statuses, and consequences in Mexico and Canada. Although common themes emerge across the cases, there are places where more integration of the two cases would also have been productive. Latent questions lurk here: how might scientism extend to other social struggles surrounding science and technology? Does industry always have access to more high-status experts like in this biotechnology case? In the debate about reducing carbon emissions, for example, the vast majority of high-status experts do support anthropogenic climate change and the need to act to minimize consequences. Ultimately though, if you are teaching on this topic in the social or natural sciences, you and your students will undoubtedly benefit by assigning or drawing from "Seeds, Science, and Struggle." Kinchy's book, or excerpts and ideas from it, would be particularly useful for teaching any undergraduate courses in the natural and social sciences on the topic of GE crops. Also, the book is a great fit for graduate students interested in the sociology of science or risk, science and technology studies, environmental sociology, and the relationships among social movements, industry, and science, as well as for teaching about multi-sited global ethnography, mixed methods, and dependent cases in a qualitative methods class.

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