

Panel: The social epistemology of engineered agricultural ecosystems

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This panel presentation discusses key concepts that are either explicitly stated or tacitly in use by researchers developing and/or utilizing new tools for gene editing in the context of agriculture. Our approach probes how systems of knowledge production shape the goals of agriculture, the means by which these goals are sought, how the conditions of success are judged, and the impacts these have on the environment broadly construed. In the past, the controversy over agricultural applications of gene technology has primarily concerned transgenesis ('traditional GMO'). Given that agriculture relies on goal-driven conceptualizations of yield, land capacity, and sustainability, philosophers of many stripes have missed an opportunity to explore the changing conceptual landscape afforded by philosophical analyses of agricultural practices and the concepts on which they rely. Agricultural concepts that are either explicitly stated or tacitly in use shape the goals of agriculture, the means by which these goals are sought, how the conditions of success are judged, and the impacts these have on the environment broadly construed. This session takes agricultural practice and the re-conceptualization of goals for improving agriculture as its starting point, examining the interplay between gene technology, agricultural research and farm production.

The forthcoming book *The Social Epistemology of Engineered Agricultural Ecosystems* (C. Kendig and P.B. Thompson, eds.) collects new interdisciplinary essays focused on social and philosophical dimensions of new biotechnologies for agriculture, emphasizing how technical innovation is accompanied by conceptual change. Three contributions to the book from scholars in philosophy of agriculture and philosophy of technology explore and analyze agricultural research, farming practice, and agricultural policies. Each asks and attempts to provide answers to the questions: How does the deliberate modification of agricultural products and processes change the nature of agricultural ecologies, goals, designs, and new uses of agricultural innovations including gene drives and robotics and, What values, concepts and assumptions frame evaluation of the possible social impacts of using new technologies for agriculture? This panel presentation will discuss how epistemic, ontological, and normative concepts have pragmatic impacts on the day-to-day workings of the farm and how agricultural knowledge is generated and shared. These concepts affect educational, environmental and agroindustry decisions, such as which chemical treatments are designed, what machinery growers rely on (e.g., tillers, planters, and ginners), are redesigned; how seeds are engineered; or how crops should be planted next season. These in turn result in different treatments being available to farmers and influence their farm management.

Paul B. Thompson (Michigan State University) will provide a brief introduction to the panel and moderate the session. Thompson will review how technologies such as CRISPR are alleged to reshape the debate over gene technology. There is a developing potential for inconsistency between the stated significance of gene editing in representations of the next round of genetically engineered plants and animals. Although CRISPR can be used for making a genetic change at a precise location on the genome, the technical capacities of constructs using CRISPR includes far more ambitious applications involving significant uncertainty and potential for unintended consequences. Each panel member discusses how technological interventions reshape socio-ecological relationships.

Section 6

Catherine Kendig (Michigan State University), will illustrate the approach of social epistemology by analyzing one set of concepts and practices within agriculture: soil and the multispecies communities living within it. She traces the ethnography of soil in terms of its management and use within agriculture, discussing how concepts and practices relating to the conceptualization of soil improvement, good soil, and soil health have changed. Philosophical analysis reveals the underlying ideas, values, and commitments that geneticists, soil scientists, agricultural extension specialists, agroindustry, and growers rely on to assess what is, and what is not good soil as well as how to improve it. In each instance, a philosophy of agriculture is active in shaping these practitioners' operative assumptions. Philosophical analysis reveals the ideas, epistemic commitments and values on which current grower and researcher strategies are based, simultaneously exposing alternative paths not taken. As such, a social epistemic analysis prepares the way for an ethical analysis of whether new gene technologies are useful, salient, or have become un-useful, irrelevant, or unjustified.

Rachel Ankeny (University of Adelaide), revisits what has become a stalemate between crop scientists who use gene editing and other molecular biological techniques, and publics who may not be actively opposed but are certainly not supportive of this type of research, as well as what arguably has become a conceptual meta-impasse in the scholarly literature on these conflicts. The argument is developed by drawing in part on the feminist political scientist Carol Bacchi's tool, *What is the Problem Represented to Be* (WPR) (Bacchi, 2009; Bletsas and Beasley, 2012). This approach to policy analysis challenges the traditional view that public policies are responses or reactions to problems which pre-exist outside of the policy process, waiting to be discovered and solved. Instead, the WPR approach argues that policies contain implicit representations of the supposed 'problems' that they purport to address, which in turn are accompanied by a range of assumptions that generally go unrecognized and unchallenged, as well as a set of silences that are not acknowledged or addressed. These representations put the supposed problem into a certain type of category, and thus restrict and direct the ways in which policies are enacted. The WPR approach forces us to articulate the underlying problem representations and to view them as requiring critical scrutiny, which in turn can lead to both new problem representations as well as novel policy solutions.

Per Sandin (Swedish University of Agricultural Sciences) will query the relationship between nature and putative improvements in plant genetics through breeding and biotechnology in light of idea of focal practice. The notion of focal practices is derived from the philosophy of technology Albert Borgmann and Paul Thompson. Each suggests that focal practice can function to curb negative commodifying tendencies associated with modern technical systems (Borgman, 1984; Thompson, 1999). Sandin will identify several candidates for focal practices that do not build on the hostility to (modern) technology and discuss how they can be developed, focusing on a variety of examples include are plant breeding, biotechnology activism, and some forms of sport. In short, for practices to be focal one must observe the restriction that the practice at least must not be inherently evil. The chapter discusses how it is possible that some types of bodily involvement is characteristic (if not defining) of focality.

References

- Bacchi, C. (2009). *Analysing policy: What's the problem represented to be?* Pearson Education, Frenchs Forest, NSW.
- Bletsas, A. and Beasley, C. (eds.) (2012). *Engaging with Carol Bacchi: Strategic interventions and exchanges.* University of Adelaide Press, Adelaide, SA.
- Borgmann, A. (1984). *Technology and the character of contemporary Life: A philosophical inquiry.* University of Chicago Press, Chicago, IL.
- Thompson, P.B. (1999). 'Farming as a focal practice.' In Higgs, E., Light, A. and Strong, D. (eds.), *Technology and the Good Life?* University of Chicago Press, Chicago, IL, pp. 166–181.