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New challenges for education in agroecology

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ABSTRACT

Based on discussions in a workshop associated with the conference *The Agroecological Imagination: A Franco-American Exchange*, we synthesize the state of agroecological education. We focus on three central questions: the what, how, and who of agroecological education. What are the key competencies, skills, and attitudes for future agroecologists? How do we best teach and learn agroecology? Who the learners and teachers are and should be? With regard to the what, we offer the notion of the expert-generalist who has an expertise but is also trained in integrative and transdisciplinary thinking. With regard to the how, we emphasize the importance of experiential learning and action learning, or active experience, and process for content in context. With regard to the who, we discuss the centrality of recognizing the broad community of agroecology, and the importance of agroecological education reflecting that breadth.

KEYWORDS

Education;
transdisciplinarity;
experiential learning; active
learning; agroecology

Introduction

Agroecology is increasingly recognized as a crucial issue in education for tomorrow's scholars, professionals, and citizens. Well over a hundred colleges and universities around the world have begun agroecological educational programs in the last 20 years, from student farms to degree programs. For example, as of 2016, the Sustainable Agriculture Education Association, a North American group, listed 71 member institutions offering some kind of agroecological degree (a few offer two or more degrees) and 58 hosting student farms (SAEA 2017). Many dozen more degree programs have been launched in Europe, Latin America, Africa, Asia, Australia, and the Pacific, including several international programs.

This spread in a time of general retrenchment in higher education around the world is impressive and encouraging. At the *Agroecological Imagination* conference in Madison in 2015, participants in the agroecological education workshop tried to step back and take stock of these accomplishments and consider the challenges for taking agroecological

education forward. Our conversations focused on three central questions: what, how, and who?

- What are the key competencies, skills, and attitudes for future agroecologists?
- How do we best teach and learn agroecology?
- Who the learners and teachers are and should be?

What competencies, skills, and attitudes?

Agroecologists are united by the recognition that the challenges facing agricultural and food challenges need integrated approaches and a more sustainable perspective (Altieri 1998; Francis et al. 2003; Gliessman 2015; Mendez et al. 2016; Wezel et al. 2009). As well, agroecologists recognize a wider sense of agricultural purpose that goes beyond mere production of commodities, and includes issues of environment, community, and justice. This wider understanding of the agricultural context requires the study of relations between agriculture, the global environment, and society.

Agroecologists, however, debate about the best theoretical language for developing this wider, integrated, and sustainable view. For many years, agroecologists have often looked to a “systems” approach that emphasizes “interdisciplinarity” to provide competencies to deal with complexity and uncertainty in the future. The workshop participants embraced these concepts but also discussed some constraints. For example, systems approaches have sometimes been associated with universalistic, mechanistic, and scientific approaches, albeit ones better informed than conventional modernist reductionism and decontextualization (Bell and Bellon, this issue; Bland and Bell 2007 and 2009). The core of the “agroecological imagination” is perhaps better stated as thinking about agroecology in the fullness of its many contexts and consequences: as “contextual thinking” (Bell, this issue). As well, interdisciplinarity has often been self-referential within the academy, neglecting the incorporation of participatory knowledge (Mendez et al. 2016). Participants suggested the value of “transdisciplinarity” to deal with the latter problem, a word that is growing in popularity in agroecological thought.

Taking contextuality and transdisciplinarity into account makes it clear that agroecologists need a *balance of knowledge* that enables appreciation for the diverse situations and purposes of agriculture, as well as skills for integrating that diverse appreciation. But does it mean the agroecologist has to know all fields equally well? This seems unrealistic. The workshop participants discussed the concept of training students to be *expert-generalists* – generalists in the sense of wideness of vision, not universalization of vision – who have a specific expertise but also have training in placing that expertise within a wider, contextualized view. Expert-generalists in

agroecology would be a cohort of specialists in one discipline or one component of farming and food (e.g. landscape ecology, rural economy) who obtain additional training in integrative thinking. In this way, agroecology students would learn to reconcile reductionist and holistic visions, as recommended by the “holon” approach to agroecology (Bland and Bell, 2007 and 2009).

Expert-generalists could be trained in two ways. Students could opt for an extra curriculum of integrative thinking after a traditional curriculum or return for integrative education after years in practice. The other approach would be to make balanced, contextualized, and integrative thinking available early for undergraduate students, before specialization in one discipline or one component of agriculture and food. Where possible, we would advocate for the latter approach, first building a wide base to ground later specialized knowledge rather than building the foundation afterwards. This is being increasingly done. For instance, the curriculum in the College of Agriculture and Food Science in France, balancing basic and applied knowledge, introduces contextual thinking (via a non-universalistic approach to systems) before any specialization at the masters level. In the US, short term summer courses at Iowa State University and the University of Wisconsin-Madison develop integrative, contextualized, and transdisciplinary thinking before the traditional curriculum begins in the fall. Much more could be done, however. On-line courses may be a good approach, as they are often given the chance to operate outside of the traditional curriculum.

However, essential to competency in both a specific expertise and in knowledge integration is having skills and attitudes that facilitate learning and discovery as a social process (Francis et al. 2013; 2016; Méndez et al., 2013; Rickerl and Francis 2004). The romantic notion of the lone scholar, individually exercising and demonstrating creative genius, is unhelpful and unrealistic. Thus, agroecological education should as well seek to help students develop:

- Acceptance of different ways of learning;
- Humility and an appreciation for the value of other perspectives;
- A welcoming attitude towards participatory knowledge;
- Interpersonal and facilitation skills;
- Strength in written and oral communication for both professional and public audiences;
- Confidence in the creative potential of interaction.

How to teach and learn agroecology

Most higher education continues to follow individualistic ideals, however, assessing students in individual projects and exams and stressing rote

learning. As well, the voices of legitimate knowledge remain unnecessarily circumscribed. This individualist and disciplinary model persists in large part through the separateness from the world of “ivory tower” approaches to teaching and learning. When both students and faculty engage with the fullness of experience, individualism and mono-disciplinarity fall away like the shedding of scales. Through *experiential learning* and *action learning*, agroecology education can promote that transformation among both teachers and learners (Francis et al. 2011; Leiblein, Ostergaard, and Francis 2004). Indeed, slightly rephrasing Leiblein et al. (2004: 148), we contend that *active experience* is the foundation for both learning and teaching agroecology.

Many agroecology education programs have developed experiential and action learning as essential aspects of their curricula, in varying degrees. Examples include the European MSc in Agroecology coordinated by ISARA Lyon from FESIA (the French Federation of Agricultural Engineering Institutes) and NMBU (the Norwegian University of Life Sciences), the Graduate Program in Sustainable Agriculture at Iowa State University, the Sustainable Agriculture and Food Production BA at Green Mountain College, and the many student farms that can be found at colleges and universities in the US and Canada. Successful experiential and action learning promotes an open co-learning atmosphere where everyone is a participant in defining the issues and seeking alternative solutions for the future. In contrast with traditional class settings based on transmitting information through lectures, experiential and action learning utilizes multiple sources of information and interaction among the participants, promoting not just interdisciplinarity but transdisciplinarity.

But not all agroecological education needs to be outside of the traditional classroom setting. Rather, the spirit of active experience should be brought into the classroom as well. Lectures still have an important place, but should also be combined with techniques for encouraging an active classroom, such as small-group work, student-led discussions and presentations, and case studies. Not only does an active approach stimulate retention, it helps develop student appreciation for the social process of learning and discovery, so central to becoming an expert-generalist. Agroecological education is not only about content; it is also about *process*.

The process focus of agroecological education should also extend into understanding the process of disciplinary knowledges – that is to say, the varying research methods of the disciplines from the natural sciences to the social sciences to the humanities. It could be said that it is more important that the agroecological expert-generalist understands the methods of the range of agroecological disciplines than their specific content, other than the content of the expert-generalist’s own disciplinary expertise. No one can know – and, in a social process model of learning and discovery, there is no need to know – everything. Agroecologists should be wary of any tendency to

know less and less about more and more. But diverse methodological understanding gives learners and discoverers the ability to dive deeper when required by a particular context and problem.

But the focus of agroecological education should not be on the learners alone. Educators should also work to develop the skills and attitudes of becoming instructors of process as much as instructors of content. For an instructor, this means putting aside one's own ego and recognizing that it takes an open attitude to not always assume the role of the sage. Instructors need to have a broad understanding of process-based approaches to agroecological context, drawing on disciplinary, interdisciplinary, and transdisciplinary knowledges. As participants in the workshop agreed, it is crucial to learn from each other, respect and practice others' methods, and be open to active and interactive methods of learning and discovery (Francis et al. 2016). The good news is that agroecology instructors and researchers generally do come from a wide range of different disciplines with prior experience working and teaching in other countries, cultures, and languages, and with prior experience in participatory work that engages knowledge from outside the academe. Agroecological educators are well on the way to developing what we might coin as a slogan: *process for content in context*.

Enlarging the educational community of agroecology

But who should be involved in that process? It is increasingly accepted that agroecology equally involves science, practice, and agrarian social movements (Wezel et al. 2009). Yet such a wide understanding could perhaps be considered a source of confusion, conflict, and compromise, especially over the explicit mixing of the scientific and the political. On the one hand, scientists may fear a loss of legitimacy as neutral discoverers of truth, while on the other hand practitioners and activists may fear the consequences of science unguided by social concern.

Nevertheless, agroecological scientists increasingly find greater risk in trying to construct and promote an apolitical science of agroecology without considering the social foundations of a *transformative agroecology* (Woodgate and Guzmán, 2016; Mendez et al. 2016). And agroecological practitioners and activists increasingly embrace the value and sincerity of scientists dedicated to such a transformative agroecology. Farmers, activists, and researchers of transformative agroecology demonstrate links in practice though their work together developing alternative agricultural and food systems (Warner 2007). From the mid-1970s, researchers like Gliessman and Altieri developed important linkages with Latin American agrarian movements, and these relationships made a significant contribution to the development of other initiatives in the US and Europe. This vision has inspired producers and

consumers working on food sovereignty and security and not only sustainability. As well, it has led to the rise of agroecological associations that span the range of science to action to practice, such as Agroecology Europe and SOCLA (Latin American Scientific Society of Agroecology) (Altieri and Nicholls 2017).

Tensions remain, however. There are still many academics who only consider agroecology as a (new) science inducing specific concepts and useful knowledge. Others regard agroecology through a productivist lens, using terms like “agroecological intensification” or “ecologically intensive agriculture” to fit agroecological ideas into the dominant agricultural system and, to a lesser extent, into the food system. Is this co-optation? If so, in which direction? As Holt-Gimenez and Altieri (2016) observe, “the planet’s smallholders and the practice of agroecology both constitute a means and a barrier to the expansion of capitalist agriculture.” Nowadays, the organic movement faces a similar debate. While some continue to support a restrictive definition and development of organic agriculture, IFOAM’s Organic 3.0 initiative “is about bringing organic out of its current niche into the mainstream and positioning organic systems as part of the multiple solutions needed to solve the tremendous challenges faced by our planet and our species,” which many critics regard as productivism and industrialism (IFOAM, n.d.).

The educational challenge will be to integrate a broad community of agroecological interest while accepting controversies such as these. Here are some key elements of that integration:

- Bringing agroecological practitioners and activists into the classroom as instructors and knowledge resources;
- Developing or expanding an active and experiential learning program (see above);
- Diversifying the origins of agroecology students and instructors, including diversity of gender, sexuality, cultural heritage, and national origin;
- Creating a sense of agroecology as a publically-oriented endeavor with important policy implications.

Conclusions

Agroecological education seeks to embrace a broad, complex, interacting set of biophysical and socioeconomic dimensions of food and agricultural systems. We have argued for three main approaches in achieving that embrace:

- The competencies and skills of the “expert-generalist” who has specific competency but also skills in integrative, contextual, and transdisciplinary thinking through seeing learning and discovery as a social process;

- The value of active experience in agroecological education to cultivate integrative, contextual, and transdisciplinary thinking and the social process of learning and discovery;
- The importance of maintaining an agroecological community as broad as the dimensions of agroecology itself.

We would note one lack in that broadness, however. Thus far, the broad integrativeness of agroecological education has almost entirely focused on bringing natural science and social science visions together in a contextual, transdisciplinary way. The humanities have thus far been mainly left out in the cold. For example, while it is now commonplace to find a natural science, social science, or natural *and* social science article within a journal such as this one, one rarely encounters in these pages poems, songs, short stories, and drawings. Nor does one commonly find them in agroecology courses.

The relative absence of the humanities aside, it is worth noting that agroecological education's focus on these three approaches is very much in keeping with current discussions and advances in pedagogical theory. Although many older fields of human endeavor struggle to retrofit their curriculum and approaches to learning, agroecology has been quite notable in the large degree to which it has already moved beyond "sage on stage" styles of education. Perhaps this is an advantage of being a relative newcomer, at least within the academe. (Agroecology has long existed outside the academe.) The institutional structures and cultures of agroecological education are not so ossified. We hope that they never become so. Indeed, perhaps the biggest value of these three approaches is the way they encourage the continual regeneration that is the heart of agroecology itself.

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