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# Ethics in the agricultural curriculum

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**Abstract.** Researchers, producers, and educators in agricultural sciences face many ethical issues related to a number of issues, including food production, food safety, environmental quality, food security, and international trade. Programs of study in agricultural higher education can provide students with a framework to examine ethical issues, as well as with experience in analyzing these issues. Some colleges of agriculture require all undergraduates to complete a course in agricultural ethics. Frequently such a course is team-taught by an ethicist and one or more agricultural scientists. It provides students with a background in ethical theories and exposes them to the processes used to make ethical decisions. Disadvantages of this approach include difficulty in adding a course to already crowded curricula and the need to examine broader ethical issues rather than discipline-specific ones. Another model incorporates ethics directly into courses in a range of agricultural subjects. While less time is spent on ethical theories or ethical decision making, students can still be exposed to these concepts either by a guest speaker or by the disciplinary faculty member teaching the course. With this model, students are exposed to ethical issues of greater interest to them. Research has also shown that incorporation of ethical topics can enhance learning scientific content.

**Keywords.** Teaching agricultural ethics – Food security – Food safety – Environmental quality – Ethical decision-making.

### *L'éthique dans les cursus agricoles*

***Résumé.*** *Les chercheurs, producteurs, et enseignants du domaine des sciences agricoles sont confrontés à de nombreuses questions d'éthique liées à plusieurs enjeux, notamment la production alimentaire, la sécurité sanitaire des aliments, la qualité environnementale, la sécurité alimentaire quantitative, et le commerce international. Les programmes d'étude de l'enseignement supérieur agricole peuvent apporter aux étudiants un cadre pour examiner les questions éthiques ainsi qu'une certaine expérience concernant l'analyse de celles-ci. Dans certains collèges d'agriculture tous les étudiants de premier cycle doivent impérativement suivre un cours en éthique de l'agriculture. Souvent ces cours sont délivrés en tandem par un expert en éthique et un ou plusieurs scientifiques en agriculture. Ceci confère aux étudiants un bagage en théories éthiques et les familiarise avec les processus employés pour prendre des décisions en matière d'éthique. Parmi les inconvénients de cette approche figurent la difficulté d'ajouter un cours à un programme d'études déjà très chargé, et la nécessité d'examiner des questions éthiques bien plus vastes plutôt que celles liées spécifiquement à cette discipline. Un autre modèle incorpore l'éthique directement dans les cours pour tout un ensemble de thématiques agricoles. Bien que l'on consacre moins de temps aux théories éthiques ou à la prise de décision éthique, les étudiants peuvent néanmoins être familiarisés avec ces concepts soit par un conférencier invité ou par le membre de la faculté concernée qui délivre le cours. Avec ce modèle, les étudiants sont sensibilisés aux questions éthiques qui leur sont d'un plus grand intérêt. La recherche a également démontré que l'incorporation des sujets éthiques peut renforcer l'apprentissage de contenus scientifiques.*

***Mots-clés.*** *Enseignement de l'éthique de l'agriculture – Sécurité alimentaire quantitative – Sécurité sanitaire des aliments – Qualité environnementale – Prise de décision éthique.*

## I – Introduction

Food production is one of the basic requirements for human life. Researchers, producers, and educators often feel that being involved in agriculture puts their activities on high moral ground. After all, they grow food, and without it, humanity would fail to exist. In that light, whatever can be done to grow more food of higher quality for lower cost has been perceived to be of value to society. For these reasons, there has historically been relatively little examination of ethical issues surrounding food production, either in agricultural research or in agricultural higher education (Chrispeels and Mandoli, 2003).

However, this scenario is changing. The global society is asking many questions about the nature of our food system. Included among the topics of importance to consumers (and therefore of importance to producers, researchers, and educators) are the structure of farms, ethics of animal production, food safety, environmental impacts of agricultural production, international trade, food security, the use of biotechnology in agriculture, and trust in science (Burkhardt, Comstock, Hartel, and Thompson, 2005; Grimm, 2006).

Those of us who are agricultural researchers and educators have a responsibility to join in the conversations about these topics. Our perspectives as scientists conducting research relevant to these topics are critical for informed, intelligent discussions and policy decisions. We also must raise these issues where appropriate in courses we teach. When our students graduate and contribute their agricultural technical expertise to society, they must also be able to articulate and defend the ethical implications of the work they do. Yet too often, we do not provide students with the exposure or the tools for intelligent discussions on ethical issues in agriculture.

## II – Ethical issues in agriculture

The range of topics that concern the general public touches on virtually all agricultural disciplines. For example, questions regarding farm structure include the following: Will (and should) the family farm survive? What role do governmental programs play in helping or hurting the chances of family farm survival? What influences production and marketing decisions at the farm level? What is the relationship between input suppliers, farmers, and marketing firms? Will global agriculture become industrialized and controlled by large agribusiness corporations? What type of agriculture is wanted in the world?

Ethics issues in animal production can be particularly divisive. What role should animal products play in a human diet? How should animals be raised for meat and dairy products? How should they be fed? How should animal diseases be managed? How should animals be used for research?

In addition to the science of food safety, issues of risk analysis and recommendations have ethical components. How should recommendations on risk, food safety policies and procedures be developed and communicated? What role does the ‘right to food’ play in food safety?

Environmental impacts of food production affect all of society. What are the most effective, efficient, and safest methods for managing soil fertility, weeds, insects, and diseases affecting plants? What are the most effective, efficient, and safest methods for raising animals? What are the environmental effects of the globalization of food production?

What are the ethical standards that should govern international food trade? How do fair trade practices impact the ability to provide high quality food, to provide food that protects the health of consumers, and enables fair access for all people to high quality food?

How can we contribute to the concept that all people at all times have access to sufficient, nutritious, and safe food needed to lead healthy lives? What difference does it make that a growing world population is becoming more affluent and as a consequence dietary preferences are resulting on too much food? How do we address the obesity issue? What factors affect a country's or culture's ability to provide stable and safe food for its citizens?

Another highly polarizing issue in agricultural sciences is the use of biotechnology. What aspects of biotechnology are appropriate to use in research and which are not? Should this technology be used to increase efficiency of traditional breeding efforts in plants and animals? Should it be used directly to create new strains of animals and cultivars of plants?

Many of these questions and issues relate directly to topics and concepts we teach in agricultural higher education. Thoughtful discussion of these topics when they arise in agricultural courses can provide students with both exposure and some understanding of ways to discuss emotional topics that are important to their careers. This is critical given the change in dynamics of society's trust of scientists and the scientific information that is brought to bear on these ethical issues.

While many polls around the world have indicated that the general public has a high level of trust in scientists and their discoveries, increasingly society is becoming more skeptical of what we discover and report. Perceptions of global warming, evolution, overpopulation, pesticide use, vaccine use and other scientific topics all show distinct differences between the general public in the United States and members of the American Association for the Advancement of Science (AAAS) in a poll conducted recently (Pew Research Center, 2015). Also, in just the five years since the previous Pew Research Center study in 2009, the number of AAAS members who feel that "today is a good time for science" has plummeted from 76 percent to 52 percent (Pew Research Center, 2015). As an example of continued reduction in public trust of scientists, a recent, highly publicized, report from the United States by Young and Penzenstadler (2015) identified a range of biosafety incidents involving highly infectious pathogens in federal and state laboratories and has fueled concerns over the quality of scientific research.

## III – Teaching agricultural ethics

Given that students in agricultural higher education are facing these issues now as citizens and students and should be in the forefront of these dialogs when they graduate because of their interest, expertise, and vocation, what role should the teaching of ethics play in our classrooms? This is a significant dilemma. First we want to provide students in our courses with the knowledge and skills they need to be successful agricultural professionals. Yet there is far too much material to cover in a typical course. In the United States higher education system, a standard science course without a laboratory meets for 50 minutes 3 times a week for 16 weeks, a total of 40 hours. I started my faculty career as a genetics instructor in 1977. I was told at the time that global genetic knowledge doubled every three years. If this was true and continued to be so from that time until today, there is now thousands of times more genetic knowledge than there was in 1977. But the introductory genetics course in 2015 still meets for a total of 40 hours. If appropriate content was taught and mastered by students receiving good grades in 1977, how can we say that sufficient content is mastered 38 years later?

In recent years, this explosion in information has also been accompanied by a dramatic shift in the ability of people to access this information. Individuals can obtain legitimate scientific information online (for example, with Google Scholar) and massive online open courses (MOOCs) promise opportunities for anyone to take higher education courses for free. Many people worldwide have suggested that universities essentially lack relevance, and with the technological democratization of knowledge, motivated individuals can obtain necessary skills and information to succeed in anything at any level – without universities (University World News, 2014).

However, much of this criticism rests on the supposition that higher education focuses on what kind of job students receive upon graduation. In reality high quality education focuses on what kind of people students want to be. The maturation of young people through interactions with other students, between faculty and students, and learning through hands-on doing of agricultural skills, all suggest that we can and should continue to teach in university settings. Adding a component of ethical awareness to that higher education agricultural setting can prepare our students to be global citizens involved in agriculture who are ethical and are 'doing the right thing.

Yet we still must address the explosion in content and skill requirements. We teach an ever-changing set of core knowledge and discipline-related skills that we perceive as important to our students. But especially today, it is not possible to teach all the content and skills needed by our students, and they will need new content and skills as they progress in their careers. It is therefore critical that we help our students learn how to learn, learn where to obtain valid information for new situations, learn how to think critically and how to solve problems. And a portion of that learning, thinking, and solving needs to include not just raising animals and growing plants, but helping them develop an understanding and a process to examine the ethical issues in the context of both science and their own moral codes.

How can we do this in undergraduate programs in agricultural disciplines? It is a significant challenge. Virtually every undergraduate curriculum I am familiar with has to wrestle with incorporation of course demands for competency in the discipline. In many institutions of higher education that award agricultural degrees there are also requirements for breadth of learning in the liberal arts. If we agree that helping students to navigate the important ethical issues in agriculture is crucial to our role in preparing them for a career in agriculture, how do we do this?

## 1. Types of agricultural ethics courses

There are a number of considerations to address in teaching ethics in agriculture. From a structural standpoint, how do we incorporate agricultural ethics into a curriculum? The continuum of options starts with the creation and requirement of a single course in agricultural ethics at the university or college level and ends with deciding to do nothing. Between these options there can be a number of alternatives, including offering a broad-based elective course in ethics, requiring a discipline-specific ethics courses for all students, or incorporating ethics into required disciplinary courses, either in a range of upper-level courses or a single capstone course.

### *A. Advantages of a core course*

From my experience, few faculty or students in agriculture have a background in philosophy or ethics. A core course can expose students to ethical theories and the process of ethical decision making. A single course could be team taught by an ethicist and one or more agriculture faculty members. The ethicist could explain ethical theories and the basis for ethical decision making. The agriculture faculty could bring scientific perspectives and between them create opportunities for students to apply ethics to important agricultural issues.

When students in the agricultural sciences are exposed to ethical issues, one of the most disturbing facets to them is that the science they are learning seems objective, while ethics seems highly subjective. One way of addressing this issue is to expose them to ethics frameworks, such as that developed after WWII from the Nuremberg trials and the resulting Nuremberg Code (United States Department of Health and Human Services, 2015a) or the Belmont Report (United States Department of Health and Human Services, 2015b).

They include:

"1. Respect for Persons. Respect for persons incorporates at least two ethical convictions: first, that individuals should be treated as autonomous agents, and second, that persons with diminished autonomy are entitled to protection.

2. Beneficence. Persons are treated in an ethical manner not only by respecting their decisions and protecting them from harm, but also by making efforts to secure their well-being. Two general rules have been formulated as complementary expressions of beneficent actions in this sense: (1) do not harm and (2) maximize possible benefits and minimize possible harms.

3. Justice. The formulations of just are (1) to each person an equal share, (2) to each person according to individual need, (3) to each person according to individual effort, (4) to each person according to societal contribution, and (5) to each person according to merit" (United States Department of Health and Human Services, 2015b).

These principles can be used by students to frame their ethical perspectives, regardless of the topic. They can be, in a sense, the "scientific method" for ethical decision making. By explaining these ideas to students, their concern about the subjectivity of ethics is often reduced. This familiarity with moral philosophy/ethical concepts can also create a neutral ground where dialogs on philosophy, moral choices, and science can combine to create somewhat less of an 'us *vs* them' or a highly emotional approach to these complex topics.

In a single course, students from all agricultural disciplines at an institution would be required to take an ethics course. It would mix many disciplines that could give students an understanding of ethical issues in the broad context of agriculture. Plant pathology students would learn about ethical issues in animal husbandry. One or more agricultural scientists as co-instructors would bring their experience, research, and teaching perspectives to ground the discussions in topics that would be relevant to the students.

### *B. Disadvantages of a core course*

A new course in agricultural ethics would need to be supported by affected faculty and approved by the appropriate authorities at an institution. As Booth and Garrett (2004) have indicated, many faculty are, at best, ambivalent about such a course because it either would need to replace a required course in their discipline or reduce students flexibility to take an elective class. The involved ethics and agricultural science faculty would need to have the desire and skills necessary to team-teach such an interdisciplinary course, and funds would need to be provided for faculty salaries. Often, a required course such as this is perceived by students as something forced on them with little relevance to their training (Jagger and Furlong, 2014).

### *C. Infusing ethics into disciplinary courses*

Jagger and Furlong (2014) make the argument that we shouldn't just tell students there are ethical issues, but help them develop a way of reasoning through the challenges and come to some resolution. Rather than a single required course in agricultural ethics, another method of teaching ethics is to incorporate ethics into disciplinary courses in agriculture. This can take the form of a single, separate module in a course, or weaving the insertion of one or more ethical issues at several points in a course.

This vertical integration approach has advantages. It eliminates the need for additional courses in a curriculum and additional faculty hiring. It creates a context for an ethical discussion that is disciplinary specific and thus one that students have both interest and some developing expertise.

Schultz (2014) has identified some common concerns raised about this decentralized approach. Some individuals are concerned that agricultural science educators are not trained as philosophers and are therefore not qualified to teach philosophical issues in their disciplinary courses. A

related issue is that, because we teach “pure” science where there is an objective right and wrong answer, adding moral issues with no universal agreement on wrong and right is outside our purview and should be left out of our teaching.

Others are of the opinion that it is inappropriate for higher education institutions (especially public ones) to raise ethical issues and thus influence the moral development or values of students. The last objection is that discussion of ethical issues would take valuable time away from a science course to address non-science issues.

Each of these concerns can be addressed. For example, while scientists often have no training in ethics, they can bring in guest speakers with this expertise, audit courses themselves in ethics, or participate in various short courses and workshops. Naqvi (2009) contends that one does not need to be a trained bioethicist to incorporate important topics of bioethics in a curriculum, and that foundations of ethical issues are common to all humanity.

Schulz (2014) argues that scientists specialize in the application of knowledge for the betterment of humanity, and as such put science in the context of the world. This context places us squarely in the middle of both science and ethics, which we have an obligation to share with our students.

Thinking it is inappropriate to include ethics in agricultural curricula because we may influence our students’ moral development assumes that scientists teach their discipline in a value-free manner. Numerous researchers, including Posner (2004) and Umbach and Wawrzynski (2005) have shown that teachers influence students through the myriad ways they interact. The issue is that excellent teachers don’t teach students what to think, but how to think. There is a significant difference.

A counter to the fourth argument has already been raised in this manuscript. We in agricultural higher education cannot truly prepare our students for careers in agriculture without exposing students to ethical issues and preparing them to respond in an informed and thoughtful manner. Interesting research by McGowan (2013) has shown that students retain scientific knowledge better when they are taught in the context of ethical dilemmas, because students are more personally engaged in the topic.

## 2. Teaching techniques for agricultural ethics

While incorporating ethics can be a challenge for agricultural educators, it also allows an opportunity to use a wide range of teaching techniques. For example, Quinn, Harding, and Matkin (2011) randomly assign students in teams. Readings and quizzes are assigned before ethical topics are discussed in class. The quizzes are graded individually, then students are asked to give a group response to the questions, with the subsequent group score incorporated into each student’s grade. Each group is assigned an ethical topic and must research the issue before creating a poster, dialog, and presentation.

Diebel (2008) is a scientist who teaches a course with guest philosophers. Students must do readings, understand case analyses, and then are assigned ethical issues. They must describe the moral principle used to come to their conclusion. There are in-class assignments where groups of students briefly analyze a situation with a given moral principle, then must respond to an evaluation of their conclusions with a different moral principle.

Pearce (2009) has an extensive course with group activities. Facilitators float among groups to assist when in-class activities are conducted. There is a mix of individual written assignments and group activities. For each issue, the fact, the value statement, and then the conclusion are required. There is a significant feedback process in the class that includes steps identifying students’ initial reaction to the topic, benefits or disadvantages to interested parties, adding relevant facts, examining the topic from the diametric opposite perspectives, then only at the last part of the assignment, arguing their point.

Jagger and Furlong (2014) describe an approach where disciplinary faculty develop a single ethical issue from their own area of expertise and use readings, group work, case studies, and in-class presentations to foster a deeper, more responsible thinking from students than would otherwise be available.

Loike, Rush, Schweber, and Fischbach (2013) teach a required science ethics course, although their techniques can be beneficial in centralized or decentralized agricultural ethics teaching. They require background reading in both science and ethics journals, particularly emphasizing presentations with several opposing viewpoints. Online discussions of posted questions facilitate covering the topic outside of the classroom. The authors found that when the course devoted more time in the classroom to discussion, debate, and role-playing, students appeared to better grasp the presented ethical issues.

## IV – Conclusion

Exposing students in agricultural higher education to ethical decision-making and its application to important ethical issues will continue to be an important part of their preparation for an agricultural career. There is a range of options for incorporating ethics into agricultural curriculum, from an ethics course required of all students in a college to use of a specific case study in capstone disciplinary courses. The flexibility of the structure and methods used to teach ethics provides faculty with many useful options to address this important issue.

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