ORGANIC AND NON-GMO PRODUCTION:
A NEW CHALLENGE FOR AGRICULTURAL EDUCATION

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Abstract

With farmers around the world facing dismal economic forecasts and increasing environmental degradation, agricultural educators and Extension personnel have the responsibility to assist them in seeking options. Organic and non-GMO production provide viable alternatives that can contribute to the increased success of farmers, both within the United States and internationally. Obstacles such as negative perceptions and attitudes, lack of research-based information, and rapidly changing barriers to organic and non-GMO production must be addressed by Agricultural Education and Extension.
Introduction

As farm economies around the globe become increasingly depressed, farmers are scrambling to find new options for survival. In addition, there is increasing concern about the degradation of our natural resources and the widespread loss of family farms. Alternatives that increase farm income, facilitate positive land stewardship, and contribute to rural sustainability must be encouraged. Agricultural education and extension shares the responsibility of providing information and support for viable options that emerge.

Two alternatives that have shown promise for some farmers are the production of organic and non-GMO (non-Genetically Modified Organisms) crops. Rather than producing conventional commodities, these farmers are producing niche market, value-added, identity preserved crops that may command a substantial premium over conventional prices. However, these methods of production present new challenges, some of which prove to be overwhelming for farmers who convert to these systems. The lack of readily available information and support is a serious issue that needs to be addressed by agricultural educators. Unfortunately, few agricultural extension educators and teachers have experience and knowledge base necessary for these new trends in agriculture. Those who do advocate for organic and non-GMO production often face obstacles with their universities and peers.

Organic farming is based on practices that build the fertility of the soil without the use of chemicals and promotion of a healthy environment and community. Organic certification mandates strict requirements for production inputs and methods, storage and handling, and record documentation. Organic producers, handlers, and processors face many challenges in fulfilling these requirements and staying abreast of ever-changing regulations.

The production and handling of non-GMO crops and foods are in some regards less complicated than organic production, but unquestionably present specific challenges that require additional education. Genetically Modified (transgenic, in which a gene from another species has been inserted) seeds, commodities and processed foods have been controversial in the international market since their introduction. Some countries are imposing restrictions banning the importation of GMOs and/or mandating labeling requirements. If the food industry is to respond to these concerns, then guaranteeing the segregation and purity of non-GMO crops and foods is of the utmost importance. Strict tracking protocols and methods of creating and preserving the identity of non-GMOs are available, but need wider promotion and utilization. Agricultural education and extension holds the potential and responsibility to offset this shortfall of information.

Purpose

In my profession as an organic and non-GMO grain buyer, I am frequently questioned by farmers who would like to try growing organic and/or non-GMO grains, but don’t know where to find adequate information and guidance. I have spoken with farmers whose entire crop was rejected because of quality issues that could have been prevented with proper education. In some cases, they lost their organic certification due to an oversight or lack of understanding of a single regulation. In other cases, crops have been contaminated by GMOs due to improper equipment or
facility cleanout, or lack of other necessary precautions. I have been very disturbed by the lack of leadership from many land grant universities and agricultural extension educators with regard to organic and non-GMO producers, and feel this needs to be addressed.

The purpose of this paper is to examine the current trends in organic and non-GMO agricultural production, both internationally and within the United States, and to consider the challenges that this emerging industry presents for agricultural education. This paper addresses the shortage of information and support for farmers who seek to enter organic and non-GMO production and suggests areas of emphasis for agricultural educators. It also addresses the obstacles faced by agricultural and extension educators who are striving to promote organic and/or non-GMO production.

The specific issues that are addressed are:
• What are the current growth trends in organic and non-GMO acreage and production?
• How have consumer demands affected production of organic and Non-GMO crops?
• What unique challenges do producers and marketers face?
• What challenges does this expanding industry create for agricultural education?

Research Methods and Data Sources
The data for this qualitative research was obtained through formal and informal interviews and daily interaction with organic inspectors and trainers, farmers, extension educators, brokers and processors of organic and non-GMO grains in the Midwest. An e-mail questionnaire was sent to selected agricultural extension educators and organic inspectors. The following questions were included:
• What do you feel is the biggest obstacle facing extension educators in regard to organic and/or non-GMO production?
• How frequently are you asked questions relating to organic and/or non-GMO production?
• Do you feel there is adequate information available for extension educators and producers about organic/non-GMO production?
• What (if any) improvements do you feel could or should be made by Extension Services to better serve producers of organic and/or non-GMO crops?
• (Where applicable) What are the most significant trends/changes/challenges in the organic industry and/or non-GMO production that you’ve observed in your international experience?
• Any other comments?

Responses were received from eight Extension educators, two university researchers, and two organic inspector/trainers from the states of Minnesota and Kansas. These responses and notes from the formal and informal interviews were analyzed for thematic generation. Themes were identified through the techniques of open and axial coding, using the criteria of frequency of appearance and relevance to the original research questions. Triangulation was used whenever possible to establish validity, thus comparing and crosschecking the consistency of the information. The primary limiting factor in this study was lack of time availability. However, it could be easily replicated and expanded with a larger interview and survey population, additional questions, and extending the geographical scope of the study.
A review of current literature was also conducted, with special focus on the rapid changes that evolved during the 2000 crop season.

**Results and Conclusions**

In the United States and Europe, the organic market is the fastest growing segment of the food industry, with an average growth of twenty percent per year for the last decade, compared to approximately two percent in the food industry overall. Sales reached an estimated $7.8 billion in 2000 and are expected to reach nearly $20 billion by 2005, according to the Organic Trade Association and a new study from Kalorama Information (AP, 2000). The global demand for organic foods has grown tremendously, with an over twenty percent increase in the EU, particularly the Netherlands and Scandinavia (Delate, 1999).

To ensure organic purity, the use of chemical fertilizers, herbicides, and pesticides is prohibited, as is all genetic engineering. Strict segregation from non-organic crops must be implemented to prevent co-mingling, and all machinery and storage facilities must be thoroughly cleaned to prevent contamination. In addition, detailed records must be kept, providing an audit trail that documents organic purity from field to finished product. An intensive inspection by a licensed organic inspector is conducted annually. Final certification is issued by a third-party organic certification agency. In the United States, farmland that is converted from conventional to organic production must undergo a three-year transition period before it can become certified organic. This conversion involves a very steep learning curve for the new organic farmer, therefore education and support is especially critical during this period. Once a crop is certified organic, it requires further specialized handling. It must be stored only in facilities that have been approved by an organic inspector. All stages of transportation must use equipment that has a “clean affidavit”. All processing and packaging facilities must also be inspected annually and maintain an official organic certification. Clearly, a lack of knowledge about the entire organic certification process can be devastating to a producer or handler.

The organic market has benefited in recent years by the public backlash against GMOs, since buying organic is currently the most reliable means of ensuring consumers that they’re not eating genetically modified foods. These two previously distinct industries are becoming increasingly intertwined and similar in their strategies to guarantee integrity.

The demand for non-GMO products is also rapidly escalating in much of the world. Eighty-one percent of Americans say genetically engineered food should be labeled; 58% say they would not buy them (Time Magazine, 1999). An Angus Reid poll indicates that 68% of Canadians would not buy GM food if labeled. The London Evening Standard (1999) reports that 78% of Britons want labeling for foods containing GMs (Stordahl, 2000). Taiwan will require all GM products to be labeled in 2001. Italy has currently banned transgenic maize. Moratoriums on the approval of new GMO crops and GMO product importation were also placed in Europe in 1999. The public opinion measurement tool “Euro Barometer” indicates that 60% of Europeans are concerned with the risk of GMOs in food. Fifty percent indicated that they would pay more for Non-GMO foods, and 74 percent are in favor of GM labeling (Van Der Haegen, 2000). Japan, Australia, South Korea, India, and Saudi Arabia also have joined the growing list of nations who are moving towards stricter regulation of GMOs.
With such an increasing demand for certified organic and non-GMO products, many farmers are considering this type of production. However, they must first examine the many requirements and demands before they make the conversion, and devise a guaranteed method to ensure the purity and identity preservation of the crop they grow.

A graphic example of failure of the segregation system is the case of StarLink, a GMO corn variety that has wreaked havoc in the national and international food industries. Although the developers assured the EPA that StarLink would be tightly controlled and kept out of the human food system, failures and breakdowns at many steps of the production and handling chain led to its escape. Many of the farmers and grain handlers were not informed about the precautions required by this variety (OCIA, 2000). Once it was released into the system, it was impossible to recapture fully. Although only 1/200th of the corn produced in the United States in 2000 was the StarLink variety, that tiny amount contaminated billions of bushels, including corn exported to Japan and Europe. As a result, as of December, farmers are stuck with over 50 million bushels of StarLink corn still sitting on farms with no available market. Japan, the largest importer of U.S. corn suddenly cut its purchases in half. The second largest importer, South Korea, totally banned all U.S.-grown corn (Crenson, 2000; Brasher, 2000). This scenario aptly illustrates the necessity for education and communication throughout the entire producing and handling system of value-added crops, something that was sorely neglected in the case of StarLink corn. Zachary Fore, University of Minnesota Cropping System specialist states,

“The StarLink controversy is just the tip of the iceberg. The number of grain products possessing specific traits will greatly expand in the coming years....In almost all cases, [they] will need to be segregated from other grains, and will need to meet criteria for handling and purity. In the simplest cases, farmers will need to plant, harvest, and store grains separately, then have them tested to meet certain purity standards. In the most complex cases, every step in the process from seed selection to final delivery will need to be documented and monitored. The product will be certified, tested, and have a paper trail that allows traceability back to its origin....These events are harbingers of things to come” (Fore, 2000).

A great need exists for increased availability of information and support for farmers who wish meet the rising demand for these products. This information and support is also crucial for agricultural educators. Several themes emerged during this research that indicate challenges to producers and educators.

- **Negative perceptions and attitudes towards organic agriculture and non-GMO crops create a serious obstacle.**
  According to Delate (1999), three common misconceptions about organic farming are:
  1. “Organic farming is by hippies.” Today you usually can’t tell the difference between an organic farmer and a conventional farmer; the “California hippie image” is not accurate.
  2. “Organic farming is farming by neglect - you plant seeds and walk away.” In reality, organic farming is actually much more management intensive than conventional farming.
  3. “Organic is a get-rich-quick way to farm.” However, the profitability of organic farming is the same with all agriculture - based upon supply and demand.
  4. “Organic yields are much lower than conventional yields.” Actually, yields often show no significant difference between conventional and organic crops, especially after the transition period during which soil health is renewed. However, the profitability is usually much higher with
organic crops. A number of other long-term studies confirm that organic agriculture can equal yields of conventional crops, and even surpass them during adverse weather conditions (Organic Broadcaster, 2000).

5. “GMO crops and conventional agriculture are necessary to feed a starving world.” While this is a huge debate in itself, the central problem of hunger is not caused by insufficient food, but by unequal distribution. Rather than relying on biotechnology and chemical inputs, farmers can be empowered to provide food needed in their communities using locally available inputs that don’t need to be bought or won’t create environmental degradation (Meadows, 2000).

Misconceptions such as these often lead to negative and derogatory attitudes by extension and university personnel, as well as conventional producers. In turn, many organic farmers often hesitate to ask extension educators for advice because “Why ask them when you’ll just be laughed at?”, as one farmer commented. Extension educators who advocate non-GMO and organic production may also be the target of ridicule. An extension specialist remarked, “I have literally had Extension staff tell me to forget about organic because it is not proven to be a healthier product.” Another reports, “I’ve seen situations where county-level people have been interested in doing more work with organic or non-GMO ag, but they’ve been hesitant in proceeding because they are concerned about what their supervisors, the dean, state specialists, etc. will think about them if they do and whether they’ll lose the support these individuals when they work with conventional agriculture. I’ve actually been in a meeting where some state specialists said that Extension had no business working with organic agriculture.” One Extension educator concluded, “It would be helpful if individuals in Extension leadership positions would make public statements that it is OK for Extension personnel to work with organic and other kinds of alternative agriculture, and better yet, for them to actually encourage that kind of work.”

Lack of support from the university often takes on a political nature. “It’s not really spoken, but it’s there. There’s too much money on the table to speak negatively about GMOs. It’s not always about education, but about money. I used to have the misguided idea that universities are unbiased and out to present useful information to the public. But it’s not always what’s best for rural America, farmers, and food, but how to balance the budget,” commented a frustrated Extension educator. Many university officials and researchers are committed to conventional and GMO paradigms and are dependent on the research dollars that flow from input manufacturers. Research money is allocated to the areas designated by the outside contributors and politicians.” That typically excludes non-GMO and organic research. Another stated, “The Extension educators that are ‘sitting on the fence’ would probably become more involved with organic and non-GMO agriculture if there was more open support from the University.”

According to surveyed Extension personnel, the attitude of local input suppliers, county commissioners, county Extension committees, and local farmers who support conventional agriculture can also be a major obstacle. In one case, a county Extension educator lost his financial support for an Extension meeting when one of the local agribusinesses found out that he was going to give a balanced presentation that covered both the pros and cons of biotechnology.

- There is a serious shortage of research-based information from land grant universities on organic and non-GMO agriculture.

Most Extension educators prefer to use their university as their primary resource base, and this is also an expectation from most farmers. However, if their university isn’t doing much resource
on organic or non-GMO production, some Extension personnel feel they can’t do much programming on that topic. One educator suggested, “If we’re going to do serious Extension work in organic agriculture, we can’t rely on our traditional sources of information. We need to partner with non-profits, agribusinesses, and farmers who have experience with organic agriculture.”

Another Extension educator emphasized, “Our mission is to provide research-based information about GMO’s, but a lot of the information is NOT research-based. That’s the root of the entire problem. There definitely is NOT a lot of reliable, scientifically factual information available.” Farmers indicate that they would like to see an increase in local research and systems-based research for organic production. Their needs are diverse and many of their challenges are site-specific, so they would like to see more emphasis on local systems and holistic approaches, rather than “prescriptions”. Therefore, as one researcher emphasized, “We will never have (nor should we attempt to produce) cookie cutter information on organic systems. Instead, our challenge is to work with producers to analyze the information that already exists for replicability, applicability, and reliability... It calls for a different approach which mandates analysis and synthesis of information by users, rather than relying more on application of pre-tested information.”

- Organic production and non-GMO production are increasingly intertwined; both are threatened by GMO production.

People at all levels who are involved with organic and non-GMO agriculture are increasingly alarmed by the threat posed by GMO and conventional production. Chemical and genetic drift due to pollen migration can easily destroy the organic or non-GMO integrity of a crop. Non-GMO farmers and the elevators and processors who handle these crops now have to mirror the tracking and segregation that organic products have always required. However, many of these players are not familiar with the thoroughness that is required to maintain the purity levels that are demanded, especially by export customer, usually ranging from one percent to 0.1% detection. The slightest detection of GM’s can result in the organic or non-GMO producer losing their premium. The farmer may have successfully grown a GM-free product, but if the custom harvester, trucker, processing facility, or shipping company failed to thoroughly clean their equipment, the farmer’s product may lose its value-added integrity (Mandler, 2000).

Educational Importance

Organic and non-GMO production are not simply “niche markets.” They are not going to go away anytime in the near future. As Mark Lipson, policy program director of the Organic Farming Research Foundation states, “Organic agriculture has succeeded over the decades despite a lack of scientific knowledge. We have only begun to really figure out what its potential is” (AP, 2000). An organic inspector remarked, “It seems that Extension agents are in a state of denial concerning the international market demand for organic and non-GMO crops. The bottom has fallen out of the conventional GMO market, but they won’t admit it. Get real! It’s time for the universities to reconnect with the land grant mission. Conduct pubic research versus corporate research. Seek knowledge, rather than patents!”

As has been illustrated, there is a great need for further education in production methods, harvesting techniques, storage, and marketing of certified organic and non-GMO crops. Fortunately, some universities are listening to the requests for this additional information and research. For example, the University of Minnesota’s Southwest Research and Outreach Center has established the Elwell Agroecology Farm and the Organic Conversion Project. This project works with over 40 area
farmers who are converting part or all of their farm to organic production. The Project links them with a team of experienced mentor-farmers, provides assistance in management plans, on-farm research, conducts workshops and field days, and connects them to other informational resources. Iowa State University also has created a comprehensive organic production and marketing program, and also provides training for extension personnel. These and other models should be further examined and utilized by professionals in agricultural education and extension to meet the need for informed, competent leadership and advocacy.

Another resource for “educating the educators” that is available, but underutilized, is the Professional Development Program (PDP) sponsored by the USDA’s SARE (Sustainable Agriculture Research and Education) program. The PDP provides continuing education grants for Extension, Natural Resources Conservation Service personnel, and other agricultural educators. However, according to P. Ford, the North Central Region PDP coordinator, in 1999 there were only twenty-five grant applicants. Programs such as this need to be more widely promoted and utilized to better equip agricultural educators.

Farmers who discover an Extension educator who is supportive of organic and non-GMO agriculture are often surprised, however pleasantly. One producer asserted, “We must let farmers know that we are working with a new generation of agents who are interested in sustainable and organic agriculture.” As one Extension educator noted, “We don’t get as many questions as we could or should get, because some farmers and agribusinesses just assume that we don’t have information in these areas. So, even when we are interested in being an organic or non-GMO information resource, some people might not view us as a credible source. I feel that part of my job is to convince organic and other alternative farmers to keep asking Extension for help because a) we do have some information, and b) receiving questions on organics will force us to come up to speed in this area.” Another educator explained, “Our Extension leaders need to be reminded, and then they in turn need to remind the rest of the Extension Service that our mission includes working with all farmers and agribusinesses in the state, not just the large conventional ones. Also, we need to provide Extension leaders and other Extension personnel with more evidence that many alternative forms of agriculture make sense - that they can be more economically, socially, and environmentally sound than some forms of conventional agriculture.”

With farmers around the world facing dismal economic forecasts and increasing environmental degradation, agricultural educators and Extension personnel have the responsibility to assist them in seeking options. Organic and non-GMO production provide viable alternatives that can contribute to the increased success of farmers, both within the United States and internationally. Demand for these products is steadily increasing on a global scale. Therefore, farmers should be supported in their efforts to meet and develop these emerging markets. Agricultural Education and Extension should play a vital role in their success.

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