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Integrating Ecology and Relating Natural Systems to Agriculture: An Increased Priority for Extension Agricultural Programming

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Integrating Ecology and Relating Natural Systems to Agriculture: An Increased Priority for Extension Agricultural Programming

Abstract

Extension must modify its historical agricultural educational emphasis from one addressing primarily the production of food to one that addresses the production of food in a system encompassing the goals of individuals, society, and the environment. In the search to incorporate more ecological rationale into agricultural production, Extension educators should develop a deeper understanding of the nature of agroecosystems and the principles and processes by which they function. A contemporary Extension agricultural program that understands agroecology and believes in the need for a more sustainable production system will lead the way toward a more profitable and environmentally friendly agriculture.

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Society now provides input into issues associated with environmental sustainability in a myriad of industries, including agriculture. Agriculture today exists within a system that encompasses both biological and societal concerns. This is quite different than what the first agriculture agents dealt with in 1914.

Extension must now begin to modify its historical educational emphasis from one addressing primarily the production of food to one that addresses the production of food in a system encompassing both the individual's, society's, and environmental goals. Developing farm operators' knowledge and awareness of relationships between farming and natural systems functioning should be an underlying theme of Extension programming in the new century. An agricultural system that can produce not only plentiful, healthful food, but also fully functioning ecosystems should be a goal of Extension outreach and programming efforts.

The Changing Context of Agricultural Extension

Extension has focused its educational efforts on an anthropocentric agricultural production system. That is to say, Extension has historically assisted the farmer in developing farming systems that maximized food production in order to feed a growing population. The focus on production of mass-produced staple commodities has unfortunately brought with it a number of consequences that society now views as unacceptable. These include:

- Soil erosion,
- Wetland loss,
- Deforestation, and
- Environmental problems associated with chemical use and agricultural fertilizers.

By no means is it implied that agriculture is the only contributor to environmental problems facing today's society. Rural and urban populations each contribute to environmental problems in their own unique way. Agriculture, however, by simple virtue of the amount of land in the world utilized for production of food products, plays a significant role in sustainability of the environment. The fact is, farmers have a major impact on environmental sustainability.

Given this long tradition of agriculture-based Extension nationwide, many Extension educators may have a strictly agricultural production background and are perhaps not trained in natural resources management or ecology. Due to the complexities of environmental systems, it is unlikely that an educator with a limited or non-existent training in basic ecosystem management principles will be able to functionally integrate ecosystem management concepts into their Extension outreach efforts. Furthermore, it could be argued that without some degree of immersion into the science of ecology and natural system functioning, the level of scholarly interest in such topics would be lacking.

In the search to incorporate more ecological rationale into agricultural production, educators must develop a deeper understanding of the nature of agroecosystems and the principles by which they function.

Agroecology has emerged as the discipline that provides the basic ecological principles for how to study, design and manage agroecosystems that are both productive and natural resource conserving. Agroecology goes beyond a one-dimensional view of agroecosystems. Instead of focusing on one particular component of the agroecosystem, agroecology emphasizes the interrelatedness of all agroecosystem components and the complex dynamics of ecological processes (Vandermeer, 1995).

Agroecosystems are communities of plants and animals interacting with their physical and chemical environments that have been modified by people to produce food, fibre, fuel, and other products for human consumption and processing.

Agroecology focuses on the form, dynamics and functions of interrelationships and the processes by which they evolve. An area used for agricultural production, e.g. a field, is seen as a complex system in which ecological processes found under natural conditions also occur, e.g. nutrient cycling, predator/prey interactions, competition, symbiosis and successional changes. Implicit in agroecological research is the idea that, by understanding these ecological relationships and processes, agroecosystems can be manipulated to improve production and to produce more sustainably, with fewer negative environmental or social impacts and fewer external inputs (Altieri, 1995).

A Need to Understand

A study of 369 Extension educators in North Carolina showed that survey participants were divided when asked if Extension educators developed programs that emphasized whole-farm agriculture systems (35.9% disagreed, 29.8% undecided, 34.3% agreed) and if agents taught clientele holistic approaches to problem-solving (31.7% disagreed, 35.6% undecided, and 32.8% agreed) (Minarovic & Mueller, 2000). This would indicate that an important step in changing the paradigm of Extension agriculture education would be to gain consensus on the necessity to incorporate agroecological principles into Extension programming.

We cannot expect our clientele to incorporate these principles if we are not capable of or are unwilling to teach them. In rapidly changing environments, both organizations and the people who make up those organizations either change with the times or risk becoming obsolete.

So, as Extension positions itself to address contemporary issues affecting society, professional staff members will need to engage in lifelong learning in order to maintain professional expertise in relevant areas (Martin, 1991). Extension agricultural staff will need to be able to think differently and acquire a new set of knowledge, skills, and abilities--just as our farm producer clientele will be required to do. The more we understand about agroecology, the better we will be able to impart this new knowledge to clients.

American agriculture, in all its parts, desperately needs to develop and implement strategic plans to reposition the industry with respect to the global marketplace and the social and environmental context within which it will operate. In this effort, American agriculture needs the applied research and Extension functions of the land-grant system as never before (Bloome, 1992). A contemporary Extension agricultural program that understands agroecology and believes in the need for a more sustainable production system can lead the way toward a more profitable and environmentally friendly agriculture.

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 **Discussion**