

# Linking Agricultural and Environmental Education By Integrating Environmental Concepts and Vocational Skills

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## Abstract

*Environmental education is interdisciplinary, multidisciplinary, and holistic instruction. Agricultural education is vocational. Although each profession encompasses natural resources management as a common subject, they tend to exist in separate worlds. An examination of the goals and practices of agricultural and environmental education reveals that the professions have problem solving, decision making, community development, citizenship, and student project activities in common. Professionals and practitioners in each profession need to develop linkages which will promote instruction in and about natural resources as recommended by a national review.*

Agricultural education traditionally excels in emphasizing transferable, hands on skills by virtue of its vocational orientation. Environmental education effectively facilitates the teaching of concepts and effective perceptions via an interdisciplinary and holistic approach directed at the public's knowledge of, and attitude toward, responsible natural resources management. However, at the present time, environmental education and agricultural education exist in separate worlds.

Since its beginning in 1969, the *Journal of Environmental Education* has contained no references to vocational agricultural education. In fact, vocational education is seldom mentioned. On the other hand, current literature is replete with articles lamenting the negative effects modern agriculture is having on the environment. Since 1970 the *AATEA Journal* has contained no mention of environmental education, and relatively few articles have addressed natural resources.

Having had professional experience in both agricultural education and environmental education, it has become apparent that each profession has something to offer the other. Education in natural resources, especially forestry and fisheries, exists within the current agricultural education structure. Education about natural resources is being accomplished effectively by the environmental education movement. However, neither profession is adequately addressing the conceptual and vocational aspects.

A combination of the best from each profession will produce capable natural resources managers and environmentally astute citizens who can aggressively and effectively confront the complex environmental challenges of the future. Teacher educators and other professionals associated with agriculture and environmental science should establish program linkages which facilitate instruction in and about natural resources. The goals and practices of environmental education are sufficiently similar and complimentary to

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those of agricultural education such that an association between the two professions will benefit efforts to teach in and about natural resources as recommended by the Committee on Agriculture (1988).

## A New Direction Needed

Natural resources as a subject matter discipline has long been associated with agricultural education. In a limited way, the study of soil is a prevalent example. Over time, however, resource topics in agriculture have expanded to include water, energy, forests, wildlife, recreation, and, in general, a more worldly view of "land resources stewardship" (Committee on Agriculture, 1988). On the other hand, many of these natural resources programs are not adequately addressing modern environmental issues and technologies (Roy and Pearson, 1989).

According to nationwide figures, there were 168 agricultural teachers employed in full time natural resources programs in 1987. This is down from 181 reported in 1986 (Camp & Hively, 1988). Although natural resources programs do not represent a large portion of nationwide efforts in agricultural education at this level, it is obvious that environmental issues and technologies have particular relevance in today's world. Given a new direction and focus, reflecting current environmental technology and ideology, instruction in and about natural resources can become a significant, contributing component of agricultural education.

A new direction and focus is needed for current natural resources programs to evolve into a more comprehensive program. The proposed transformation involves two emphases: 1) a pervasive management perspective and 2) an integration of concepts. Management must be the direction and focus of natural resources programs and concepts must be integrated and taught in conjunction with vocational skills.

## The Management Perspective

Why should agriculture/natural resources programs be transformed into natural resources management programs? First, the vocational attributes of the program become more realistic. Management practices are emphasized in agribusiness, why not in natural resources? An agribusiness teacher would not consider omitting the "how to" aspects of farm management, marketing, decision making, and the like. Why, then, is a unit in outdoor recreation most often represented by a description of the U.S. National Park System with very little reference to the theory and processes of actually managing the various types of users, sites and recreational opportunities provided by strategic management of natural resources in different kinds of parks (Jubenville, 1984)?

A second, more important, reason is that natural resources management is relevant and timely given the environmental concerns of the day. This is especially true in agriculture, an endeavor which intensively manipulates the ecosystem and places extreme demands on basic resources such as water, energy, and soil. Future agriculturists and resource managers have the responsibility of being adequately prepared to respond to the long term effects of current production practices and protect the basic resources which sustain life.

One intent of vocational education is to learn to do things, not to merely learn theory. As such, both management and the conceptual tools which facilitate effective management must be integral parts of the curriculum. The act of managing involves policy analysis, critical thinking, problem solving, decision making, judicious reasoning, effective use of various forms of communication, and transferability of practical skills. By consciously teaching natural resources in a management context, these cognitive parameters, generally considered lofty goals for any type of instruction, more automatically become desirable attributes functioning in tandem with transferable skill development.

Disinger (1985/86), an environmental educator, argues that the "current concerns for future education and global education must find their substantive bases in environmental education, perhaps redefined in terms of resource management education" (p.2). Few would dispute the fact that environmental issues and concerns are in the forefront today, and natural resources managers are not the only ones aware of this. Even the authors of a general text about curriculum planning stress that a "decreasing pool of natural resources results in increased attention to all aspects of the natural environment" (Steeves & English, 1978, p. iii). They contend that the dynamic attributes of natural resources is the primary justification for continuous review and revision of curriculum. Disinger's call for resource management education can be answered.

Given that management perspectives are important and vocational, what is relevance in this case? Boyer (1971) defines relevance as education that is vital to life in that it affects conditions which sustain life and promote the quality/meaning of life. If natural resources provide the foundations upon which we live and their ability to support continued high standards of living is tenuous, education in natural resources management is indeed relevant.

### **The Need for Integrating Concepts**

Natural resources programs in agricultural education as currently taught are designed to be vocational. Hence, transferable skill development is a primary objective and usually becomes the emphasis of the program. Concepts, being less "tangible" than skills, are generally more difficult for the teacher to define, quantify and evaluate. As such, concepts may be underemphasized even though they are extremely important. The teaching of concepts promotes higher levels of learning such as analysis, synthesis, and evaluation; facilitates problem solving, an ultimate goal of instruction; and provides the basis for management applications, the vocational aspect of natural resources programs.

This is not to imply that concepts are totally lacking in current natural resources programs! However, there is room for improvement. If natural resources is taught in a management context similar to agribusiness, both concepts and management parameters must be adequately addressed.

To substantiate what appears to be a lack of conceptualization in natural resources as currently taught, a cursory review of the "table of contents" from 11 secondary and college texts related to environmental science and natural resources management reveals that many general concepts are lacking and/or are not readily evident (Table 1). Chapter titles tend to reflect topical presentations on forestry, wildlife, water, pollution, energy conservation, minerals, and the like. Few texts contain chapters or separate sections encompassing conceptual areas such as environmental ethics, decision making, resource economics, land use planning, environmental/resource policy, international perspectives, and modeling for the future.

The most notable omission from some texts is economics. Ecology and economics work in tandem to provide the basis for decision making related to the responsible management of natural resources. Management cannot occur without consideration of the ecological, economic and social aspects of the issue or practice! This observation regarding inadequate coverage of economics is consistent with the findings of Voelker and Kolb (1973) who reported economics to be among the bottom three (of 26) "environmental resource management thematic areas" addressed in selected social studies texts. The incorporation of economics into the natural resources management curriculum provides a rather unique opportunity to acquaint the student with the intangible values aspects of economics, thus demonstrating that not all resources can or should be valued by the dollar.

A subject matter orientation is not necessarily undesirable; however, the interdisciplinary and multidisciplinary aspects of those subjects must be addressed. This is often more difficult than it appears. Sometimes these aspects tend to be so interwoven among topics that only the most perceptive teacher or student would readily glean the general concept intended (Troy & Schwaab, 1982; Young, 1986). Hence, there is a delicate balance between being less topical and more interdisciplinary, multidisciplinary and holistic. Research is needed to determine how that optimum balance might be defined, achieved and evaluated.

Whether preparing teachers, agriculturists, or resource managers, university faculty must also be aware of adequately representing a balance between concepts and management skills. A comprehensive content analysis of these texts and other curriculum materials is needed to provide qualitative and quantitative data regarding the extent to which concepts and management skills are taught at secondary and university levels.

### **Applications from Environmental Education**

Environmental education debuted in the late 1960s and gained momentum during the subsequent decade of environmental awareness and activism. Although the fundamental concepts existed for several years, some environmental

Table 1: Topical Contents of Selected Environmental Science and Natural Resources Management Texts

Content	Text*										
	1	2	3	4	5	6	7	8	9	10	11
Philosophy & History of Conservation	+	+	+	+	+	-	-	+	-	+	-
Ecology	+	+	+	+	+	+	+	+	-	-	+
Economics	-	-	-	+	+	+	-	+	-	-	+
Air	+	+	-	-	+	-	+	+	+	-	-
Soil	+	+	+	+	-	+	+	-	+	+	+
Water	+	+	+	+	+	+	+	+	-	+	+
Agriculture	+	+	-	+	-	+	-	+	+	+	+
Range/Grassland	+	-	-	+	-	+	-	+	+	-	+
Forestry	?	+	+	+	+	+	-	+	+	+	+
Watershed/Groundwater	?	+	-	+	-	-	-	+	+	+	+
Wildlife	+	+	+	+	+	+	-	-	+	+	+
Fisheries/Marine Resources	-	+	+	-	+	+	-	-	+	+	+
Minerals (nonfuel)	?	+	+	+	+	+	-	+	+	+	+
Fossil Fuels	+	+	+	+	+	+	-	+	+	+	+
Recreation/Parks/Wilderness	+	+	-	+	-	+	-	?	+	-	-
Land Planning/Use	+	+	-	+	+	+	-	-	-	+	-
Energy Conservation & Production	+	+	+	+	+	+	-	+	+	+	+
Environmental Policy	+	-	-	+	+	+	-	+	-	-	-
Pollution	+	+	+	+	+	+	+	+	+	+	+
Population	+	+	+	+	+	+	+	+	+	-	-
Environmental Ethics	+	-	-	+	+	+	+	-	-	-	-
Resource Communications	-	-	-	-	-	+	-	-	-	-	-
Modeling/Futurism	-	-	-	-	-	-	-	+	-	-	-
Biogeology	-	-	-	-	+	-	-	-	-	-	-
Global/International Perspectives	+	+	-	+	+	+	-	+	+	-	-
Public Health/Protection	-	+	+	-	-	+	+	-	-	-	+

Legend: + = presence of topic; - = absence of topic; ? = questionable coverage of topic

\* Texts:

1. ReVelle, P., & ReVelle C. (1988). *The Environment: Issues and Choices for Society* (3rd edition). Boston: Jones and Bartlett Publishers.
2. Turk, J. & Turk, A. (1988). *Environmental Science* (4th edition). Philadelphia: Saunders College Publishing.
3. Owen, O. S. (1985). *Natural Resource Conservation: An Ecological Approach* (4th edition). New York: Macmillan Publishing.
4. Chiras, D. D. (1988). *Environmental Science: A Framework for Decision Making* (2nd edition). Menlo Park, CA: Benjamin/Cummings Publishing.
5. Botkin, D. B. & Keller, E. A. (1982). *Environmental Studies: The Earth as a Living Planet*. Columbus: Charles E. Merrill Publishing.
6. Miller, G. T. (1985). *Living in the Environment* (4th edition). Belmont, CA: Wadsworth Publishing.
7. Wagner, R. H. (1971). *Environment and Man*. New York: W. W. Norton & Company.
8. Cutter, S. L., Renwick, H. L., and Renwick, W. H. (1985). *Exploitation, Conservation, Preservation: A Geographic Perspective on Natural Resource Use*. Totowa, NJ: Rowman & Allanheld.
9. Bennett, C. F. (1983). *Conservation and Management of Natural Resources in the United States*. New York: John Wiley & Sons.
10. Camp, W. G. and Daugherty, T. B. (1988). *Managing Our Natural Resources*. Albany, NY: Delmar Publications.
11. Kircher, H. B. and Wallace, D. L. (1982). *Our Natural Resources* (5th edition). Danville, Illinois: Interstate Printers & Publishers.

educators declare that environmental education officially began on Earth Day, April, 1970 (Disinger & Opie, 1986; Troy & Schwaab, 1982). It evolved from, and generally became accepted as, the successor to nature study, conservation education, and outdoor education (Disinger, 1985/86).

Environmental education is designed to permeate all conventional grade levels and subjects (Strapp, 1969; Troy & Schwaab, 1982) in addition to adult and community-based emphases (Weidner, 1970). Proponents of environmental education wanted to create and maintain an interdisciplinary and multidisciplinary approach to education. Thus, environmental education was never intended to be a separate discipline. Instead, it was to be "pervasive process" (Charles, 1986) to be applied throughout the educational system (Bogan, 1983; Troy & Schwaab, 1982).

Legislation supported the development of environmental education. In 1970, Congress passed the Environmental Education Act which defined environmental education, established a national-level administrative office, and created an Advisory Council. By 1978, the Council was disbanded,

but the Act was renewed under the Elementary and Secondary Education Act. Now, most environmental education is funded under the auspices of programs specified in the Education Consolidation and Improvement Act of 1981 (Troy & Schwaab, 1982; Young, 1986).

Environmental education flourished early on; however, progress has slowed in the 1980s. Reasons given include lack of definition, organization, and direction (Troy & Schwaab, 1982); lack of teacher preparation, inservice and instructional materials (Ham & Sewing, 1987/88); and the current educational system's hesitancy to accept a process oriented approach in lieu of traditional subject matter oriented disciplines (Disinger, 1985/86). Although there have been barriers to the full implementation of environmental education as it was originally conceived, the profession has made valuable contributions in areas that can be applied by other disciplines. This becomes more evident as the principles of environmental education are better understood.

According to their "Mission Statement," the North American Association for Environmental Education (NAEE)

endeavors to foster:

- the education of skilled individuals able to understand environmental problems and possessing the expertise to devise effective solutions to them, and (2) development of a citizenry conscious of the scope and complexity of current and emerging environmental problems and supportive of solutions and policies which are ecologically sound (Disinger & Opie, 1986, p. 4).

More specifically, the guiding principles given in the mission direct that environmental education:

- consider the environment in its totality -- natural and built biological and physical phenomena and their interrelations with social, economic, political, technological, cultural, historical, moral, and aesthetic aspects;
- integrate knowledge from the disciplines across the natural sciences, social sciences, and humanities;
- examine the scope and complexity of environmental problems and thus the need to develop critical thinking and problem solving skills and the ability to synthesize data from many fields;
- develop awareness and understanding of global problems, issues, and interdependence -- helping people to think globally and act locally;
- consider both short and long term futures on matters of local, national, regional and international importance;
- relate environmental knowledge, problem solving, values and sensitivity at every level;
- emphasize the role of values, morality and ethics in shaping attitudes and actions affecting the environment;
- stress the need for active citizen participation involving environmental problems and preventing new ones;
- enable learners to play a role in planning their learning experiences and providing an opportunity for making decisions and accepting their consequences; and
- be a life-long process -- should begin at a preschool level, continue throughout formal elementary, secondary, and post secondary levels, and utilize informal modes for all age and educational levels (p. 4).

The overlap with principles and philosophies of agricultural education are evident throughout the mission and, further, through the means by which environmental education has been applied in practice. Problem solving, decision making, community development, citizenship, and student project activities are prime examples of similarities between the professions.

Although environmental education originated as a strategy for educating the general citizenry, it has evolved into an approach to education applicable at any and every level of public education (Roth 1970; Strapp, 1969). Components of sound educational theory and strategies are evident. For instance, Hill and White (1969) underlined key words throughout their article which described the fundamentals of environmental education. Although they did not describe a "new horizon" for education in toto, words such as "aware," "knowledge," "appreciation," "responsibility," "participation," "problem solving," "discovery," and "community resources" suggest that environmental education is based on sound educational theory and closely aligned with the principles and philosophies of vocational education.

Shoenfeld (1969) separates the dimensions of environmental education from conventional conservation education by delineating new interpretations of man-to-land relationships consisting of polarized transitions. He envisioned environmental education facilitating progress toward a sustainable future by promoting movement from compartmentalization to interdisciplinary integration, local perspectives to global perspectives, evangelical foundations to ecological foundations, resource centered justifications to man centered strategies, terrestrial narrowness to universal vision, biophysical sciences to social sciences, efficiency parameters to quality goals, technical impetus to public involvement, and elementary education to adult education. These reflect major environmental issues and concerns of today (Boyer, 1971). These transitions are readily applicable to curricula in production agriculture and natural resources.

"In most cases, effective resources management depends on the support and cooperation of an informed and motivated public" (Wood & Wood, 1987, p. 3). More specifically, Troost (1972) contends that the public must have a basic knowledge and working comprehension of ecological concepts and facts, socioecological problems of the urban environment, relationships of man with nature, pollution and population, politics affecting environmental policy, and decision making strategies based on the analysis of sound alternatives. This is truly an interdisciplinary and holistic curriculum, "a tall order" to say the least. Given that vocational educators and agriculturists have long lamented the public's lack of understanding of their respective professions, borrowing expertise regarding public education models from environmental education and its forerunner, conservation education, would prove beneficial.

During an annual NAEE conference several recommendations for improving school based environmental education were forwarded (Disinger & Opie, 1986). Among the recommendations was a call for a more integrated approach involving concepts, skills, attitudes and behaviors. Likewise, the curriculum should reflect parallels with employment standards/competencies and utilize sound instructional strategies including hands on learning. Some of these concerns are strengths of agricultural education. As such, a symbiotic relationship between the two professions is available.

### Integration of Concepts and Skills

To truly offer a quality program in and about natural resources, a delicate integration of concepts and skills is required. Furthermore, these must be taught in a management context, which, by definition, must include economics. Interdisciplinary and multidisciplinary aspects of various resources, heretofore treated as unique subjects related to the basic resources (Strapp, 1969), must become standards if natural resources taught under the auspices of agricultural education is going to become a relevant program in modern times. As environmental issues and technologies change, so must natural resources programs. Management perspectives help make the program vocational, and the concepts from environmental education provide a sound basis for educating the "more and better natural resources managers" (Bogan, 1983) and environmentally aware and motivated citizens

(Wood & Wood, 1987) needed to solve tomorrow's environmental problems.

Many professional agricultural educators may be surprised to discover that environmental educators have been promoting the teaching of concepts via decision making and problem solving strategies. In addition, environmental education has been successfully reaching and affecting the general public. Similarly, environmental educators may be surprised to discover that agricultural education can provide leadership in teaching transferable skills which parallel local employment opportunities and foster beneficial linkages with the community, business and industry. Furthermore, agricultural education can provide an important subject matter niche for environmental education. This examination of the potential for association between specialists in agricultural education and environmental education provides sufficient cause for change. An amalgamation of philosophies and practices from agricultural education and environmental education can provide the foundation for outstanding, relevant and sorely needed secondary and university level instruction in and about natural resources.

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## 1989 NACTA Teaching Award of Merit

The NACTA Teaching Award of Merit Program is designed to provide annual recognition of a faculty member at each institution having a NACTA institutional membership. The awardee is to be selected by appropriate individual(s) at the university or college having institutional membership. Selection criteria are left to the institution, but the award is intended for those who truly excel in the area of college teaching in agriculture. NACTA provides an attractive certificate to be presented at an appropriate campus function. Names of the awardees are announced at the annual NACTA Conference and published in the NACTA Journal. Current awardees are:

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