

REINVENTING CAREER EDUCATION AND RECRUITMENT IN AGRICULTURAL EDUCATION FOR THE 21ST CENTURY

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Abstract

Supplying a well-trained workforce for agriculture should be a primary goal of the education community. This is an issue of particular importance to rural areas struggling with declining tax bases, outmigration of their most capable young persons, and decaying infrastructures. This study examined career aspirations among middle school youth in one rural New York State community to determine the level of interest in agriculture careers as well as interest in other occupations that would be available in a broadly defined agriculture industry. Results indicate that while few students expressed an interest in traditional agriculture occupations, over one-half identified areas of interest that are representative of a broadly defined agriculture, food, fiber, and natural resources industry. These results have implications for not only local program design and recruitment, but curriculum innovations, as well.

Introduction and Theoretical Framework

In the more than 10 years since the National Research Council released its landmark study Understanding Agriculture: New Directions for Education (NRC, 1988), it has become one of the most cited documents in relevant agricultural education publications. The Executive Summary of the Reinventing Agricultural Education for the Year 2020 (RAE 2020) initiative, A New Era in Agriculture (National Council, 1999) provided the following information from New Directions about how agriculture, as an industry, should be viewed:

Agriculture is a field that encompasses the production of agricultural commodities, including food, fiber, wood products, horticultural crops, and other plant and animal products. The terms include the financing, processing, marketing, and distribution of agricultural products; farm production, supply and service industries; health, nutrition and food consumption; the use and conservation of land and water resources; development and

maintenance of recreational resources; and related economic, sociological, political, environmental, and cultural characteristics of the food and fiber system. (p. 2)

Indeed, both the Vision and Mission for agricultural education that have resulted from the RAE 2020 process include a view of agriculture beyond production:

Vision: Agricultural education envisions a world where all people value and understand the vital role of agriculture, food, fiber, and natural resources industries in advancing personal and global well-being.

Mission: Agricultural education prepares students for successful careers and a lifetime of informed choices in the global agriculture, food, fiber, and natural resources industries. (p. 2)

Helping students to prepare for successful

careers and informed choices will require that they understand the range of possibilities in the agriculture industry of the future.

Career Choice

What are the factors that determine career choice in adolescents and young adults? A key component for consideration of entry into the labor market is the formation of ideal and expected work roles internalized by a young person based on a personal and societal frame of reference. According to Harter (1990), identity formation is the “self-definition that involves integration and evaluation of specific self-attributes, and also includes the more general roles a person will adopt within the larger society, including occupational, religion, and political identities” (p. 354). Identity formation results from a combination of factors related to family background (e.g. race), human capital acquisition (e.g. education), and socialization. A 1997 study by Conroy confirmed existing knowledge about the effects of socialization, both from socioeconomic status and gender, on an adolescent’s view of “self” (Flanagan, 1995; Harter, 1990; Steinberg, 1989).

Counselors and others often assume that students, especially those that are disadvantaged, know more than they really do about jobs and careers (Heebner, 1995). This lack of “cultural capital” (Claus, 1990), sometimes due to acquired low self-confidence and expectations from relatives, results in a lack of knowledge about jobs and careers, and also how to use skills and interests to find a satisfying job. Wrong choices by adolescents, particularly those that limit educational attainment, result in reduced possibilities over the lifespan (Topel & Ward, 1992) by limiting the career-line paths that emerge from the initial job placement (Spilerman, 1977).

Gray (1996) reported that over one-half of American youth are leaving high school with no or inadequate skills to compete in today’s labor market. In addition, they also lack information

about careers, career clusters, and emerging work systems. Efforts to keep students in school and to guide their educational choices must be combined with career education programming to ensure that initial employment is appropriate to move into a viable career path.

Orthel, Sorensen, Lerman and Riesenber, (1989) concluded that a negative opinion of pursuing a career in agriculture is really an expression of pursuing a career in farming and ranching, and that students have not been exposed to factual information about the industry of agriculture and corresponding careers. Evidence shows that students’ perceptions are formed and subsequently influence enrollment decisions at or before the junior high level (Scanlon, Yoder & Hoover, 1989) making it important to reach students in middle school and earlier.

The Role of Education and Agricultural Education in Rural Community Development

Production agriculture is no longer the largest employer in rural areas. Manufacturing, such as plants that process raw materials, light assembly plants, and branch plants of national firms tend to now be the largest employers (Huang & Howley, 1991). Economic development initiatives in rural areas could capitalize on these trends by focusing on new investments and development within the agriculture sector—food processing, warehousing and distribution, landscaping, light equipment manufacturing and repair, wood products, organic gardening and “niche farming,” and specialty products. However, an educationally disadvantaged labor force in rural communities is not likely to attract investment or launch economic development efforts (Huang & Howley, 1991). In addition, better-educated individuals are more likely to leave rural areas than are their less educated cohorts (Conroy, 1997).

How can rural schools address some of these issues? Suggestions include better basic

instruction to strengthen workforce skills, serving as resources for solving community issues, and participation in economic development (Conroy, 1997; Fitchen, 1980; Flora, 1992; Weinberg, 1987). Current reforms that emphasize the integration of academic and vocational subjects, work experience and apprenticeship, and work readiness provide a venue for agricultural educators to capitalize on their rich experiential and applied learning base (NRC, 1988). The importance of agriculture to our culture, history, and economy, and the increasing awareness of the scientific nature of agriculture, make it the premier content vehicle to tie academics together. Beyond these obvious educational and social benefits, agriculture and related businesses continue to be a major force in national employment and productivity (USDA, 1996).

A secondary agricultural education program can be a vital part of rural community economic development efforts. Nationally, agriculture continues to have an increased need for research and development, marketing, distribution, communications, etc. Educational programs that shift emphasis from production agriculture to broad knowledge and skills in agriculture occupations beyond production can prepare students to work in locally-based specialty agriculture firms. Programs that focus on the economically important agriculture, food, fiber, and natural resources industry can provide career education and coursework for college-bound students interested in a variety of career areas. However, recruitment into those types of programs will continue to remain an issue.

Statement of the Problem

Conroy (1997) found that knowledge of a career area and its opportunities was significantly related to career aspirations and educational plans of adolescents. In addition, typical agricultural job classification systems do not include the many occupations that provide support to the agriculture industry such as laboratory sciences, warehousing,

transportation, clerical support occupations, legal services, and others. Researchers such as Claus (1990), Lakes (1997) and Lakes and Pritchard (1991) have also noted that the curriculum differentiation supported by traditional vocational education coursework leads to “class oppression,” low-skill, and lower-paying jobs in many situations. As a consequence, knowledge of the career aspirations of youth in any school district could assist agricultural educators and administrators to design a curriculum to adequately inform youth of the vast career opportunities available in a broadly defined agriculture, food, fiber, and natural resources industry.

Purpose and Objectives

The purpose of this study was to examine the career interests of middle school youth enrolled in one rural New York State school district within the contexts of both traditional production agriculture occupations and those that are related to the vast agriculture, food, fiber and natural resources industry. A secondary, but no less important purpose of the study was to examine the level of agricultural awareness of participants. These purposes were met by the following objectives:

1. Identify occupations of interest of participants; and
2. Assess participants’ awareness of the relationship between various occupations and the agriculture industry.

In addition, several analyses and development activities were carried out to support the purpose, objectives, and theoretical bases for the study:

1. Classify occupations as to whether they are related to either traditional agriculture or to occupations that are part of a more broadly classified agriculture, food, fiber,

and natural resources industry; and

2. Develop a conceptual model to illustrate redefined career areas in the broad agriculture, food and fiber, and natural resources industry.

Methods and Procedures

The population for the study consisted of 422 students enrolled in a rural middle school in New York State, selected because of the administrators' intent to develop a community-based agricultural education program that would focus on career interests of students in the district. The participants had not been exposed to systematic career education through any school program. Data were collected from 381 students (90.3%) representing the total enrollment of 422 less seven who did not have parental permission to participate and 34 who were absent; there was no follow-up of the nonrespondents. A questionnaire was developed that focused on both general occupational interest as well as agricultural awareness (Conroy, 1997; Newsom-Stewart & Sutphin, 1994). Because of prior use of all sections of the questionnaire and accompanying reliability assessments, no pilot test was administered (Overall reliability coefficient = 0.74; Subscale reliability coefficients = 0.73, 0.77, 0.79, 0.65, 0.87, 0.66). Content and face validity for prior use of the instrument were ascertained through the use of a panel of experts.

Objective 1 was met by asking participants to identify what job they thought would be a good job for them. This information was coded as to whether it 1) matched the title of a traditional agriculture occupation, 2) was a job title that did not match a traditional agriculture occupation and was obviously outside the industry, or 3) was a non-agriculture job that was available within the industry. An example of a non-agriculture job that would be available within the agriculture industry

is "Accountant," a job held by individuals working for such firms as growers' cooperatives, supermarket chains, meat packers, etc.

The subjectivity in classifying non-agriculture jobs could lead to some error in the data analysis. This was controlled by establishing procedures to not classify any job that was specific enough to eliminate it from selection, e.g., "police" or "detective" were considered specific enough to indicate that the students wished to work on a police force or in a related agency and perform duties associated with that type of work. In contrast, "security guard" is a job that can be performed in a variety of settings including many firms and organizations within the broad agriculture industry.

Objective 2 was met through use of a set of 50 Likert-scaled terms/phrases that represented areas of work or study within the broad agriculture industry. Participants were asked to indicate to what extent they believed the individual terms/phrases were related to agriculture. Responses ranged from "1" (Not at All Related) to "4" (Strongly Related). Participants were also given an answer choice of "Don't Know" which was not used in the calculation of the means, as it was not part of the Likert scale. The calculated standardized internal consistency reliability coefficient for the items representing awareness was $\alpha = 0.93$. Overall means and standard deviations were calculated for each area.

Results

A total of 365 (of 381) students provided specific job titles of interest to them by writing in responses to the question, "What is the ideal or best job for you?" Only 30 students (8.2%) indicated that they were interested in pursuing occupations identified as traditional agriculture careers. Identified areas are presented in Table 1.

Table 1. Traditional Agriculture Occupations of Interest to Middle School Youth (n = 30)

Area of interest	n	%
Veterinary medicine	18	60
Forestry/Natural resources	3	10
Agricultural science	2	6.7
General farming	2	6.7
Landscaping	2	6.7
Animal biology	1	3.3
Agricultural engineering	1	3.3
General work with animals	1	3.3

Reclassification Using the Industry Concept

An additional definition, that of the word industry, is useful for thinking about job classifications in a more global sense. Industry is defined as “the aggregate of work, scholarship, and ancillary activity in a particular field,” (<http://infoplease.lycos.com/ipd/A0490028.html>).

In examining the remaining 335 students’ identified occupational areas of interest and reclassify them utilizing a concept of *industry* the results are dramatically different than when considering interest in traditional agriculture production and agriculture skills-specific occupations as presented in Table 1. Using a more broad-based industry classification scheme, an additional 170 (46.6%) of the participants identified jobs of interest that can be viewed as being a part of this broadly defined industry. Table 2 provides a breakdown of the occupational areas of interest for the 170 participants who fit within this broad classification scheme.

Combining Tables 1 and 2, a total of 200 of the participants (54.8%) expressed an interest in occupational areas for which employment in the agriculture, food, fiber, and natural resources industry is possible and highly likely if pursued. The question is, are these students aware of the relationships between occupational areas in which they may be interested and careers within the

Table 2. Non-traditional Agriculture Occupations of Interest to Middle School Youth (n = 170)

Area of interest	n	%
Working with computers	28	16.5
Teaching	25	14.4
Marine science	19	11.2
Legal services	16	9.4
Engineering	14	8.2
Laboratory sciences	13	7.6
Mechanics and repair services	9	5.3
Zoo occupations	7	4.1
Clerical occupations	6	3.5
Journalism and photography	6	3.5
Food service and related	5	2.9
Accounting and financial	4	2.4
Construction and maintenance	4	2.4
Air transportation services	3	1.8
Business ownership/ management	3	1.8
Pharmaceuticals	3	1.8
Security	2	1.2
General transportation services	2	1.2
Manufacturing	1	0.6

agriculture, food, fiber, and natural resources industry? Recruiting students into secondary agriculture programs may depend on some level of awareness of these relationships.

To address this question, students were provided with a set of 50 Likert-scaled terms and phrases that are representative of some of the many occupational areas within the agriculture, food, fiber, and natural resources industry. Specifically, they were asked to, “Circle the number that best describes your beliefs about whether the following terms are related to agriculture.” Table 3 provides an overview of how both groups of students, those indicating an interest in traditional agriculture jobs and those indicating an interest in broadly defined industry-related jobs, perceived the relationship of terms and phrases to agriculture.

An examination of Table 3 reveals that **all** students believe 10 items to be at least “related” to agriculture as evidenced by a mean score of ≥ 3.00 : outdoors and the environment, soil, water, biotechnology, natural resources, microbiology, crop science, air, recreation and parks, and forestry. In addition, the 30 students expressing interest in traditional agriculture occupations believed the following items “related” to

agriculture: plant breeding, entomology, landscaping, plant structure and classification, wildlife management, and physical sciences. In all instances except one (air) for these 16 terms and phrases, students expressing interest in traditional agriculture jobs had a higher overall mean score. This reflects a stronger belief in a relationship than did students expressing an interest in a broad-based industry-related occupation.

Table 3. Awareness of Agriculture and Related Terms and Phrases

Term or phrase	<u>Traditional ag jobs</u>		<u>Related occupations</u>	
	M	SD	M	SD
Outdoors and the environment	3.73	0.45	3.31	0.81
Soil	3.67	0.61	3.46	0.86
Water	3.67	0.61	3.47	0.82
Biotechnology	3.60	1.48	3.23	1.48
Natural resources	3.43	0.73	3.36	0.78
Microbiology	3.40	1.45	3.04	1.53
Crop science	3.33	0.96	3.08	1.05
Air	3.25	0.93	3.33	0.82
Recreation and parks	3.17	1.00	3.06	0.97
Forestry	3.17	1.00	3.06	0.97
Plant breeding	3.17	1.12	2.97	0.98
Entomology (insect and pests)	3.13	1.10	2.85	1.19
Landscaping	3.07	1.07	2.93	1.01
Plant structure and classification	3.07	1.11	3.01	1.01
Wildlife management	3.03	0.99	2.97	0.92
Physical sciences	3.00	1.15	2.83	1.22
Plant science	2.96	1.02	2.77	0.83
Food processing and marketing	2.93	0.98	2.78	1.14
International development	2.87	1.33	2.95	1.54
Animal science	2.83	1.10	2.78	1.09
Recycling	2.79	0.94	2.72	0.98
Large animal health	2.73	1.31	2.51	1.23
Horse science and management	2.73	1.28	2.46	1.27
Human population	2.70	0.92	2.65	0.94
Animal nutrition	2.70	1.15	2.63	1.09
Veterinary science	2.70	1.17	2.53	1.24
Measuring and diagramming	2.67	1.35	2.78	1.99
How cows make milk	2.56	1.07	2.49	1.20
Animal reproduction	2.53	1.22	2.65	1.11
Laboratory animal care	2.47	1.46	2.19	1.22

(table continues)

Term or phrase	<u>Traditional ag jobs</u>		<u>Related occupations</u>	
	M	SD	M	SD
Power systems	2.47	1.33	2.68	1.34
Mathematics	2.47	1.25	2.53	1.25
Small animal care	2.43	1.19	2.39	1.21
Wood working	2.43	1.43	2.29	1.27
Leadership	2.43	1.38	2.61	1.44
Economics	2.40	1.07	2.53	1.06
Flower arranging	2.39	1.07	2.42	1.02
Structures for living and working	2.37	1.10	2.89	1.32
Producing building materials/supplies	2.10	1.12	2.29	1.15
Marketing	2.04	0.99	2.23	1.16
Financing and trading	2.04	1.01	2.06	1.05
Computers	2.03	1.13	2.26	1.29
Teaching	2.00	1.14	2.21	1.27
Drafting and design	1.97	1.33	2.08	1.41
Truck driving and delivery	1.97	1.25	2.53	1.25
Welding and gas cutting	1.90	1.27	1.96	1.30
Small engine repair	1.87	1.28	2.07	1.29
Accounting	1.83	0.84	1.90	1.06
Electrical systems and repair	1.60	0.97	1.96	1.27

^aOverall $n = 30$; responses of "Don't know" were not included in calculation of means. ^bOverall $n = 170$; responses of "Don't know" were not included in calculation of means, "Based on the scale "1" = Not at all related, "2" = Related only some, "3" = Related, and "4" Strongly Related

Further examination of Table 3 reveals that this trend continues until terms and phrases become less identifiable with traditional agriculture occupations, e.g., measuring and diagramming, power systems, mathematics, leadership, marketing, computers. This would seem to indicate that the students in this particular middle school who are interested in traditional agriculture are most aware of its relationship to the outdoors/environment and agronomy,-related terms/phrases. Since the area in which this particular school is located has a large number of crop farming operations, this awareness is understandable. The same pattern of awareness is true, for the most part, for students expressing an interest in broadly defined industry career areas. This information supports prior research that indicated students perceive agriculture to be primarily farming and ranching (Orthel et al.,

1989).

The Issue of Rural Outmigration

Participants responded to a Likert-scaled statement about the importance of various factors in choosing a job; one of those factors is the desire to remain in the home area. The specific statement was, "I don't have to move away from the [hometown] area," and the scale for responses was "1" (Not Important) to "4" (Very Important). Means, frequencies, and percents were calculated for the 365 valid responses to this statement, and compared by the type of occupation of interest. Results indicate that those students expressing an interest in a traditional agriculture job were more likely to believe that staying in their home communities is important to them (Mean 1.73, SD 1.04 vs. Mean 1.57, SD 0.85), although the group

differences are not extreme. However, examining frequencies shows more differences in the two groups. Nearly one-fourth ($n=7$, 23.3%) of students expressing an interest in traditional agriculture jobs believed that remaining at home

was important or very important in choosing an occupation as compared to 11.9% ($n=40$) of those expressing an interest in a non-agriculture job (Table 4).

Table 4. Desire of Students to Remain at Home by Occupation of Interest

Occupation of Interest	<u>n</u>	Not important n/%	Sort-of important n/%	Important n/%	Very important n/%
Traditional agriculture job	30	18 (60.0)	5 (16.7)	4 (13.3)	3 (10.0)
Non agriculture job	335	211 (63.0)	84 (25.1)	25 (7.4)	15(4.5)

Conclusions, Discussion, and Recommendations

Conclusions drawn are not generalizable beyond the participating school district. What do the data reveal? Students in this middle school have occupational interests similar to rural middle school students surveyed in the past (Conroy, Scanlon & Kelsey, 1997). An examination of students interested in jobs related to agriculture using a broad-based industry approach to classifying reveals that they are interested in jobs that are projected to be high demand: working with computers, teaching, and engineering to name a few (Table 2). These jobs are not perceived to have much relationship to agriculture (Table 3), and students would be unlikely to think of enrolling in an agriculture program to learn more about their areas of interest, or investigate postsecondary opportunities available to them. This may be especially true if the secondary agriculture program is focused on hands-on instruction and assessment in production-oriented content areas.

Students interested in occupations related to the sciences (e.g., marine science, engineering) would most likely be encouraged to enroll in a rigorous sequence of science and mathematics courses in their high school years if they, in fact, pursue their occupations of interest. Granting science credit for agriculture courses may improve

recruitment possibilities, but not without a cost. According to Arkansas agriculture teachers, granting science credit for agriculture courses would improve agriculture career awareness, but would not necessarily allow them to serve the needs of their local agriculture industry (Johnson, 1996).

Herein lies the dilemma. Individuals often have to leave their rural home communities in order to complete higher education and engage in employment in their chosen occupations. This makes the role of traditional vocational education programs as outlined in federal legislation, that of serving local industry through courses focused on occupationally-specific skills training, unlikely to be met. Clearly, a more broad-based industry approach and more holistic mission for agricultural education and the role that it plays in preparing individuals for the workforce are needed.

An examination of the types of employment opportunities in the communities under investigation as well as direct communications with cooperative extension and local economic development board personnel reveals that the 30 students interested in traditional agriculture occupations would have access to education and/or direct postsecondary employment in their areas of interest within their home communities. Most of the students interested in employment in an occupation related

to the agriculture, food, fiber, and natural resources industry would have access to education in their respective areas of interest, but employment would be limited if they desired to remain in the area unless economic development efforts can capitalize on the presence of a trained workforce. In addition, even if these 170 students enrolled in one of the local postsecondary institutions, it is unlikely they would seek employment within the agriculture, food, fiber, and natural resources industry without some mechanism available to provide information to them regarding opportunities. At best, these opportunities just “happen” as the result of recruiting efforts by companies. Students unfamiliar with the industry may never plan to be accountants within the industry; for example, they just want to be accountants!

A Conceptual Model of Agriculture Careers in the 21st Century

What kinds of mechanisms can be put into place to “reinvent” career education in agriculture within the industry context? Figure 1 is proposed as one conceptual model for reconceptualizing careers in the broad agriculture, food, fiber, and natural resources industry. In Figure 1, the industry is seen as having six major career areas: production, manufacturing and processing, marketing and distribution, retail/food service, other sales and service, and public education. There are technical support (e.g. engineering, laboratory technicians, veterinarians) and administrative support (e.g. clerical occupations, web design, journalism) jobs that support all of those major areas. In addition, the outer circle shows areas such as conservation, environmental science, sustainable agriculture, and natural resources that represent over-arching career areas on which the entire industry depends. Examining the participants’ career areas of interest in those areas not typically classified as agriculture provides a means to examine the utility of this model (Table 5).

An examination of Table 5 reveals that all of the occupational areas identified by the 170 students not expressing an interest in a traditional agriculture career can be placed within the framework of the areas identified in Figure 1. The challenge then becomes one of “reinventing” the agricultural education program at the local level and how it is marketed to provide useful and valuable career path information for students, whether or not they enroll in the program.

Further activities to categorize curriculum offerings within secondary agriculture programs could be conducted to match the foci of programs within the context of Figure 1 career areas. In addition, curriculum could be developed to enable teachers and others to implement a broad career approach to agricultural education that will meet the current and emerging needs within their respective communities. There also remain the questions related to the purpose of agricultural education within the communities in which programs are housed. Given the changes in the industry, secondary programs can and should serve a larger purpose than preparing workers for typical production-oriented or laborer’s jobs. Building on the visioning process begun during the National Council for Agricultural Education’s Reinventing Agricultural Education for the Year 2020 project, local programs can work with stakeholders in their communities, determining the types of jobs likely to be held by individuals who graduate from the local schools and remain within their communities, or by workers who will immigrate into the communities. These jobs may differ markedly from the traditional jobs held by agriculture workers in the past century. Research is also needed regarding the impact that a broad-based industry approach to career education in agriculture has on components of agricultural education such as agricultural literacy. In other words, do current literacy initiatives present a broad enough view of the industry and, if not, how can the offerings be improved?

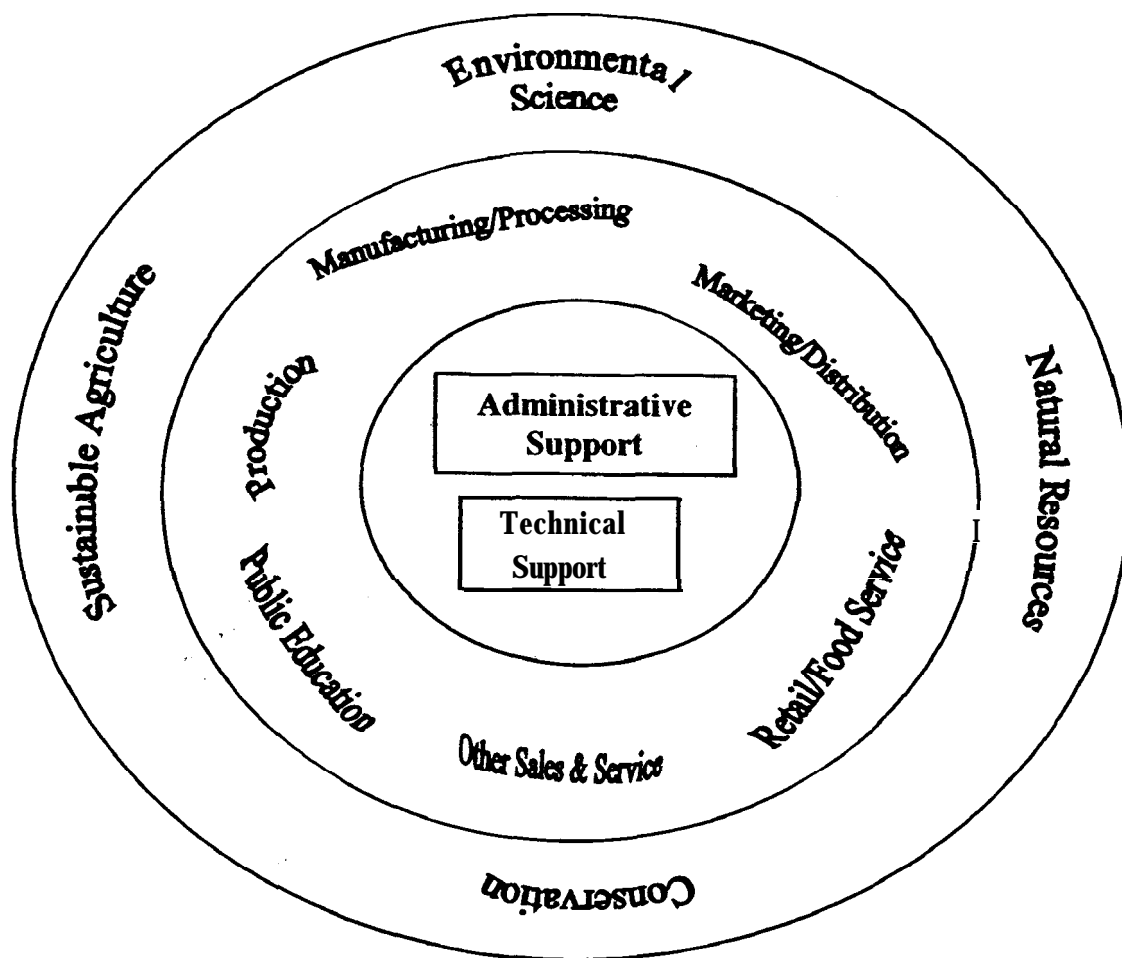


Figure 1. A New Framework for Career Areas Within the Agriculture, Food, Fiber, and Natural Resources Industry

In summary, this study points to a need to re-examine how career education is addressed within the agricultural education program. The ability to target students for recruitment who have career interests that are, in fact, appropriate to the broadly defined agriculture, food, fiber, and natural resources industry would be an important benefit. The most difficult part of this change will be the development of curriculum materials that address nontraditional industry-wide occupations within the context of the agriculture classroom while maintaining the integrity of the history and tradition that is essential to the discipline, and what separates it from other course offerings.

As impetus for this study, school district administrators in one rural county in New York

expressed a desire to add agricultural education to their overall program offerings, through both Grades K-S literacy and exploratory effort and a Grades 9-12 agriscience and technology program. They expressed a belief that this would enhance workplace skills of graduates as well as encourage youth to pursue careers in the broadly defined agriculture, food, fiber, and natural resources industry. They also viewed this step as providing an incentive for businesses to consider their area for relocation.

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Table 5. Alignment of Student Identified Career Areas of Interest With Figure 1 Agricultural Career Areas (n = 170)

Area of interest	n	Career area(s)
Working with computers	28	Administrative support
Teaching ^a	25	Public education
Marine science	19	Technical support, natural resources/conservation
Legal services	16	Administrative support
Engineering	14	Technical support
Laboratory sciences	13	Technical support
Mechanics and repair services	9	Technical support
Zoo occupations	7	Public education
Clerical occupations	6	Administrative support
Journalism and photography	6	Technical support, administrative support, public education
Food service and related	5	Retail/food service
Accounting and financial	4	Administrative support
Construction and maintenance	4	Technical support
Air transportation services	3	Marketing and distribution
Business ownership and management	3	All areas
Pharmaceuticals	3	Technical support, production, manufacturing and processing
Security	2	Administrative support
General transportation	2	Marketing and distribution
Manufacturing jobs	1	Manufacturing and processing

^aAgricultural education not identified as a content area

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