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The Increasing Role of Agribusiness in Agricultural Economics

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While the demand for traditional agricultural economics is diminishing, there is a growing need for the economics and management of the food sector and the environment. Departments of agricultural economics have shown great flexibility in including agribusiness in their Bachelor's and Master's teaching programs. Ph.D and research programs appear to adjust more slowly to changing demand. Although agricultural economics programs are providing a variety of service course offerings, opportunities for joint programs with biological, physical, and natural sciences, particularly resource management, are not being exploited. If business schools decide to compete for agribusiness students in the future, missed opportunities with other departments and schools may become very costly. If this profession is to remain viable in the long run, it must continue to evolve, developing opportunities with biological, physical, and natural disciplines, in order to meet the demands of a changing market.

Key Words: agribusiness, agricultural economics, education, extension, research

Scientific disciplines, like the subjects of their studies, evolve continuously. In fact, if their research agenda and educational curriculum were static, they could not claim their work reflected the ever-changing world. This evolution is by no means smooth; rather, it is characterized by the stepwise adjustment of disciplines to changes in society and, in particular, in the demand for their outputs (teaching and research). Currently, the discipline of agricultural economics finds itself in just such a transition period.[1] Its teaching and research agenda has shifted from traditional programs with fields in production, demand, finance, trade, and development, to more diverse programs with majors in agribusiness, resource economics, and management.

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[1] Many individuals in the agricultural economics profession strongly hold to the belief that economics is the "mother discipline" and agricultural economics a field within it.

We suggest in this paper that many successful undergraduate and graduate programs emphasize agribusiness and resource economics, while associated Ph.D. programs ostensibly trail behind, maintaining a more traditional research and teaching focus which results from the conflicting demands on their departments, as well as faculty research and teaching preferences. One of the challenges facing the agricultural economics profession is to adjust its research and personnel to changes in the demand for its product. While the demand for traditional agricultural economics is diminishing, there is growing need for the economics and management of the food sector and the environment, in addition to latent demand for the integration of applied microeconomics into other biological, physical, and social sciences.

It is argued here that the perceived conflict between economics and management is a natural result of the history of the discipline. First, we examine the changing focus of agricultural economics and its clientele. This historical background is followed by a discussion of the transition to agribusiness within agricultural economics departments and an overview of the structures of undergraduate agricultural economics departments in the United States. In particular, we consider the majors of the departments and their interaction with other units in the university. In a similar context, we analyze Master's programs in agribusiness. Joint programs and service courses are then addressed as options for reinventing the profession, as well as the incentives provided by academic institutions. Next, Ph.D. programs and their affiliated research efforts are discussed. Finally, we propose possible strategies to push the discipline in new directions and take advantage of current trends before they become missed opportunities.

The Evolution of the Agricultural Economics Discipline

Historical Background

The agricultural economics profession has been constantly reshaping itself since the beginning of the 20th century. At that time, the economic importance of agriculture and the large proportion of the population working in this sector increased the value of research on farm management and the economics of agriculture, leading to the establishment of the farm management profession.

The American Farm Management Association and the American Association of Agricultural Economists merged in 1918 to become the American Farm Economics Association, and began publishing the *Journal of Farm Economics.* In 1968, the association's name was changed to the American Agricultural Economics Association, and the journal was changed to the *American Journal of Agricultural Economics.* From its inception, agricultural economics has had a dual emphasis on management and economics. While farm management, marketing farm products, land economics, and farm finance issues dominated the early years (Taylor and Taylor, 1952), over time, questions of international trade and agricultural policy became more important, and gradually emphasis shifted to economic issues.

After World War II, the area of international development grew in importance. The 1970s saw the emergence of concern for environmental and resource issues, including the energy crisis of 1973. Inspired by the 1967 publication of Rachel Carson's *Silent Spring*, the public began to express increasing concerns about the presence of chemicals and pesticides in their food and water. Agricultural and environmental issues became inextricable, Congress passed clean air and water legislation, and departments of agricultural economics transformed themselves into departments of agricultural and resource economics.[2]

At around the same time, the relative size of the farm sector declined. This decline caused a sharp drop in employment opportunities and in the derived demand for agricultural and agricultural economics education.[3] Even the growing interest in environmental and international development issues could not compensate for the sharp fall in the demand for agricultural economists, and some departments recognized emerging opportunities in the agribusiness field.

The demand for agribusiness was induced by two factors, one direct and one indirect. First, as more and more value-added activities moved off the farm, the size of food processing and agricultural input sectors increased. In addition, the emergence of biotechnology and precision farming created expanded research possibilities in the field. Even though production agriculture has declined to less than 1% of the gross domestic product (GDP) and 2% of employment, the food and fiber system (including farming, food processing, input manufacturing, transportation, trade, retailing, and food establishments) continues to account for 15% of GDP and 18% of employment [U.S. Department of Agriculture (USDA), 2000].

In addition to the natural constituencies of those interested in international or domestic agricultural and environmental problems, there exists a group of individuals who use the programs as substitutes for business or economics programs. Students may prefer agricultural economics departments to economics departments in universities where the agricultural economics department is stronger. Moreover, while students are increasingly interested in business education, many top business schools do not offer undergraduate programs.

One simple indicator of the trends in agricultural economics departments is their name. Inevitably, the name of a program is a marketing tool, creating the first impression of "buyers" of the program, i.e., incoming students. Table 1 represents a tabulation of the names of 58 agricultural economics departments we analyzed using information from their online web pages.

As seen from table 1, 58 universities offer a program in agricultural economics, but only 31% of them have retained the traditional name of "agricultural economics."

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[2] On many land grant university campuses, resource and environmental economics grew out of land and water economics.

[3] The agricultural sector has been able to capture a significant amount of support from the government and, indeed, there is a strong demand for high-quality economic analysis of alternative policy programs, but the number of people involved in this activity is rather small. Most of the students who consider undergraduate and Master's classes in agricultural economics will not end up working on agricultural policy problems, and the employment opportunities they perceive on the farm and in farm-oriented activities are declining.

Table 1. Names of Departments Offering Agricultural Economics and Agribusiness Programs

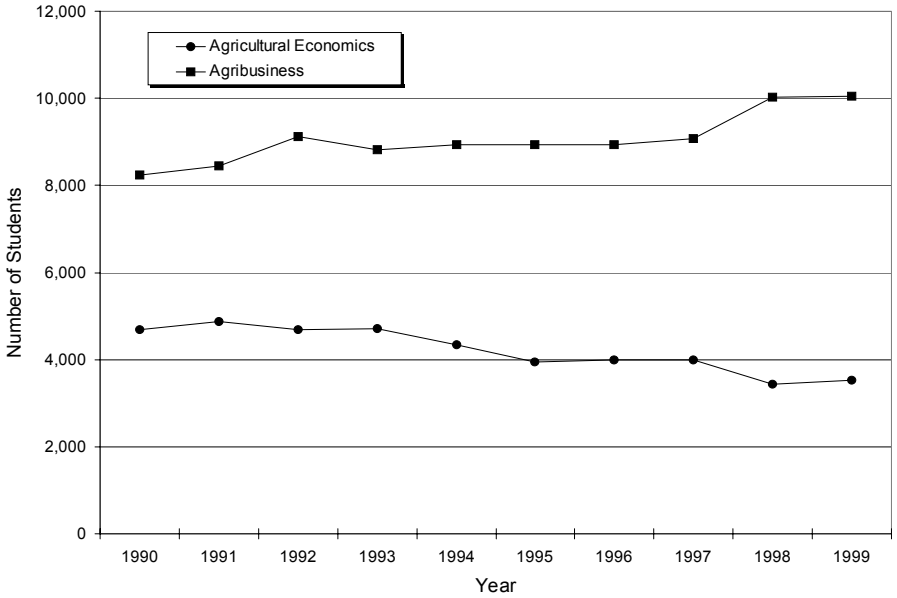
Department Name	Frequency	Percent
Agricultural Economics	18	31
Resource and Agricultural Economics	13	22
Applied Economics	3	5
Agricultural and Applied Economics	6	10
Agricultural Economics and Agribusiness/Food	9	16
Resource Economics and Agribusiness/Food	4	7
Agribusiness	1	2
Agribusiness and Applied Economics	1	2
Economics ▪ Economics and Statistics ▪ Agricultural Economics and Management	3	5
Total:	58	100

Another 22% added the title "resource" to the header "agricultural." Thus, a total of 53% of departments kept the traditional (or slightly modified) name. Nine departments differentiate themselves from the standard economics departments by calling themselves "applied economics" with and without mentioning agriculture. Fifteen departments changed their name to reflect the inclusion of agribusiness teaching in their agenda, making it second in popularity after "agricultural economics." The distribution of department names therefore reflects the increasing importance of both resource economics (which caused the field to reinvent itself and, in some cases, redirect itself from land economics to resources some 30 years ago) and agribusiness, which is now growing in importance.

While the imbalance between availability of business education and the number of possible business students has created a window of opportunity for agribusiness programs, the spillover from these students and those substituting for economics programs has not been sufficient to stem the waning interest in agricultural economics programs. Consequently, despite the innovations of some programs, the overall enrollment in agricultural economics has declined over time.

Certainly, some of this decline is part of a trend in the field of economics in general. Economics majors went through a serious decline from the 1980s to the mid-1990s. Siegfried (1999) provided the following explanation of a 30% decline in the number of Bachelor's degrees earned in economics from 1991/92 to 1995/96:

> Excess demand for entry into business programs has evaporated in the 1990's, undergraduate business school requirements have been relaxed, and many students who otherwise would end up as 'business wannabe' economics majors forgo economics in favor of their first choice—business. Almost all economics departments in public Ph.D. universities face competition on campus from undergraduate business programs … (p. 325).



Source: USDA, Food and Agricultural Education Information System (FAEIS) database, Texas A&M University, 2001.

Figure 1. Enrollment in undergraduate agribusiness and agricultural economics majors

For agricultural economics, this decline was steeper; enrollment dropped by 30% during the 1980s and around an additional 17% during the 1990s (Coffey, 1987; Erven, 1987; USDA, 2001). A recent case study at Kansas State University (Burton et al., 1996) revealed student enthusiasm for agribusiness and farm management options, with around 90% of the students choosing these over a traditional major in agricultural economics. Figure 1 shows the number of undergraduate students majoring in agribusiness and agricultural economics over the period 1990–1999. This graph was developed from information collected by Texas A&M University regarding education and employment in the natural resources field (USDA, 2001).

The shrinking demand for undergraduate education for traditional agricultural economics is plainly evident in figure 1, as is the upward trend in demand from agribusiness education. At the Master's and Ph.D. levels, the trend is similar though not quite as strong. Table 2 summarizes the available statistics, taken from Texas A&M University's Food and Agricultural Education Information System (FAEIS) database (USDA, 2001).

These numbers clearly show the increasing enrollment in agribusiness programs, but what exactly does this entail? Defining the curriculum requires first and foremost a clear definition of the subject itself. We contend there is a certain ambiguity surrounding the definition of agribusiness. There are those who would argue that agribusiness is the extension of agricultural economics to agribusinesses, in particular,

Table 2. Enrollment in Agribusiness and Agricultural Economics Majors: Bachelor's, Master's, and Ph.D. (1990–1999)

Description	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Ag Economics / Bachelor's	4,693	4,882	4,692	4,719	4,340	3,936	3,982	3,990	3,442	3,518
Agribusiness / Bachelor's	8,238	8,457	9,116	8,823	8,942	8,935	8,945	9,074	10,017	10,053
Ag Economics / Master's	1,058	1,044	1,110	1,106	996	951	893	802	790	711
Agribusiness / Master's	196	291	265	221	225	209	241	196	232	293
Ag Economics / Doctoral	791	837	867	1,035	864	859	746	770	652	697
Agribusiness / Doctoral	67	76	58	82	75	80	71	74	76	71

Source: USDA, FAEIS database, Texas A&M University, 2001.

that it is microeconomics applied to agricultural and agriculturally related firms. This definition fits neatly into the traditional agricultural economics curriculum.

There are others, however, who would define agribusiness as the application of business methodologies to the agricultural sector. This second definition demands a different set of skills be transferred from faculty to students in agribusiness departments. In the following section, we show that the adjustment from the first to the second definition is both logical and feasible by detailing the theoretical relationship between agricultural economics and the "business" view of agribusiness.

The Convergence from Undergraduate Agricultural Economics to Agribusiness

Litzenberg and Parks (1996) maintain that much of what is taught in agribusiness programs falls outside the realm of traditional agricultural economics. While it may be true certain applications pose challenges to agricultural economics departments, we hold that, in general, agribusiness programs are fortified, applied agricultural economics programs. In fact, the agribusiness emphasis is similar to a return to the farm and marketing management agendas of earlier agricultural economics programs. There is emphasis on training in microeconomics and quantitative methods as well as added course work in finance and marketing, including marketing management, pricing, trade, selling, and agribusiness management.

An important characteristic of these programs is the conversion and expansion of agricultural economics and economics fields toward agribusiness applications. This transition is straightforward in some fields and more contrived in others. The following summary addresses this change by considering the evolution of particular fields within the discipline:

- In the field of strategic decision and market behavior, the transition to agribusiness applications is straightforward. Individuals with training in industrial organizations and game theory must merely adapt their case studies and examples to agribusiness situations, informed by knowledge of the industry. One of the challenges in this field is the theoretical emphasis of game theory and students' desire for practical examples.

- Classes on the demand system transform into marketing courses. These classes rely on the basic tools of demand theory and analysis, including the household production function, and expand the discussion on issues associated with advertising. In most cases, this transition is incomplete since traditional economics ignores market instruments including money-back guarantees, demonstrations, etc. Furthermore, economists are not usually trained to teach students sales techniques.[4]
- The study of futures markets and forward contracts (which is covered in the field of marketing in agricultural economics) is one area where traditional training in agricultural economics overlaps neatly with agribusiness.
- Agribusiness management classes are frequently classes in production economics which are expanded to go beyond the farm gate toward the agribusiness firm. Here again, traditional training in agricultural economics may fall short. This shortcoming may be overcome in cooperation with business schools. Individuals trained in contracts, industrial organization, and related areas are being hired in agricultural economics, and other faculty are focusing on agribusiness management issues.
- The field of finance builds on the subfield of agricultural finance and agricultural marketing. In some departments, the agricultural finance field has been particularly strong (the University of Illinois being a good example), while in others a strong background in finance exists in some agricultural marketing programs. In other instances, a background in macroeconomics could contribute usefully to the finance program. In any case, however, there have been rapid changes in the field of finance, and many traditional agricultural economists will find their training less than adequate with respect to this specialty.[5]
- Classes in international trade naturally feed into the study of international business. The economics of international trade explains some of the principles of international business but neglects many practical issues, including contracting arrangements, transfer of funds, shipping, etc. Obviously, in these areas the gap between economics and business training may be significant.

The subject matter and methodologies of agricultural economics are broad and flexible enough to provide a solid foundation for agribusiness education at the undergraduate level. Similar tendencies occur at the Master's level, and the experiences of Cornell and UC Davis provide an interesting example of institutions without undergraduate business/management programs; both departments have successfully attracted students to their business/management programs.

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[4] For several years, the undergraduate agribusiness programs at Purdue, Iowa State, Texas A&M, and other schools have had very successful agricultural selling courses developed and taught by agricultural economics faculty.

[5] Even when agricultural economics programs have appropriate faculty to teach such agribusiness courses, academic rivalries may interfere—for example, when the department at Iowa State encountered serious resistance from the Business School in efforts to offer a course in financial economics.

The Response of Agricultural Economics Departments to the Agribusiness Challenge

Departments of agricultural economics have responded to the growing importance of agribusiness in several ways, and the nature and magnitude of the response depend on the university, existence and strength of economics departments and business schools, and the location and programs of other universities within their state. The changes in educational programs have been more significant than the changes in personnel and research. As previously mentioned, more drastic adjustments have occurred in undergraduate and Master's programs, suggesting they are most responsive to changes in students' needs.

The new agribusiness agenda is consistent with Litzenberg and Schneider's 1987 survey of 543 agribusiness firms, showing the agribusiness industry prefers employees with formal education in both business and economics (with an emphasis on business) in addition to interpersonal skills. Applied economics and agricultural economics departments are the natural suppliers of this demand by offering programs both at the undergraduate B.S. level and, in particular, at the Master's level. These programs can be offered as stand-alone programs (degree in agribusiness) or jointly with business schools. Agribusiness programs should not be limited merely to economics students who are interested in management, but can also be tailored to students interested in food, nutrition, farm animal, and plant sciences.

The Revised Structure and Trends in Undergraduate Programs

It is somewhat unjust to attempt to define a typical undergraduate program in agricultural economics departments, given their large number and diversity. Nevertheless, to the extent it is possible to generalize, we do so in this section. In a majority of universities, the agricultural economics major has fields in production, marketing, finance, policy, and development. However, given agricultural economics programs are not only providers of service classes but also recipients of such classes, there is often synergy between departments. For example, agricultural economics departments may rely on economics departments for provision of classes in macroeconomics and other economic fields; on business schools for classes in finance, accounting, and marketing; and on statistics and mathematics departments for courses in those disciplines. In universities where agricultural economics and economics are integrated, the major will include classes in macroeconomics, public finance, international trade, etc.[6]

In universities with a large student enrollment in the economics program, agricultural economics may provide instruction to the economics program in the field of natural resources, development, and even econometrics. In some universities, agricultural economics classes are included in natural resources majors such as forestry,

[6] Iowa State, with a combined economics and agricultural economics department, changed the name of the undergraduate and economics curriculum to agricultural business in 1954, and students are required to take nine semester credits plus other electives in the Business School.

agronomy, water resources, and environmental studies. Agricultural economists may in some cases teach joint classes with natural scientists on water resource management, food policy, management of biotechnology, and sustainable development.

In order to demonstrate some of the patterns emerging in different agricultural economics departments, we have collected information on 58 programs, most of which are in the United States, but with a few representative universities from other countries. The information was obtained largely from departmental websites during 2000. In this section, we attempt to summarize some of the patterns common to current departments of agricultural economics. Further detail is provided in appendix table A1. In some cases, schools may have characteristics which place them in more than one category.

By our analysis, 36 of the 58 programs reviewed offer at least one agribusiness program as a major (69%). Some agricultural economics departments that do not offer agribusiness may offer a major in management (e.g., Cornell and UC Davis). For the purposes of exposition, we have treated both agribusiness and management as "agribusiness." Twenty-seven departments offered one program in agribusiness, five offered two programs in agribusiness, and four offered three or more programs.

Arizona State University represents another approach, having created a separate agribusiness department. Most of the departments having more than one program offered one program in general agribusiness and the other in something like food marketing/management. In comparison to the vast majority of agricultural colleges offering agribusiness programs as a major, only five universities have chosen to offer it as a minor. Five other departments offered this curriculum both as a major and a minor.

Our data enabled us to analyze 24 undergraduate agribusiness major programs and nine minors in agribusiness. Those departments which offered agribusiness as a major required, on average, about 50 credits (with a standard deviation of 3.5 credits), or 37% of the entire degree requirement where the highest proportion is 54% and the lowest is 17%. In the minor programs, the average credit requirements were 21 (the highest was 27 and the lowest was 15).

A follow-on survey of student participation in agricultural economics and agribusiness majors, as well as joint programs and service courses, was conducted in the fall of 2000. Surveys were e-mailed to chairpersons at 30 departments of agricultural economics. Because only 16 responded, the results were supplemented with information obtained from seven agricultural economics departments' homepages on the internet. Among those departments in the combined samples that offered both agricultural economics and agribusiness undergraduate programs, agribusiness majors exceeded agricultural economics majors in 17 of 19 departments, with the other two departments reporting 38% and 44% agribusiness majors.

Although there is variation in the way departments adapt to agribusiness, there is no denying the increasing influence of agribusiness, particularly at the undergraduate level. When agribusiness programs exist, they dominate traditional agricultural economics programs in terms of majors. These results are presented in table 3, and further details of the fall 2000 e-mail survey are discussed in a subsequent section.

Table 3. Summary of Information: Majors in Agricultural Economics Departments (2000)

University	No. of Undergrads with Traditional Majors	No. of Undergrads with Ag Bus./Mgmt. Majors	% of Undergrads in Ag Bus./ Mgmt.	No. of Master's Students in Traditional Programs	No. of Master's Students in Ag Bus.
UC Davis	219	663	75	13	—
Clemson	50	0	0	50	—
Oklahoma State	194	150	44	31	—
U of Tennessee	0	100	100	25	—
Ohio State	0	280	100	34	—
Kansas State	160	180	53	30	60
North Dakota State	175	0	0	20	—
U of Arkansas	16	125	89	27	—
U of Massachusetts	57	0	0	16	—
Illinois State	120	182	60	0	20
U of Minnesota	116	122	51	32	53
U of Wisconsin	27	70	72	17	—
Iowa State	0	375	100	40	—
U of Georgia	85	51	38	26	—
Texas A&M	295	451	60	26	47
Mississippi State	47	53	53	6	19
Colorado State	54	146	73	26	—
U of Idaho	14	50	78	9	—
Louisiana State	0	106	100	11	—
U of Missouri	100	140	58	19	—
U of Nebraska	65	235	78	11	3
North Carolina State	55	185	77	5	—
Penn State	25	66	71	12	—

Source: Data derived from fall 2000 e-mail survey of department chairpersons, supplemented by internet websites enrollment data.

In most of the programs responding to the follow-on e-mail survey, the business courses taken in the agribusiness program are accounting, management, finance, and marketing. Those programs not offering a joint program with the business school required an average of two marketing courses (one basic and another specializing in a specific industry or in selling) in addition to courses in marketing-related topics, such as futures and commodity pricing. For those departments offering a joint degree with the business school, the mandatory curriculum requires that students take the typical series of business school courses.

Master's Programs

As with undergraduate programs, from a diverse pool there emerge several patterns of Master's programs in agricultural economics. Agribusiness is obviously becoming a major area of emphasis in some Master's programs. Boland, Featherstone, and

Chapman (1999) discuss various forms of Master's degrees in agribusiness, varying from joint degrees with business schools to an M.S. with electives in management and marketing to a uniquely designed Master's of Agribusiness (MAB). Their findings reveal the number of agribusiness programs has increased both in quantity and variety since the introduction of the first such program at Santa Clara University in 1972. A detailed analysis of the requirements of different programs is presented in their article.

In addition to Santa Clara, there are various universities with a specialized degree in agribusiness. They include the University of Alberta, Auburn, UC Davis, UC Fresno, Iowa State (offered by the Business College), McGill, and the University of Wisconsin. Arizona State, University of Florida, Kansas State, Michigan State, Mississippi State, Texas A&M, Texas Tech, Utah State, and Washington State represent another pattern, offering either an M.S. in agribusiness or an MAB, and have various tracks in their Master's program including agribusiness, international development, resource management, etc. These results confirm those of Boland, Featherstone, and Chapman (1999).

In table 3, we present information on enrollments in several of these programs, taken from our fall 2000 survey and supplemented by internet websites enrollment data. There appears to be a larger tendency to collaborate with other departments in providing a Master's degree. Universities with business schools seek to augment their agribusiness curricula with business school faculty. In some cases, joint programs have been developed between agricultural and business schools. In universities without a business school, the Master's in economics of business and agribusiness offered by the agricultural economics department can serve as a proxy for an MBA program.

Joint Programs, Service Courses, and Incentives

Joint programs involving agricultural economics departments are a widely used option for delivering educational services in our follow-on sample. Five of the 11 programs in our follow-on e-mail sample reported participation in joint programs on their respective campuses. Four of these five programs were joint with the business school, which is consistent with the growing emphasis on agribusiness programs in departments of agricultural economics. Only Minnesota and Wisconsin, however, reported significant numbers of undergraduate majors involved with the joint programs. We did not inquire as to the incentive structures within the universities in the sample to determine their impact on the options pursued.

It is possible economies of scale may help explain the relatively higher degree of reliance on educational resources from the outside and the cooperation with other units in agribusiness Master's programs. Another explanation is simply that agricultural economics departments recognize their limitations in teaching advanced business classes, and so decide to capitalize on their strengths through joint programs. This is evident not only in agribusiness but also in other fields, such as international development, natural resources management, public administration, and sustainable agriculture. In these programs, the agricultural economics department collaborates with other departments and colleges.

It is worth mentioning another pattern which includes schools emphasizing interdisciplinary research and cooperation between departments. This category encompasses many schools that follow the agribusiness trend but also includes those that encourage cooperation between other schools of natural science on their campuses. Among these are the Universities of Minnesota, Wisconsin, California at Berkeley and Davis, Cornell, and the University of Vermont. Often these departments call themselves departments of agricultural and applied economics, highlighting their tendency toward the application of microeconomics to various fields.

Offering a joint degree in agricultural economics and business is obviously the highest form of cooperation, enabling students to take electives in business from business schools or specific courses in agribusiness. In general, it is the larger universities with access to business schools that offer agribusiness degrees at the undergraduate level and a joint MBA or an MAB at the Master's level. For example, the University of Alberta and Oregon State University have such joint degrees.

In addition to joint programs, many departments of agricultural economics interact with the larger university by providing service courses to other departments. For example, some departments provide courses in econometrics to economics departments or courses in health economics in schools of public health. This less binding form of integration increases the vitality of the department, while receiving service sources from other departments may increase their commitment to the survival of the agricultural economics departments.

We caution the reader that care must be taken in interpreting these data because service courses may be defined differently in our sample universities. In some universities, service courses are open to agricultural economics majors and nonmajors in meeting departmental and graduation requirements, while in other universities, agricultural economics departments may preclude their majors from taking certain service courses for credit. Tables 4 and 5 describe demand and supply of service courses, based on information taken from the fall 2000 e-mail survey of department chairs mentioned above. Because we were unable to augment this portion of the e-survey with the supplemental internet survey, these results should be treated with greater caution.

All the departments in our sample survey offer service courses. The agricultural economics service courses are heavily subscribed by both agricultural economics and other undergraduate majors, with enrollment of nonmajors accounting for two-thirds of the demand for agricultural economics service courses in the sample. In addition, two-thirds of own undergraduate majors take advantage of agricultural economics service courses in meeting their graduation requirements.

Two observations may be made after reviewing these data: (*a*) agricultural economics service courses engage substantial resources from departments of agricultural economics, and (*b*) service courses are very attractive to our own undergraduate majors. We suggest several reasons why our own majors may be attracted to service courses. First, these courses may be easier for majors who, by virtue of their studies, have better grounding in economic logic and concepts. On the other hand, students from nonagricultural backgrounds may be interested in acquiring knowledge of and

Table 4. Summary of Information Regarding Service Courses (2000)

University	Undergrads in Ag Econ Departments Taking Service Courses	Undergrads from Other Departments Taking Service Courses	Ag Econ Grad Students Taking Service Courses	Other Grad Students Taking Service Courses
UC Davis	882	—	10	—
Clemson	60	400	5	5
Oklahoma State	50	80	30	10
U of Tennessee	100	200	25	20
Ohio State	280	—	5	—
Kansas State	150	450	0	0
North Dakota State	175	1,600	—	—
U of Arkansas	190	80	15	10
U of Massachusetts	57	500	19	20
Illinois State	50	550	0	0
U of Minnesota	317	473	8	2
U of Wisconsin	55	500	15	50
Iowa State	300	4,500	100	125
U of Georgia	40	80	0	0
Mississippi State	100	200	0	0
Total	2,806	9,613	232	242

Source: Data derived from fall 2000 e-mail survey of department chairpersons.
Note: Percentage of undergraduates from departments other than Agricultural Economics taking service courses = 67%; percentage of non-agricultural economics graduate students in service courses = 48%.

Table 5. Summary of Most Common Types of Service Courses by Percentage of Schools Offering

Service Courses	Percent
Nutrition	31
Plant Science	56
Agricultural Management	31
Business	63
Economics	56
Animal Science	25
Other	69

Source: Fall 2000 e-mail survey of department chairs.

examples from agriculture. Finally, students from an agricultural background may seek courses where more realistic examples are used, with which they can better identify.

Graduate service courses in agricultural economics are offered at 9 of the 11 universities in our follow-on sample. Roughly half of the graduate students in agricultural economics enroll in the graduate service courses offered by their department. The enrollments of nonmajors in agricultural economics service courses are about equal

to graduate majors for the sample. Only Wisconsin tends to serve significantly more graduate nonmajors than graduate majors in the sample (table 4).

Academic incentives are not always compatible with agricultural economics efforts to augment their demands via service courses, new majors, and joint programs. First, the "rewards" are typically new faculty and related resources to offer new programs and serve new enrollments (or possibly, better utilization of existing faculty and justification for retaining positions). Like any bureaucratic system, universities are slow to reallocate resources even when student contact hours or majors demonstrate a significant increase relative to teaching loads. Incentive structures are also likely to change with replacement of deans and upper administrators. Second, university systems for majors and minors, participants in joint programs, and service courses vary widely. Some institutions place primary credit on majors or primary majors, others emphasize student contact hours per faculty member, while other institutions may credit joint programs to a "lead" department or not credit them at all. Many universities may lack a set of incentives compatible with maintaining a department on the cutting edge.

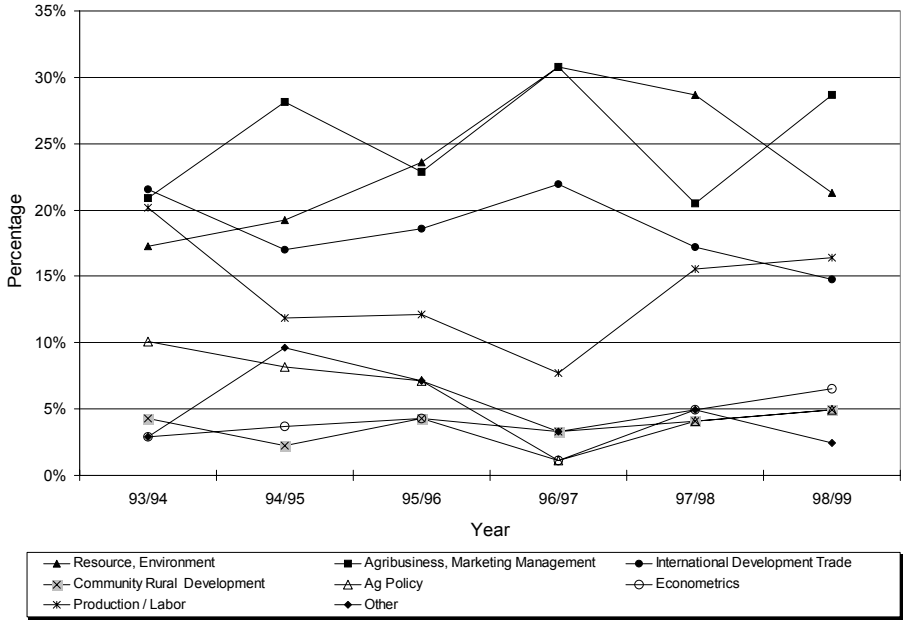
It is only natural for departments to follow incentives when they exist, or a path of least resistance when incentives do not exist. These incentive systems have an important impact on departments of agricultural economics when establishing agribusiness programs, joint programs, and innovative service courses, or even if to initiate such efforts at all. Alternatively, department heads and chairs, as well as faculty, may be motivated to initiate new programs and courses to avoid the asymmetric treatment (i.e., budget cuts and lost positions) of declining enrollments and majors in traditional agricultural economics programs.

Ph.D. Programs

In general, Ph.D. programs in agricultural economics have changed very little in recent years, maintaining their traditional fields of development, agricultural economics, and natural resource economics. Whenever possible, they rely on economics departments, particularly for courses in macroeconomics. They may also have joint offerings or may be responsible for fields that are part of the Ph.D. program in economics including natural resources, development, production, and sometimes econometrics.

We argue that the tendency to lag behind Master's and undergraduate education with regard to structural innovation results directly from the opposing forces to which Ph.D programs are subjected. On the one hand, Ph.D programs exist to train the instructors of the future. In this sense, they experience pressure to produce professors with focuses in agribusiness, environmental economics, and any other sort of instructor demanded by the populations of the undergraduate and Master's students.

On the other hand, doctoral students serve as the labor force for faculty undertaking current research, much of which, in agricultural economics departments, is funded publicly. For example, while much research funding is available through



Source: Based on data collected by Michele C. Marra, North Carolina State University.

Figure 2. Ph.D. dissertations by category: 48 departments of agricultural economics (1993–1999)

federal, state, and local governments eager to support farmers, production agriculture, and environmental objectives, the incoming undergraduates and Master's students exhibit more interest in private-sector issues. Research focusing on domestic agricultural or resource economics and management issues tends to perpetuate the demand for traditional agricultural economists. Exacerbating the tendency to resist structural change is the fact that U.S. Ph.D. programs in agricultural economics are a training ground for economists from developing countries, where the thrust of interest often has to do with the customary issues of production, trade, etc.

Figure 2 illustrates the division of Ph.D. dissertations by category during the 1990s. The information was collected by Michele Marra of North Carolina State University and summarizes the total dissertations by field of 48 departments of agricultural economics between 1993 and 1999. The distribution of topics reflects the dominance of natural resource and agribusiness issues (although it would appear that resource issues are on a downswing), as well as the continued importance of international trade and development.

It is worthwhile noting the topics of the agribusiness dissertations have more in common with our first definition of agribusiness, maintaining a theoretical and economic rather than a business approach. Although no schools offer doctoral programs in agribusiness, and Ph.D. level courses in the field are scarce, these findings suggest departments of agricultural economics are able to play an important role in satisfying

the substantial demand for education in this field. Further, at least for the past seven years, the data indicate students have maintained a strong interest in agribusiness topics, despite the fact that only five of the programs we surveyed offer agribusiness as a field. The following section further explores an important component of the explanation for the slow adjustment of doctoral programs to changes in the profession—research funding.

Research

As Binswanger (1974) argued, research is an economic activity, whereby allocation of resources among various research topics is conducted to attain the highest level of net benefit. For faculty members, benefits may be in terms of publications, which will result in promotion and recognition. In addition, it behooves faculty members to select topics supported by interested agencies, thus accelerating the growth of their research budget. Faculty members' selection of research topics is also heavily influenced by their human capital, both in terms of techniques and familiarity with research topics. And finally, this selection may also be inspired by experience gained in educational activities, with class projects sometimes providing the foundation for larger research efforts.

Given the private-good nature of agribusiness research, the expansion of educational emphasis on agribusiness issues has not necessarily been followed by new research funding in the same area. The USDA and state experiment stations' research agendas still emphasize farm management, marketing, policy, and environmental issues (Fuglie et al., 1996). Although not specific to agricultural economics research, only limited adjustments in the shares of funds allocated to major USDA-SAES goal areas have occurred over time.

This lack of adjustment is not surprising given that public funding of traditional agricultural economics research was justified by the public-good nature of the early farm production and marketing research. Although much current agricultural production research has more in common with the private agenda, it remains easier to rationalize within the land-grant university context. This similar characteristic in the context of agribusiness research, however, raises the question of the appropriateness of public funding for such activities.

Even the priorities established by the agricultural economics profession, outlined in *Economic Research Priorities for an Efficient and Sustainable Food System* [Council on Food, Agricultural, and Resource Economics (C-FARE), 1997], do not include a strong emphasis on agribusiness research. There is increased attention on agribusiness issues in the current C-FARE priority-setting process as a result of what is occurring in the food chain with the "industrialization of agriculture." However, the emphasis is not on agribusiness management, financial strategies, or employment opportunities, but rather on the perspective of the producer (i.e., the farmer or grower).

To provide responsive educational programs and research opportunities, pursuing nontraditional funding sources and reconsidering research priorities may be required.

Needless to say, providing leadership on these more private-good issues takes the agricultural economics profession into unfamiliar, and potentially dangerous, territory given our traditional clientele.

In addition, public-sector funding trends and the profession's priorities may not be a good indicator of research trends. To assess the value given to various types of research by departments of agricultural economics, we conducted a survey among agricultural economics chairs on the relative merits of publications in various journals using the *American Journal of Agricultural Economics* (*AJAE*) as a benchmark. We received responses from over 35 chairs, and their comments and numerical rankings were very insightful. Several participants indicated they evaluate papers not journals, and that the reputation of the journal is an imperfect signal of the quality of the papers. Excellent papers often appear in less prestigious journals, and chairs make sure to recognize them and reward the authors.

The principles guiding the weighting schemes vary substantially. Some respondents treated publications in applied agricultural economics and economics journals equally. Others weighed journals according to difficulty in publication measured by rejection rates. Others emphasized that the nature of the appointments dictates the value given to specific journals. Individuals with extension appointments will get relatively more credit for papers in *Choices*, for example. Even in the face of all these disclaimers, the average outcomes presented in table 6 are representative of over 35 departments and one research institution.

The results of the survey underscore the prominent role of the economics discipline in agricultural economics research. Publications in major economics journals seem to be significantly more valued than those in the major journals of statistics or business administration, while those in natural science journals receive equal or lower scores than the latter. This may cause difficulties for individuals with business degrees and research emphasis on business administration who may be hired for agribusiness education purposes. Interviews suggest that chairs often approach the business schools to assist in the evaluation of such individuals. Some junior faculty members with degrees in business have expressed serious concerns about the criteria which will be used in their promotion and tenure decisions.

A brief overview of recent journals of agricultural economics reveals there is increasing emphasis on research of agribusiness issues. In particular, questions of contracting, contract farming, marketing of agricultural commodities and advertisements, industrialization of agriculture, use of futures markets and forward contracting, etc., are increasingly popular. Studies on the impact of new innovations such as biotechnology, precision farming, and the internet cannot be conducted without understanding agribusiness firms, their objectives, and their behavior. Agribusiness joint production, resources and the environment, and development and trade are becoming major areas of research in agricultural economics departments. Furthermore, research on agribusiness-related issues frequently receives higher priority in Economic Research Service (ERS) cooperative agreements and competitive grants programs such as the National Research Initiative (NRI).

Table 6. Journal Rankings Based on Survey of 35 Agricultural Economics Department Chairs, Fall 2000

Journal Name	Mean	Std. Dev.	Rank
American Journal of Agricultural Economics (*AJAE*)	100.000	0.000	4
Journal of Agricultural and Resource Economics (Western)	76.581	2.546	9
Agricultural and Resource Economics Review (Northeastern)	66.894	3.057	13
Review of Agricultural Economics	68.098	4.088	12
Choices	52.870	4.178	17
Agricultural Economics (International)	72.429	4.013	11
Journal of Environmental Economics and Management (*JEEM*)	88.894	2.338	7
Land Economics	83.667	2.204	8
Environmental and Resource Economics (European *JEEM*)	73.054	3.597	10
Agribusiness: An International Journal	65.476	3.925	14
Journal of Agribusiness	59.048	4.072	18
The International Journal of Agribusiness	63.276	5.476	15
Major Economics Journals (*Agricultural Economics Review*; *Econometrica*)	155.542	12.649	1
Mainstream Economics Journals (*Review of Economics and Statistics*; *International Economic Review*)	125.667	4.864	2
Economics Subfield Journals (*Journal of Development Economics*; *Journal of Public Finance*)	96.233	3.556	5
Management Science	91.526	4.647	6
Journal of the American Statistical Association	104.317	4.648	3
Soil Science and Agronomy Journals	59.324	3.572	16

While agribusiness became a major topic in *AJAE*, journals specializing in the field have been established and are slowly gaining momentum. Major agricultural economists are contributors to these journals, and their editorial boards include prominent agricultural economists. Some departments have established distinguished chairs in agribusiness, most notably the Pioneer Chair at Iowa State University.[7] Since the private sector is likely to support chairs in agribusiness, we may see expansion of senior positions in this field.

In sum, as a research theme, agribusiness is growing in importance. Although traditional issues still carry the majority of public funding, there is increasing demand for agribusiness research as evidenced in academic journals. Although publications specializing in this new field are still establishing their legitimacy, they are finding increasing acceptance among agricultural economics departments, a trend which will surely influence the evolution of the discipline.

Next, we discuss hiring policies within agricultural economics departments, a theme which will close our overview of the current state of the discipline and serve as the launching point for our suggestions regarding new directions for the field.

[7] The Pioneer Chair in Agribusiness is in the Business College, but now held by someone with a joint appointment in the Economics Department. Iowa State also has a Pioneer Chair in Science and Technology Policy with an important agribusiness component in the Economics Department.

Faculty Hiring in Agricultural Economics

Traditionally, positions in agricultural economics are described both in terms of research and teaching. Generally, the area of teaching responsibility has much weight in defining the position. In reviewing the list of job openings in agricultural economics at the online AAEA website during spring 2001, we found the following: of 17 assistant professor or equivalent positions currently posted on the AAEA's employment site, eight (41.7%) are in agribusiness, five (29.4%) are in other agricultural economics fields, and four (23.5%) are in management fields that have a significant agribusiness component. During 2001, approximately 70% of the new teaching positions have had a strong agribusiness emphasis. This is part of a pattern which has been emerging for several years where the demand for new agribusiness faculty positions has significantly increased.

In most cases, the desired qualification of candidates for these positions is a Ph.D. in agricultural economics, but there is increased emphasis on having a background in business. These new employment opportunities represent one of the forces pressuring changes in the agricultural economics Ph.D. program. Agricultural economists with a Ph.D. may obtain jobs in academic departments as well as in industries and governments. Although the majority end up in agricultural economics departments, some are hired by forestry or even economics departments interested in applied economists. However, in some situations, agricultural economists may not be qualified to fill new positions in their own departments due to a lack of training in agribusiness.

New Directions and Conclusions

Agricultural economics is going through a period of change. The decline in the relative size and employment opportunities of the farm sector, combined with growth and increased opportunities in the food, agribusiness, and resource sectors, has contributed to the shift in students' interest away from traditional agricultural economics toward agribusiness and resource economics. This tendency, together with what we perceive to be excess supply of economics education and excess demand of business education, has led to changes in the educational offerings of agricultural economics departments.

In addition, we suggest there is latent demand for services potentially provided by departments of agricultural economics to other schools, particularly those of natural and social sciences, within the same university. This final point becomes increasingly relevant if one poses the question of what might happen if business schools decided to augment their programs to recapture the students currently driven to agricultural economics programs due to the limited capacity of business programs, or their lack of emphasis on agribusiness.

The adjustments to accommodate agribusiness are most apparent at the undergraduate and Master's levels. The undergraduate programs in many of the departments contain three complementary majors—agricultural economics, agribusiness, and

resource economics. Similarly, Master's degrees include tracks in resource management and agribusiness in addition to agricultural economics. There are many examples of cooperation among departments of agricultural economics, business schools, and other units offering joint programs, particularly at the Master's level. The evolution is to a certain extent mirrored in their research agenda. By our measure, 50% of recent publications in *AJAE* are devoted to resources and/or agribusiness issues.

In spite of some difficulties, most agricultural economics departments have adjusted quite well to changes in demand, at the level of undergraduate and Master's education. Indeed, many of the traditional strengths of agricultural economics departments are well suited to cover the key elements of business education. Agricultural economics has always had a strong program in production, risk, demand, natural resources and the environment, and development; and these issues provide a good starting point for programs emphasizing business and resource management problems.

Ph.D. programs in agricultural economics have not undergone as many structural changes as their counterparts at the Bachelor's and Master's levels. In the United States, they have experienced reduced demand by domestic students, partly because of better opportunities due to the growing economy and also because of the declining appeal of the traditional agricultural economics field. Many of these new Ph.D. students, particularly those who have backgrounds in some related fields, may not necessarily be a good match for many employment opportunities in agricultural economics, especially the ones emphasizing agribusiness issues. We suggest that many students may seek a Master's degree from a business school, and that Ph.D. programs should consider giving more emphasis to issues and problems facing agribusiness.

While most departments should be commended for the adaptation to the increased demand for research and education in agribusiness, they should not become complacent. The profession must realize that there remain many ignored opportunities to provide economics education to students of other physical, biological, and social sciences. Agricultural scientists recognize the importance of economics in issues of intellectual property rights, pest management, animal breeding, crop production systems, and soil management.

Other disciplines have been relatively untouched by economics. Schools of engineering, for example, provide an enormous reservoir of interdisciplinary research opportunities in the areas of watershed management and environmental policy, finance, as well as interests in industrial organization. Professional schools, like those of medicine, veterinary medicine, and law, study issues which can be effectively complemented by economic analysis. Possible synergies also exist between schools of public health, community and regional planning, and Master's and Ph.D. programs in physical and biological sciences, to name a few.[8]

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[8] Many agricultural economics departments once maintained active research and education programs in rural development, which have more recently been replaced by small limited efforts.

There are bodies of economics research that address these problems, and we should strive to sell our profession better to scientists and increase courses that have an economic content in many fields which have traditionally been ignored in economics. If agricultural economics departments do not provide tailor-made courses or minors to these programs, there are two possible results. Either the material will not be presented, and students may ignore economic considerations, or departments will build their own program and either outsource the teaching or provide in-house instruction, thus generating competition for existing agricultural economics and agribusiness programs.

In spite of all the turmoil within the discipline, most departments continue to value and emphasize economic methods. The primary emphasis in agricultural economics departments is on applied economic concepts and economics methodology, and their application is changing according to their needs and what reality dictates. This is a tremendous asset, as such an orientation stabilizes the profession—but if taken to extremes, it may pose serious limitations.

Agricultural economists have been quite skillful in modifying economics education to address issues of agribusiness and natural resources and environmental policy. In some instances, we have been able to build strong, stand-alone programs in these curriculum areas. However, we have been unable to expand economics education through its inclusion within the other natural resources disciplines. We have been successful in capturing some territories not covered by the business schools—yet, this is little more than "occupied territory" and is merely one field of focus. The true challenge lies in being able to capture many of the opportunities within our own schools. And this challenge will continue to confront us so long as demands are being made on our programs to evolve and change.

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Appendix Table A1. Sample Listing of Academic Programs from 58 Agricultural Economics Departments, by Offerings of Undergraduate Majors and Minors, and Graduate Programs (Fall 2000)

	University / Department Name	Undergraduate Majors and Minors [numbers denote majors, letters minors]	Graduate Programs [letters denote degree specialty areas]
1	**U of Alberta** Rural Economy	1. Agriculture 2. Forest Business Management 3. Agricultural/Food Business Management 4. Environmental & Conservation Sciences 5. Forestry	M.S.: 1. Agricultural Economics/Rural Sociology 2. Forest Economics Ph.D.: 1. Agricultural Economics 2. Forest Economics Joint MBA offered
2	**Arizona State U** Center for Agribusiness Policy Studies	1. Agribusiness Management 2. Agribusiness Finance	
3	**U of Arizona** Agricultural & Resource Economics	1. Agribusiness Management 2. Agricultural Economics 3. Resource & Environmental Economics	M.S.: 1. Agricultural Economics a. Agribus., b. Econ Develop., c. Environ. Econ, d. Quantitative Econ Ph.D.: 1. Agricultural Economics a. Environ. & Resource Econ, b. Internat. Develop.
4	**U of Arkansas** Agricultural Economics & Agribusiness	1. Agribusiness Management a. Agribus. Management & Marketing b. Pre-law c. Agricultural Economics	M.S.: 1. Agricultural Economics a. Economics b. Agribusiness c. International Agribusiness
5	**Auburn U** Agricultural Economics & Rural Sociology	1. Agricultural Economics a. Agribus. Management & Marketing b. Farm Management c. Natural Resource Management d. Rural Sociology	M.S.: 1. Agricultural Economics M.A.: 1. Agriculture MBA: 1. Agribusiness 2. Environmental Management Ph.D.: 1. Agricultural Economics
6	**U of British Columbia** Food & Resource Economics	1. Global Resource Systems a. Environ. & Resource Econ b. Econ of Food Systems 2. Food, Nutrition & Health 3. Agroecology	M.Sc.: 1. Food & Resource Economics a. Food Marketing Analysis b. Resource & Environ. Econ
7	**U California, Berkeley** Agricultural & Resource Economics	1. Environmental Economics & Policy	Ph.D.: 1. Agricultural & Resource Economics a. Ag Econ, b. Environ. Econ, c. Internat. Develop.

Appendix Table A1. Continued

	University / Department Name	Undergraduate Majors and Minors [numbers denote majors, letters minors]	Graduate Programs [letters denote degree specialty areas]
8	**U California, Davis** Agricultural & Resource Economics	1. Managerial Economics	M.S.: 1. Agricultural & Resource Economics MBA: 1. Agribusiness Ph.D.: 1. Agricultural & Resource Economics a. Ag Econ, b. Environ. Econ, c. Develop. Econ
9	**California State U** Agricultural Economics	1. Agricultural Business	
10	**U of Cambridge** Land Economy	1. Environmental Law 2. Economics 3. Resource Management	M. Philosophy / Ph.D.: Land Economy
11	**Catholic U, Chile** Agricultural Economics		M.A.: 1. Agricultural Economics
12	**Clemson U** Agricultural & Applied Economics	1. Agricultural & Applied Economics 2. Community & Rural Development	M.S.: 1. Agricultural & Applied Economics Ph.D.: 1. Agricultural & Applied Economics
13	**U of Connecticut** Agricultural & Resource Economics	1. Agribusiness Management 2. Environmental Economics & Policy	M.S.: 1. Agricultural & Resource Economics Ph.D.: 1. Agricultural & Resource Economics
14	**Cornell U** Applied Economics & Management	1. Applied Econ & Business Management a. Agribus. Mgmt., b. Ag & Applied Econ, c. Bus. Mgmt. & Mktg., d. Environ. & Resour. Econ, e. Farm Mgmt. & Finan., f. Food Industry Mgmt.,	M.S.: 1. Agricultural Economics 2. Resource Economics Ph.D.: 1. Agricultural & Resource Economics
15	**U of Delaware** Food & Resource Economics	1. Agricultural & Resource Economics 2. Agricultural Education 3. Food & Agribusiness Management 4. Natural Resource Management	M.S.: 1. Agricultural Economics 2. Operations Research/Agricultural Economics Ph.D.: 1. Agricultural Economics 2. Operations Research/Agricultural Economics
16	**U of Florida, Gainesville** Food & Resource Economics	1. Agribusiness Management 2. Applied Economics a. Ag Law b. Ag & Resource Ethics & Policy c. Food & Resource Economics d. Agribusiness Management & Sales	M.Ag.: Master of Agriculture MAB: Master of Agribusiness M.S.: 1. Food & Resource Economics Ph.D.: 1. Food & Resource Economics

Appendix Table A1. Continued

University / Department Name	Undergraduate Majors and Minors [numbers denote majors, letters minors]	Graduate Programs [letters denote degree specialty areas]
17 **U of Georgia** Agricultural & Applied Economics	1. Agribusiness 2. Agricultural Economics 3. Environmental Economics & Management a. Agribusiness, b. Agricultural Economics	M.S.: 1. Agricultural Economics 2. Environmental Economics M.A.: 1. Agricultural Economics Ph.D.: 1. Agricultural Economics
18 **U of Guelph** Agricultural Economics & Business	1. Agricultural Business 2. Agricultural Economics	MBA w/Agribusiness specialization
19 **U of Hawaii, Manoa** Agricultural & Resource Economics	1. Agricultural & Resource Economics a. Agribusiness, b. Natural Resource Econ, c. Fisheries & Aquaculture Economics, d. Agricultural Economics	M.S.: 1. Agricultural & Resource Economics Ph.D.: 1. Agricultural & Resource Economics
20 **Hebrew University, Israel** Agricultural Economics & Management	[It is unclear what degrees are offered in this particular department.]	
21 **U of Helsinki (Finland)** Economics & Management	1. Agricultural Economics & Marketing 2. Consumer Economics 3. Environmental Economics 4. Food Economics & Marketing	M.S.: Same subject areas as undergrad program Ph.D.: Same subject areas as undergrad program
22 **U of Idaho** Agricultural Economics & Rural Sociology	1. Agribusiness 2. Agricultural Economics 3. Natural Resources & Rural Development	
23 **U of Illinois, Urbana-Champaign** Agricultural & Consumer Economics	1. Agribus., Farm, and Financial Management a. Ag Accounting, b. Ag Finance, c. Farm Mgmt., d. Food & Agribus. Mgmt. 2. Internat., Resource, and Consumer Economics a. Consumer Econ & Finance b. Environmental & Resource Mgmt. c. Policy, Internat. Trade & Develop. 3. Commodity, Food, and Textile Marketing a. Consumer & Textile Marketing b. Markets & Price Analysis	M.S.: Same specializations as undergrad program Ph.D.: Same specializations as undergrad program

Appendix Table A1. Continued

University / Department Name	Undergraduate Majors and Minors [numbers denote majors, letters minors]	Graduate Programs [letters denote degree specialty areas]
24 **Southern Illinois U, Carbondale** Agribusiness & Economics	1. Agricultural & Resource Management 2. Applied Economics & Agribusiness	M.S.: 1. Agribusiness Economics 2. Agricultural Services M.A./MBA also offered Ph.D.: 1. Environmental & Resource Policy
25 **Iowa State U** Agricultural Economics	1. Economics 2. Agricultural Business	M.S.: 1. Agricultural Economics with 2 fields from: Ag Marketing, Ag Policy, Internat. Ag Develop., Ag Finance, Monetary Economics Ph.D.: 1. Agricultural Economics
26 **Kansas State U** Agricultural Economics	1. Agribusiness 2. Agricultural Economics	M.S.: 1. Agricultural Economics M.A.: 1. Agribusiness Ph.D.: 1. Agricultural Economics
27 **U of Kentucky** Agricultural Economics	1. Agribusiness Management & Food Marketing 2. International Ag Marketing & Trade 3. Farm Management 4. Agricultural Finance 5. Agricultural & Rural Public Policy 6. Environmental & Resource Economics	M.S.: 1. Agribusiness 2. Applied Agricultural Economics 3. Agricultural Extension Ph.D.: 1. Agricultural Economics
28 **Louisiana State U** Agricultural Economics & Agribusiness	1. Agricultural Business 2. Food & Resource Economics 3. Agricultural & Resource Economics	
29 **U of Manitoba** Agricultural Economics & Farm Mgmt.	1. Agricultural Economics 2. Agribusiness	M.S.: 1. Agricultural Economics & Farm Management Ph.D.: 1. Economics 2. Agricultural Economics
30 **U of Maryland** Agricultural & Resource Economics	1. Agricultural & Resource Economics a. Business Management b. Farm Production c. Food Production d. Environmental & Resource Policy e. International Agriculture	M.S.: 1. Agricultural & Resource Economics Ph.D.: 1. Agricultural & Resource Economics

Appendix Table A1. Continued

University / Department Name	Undergraduate Majors and Minors [numbers denote majors, letters minors]	Graduate Programs [letters denote degree specialty areas]
31 **McGill U, Canada** Agricultural Economics	1. Agricultural Economics a. Agricultural Systems, b. Agribusiness, c. Natural Resource Econ	M.S.: 1. Agricultural Economics M.S./MBA also offered Ph.D.: 1. Agricultural Economics
32 **Michigan State U** Agricultural Economics	1. Agribusiness Management 2. Food Industry Management 3. Public Resource Management	M.S.: 1. Agribusiness 2. Resource Economics Ph.D. 1. Resource Economics
33 **U of Minnesota** Applied Economics	1. Applied Economics 2. Agricultural & Food Business Management	M.S.: 1. Agricultural & Applied Economics Ph.D.: 1. Agricultural & Applied Economics
34 **U of Missouri, Columbia** Agricultural Economics	1. Agribusiness Management 2. Agricultural Economics a. Farm & Ranch Management b. Agricultural Economics	M.S.: 1. Agricultural Economics with focus in: a. Agribusiness Management b. Price & Policy Analysis c. Resources & Development Ph.D.: [same as M.S.]
35 **Mississippi State U** Agricultural Economics	1. Agricultural Economics 2. Agribusiness	M.S.: 1. Applied Economics MAB Ph.D.: 1. Applied Economics
36 **Montana State U** Agricultural Economics & Economics	1. Agricultural Business 2. Economics	M.S.: 1. Applied Economics
37 **U of Nebraska, Lincoln** Agricultural Economics	1. Agribusiness 2. Agricultural Economics 3. Natural Resource & Environmental Economics 4. Grazing Livestock Systems Management	M.S.: 1. Agricultural Economics MBA: 1. Agribusiness Ph.D.: 1. Agricultural Economics
38 **U of Nevada** Applied Economics & Statistics	1. Agricultural & Applied Economics 2. Environmental Policy Analysis a. Agribusiness b. Natural Resource & Environmental Econ c. Applied Statistics	M.S.: 1. Resource & Applied Economics MBA: 1. Agribusiness
39 **New Mexico State U** Agricultural Economics & Agribusiness	1. Agricultural Economics & Business	M.S.: 1. Agricultural Economics M.A.: 1. Economics

Appendix Table A1. Continued

University / Department Name	Undergraduate Majors and Minors [numbers denote majors, letters minors]	Graduate Programs [letters denote degree specialty areas]
40 U of Newcastle Agricultural Economics & Food Marketing	1. Agribusiness Management 2. Countryside Management 3. Food Marketing 4. Food Marketing & Management 5. Rural Studies	M.S.: 1. International Ag & Food Marketing 2. Rural Resource & Countryside Management M. Philosophy: 1. Agricultural Economics & Food Marketing
41 U of New England, Australia Agricultural & Resource Economics	1. Agricultural Economics 2. Agribusiness	M.S.: 1. Ag, Resource & Development Economics Ph.D.: 1. Ag, Resource & Development Economics
42 North Carolina State U Agricultural & Resource Economics	1. Agricultural Business Management 2. Environmental Sciences/Econ Policy 3. Natural Resource/Econ Management	Master of Economics M.A.: 1. Economics M.S.: 1. Agricultural Economics Ph.D.: 1. Agricultural Economics
43 North Dakota State U Agribusiness & Applied Economics	1. Agricultural Economics 2. Agribusiness	M.S.: 1. Agricultural Economics 2. Resource Management
44 Ohio State U Agricultural, Environ. & Develop. Econ	1. Agribusiness & Applied Economics	M.S.: 1. Agricultural, Environmental & Develop. Econ Ph.D.: 1. Agricultural Economics
45 Oklahoma State U Agricultural Economics	1. Agricultural Economics	M.S., M.A., and Ph.D., all with possible specializations: a. Farm Management b. Rural Development c. Econ Development d. Marketing e. Environmental Economics f. Agribusiness Management g. Agricultural Finance
46 Oregon State U Agricultural & Resource Economics	1. Agribusiness Management 2. Agricultural & Resource Economics 3. Environmental Economics & Policy	M.S.: 1. Agricultural Economics Ph.D.: 1. Agricultural Economics
47 Penn State U Agricultural Economics & Rural Sociology	1. Agribusiness Management 2. Environmental & Resource Economics	M.S.: 1. Agricultural Economics 2. Rural Sociology Ph.D.: [same as M.S.]

Appendix Table A1. Continued

University / Department Name	Undergraduate Majors and Minors [numbers denote majors, letters minors]	Graduate Programs [letters denote degree specialty areas]
48 Purdue U Agricultural Economics & Management	1. Agricultural Economics 2. Food Industry Marketing & Management 3. Agricultural Finance 4. Sales & Marketing 5. Farm Management 6. Agribusiness Management 7. Quantitative Economics	M.S. and Ph.D., all with possible specializations: a. Marketing & Price Analysis b. International Trade & Econ Development c. Agribusiness Management d. Public Policy Analysis & Resource Economics e. Farm Management & Production Economics f. Community Development g. Applied Econometrics & Math Programming Joint MBA also offered
49 U of Reading Agricultural Economics & Management	1. Agricultural Economics 2. Food Marketing Economics 3. Rural Resource Management 4. Food Science, Food Econ & Marketing 5. Food Manufacture, Management & Marketing	M.S.: 1. Agricultural Economics 2. Food Economics & Marketing 3. Agricultural Development Economics 4. Tropical Agricultural Development Research Ph.D.s
50 Rutgers U Agricultural, Food & Resource Economics	1. Business Economics 2. Environmental/Natural Resource Economics 3. Agricultural Economics	M.S.: 1. Agricultural Economics
51 U of Saskatchewan Agricultural Economics		Master of Agriculture M.S. and Ph.D.: Agricultural Economics
52 U of Tennessee Agricultural Economics	1. Agricultural Economics & Business	M.S.: 1. Agricultural Economics
53 Texas A&M University Agricultural Economics	1. Agribusiness 2. Agricultural Economics	M.S.: 1. Agricultural Economics M.A.: 1. Agribusiness Ph.D.: 1. Agricultural Economics
54 U of Vermont Community Development & Applied Econ	1. Small Business 2. Consumer Economics 3. International Development & Agricultural Econ	M.S.: 1. Agricultural Economics 2. International Development

Appendix Table A1. Continued

University / Department Name	Undergraduate Majors and Minors [numbers denote majors, letters minors]	Graduate Programs [letters denote degree specialty areas]
55 **Virginia Polytechnic** Agricultural & Applied Economics	1. Agribusiness Management 2. Economic & Community Development 3. Environmental & Natural Resource Econ 4. Marketing, Price & Risk Management 5. Veterinary Business Management 6. Agricultural Trade & Policy	M.S.: 1. Agricultural Economics Ph.D.: 1. Agricultural Economics
56 **Washington State U** Agricultural Economics	1. Agribusiness 2. Agricultural Economics	M.A.: 1. Agribusiness 2. Agricultural Economics Ph.D.: 1. Agricultural Economics
57 **U of Wisconsin, Madison** Agricultural & Applied Economics	1. Agribusiness Management 2. Agricultural & Applied Economics	M.S. and Ph.D.: Agricultural & Applied Economics Joint MBA also offered
58 **U of Wyoming** Agricultural & Applied Economics	1. Agribusiness Management 2. Farm & Ranch Management 3. International Agriculture	M.S.: 1. Agricultural & Applied Economics 2. Agribusiness

Source: Information largely obtained from online departmental websites, fall 2000.