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A Summary of Doctoral Research in Agribusiness Management, Food Business, and Industrial Organization, 1951 to 2002

National Food and Agribusiness Management Education Commission

Working Paper #2

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National Food and Agribusiness Management Education Commission

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Other NFAMEC Working Papers include

Working Paper #1: A Summary of Undergraduate Curriculum in Agribusiness Management Degrees

Working Paper #3: Graduate Courses in Agribusiness and Food Business Management

Working paper #4: Capstone Courses in Undergraduate Agribusiness Degrees

Working Paper #5: A Summary of Extension Programs in Agribusiness Management and Food Business

Working Paper #6: A Summary of Masters Degree Research in Agribusiness and Food Business Management

A Summary of Doctoral Research in Agribusiness Management, Food Business, and Industrial Organization, 1951 to 2002

Abstract

Doctoral programs in agricultural economics have long been the primary source of agribusiness management faculty in the United States. One measure of doctoral training is the choice of a dissertation topic. Presumably, doctoral students will choose to work with faculty that have expertise in their area of interest. Thus, one measure of doctoral programs that have expertise in agribusiness management is the choice of dissertation research by graduate students. In this paper, we look at dissertation topics over time. In particular, we segment dissertation topics into 14 different subject categories and compare these over the 1951 to 2002 time period. Three categories are likely to be highly correlated with whether a department has expertise in doctoral training of agribusiness management faculty. These categories are agribusiness management, food business, and industrial organization. Agribusiness management, food business, and industrial organization represented only 6.6 percent of all agricultural economics dissertations over the 1951 to 2002 time period. We agree with Peter Barry who suggests that agribusiness management research has begun to mature and that a bright future exists for such research.

A Summary of Doctoral Research in Agribusiness Management, Food Business, and Industrial Organization, 1951 to 2002

Doctoral programs in agricultural economics have long been the primary source of agribusiness management faculty in the United States. In fact, virtually all 140 undergraduate programs in agribusiness management or agricultural economics require instructors to have a doctorate in agricultural economics or related discipline. The supply and demand for doctoral students has been widely studied as have requirements for agribusiness fields of study in agricultural economics doctoral programs.¹ House and Sterns note that these requirements differ widely and there is no profession-wide standard of what constitutes an agribusiness field of study in doctoral programs. Many resources are available for graduate agribusiness programs. For example, the USDA CSREES Higher Education Programs has funded 202 doctoral students in management and marketing since 1984.²

The 1989 National Agribusiness Education Commission (NAEC) conducted a comprehensive look at the role of agribusiness in agricultural economics programs in the United States.³ The 2003 National Food and Agribusiness Management Education Commission was charged with undertaking a similar task. One measure of doctoral training is the choice of a dissertation topic. Presumably, doctoral students choose to work with faculty that have expertise in their area of interest. Thus, one measure of doctoral programs that have expertise in agribusiness management is the choice of dissertation research by

¹ House, L. and J. Sterns. 2003. "What are Agricultural Economics PhD Students Learning about Agribusiness Research Methods and Subject Areas." *NACTA Journal*, pp.31-35.

² Boland, M.A. and L. Thielen. "Industry Note: The USDA CSREES HEP: Doctoral Fellowships in the National Need of Management and Marketing." *International Food and Agribusiness Management Review*, 7,1(2004): 67-69.

³ Downey, W.D., ed. 1989. *Agribusiness Education in Transition: Strategies for Change*. Report of the National Agribusiness Education Commission, Lincoln Institute of Land Policy, Cambridge, MA.

graduate students. In this paper, we look at dissertation topics over time. In particular, we segment dissertation topics into 14 different subject categories and compare these over the 1951 to 2002 time period. Three categories are likely to be highly correlated with whether a department has expertise in doctoral training of agribusiness management faculty. These categories are agribusiness management, food business, and industrial organization.

Description of the Data

The American Agricultural Economics Association (AAEA) has published graduated doctoral students and dissertation titles and subject categories every year since 1951 in the *American Journal of Agricultural Economics* (previously called *Journal of Farm Economics*). This was not done in 1979 and 1980 as these were published in the AAEA newsletter.⁴

Using those sources as well as a database provided by AAEA and University Microfilms International in Ann Arbor, Michigan, we compiled a list of individuals who have received doctoral degrees in agricultural economics programs in the United States since 1951. Several issues were apparent as we began creating the database. There was some duplication in names in the databases and in some cases masters student names were listed in the journal as having received doctorates. In some years, departments did not report any doctoral students as having graduated even though they did, in fact, have students graduate. When we found universities that did not report graduated doctoral students in a given year, we contacted them for a list of students that graduated that year.

⁴ We greatly appreciate the assistance of Louise Letnes at the University of Minnesota's Waite Library for providing us copies of the back issues of the AAEA newsletter for these two years.

Another issue was what departments to include in the data. For example, Montana State University reported graduating doctoral students between 1966 and 1978 but does not currently have a PhD program. Similarly, South Dakota State reported two doctoral students. We elected to include departments that have clearly delineated agricultural economics programs with faculty that have published agricultural economics research over time, which meant that we included schools such as Montana State and South Dakota State University.

The resulting data set has 8,109 graduated doctoral students since 1951. We were unable to get a complete data set prior to 1951 and thus, used that date as our cutoff. The list of schools is shown in Attachment A. We analyzed the data using the 1951 to 2002 and the 1993 to 2002 time periods. The latter 10-year period was chosen because the NAEC announced its findings in 1989. Any changes to doctoral programs were likely to have been implemented in the early 1990s and it would take a graduate student three years to complete his or her dissertation.

Classification of Doctoral Research Subject Categories

Attachment B has the subject categories for the doctoral research categories that were used to segment the dissertations. In addition to AAEA's 12 subject categories, we created two additional categories and titled them Agribusiness Management and Food Business. Agribusiness management is typically "lumped" with marketing or finance in studies of graduate programs.⁵ We wanted to measure the influence that agribusinesses had on the choice of a dissertation topic. If an agribusiness or food business supplied primary data for a

⁵ For example see Figure 2 in Heiman, A., J. Miranowski, D. Zilberman, and J. Alix. "The Increasing Role of Agribusiness in Agricultural Economics." 2002. *Journal of Agribusiness* 20:1-30.

research topic, it would suggest that the doctoral advisor and doctoral student had an active relationship with that agribusiness firm.

Agribusiness Management was defined as application of economic concepts using data on agribusinesses that resulted in research with implications for agribusiness managers. These dissertations were typically categorized in the Agricultural Product or General subject categories by AAEE. Examples of these dissertations include cost functions for dairy processing, fertilizer, grain processing or similar plants where the results helped provide some guidance for managerial choice of inputs. Other examples include research on cooperative managers and directors regarding equity management and other policies, management simulation models, and optimal plant location and transportation models.

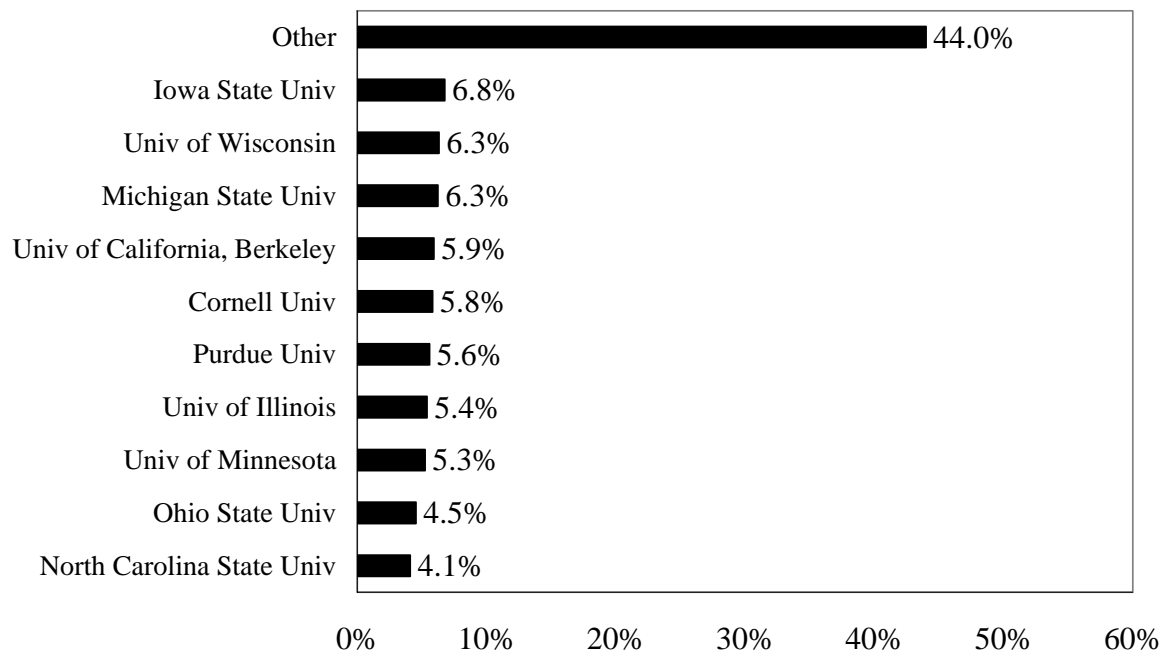
Food Business was defined similarly except that the application of economic concepts was used on food and consumer wholesalers and retailers. Examples of these dissertations include optimal retail supermarket locations, store layout design, and retail cut flower and supermarket merchandising and promotion issues.

Overview of Doctoral Programs

Figure 1 shows the 10 leading doctoral programs over time. Iowa State, University of Wisconsin, and Michigan State University each had more than 6 percent of all graduated doctoral students in our data. The number of graduated doctoral students over the past 10 years is shown in Figure 2. University of Illinois and University of California, Berkeley, replace Iowa State and University of Wisconsin in the list of top 10 programs. One interesting fact is that there is more decentralization in doctoral programs over the past 10 years. For example, the top four programs graduated 25 percent of all doctoral students from

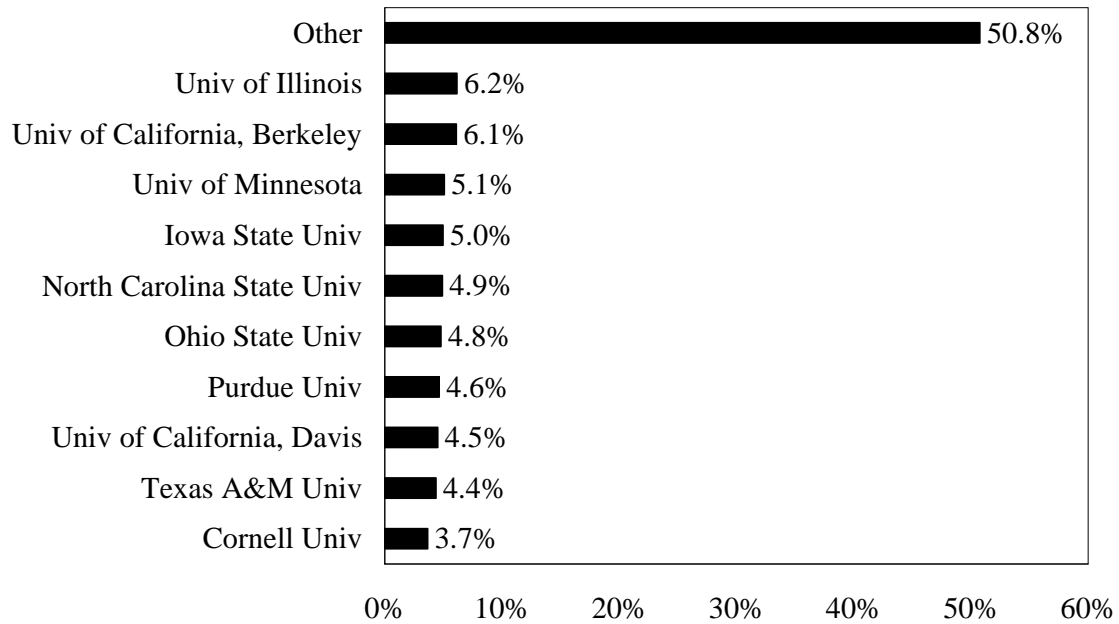
1951 to 1992 but only 23 percent from 1993 to 2002. Similar trends exist with regard to the top eight and top 20 schools for these two periods. However, the top 20 programs graduated 82 percent of all doctoral students in agricultural economics over the 1951 to 2002 time period (Figure 3) and 77 percent over the 1993 to 2002 time period.

Figure 1. Leading Doctoral Programs in Agricultural Economics,
1951-2002 (N=8,109)



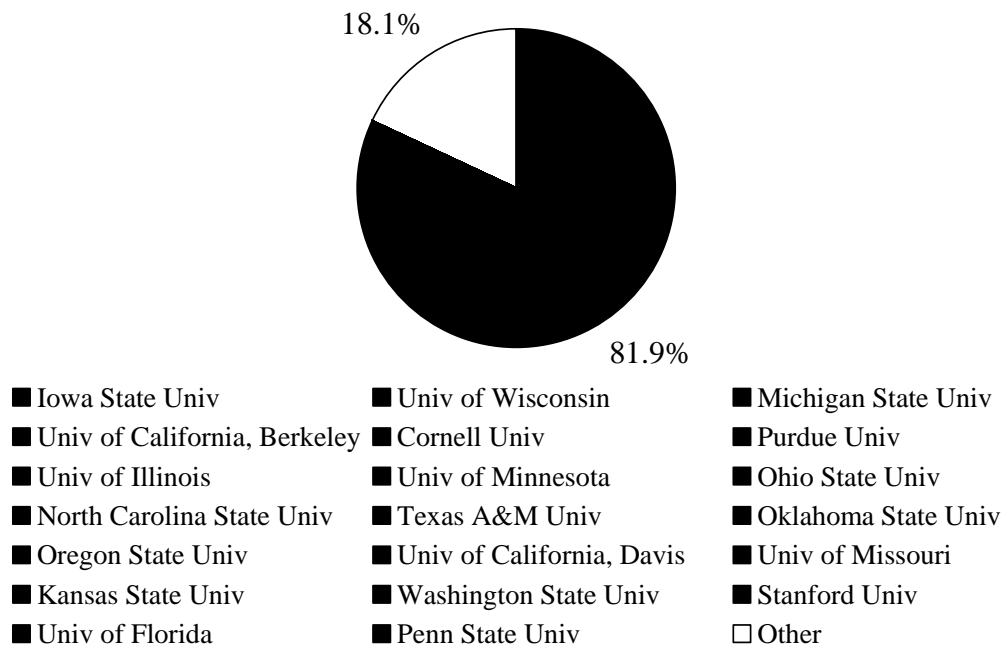
Source: National Food and Agribusiness Management Education

Figure 2. Leading Doctoral Programs in Agricultural Economics, 1993-2002 (N=1,832)



Source: National Food and Agribusiness Management Education Commission

Figure 3. Percentage of Graduates from the Top Twenty Schools, 1951-2002 (N=6,640)



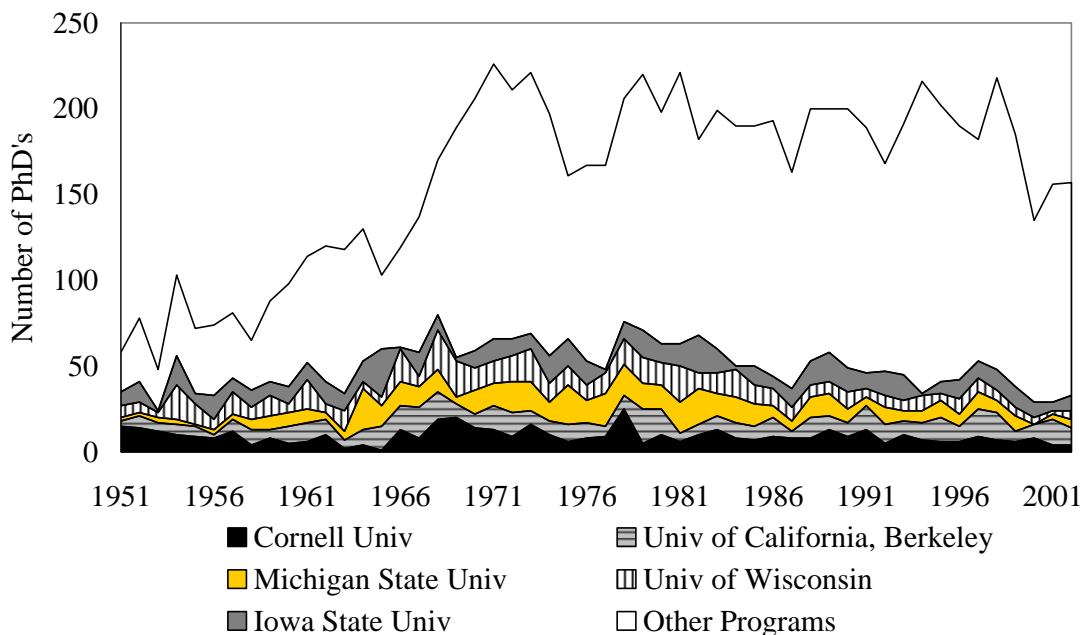
Source: National Food and Agribusiness Management Education Commission

The total numbers of doctoral students as well as the four leading schools are shown in Figure 4. It is interesting to note that doctoral graduates more than doubled from 1966 to 1975 and have remained somewhat constant until 2000 in this data with an average of 216 doctoral students graduating each year from 1980 to 2000.

Subject Categories

Figures 5 and 6 show the subject categories in doctoral programs for the two time periods. Economic Development has remained the leading dissertation subject category chosen by doctoral students over time. It is interesting to note that three categories, Agricultural Products, Production Economics, and Economic Development, have accounted for 47.5 percent of all dissertation topics since 1951 and when Natural Resources, Agricultural and Food Policy, and Agricultural Inputs are included, this figure is 76.8 percent.

Figure 4. Leading Doctoral Programs Over Time, 1951-2002



Source: National Food and Agribusiness Management Education

Figure 5. Subject Categories in Doctoral Programs, 1951-2002 (N=7,998)

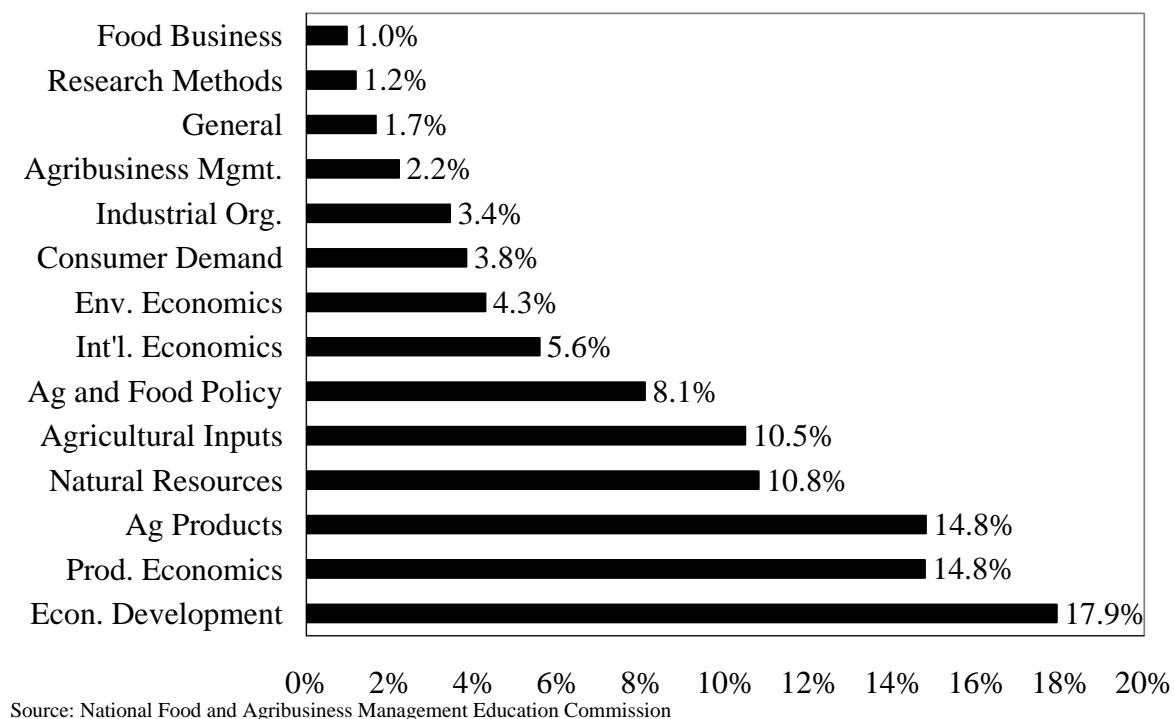
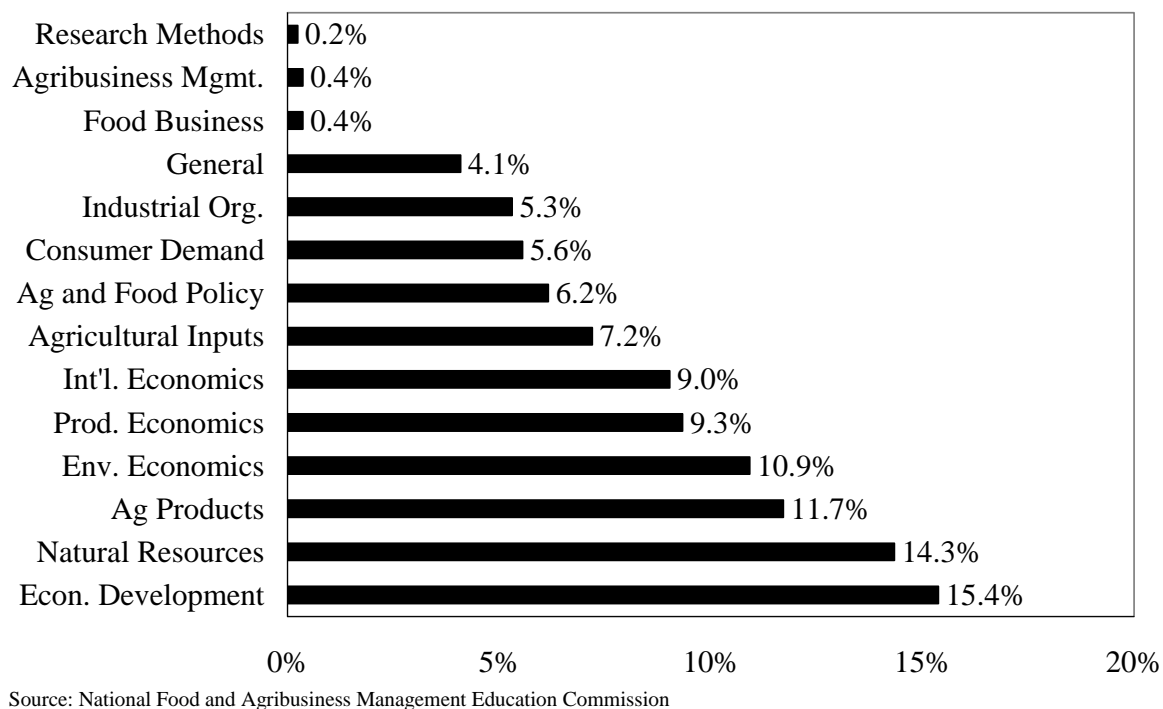


Figure 6. Subject Categories in Doctoral Programs, 1993-2002 (N=1,639)



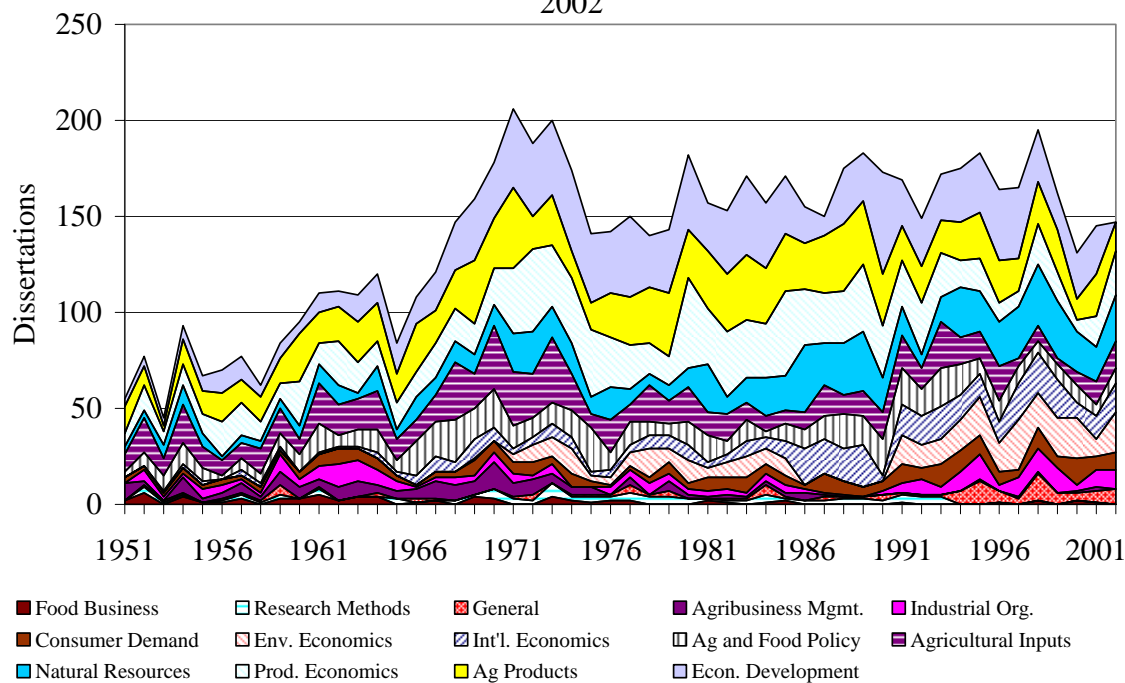
In the past 10 years, Natural Resources and Environmental Economics appear in the top five most chosen dissertation categories. The top three categories account for only 41.4 percent of all subject categories indicating that other subjects have become popular in the past 10 years. These other subjects include Industrial Organization, Consumer Demand, and International Economics, which includes trade.

Figure 7 shows the subject categories over time. It is difficult to make many generalizations. However, Production Economics was very popular in the 1970s and less so today as a dissertation topic. Agricultural Products, which includes marketing, and Economic Development remain consistently popular. International Economics began its growth in the mid-1980s. Environmental Economics emerged in the late 1960s and early 1970s while Natural Resources has steadily increased in popularity since 1951. The active involvement of agribusinesses in doctoral research topics has declined as evidenced by Agribusiness Management and Food Business' decrease in popularity since 1985.

Agribusiness Management, Food Business, and Industrial Organization

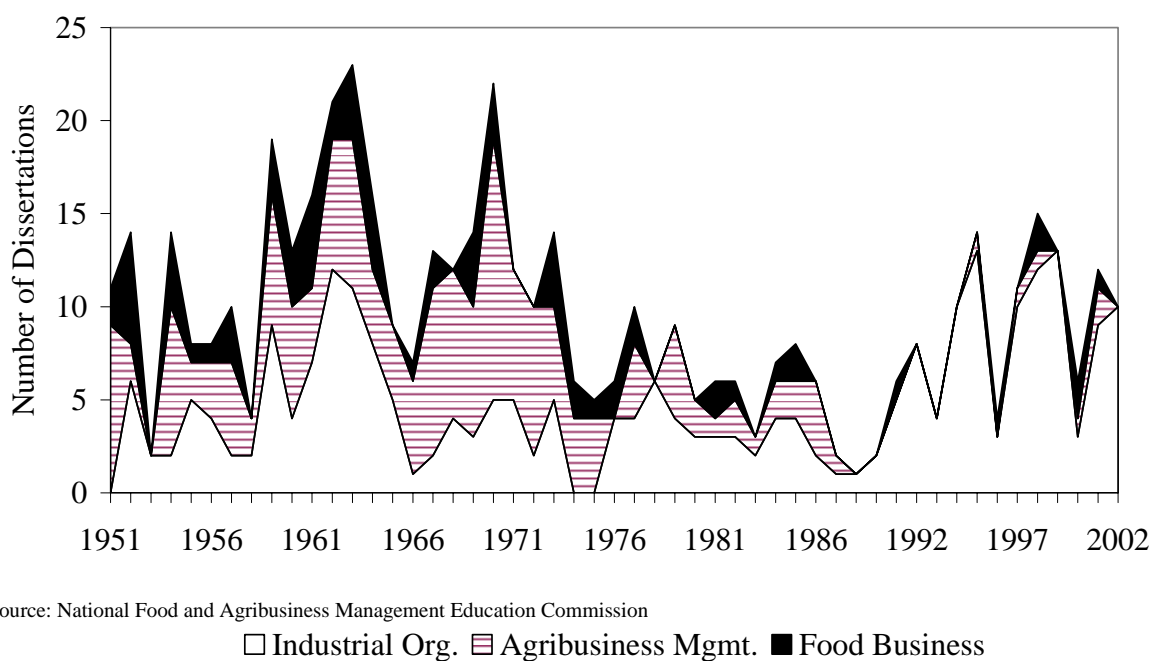
We identified 493 dissertations that were in the Agribusiness Management (172), Food Business (72), and Industrial Organization (249) subject categories. Agribusiness Management and Food Business were important subject categories in the 1950s, 1960s, and 1970s, but by the mid-1980s had decreased significantly with only a handful of dissertations in each of these categories from 1987 to 2002 (Figure 8). In contrast, dissertations in Industrial Organization had increased significantly in the 1990s. A summary of the dissertations is presented below followed by a general discussion of the results.

Figure 7. Subject Categories in Doctoral Programs Over Time, 1951-2002



Source: National Food and Agribusiness Management Education Commission

Figure 8. Agribusiness Management, Food Business, and Industrial Organization Dissertations Over Time, 1951-2002



Source: National Food and Agribusiness Management Education Commission

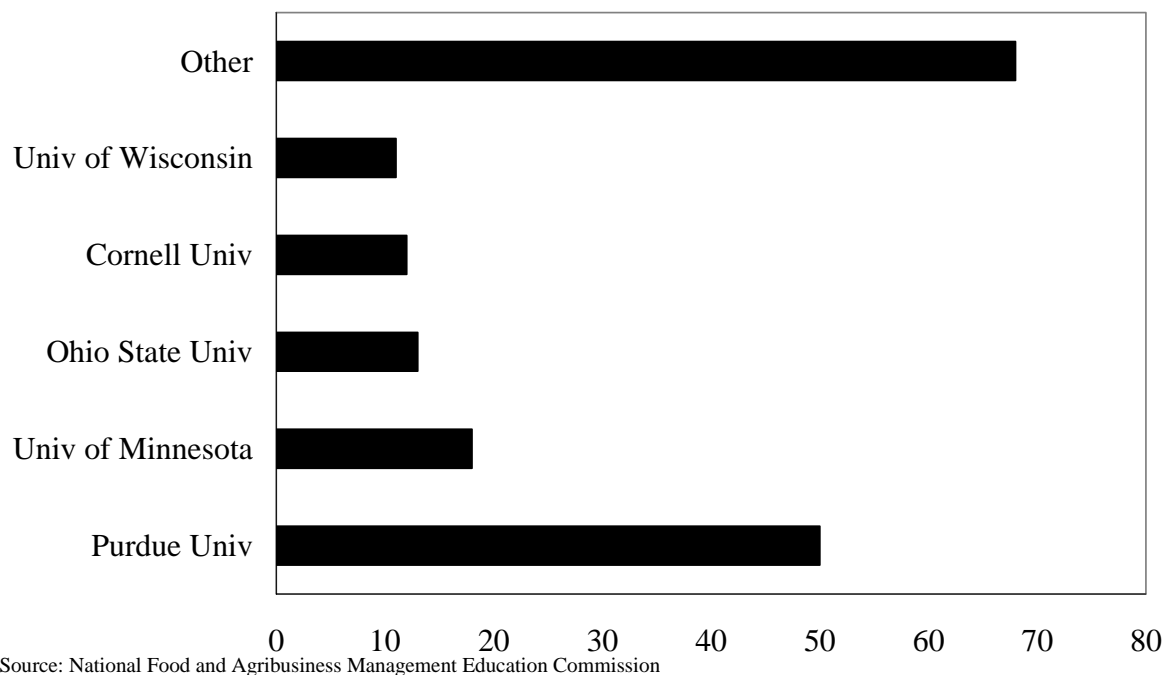
Agribusiness Management

Figure 9 shows the number of dissertations in Agribusiness Management by leading universities over time. Purdue University, University of Minnesota, Ohio State University, Cornell University, and University of Wisconsin accounted for 60.5 percent of the 172 dissertations from 1951 to 2002. Purdue University had nearly three times as many dissertations as Minnesota and Ohio State and four times as many as the other two universities in that figure.

Food Business

Figure 10 shows the number of dissertations in Food Business by leading universities over time. One-third of those dissertations were completed at Cornell University. Other universities that had more than 10 dissertations included The Ohio State University and

Figure 9. Number of PhD Graduates with Agribusiness Management
Dissertations from Leading Programs, 1951-2002

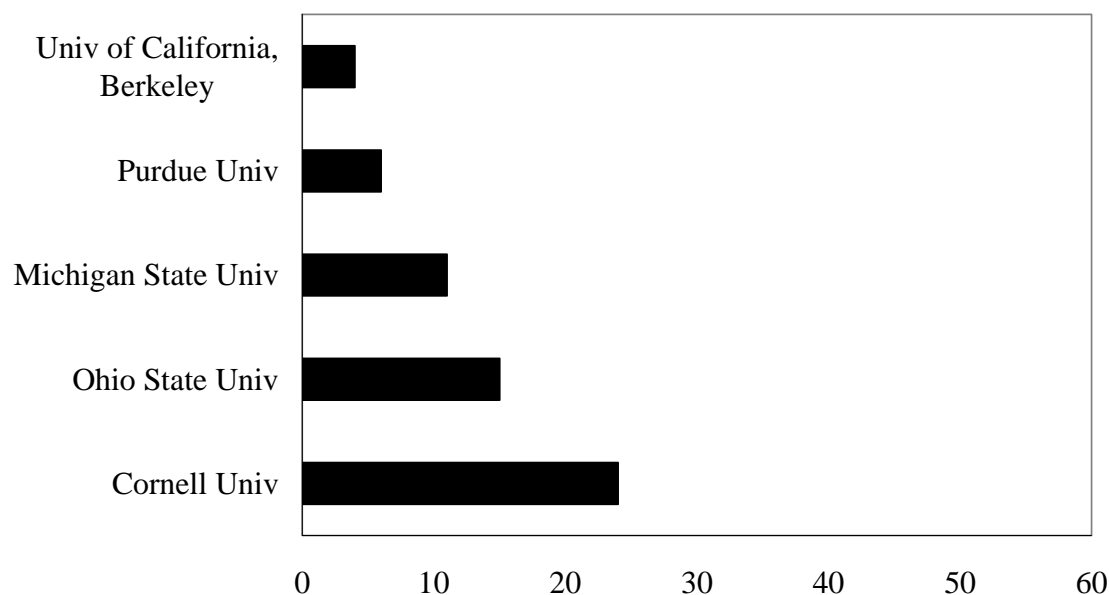


Michigan State University. Cornell and Michigan State have had the most consistency over time with dissertations completed in each of the five year intervals from 1951 to 2001.

Industrial Organization

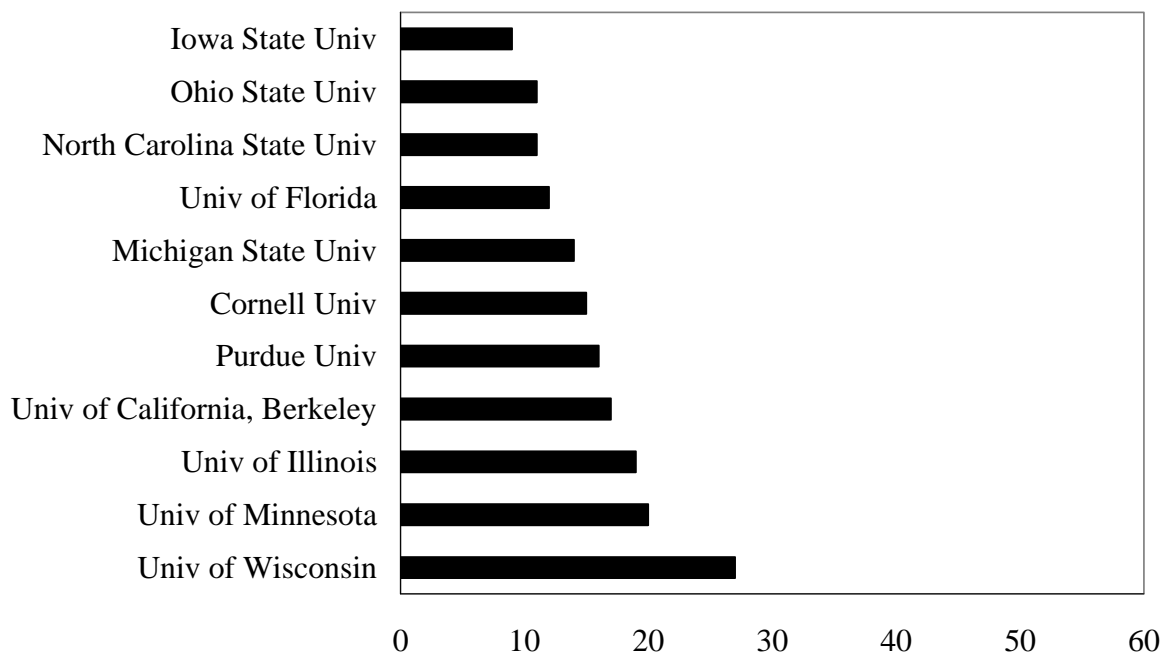
Figure 11 shows the number of Industrial Organization dissertations completed in the leading programs since 1951. This subject category is much more diverse with regard to universities. The University of Wisconsin, University of California, Berkeley, University of Illinois, and University of Minnesota comprised one-third of the dissertations in our data. However, many other schools have had dissertations in this subject as well. As noted earlier, the data can be somewhat misleading. For example, two-thirds of the dissertations at Wisconsin were completed prior to 1980. Similarly, two-thirds of Minnesota's dissertations were completed prior to 1970. Nine of the University of Illinois' dissertations were completed in the past 10 years. Similarly, the University of Connecticut has graduated seven students in this subject category since 1991 and three-fourths of North Carolina State's dissertations have been completed in the last 10 years.

Figure 10. Number of PhD Graduates with Food Business Dissertations from Leading Programs, 1951-2002



Source: National Food and Agribusiness Management Education Commission

Figure 11. Number of PhD Graduates with Industrial Organization Dissertations from Leading Programs, 1951-2002



Source: National Food and Agribusiness Management Education Commission

Discussion of the Results

There are several key results from this analysis.

Lack of Agribusiness Management and Food Business Dissertations since 1986

Agribusiness management is the third most required course in agricultural economics programs in the United States.⁶ The ability to teach agribusiness management courses has been frequently mentioned in recent years in job announcements. The USDA CSREES HEP has declared management and marketing to be an area of national need with regard to its fellowships program. It has funded more than \$4 million in fellowships in these areas since 1984.

Despite these resources, agribusiness management, food business, and industrial organization represented only 6.6 percent of all agricultural economics dissertations over the 1951 to 2002 time period. And, since 1986 when the NAEC began its work, agribusiness management and food business dissertations have been almost non-existent relative to other subject fields. Wolverton and Downey summarized a survey of NAEC participants in 1999 regarding implementation of the NAEC recommendations.⁷ The recommendation for the creation of PhD programs in agribusiness received the lowest score at 2.7 on a 10-point scale. The authors reported that it was obvious from the respondents' comments that implementation of this NAEC recommendation was frustrating.

⁶ Working Paper #1: A Summary of Undergraduate Curriculum in Agribusiness Management Degrees, National Food and Agribusiness Management Education Commission.

⁷ Wolverton, M.W. and W.D. Downey. 1999. "A Look at Agribusiness Education Since the National Agribusiness Education Commission's 1989 Report: The Lincoln Report Revisited." *American Journal of Agricultural Economics*. 81:1050-1055.

There are several likely reasons for these observations. First, many of the dissertation topics in these two subjects that we analyzed involved operations research or programming models. In past decades, agricultural economists had a competitive advantage in this area and it appears many of these dissertations involved collaborative efforts with industry with regard to problem formulation and data. However, there are fewer firms due to consolidation and many of these activities can now be done in-house rather than at universities. This suggests that agribusinesses may find less opportunities for agricultural economists to help them on research topics.

Second, faculty retirements are likely another issue at universities that have had a long history of supervising dissertations. In many programs, there have been only one or two faculty supervising dissertations in these two subjects. Thus, a retirement can have a great impact on the profession.

Third, uncertainty about the ability to publish agribusiness management and food business research in agricultural economics journals is another variable that has likely contributed to the lack of dissertations in these two subjects in recent years. None of the top 10 journals ranked by department heads in Heiman et al. have a history of publishing agribusiness management or food business research. A dissertation represents a year or more of research effort in graduate school. Given the importance of publishing research, graduate students have likely chosen more traditional agricultural economics topics as a means of generating publications so as to receive tenure.

Fourth, Dooley and Fulton surveyed department heads to learn more about the role of agribusiness in agricultural economics departments.⁸ They found that agribusiness faculty

⁸ Dooley, F.J. and J.R. Fulton. 1999. "The State of Agribusiness Teaching, Research, and Extension at the Turn of the Millennium." *American Journal of Agricultural Economics* 81: 1042-1049.

taught 32.8 percent of the teaching full time equivalents (FTE) were allocated to agribusiness whereas 68.8 percent of the undergraduate students were enrolled in an agribusiness degree or option. Less than 20 percent of the research and extension FTE were allocated to agribusiness. An average agribusiness faculty member had a 49.7, 31.3, and 19 percent teaching, research, and extension appointment. Lack of positions with research opportunities in agribusiness management may discourage graduate students from choosing research topics in agribusiness management.

Importance for Extension Faculty

One interesting result was the importance of agribusiness management, food business, and industrial organization dissertations for faculty with agribusiness management extension appointments. We identified 17 individuals that had at least a 50 percent FTE appointment in agribusiness management extension (primarily cooperatives) who had done a dissertation in one of these three fields.⁹

Limitations of the Analysis

There are some limitations of this analysis. One is our definition of what constitutes an agribusiness management or food business dissertation. Our definition excluded some dissertations in closely related topics such as vertical coordination that are properly classified in Agricultural Products. Our focus was on dissertations that used primary data from agribusinesses and food businesses . It also excludes several dissertations done in

⁹ Working Paper #5: A Summary of Extension Programs in Agribusiness Management and Food Business, National Food and Agribusiness Management Education Commission.

management rather than agricultural economics (primarily at Florida and Illinois). Our rationale for excluding these was that these individuals who completed their dissertations in management have taken jobs in colleges of business rather than colleges of agriculture and their topics were not directly related to agriculture.

It was also evident that faculty with appointments in agribusiness management have written dissertations in other subjects such as finance (classified in Agricultural Inputs), natural resources, and other subjects. We found 31 faculty who are currently teaching agribusiness management courses and had done their dissertation in a field different from the three that we used in this study. About one-third of these faculty began their careers in marketing or farm management. Another third have been hired since 1996. Obviously the correlation between dissertation choice and resulting job are not as strong as one might think. However, given that these faculty have less research FTE's relative to other disciplines may mean that the choice of dissertation subject may not be as important.

Implications for the Future

While the past 15 years may have seemed bleak with regard to doctoral research in agribusiness management and food business topics, we agree with Peter Barry who suggests that agribusiness management research has begun to mature and that a bright future exists for such research.¹⁰ This applies to graduate programs and doctoral training. For example, concepts from management have been used to study vertical coordination in agriculture. Transactions cost theory, agency theory, and property rights theory applications have found

¹⁰ Barry, P.J. 1999. "Where Next for Agribusiness Research and Education? An Organizational Economics Perspective." *American Journal of Agricultural Economics*. 81: 1061-1065.

their way into agricultural economics research. Other examples can be found in the House and Sterns paper.

Fee-based extension programs are becoming more and more prevalent in land grant universities due to budget cutbacks in recent years. Many agribusiness extension programs have long been based on fees and some programs have developed niches in providing education to lenders, managers, and business development specialists. This is likely to make agribusiness management even more important in the future.

Dooley and Fulton reported that 68 percent of the department heads believed that enrollment in agribusiness programs and food industry economics would increase in the next five years. In addition, 36.5 percent of new hires in the past five years have had agribusiness responsibilities. Similarly, 63.2 percent of the department heads reported expecting more agribusiness FTE in the next five years. Many of these new FTE's are due to increased enrollments in undergraduate programs.

The Agribusiness Economics and Management section of the AAEEA has the largest membership of any AAEEA section. WCC-72, the regional research group for agribusiness faculty, has a well attended meeting every year. Agribusiness management faculty plan the largest educational program for directors and managers of cooperatives (e.g., Farmer Cooperatives conference).

It is too soon to know for sure whether agricultural economics faculty accept many of the new advances being made in management research. Programs at universities such as Missouri have invested heavily in agribusiness management by hiring faculty to support its Agribusiness Institute whose research focuses on institutional economics and Minnesota has made significant investment in food business through its Food Industry Center. The payoff is

whether graduates of these programs are hired and tenured in agricultural economics departments.

Attachment A

Dissertations from the following universities were considered in our study: Auburn University, Clemson University, Colorado State University, Cornell University, Iowa State University, Kansas State University, Louisiana State University, Michigan State University, Mississippi State University, Montana State University, North Carolina State University, Ohio State University, Oklahoma State University, Oregon State University, Penn State University, Purdue University, South Dakota State College, Stanford University, Texas A&M University, Texas Tech University, University of California, Berkeley, University of California, Davis, University of Chicago, University of Connecticut, University of Florida, University of Georgia, University of Hawaii, University of Illinois, University of Kentucky, University of Maryland, University of Massachusetts, University of Minnesota, University of Missouri, University of Nebraska, University of Rhode Island, University of Tennessee, University of Wisconsin, University of Wyoming, Utah State University, Virginia Polytechnic Institute and State University, Washington State University, West Virginia University.

Appendix B

Specialization categories used from 2002-1991

- 1 Consumer Demand
- 2 Production Economics and Supply
- 3 Agricultural Products: price analysis, subsector, models, marketing, futures
- 4 Agricultural Inputs: land, labor, finance
- 5 Natural Resources: energy, conservation, land use, water, forestry, fisheries
- 6 Environmental Economics: pollution, regulation, nonmarket valuation
- 7 Agricultural and Food Policy: regulation, taxation, welfare
- 8 Economic Development: developing economies, aid, regional, general equilibrium
- 9 International Economics: trade, integration
- 10 Industrial Organization and Market Structure
- 11 General: teaching, extension, research, methodology, professional
- 12 Research Methods: statistics, econometrics, mathematical programming

Categories from 1990-1987

- 11 Agricultural Economics General; Curricula and Teaching; Extension, Profession
- 4 Agricultural Inputs; Capital, Agricultural Finance; Land Appraisal and Prices; Labor; Human Capital
- 1 Agricultural Products; Demand, Supply, Prices; Food, Consumer, and Household Economics
- 8 Economic Growth and Development; Planning Models, Fluctuations; Technological Change; Aggregate Production Capacity; Regional and Community; Migration
- 9 International Economics; Trade; Integration; Business; Aid
- 10 Marketing; Agribusiness; Cooperatives; Transportation; Industry Organization; Vertical Coordination
- 5 National Resources; Energy; Conservation; Environment; Wastes; Land Use and Tenure; Recreation; Water; Fisheries
- 2 Production Economics and Management; Risk and Uncertainty
- 7 Public Issues and Policy; Agricultural Regulations; Taxation; Inflation, Welfare Programs; Poverty; Regional and Community Development; Education; Health
- 12 Research Methodology; Modeling; Econometrics; Mathematical Programming; Agricultural Data

Categories from 1985-1971

- 11 Agricultural Economics, General
- 4 Agricultural Finance, Capital, Credit
- 8 Agricultural Income; Rural Poverty
- 4 Agricultural Labor; Rural Manpower
- 2, 3 Agricultural Products: Demand, Supply, Prices
- 10 Cooperatives and Cooperation
- 8 Economic Development, Growth, and Planning
- 6 Energy
- 6 Environmental Economics; Conservation
- 5 Fertility
- 1 Food and Consumer Economics
- 4 Human Resource Development

10	Industrial Organization; Market Structure
11	Institutions, Private and Public
3	Marketing and Location
8	Migration
5	Natural Resource Economics
2	Production Economics and Management
7	Public Policy
8	Regional, Rural, and Community Development
12	Research Methodology
8	Sector and Subsector Analysis
8	Socioeconomic Research
4	Taxes, Taxation, and Rural Appraisal
2	Technological Change
9	Trade
4	Land Tenure
8	Regional Economics
3	Transportation
12	Agricultural Data
11	General Economics
5	Fisheries Economics
5	Land Economics
5	Pesticides