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Regional Trends in Extension System Resources

Mary Ahearn, Jet Yee, and John Bottum

Abstract

In 1914, the Cooperative Extension Service was established to disseminate information about agriculture and home economics from land-grant universities to the U.S. public. At that time, about 30 percent of U.S. workers were in agriculture-related occupations; by the late 1990s, that share had declined to about 1 percent. Today, the Extension System (“Extension”) is largely publicly funded and links the educational and research arms of the U.S. Department of Agriculture, land-grant universities, and related institutions. The system has changed along with its audience. The number of full-time-equivalent Extension personnel dropped by 12 percent from 1977 to 1997, with the largest declines found in community resource development and 4-H youth programs, two of the four main Extension program areas. (The other two programs are agriculture and natural resources, and home economics and human nutrition.) Regional personnel FTE allocation patterns were mostly similar to the national ones.

Keywords: Cooperative Extension Service, Extension, full-time-equivalent, FTE, agricultural productivity, Smith-Lever Act of 1914, research and development, land-grant universities.

Authors

Mary Ahearn and Jet Yee are economists with the Economic Research Service, USDA. John Bottum is retired. He was formerly with the Cooperative State Research, Education, and Extension Service, USDA.

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Introduction

The Extension System's mission, which has been expanded several times since its 1914 founding, is to deliver information to the American public through links among USDA's Cooperative State Research, Education, and Extension Service (CSREES), land-grant universities and colleges, and most of the approximately 3,000 counties in the United States. Educational information that benefits the public at large, such as information that enhances environmental quality and food safety, is likely to be undersupplied by the private sector. The nature of such information makes it difficult to place a value on it. Those charged with allocating resources to the Extension System and those with the responsibility to allocate Extension resources among competing program areas face a difficult challenge.

This report describes how Extension resources were allocated across major program areas and major regions of the country from 1977 to 1997. These data have not been readily available, in contrast to data for research activities. Data on Extension full-time equivalent personnel (FTEs) are valuable for many of the reasons indicators of inputs into the research process are valuable, such as program evaluation, analysis of budget allocations, and rates-of-return estimation on investments in Extension.

Mission

The 1914 Smith-Lever Act established the Cooperative Extension Service as a response to the need to disseminate information generated by the land-grant universities to the American people. The law has been amended several times to broaden the purposes of Extension and to alter its funding mechanisms. The original mission of the Extension Service was:

"... to aid in diffusing among the people of the United States useful and practical information on subjects relating to agriculture and home economics, and to encourage application of the same ..." (NASULGC, 2001).

When the land-grant universities were founded, in 1862 and 1890, most of the U.S. population lived on farms. When the Extension Service was established in 1914, its focus was on agriculture and mechanical arts. Extension was organized on a State-by-State and coun-

ty-by-county basis, with Extension offices in nearly all of the Nation's approximately 3,000 counties. The "cooperative" in the service's title is a reference to its funding, which was and is provided by local, State, and Federal sources. When the Cooperative Extension Service was created, about 30 percent of U.S. workers were employed in farming. Only about 1 percent of the hired workforce is in farming today. Consequently, the Extension mission has broadened considerably over time, as reflected in a statement of its mission by the National Association of State Universities and Land-Grant Colleges (NASULGC, 2001):

"... to enable people to improve their lives and communities through learning partnerships that put knowledge to work."

In the late 1980s, the Extension System shifted from a focus on audience to a focus on issues. The issues were derived from seven "base programs": 4-H and Youth Development; Agriculture; Community Resources and Economic Development; Family Development and Resource Management; Leadership and Volunteer Development; Natural Resources and Environment Management; and Nutrition, Diet, and Health. Extension also launched several national initiatives, in which nearly all States participated. The new focus required much more cooperation between Extension staff and staff of other agencies, as well as a much higher level of organization to successfully resolve issues. In 1994, 19 percent of Extension FTEs were devoted to national initiatives that included water quality, youth at risk, food safety and quality, sustainable agriculture, and communities in transition.

Extension's efforts to reinvent itself in the past two decades are exemplified by the 1987 Report of the Futures Taskforce to the Extension Committee on Organization and Policy (ECOP) and in a 1997 initiative intended to help it become a more relevant, dynamic, and flexible organization (NASULGC, 2001).

Funding

The current Extension System is a cooperative effort among Federal, State, and local government units. Funding is derived from each source to address priority issues identified by all three levels of government, or their representatives. There have been considerable shifts in funding in recent times, and we would expect funding shifts to be reflected in program priorities over

time. Currently, the major funding source for Extension is the States. In 2000, 49 percent of the total \$1.7 billion that supported the Extension System was from the States (USDA, CSREES, 2001). The Federal share was 24 percent, and the local share was 27 percent.¹ But the Federal share has historically been larger. In 1977, the Federal component of Extension funding was 42 percent, with the State share being 38 percent and the local 20 percent (USDA, CSREES, various years).

The Federal contribution is composed of formula funds, allocated primarily by the farm and rural populations of States, and earmarked funds. In recent times, the share of formula funds has decreased and the share of funds earmarked by Congress has increased. Changes in Federal support for Extension have not been identical to changes in Federal support of research. In the early 1970s, Federal support for Extension exceeded Federal support for research at land-grant institutions (in absolute terms).² By the end of that decade, the reverse was true. The Federal share of funding State research and development activities in 2000 was 33 percent, compared with 24 percent for Extension.

Performance Indicators

Over the past decade, the U.S. Department of Agriculture and the land-grant educational system have been challenged to pay closer attention to priority setting and accountability, as required by the 1993 Government Performance and Results Act (GPRA). GPRA requires that federally funded entities, such as the Extension System, develop and implement an accountability system based on performance measurement. USDA developed five issue-oriented goals under GPRA—an agricultural production system that is highly competitive in the global economy; a safe, secure food and fiber system; a healthy, well-nourished population; greater harmony between agriculture and the environment; and enhanced economic opportunity and quality of life. In their annual reports on Extension

¹The local share includes 6.6 percent classified as “nontax” sources. Nontax sources are nongovernmental funds, such as private donations.

²This includes funding of the following non-Federal institutions: Experiment Stations, 1890 institutions, schools of forestry, veterinary colleges, and other cooperating institutions.

activities, States are asked to group their Extension activities under these goals.

The Federal Agriculture Improvement and Reform Act of 1996 (FAIR, or the Farm Bill) and the Agricultural Research, Extension, and Education Reform Act of 1998 reinforced the move to performance-based management, using indicators of inputs, outputs, outcomes, and processes. In the case of the Extension System, indicators would include: work assignments for full-time-equivalent Extension personnel (input); an Extension program’s outreach to a group of farmers (output); a change in behavior by Extension information recipients that resulted in an improvement in their quality of life or the quality of the environment (outcome); and a measure of the extent to which the views of stakeholders were solicited in the planning and evaluation processes (process). The measurement of the indicators becomes more complex as one moves from each indicator to the next.

The recent history of measuring performance of public information programs extends back at least to 1976 with the National Research Council’s report on statistical priorities (NRC, 1976). In that report, the panel argued that statistical budgets should be subject to the tools of benefit-cost analysis. This generated a controversy about the feasibility of measuring the benefits of publicly produced information. In another NRC study in 1985, the panel concluded that a formal benefit-cost analysis could not be conducted for a public information system on natural gas. In fact, they argued that the principle of benefit-cost analysis applied to public information systems in general had been “counterproductive” (NRC, 1985).

A significant amount of conceptualization has already been invested in this measurement challenge as it applies to investments in Extension, and this report makes no attempt to summarize it (e.g., Ladewig, 1999; Accountability Task Force, 2001b). An example of this type of effort is available from the Institute of Food Science and Agricultural Sciences, Program Development and Evaluation Center, University of Florida, at <http://pdec.ifas.ufl.edu>. Examples of Extension indicators for four Southern States (Florida, Virginia, Mississippi, and Texas) also are available (Accountability Task Force, 2001a).

Technical economic analysis may also contribute to an understanding of performance indicators for informa-

tion dissemination and educational investments. The relevant economic literature includes:

- The well-developed literature on the rates of return to investments in formal education in terms of salary levels (Willis, 1986).
- The literature on technology adoption and diffusion (Griliches, 1957; Rogers, 1995).
- The literature on the role of formal education in agricultural profitability (Huffman, 1976).
- The literature on the role of Extension in agricultural productivity (Huffman and Evenson, 1993).

The latter literature focuses directly on Extension and was the motivation for developing the data series described here. The traditional activity of Extension is to reduce the time lag between development of new agricultural technologies or information and the application of that information for enhancing productivity. Consequently, economists have devoted some effort to measuring the impact of Extension on agricultural production and to estimating the rate of return to Extension activities (Huffman and Evenson, 1993; Yee et al., 2002b).

Empirical evidence on the rate of return to Extension is mixed. Estimates range from 20 percent to over 100 percent (Fuglie et al., 1996). Other studies find a low rate of return to public Extension (Huffman and Evenson, 1993). Huffman and Evenson also find that farmers' schooling is a substitute for Extension, possibly suggesting that Extension has become less important as farmers' education levels have risen over time. Farmers who have more education may be better able to assess the merits of new technology and successfully adapt it to their particular situations without the aid of Extension expertise. However, a major problem in estimating the rate of return to Extension is data-related. The data-reporting system for Extension expenditures is less complete than the one for research expenditures used by USDA, the Current Research Information System (CRIS).

Major Program Areas

The subject areas have changed over time, but from the late 1970s to the 1990s, the time period examined here, Extension program areas can be classified into four major program areas. They are: Agriculture and Natural Resources; Community Resource

Development; 4-H and Youth Development; and Home Economics and Human Nutrition.

Agriculture and Natural Resources. Agriculture remains the largest program area of Extension and other parts of the USDA land-grant system. An argument can be made that this most traditional of all Extension programs is losing its public support. Many private sector firms now offer production-related information to agricultural producers, and this will likely only expand in the future as farms increase in size. USDA regularly surveys agricultural producers to determine the sources of information they use in making their pest- and waste-management decisions. The most common source of information for pest management is private chemical dealers, but this varies by commodity. Chemical dealers were the major source of advice to wheat producers for 58 percent of wheat acres in the mid-1990s (Padgett et al., 2000). Extension personnel were the major source of advice for wheat producers for only about 16 percent of the wheat acres. The other sources, such as private crop consultants and media sources, accounted for the remaining wheat acres.

The share of acres where Extension provided the major source of pest-management advice varied across commodities: 10 percent for cotton, for example, and 22 percent for grapes. However, because of the large share of acres in the major row crops of corn, soybeans, and wheat, most of Extension's pest-management advice is focused on those commodities nationwide. In a Gallup survey of large farms, Extension was reported to have a significant influence on farmers' buying decisions only 28 percent of the time (Association of Leading Ag Media Companies, 2001). Extension's influence was stronger in lower income households and among farmers over 50 years old.

What the studies that report increases in private-company sources of information for individual producers do not show is the amount of education and information provided to the private sector (media, consultants, and chemical companies) by the Extension System. In fact, many agricultural-products companies rely on Extension to serve as an objective supplier of information, and as a check on the agribusiness and agricultural media that supply information on agricultural production and marketing options. In addition, as intellectual property rights protect more research results, the role of Extension in educating all interested parties, not just those willing to pay, is becoming more important.

We have grouped natural resource programs into this category because of the overlap between the two areas. For example, adoption of conserving farm production practices could be classified in either category. It would have been instructive to monitor resources over time in separate categories for agriculture and natural resources, but any distinction would have been arbitrary and perhaps misleading. Extension information and activities in the natural resource area are likely to be beneficial for the public but their impact is difficult to measure. This is especially true for agricultural practices that are viewed as sustainable and for which there is little profit motive for the private sector.

Community Resource Development. Extension activities in the area of community resource development are important both in communities with economies dependent on agricultural production activities and those with nonagricultural economies. This likely reflects the local leadership and financial support of the Extension System, in contrast to the research arm of the land-grant system. Social scientists such as economists and sociologists dominate Extension activities in community development.

4-H and Youth Development. Traditional 4-H programs for youth are focused on agricultural production activities. However, the overarching goal of all youth programs, both agricultural and nonagricultural, is youth development.

Home Economics and Human Nutrition. Home economics and human nutrition Extension programs are targeted to all issues that affect all populations, and rely significantly on the expertise of consumer economists and nutritionists. This program area also includes programs associated with food safety.

Data and Methods

Historically, measures of inputs, especially expenditures and staff years, have been the main focus of Extension information management. Input measurement will continue to be important in more modern systems of evaluation in order to determine the efficiency of those inputs relative to the outcomes. The expectation is that this information will facilitate program managers' evaluations of how closely the resource allocation for Extension matches its stated priorities. One indicator of the focus of Extension activities is the allocation of personnel to various pro-

gram areas. Unlike the allocation for research expenditures in the land-grant system captured in CRIS, no easily accessible information system exists for Extension full-time-equivalents. There are good reasons for this. One is that it is harder to determine exactly how Extension experts allocate their time, because they are likely to work on multiple issues on a daily basis, compared with researchers, who are more likely to dedicate longer time periods to single issues. Consequently, the historical trend information is piecemeal, and must be assembled from a variety of published and administrative documents. The data we have assembled here for total FTEs in a State are for 1977 to 1997. However, the State data for each of the four program areas only cover 1977 to 1992. See more detailed data information at <http://www.ers.usda.gov/data/Extension/index.html>.

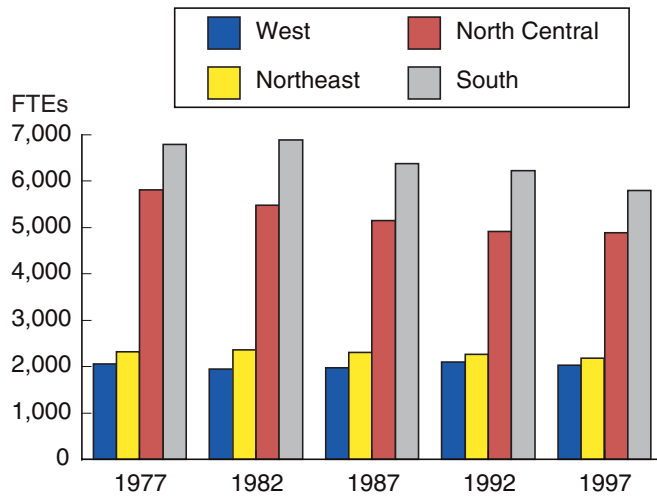
Results for Total Extension FTEs

The total Extension FTEs in the United States (excluding Alaska and Hawaii) for 1997 were 14,890, compared with a total of 16,990 in 1977—a 12-percent decline. The year-to-year changes over the two decades were always modest at the national level. The greatest changes on a year-to-year basis were between 1982 and 1987. These temporal trends in Extension FTEs varied across the regions (see fig. 1)³ and the States. Nearly three-quarters of the Extension FTEs are in the two regions that had the greatest declines in FTEs over the period. The North Central region had a 16-percent decline in Extension FTEs, and the South had a 15-percent drop. In contrast, the West had a 2-percent decline, and the Northeast had a 6-percent decline. From 1982 to 1992, the West actually experienced some increases in Extension FTEs, although like the other three major regions, Extension FTEs declined between 1992 and 1997. Seventeen States had more Extension FTEs at the end of the study period, 1997, than at the beginning, 1977. The greatest increase in FTEs, both in absolute terms and as a percentage change, was in Montana. Illinois had the greatest decline in the number of Extension FTEs between 1977 and 1997, with a decrease of 318.5 FTEs, from 778.5 to 460.0. Vermont had the greatest decrease as a percent of the 1977 FTEs, with a 56.8-percent decline in FTEs by 1997.

³Regions were defined as follows: Northeast—ME, VT, NH, RI, CT, NJ, DE, MD, PA, WV, NY, and MA; North Central—ND, SD, NE, KS, MO, IA, MN, IL, WI, MI, IN, KY, and OH; South—FL, GA, SC, NC, VA, TN, AL, MS, LA, AR, OK, and TX; West—WA, OR, CA, ID, NV, UT, AZ, MT, WY, CO, and NM.

Figure 1

Regional distribution of Extension FTEs



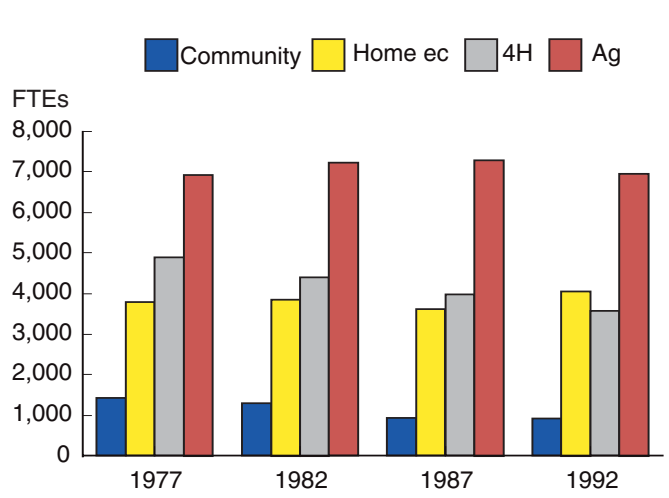
Results for Extension FTEs by Program Area

The declines in the total FTEs between 1977 and 1992 were not evenly distributed across the four major program areas (fig.2). Agriculture and Natural Resources had modest increases in FTEs (30.3), and Home Economics and Human Nutrition had an increase of 253.4 FTEs. Community Resource Development had a decrease of 488 FTEs, and 4-H and Youth Activities had a decrease of 1,320.4 FTEs. This is in contrast to inputs into research in the land-grant system. Although there is a somewhat different set of program area categories for research, the 1995 land-grant study reported that there was little change in the distribution of expenditures across program areas from 1972 to 1992 for the 1862 institutions (NRC, 1995).

Agriculture and Natural Resources was the largest program area in terms of FTEs at the beginning and the end of the period. In 1992, Agriculture and Natural Resources had 6,959 FTEs, or nearly half (45 percent) of the total Extension FTEs. At first glance it is surprising that the Agriculture and Natural Resources area continues to utilize such a large share of the FTEs in Extension, given the increase in private-sector provision of information about agriculture production decisions. However, some justify public investment in private decisions on efficiency grounds, namely that society benefits from a more efficient system resulting in cheaper food. In addition, some justify public investment in the belief that helping small farmers to make good farming decisions allows society to benefit from a system of agriculture with many small farms. It may

Figure 2

Program area distribution of Extension FTEs



be true that if it were possible to accurately separate out agricultural Extension activities more finely to identify potential public-good outcomes, e.g., those that reduce environmental externalities, much of the increase would be associated with those activities. However, that type of analysis is beyond the scope of this report.

In 1977, more FTEs were dedicated to 4-H and Youth Activities than to Human Nutrition and Home Economics. By 1992, the reverse was true. That decline in 4-H and Youth FTEs has been relatively steady. By 1992, this program area accounted for 23 percent of total FTEs at the national level. Although the mission of the Extension 4-H programs has generally been perceived to be broadened to include non-farm youth, the FTEs dedicated to it have not matched this broadened mission. Perhaps this is because there are viable alternative sources of youth development activities outside of the farm community. In contrast, the Human Nutrition and Home Economics program areas of Extension have experienced increases in FTEs, both in absolute numbers and the share of total FTEs. In 1977, 22 percent of the FTEs were dedicated to this program area, compared with 26 percent in 1992.

The Extension FTE trends also indicate that the smallest of the program areas, Community Resource Development, got smaller from 1977 to 1992. In 1977 there were 1,416 FTEs (or 8 percent of total FTEs) devoted to this program area, and in 1992 there were 924 FTEs (or 6 percent of total FTEs). Perhaps this is

the result of a declining portion of the population living in rural areas. In 1977, 28 percent of the U.S. population resided in nonmetropolitan areas, compared with 20 percent in 1992. The greatest decline in FTEs came between 1982 and 1987, and the number of FTEs was virtually unchanged between 1987 and 1992. It is interesting to note that social scientists dominate this program area. During a 1996 survey of agricultural economists, community development activities were seen as a relatively higher priority for Extension than research was (Ahearn et al., 1997). Perhaps the respondents considered there to be more potential in community development Extension activities than in community development research activities.

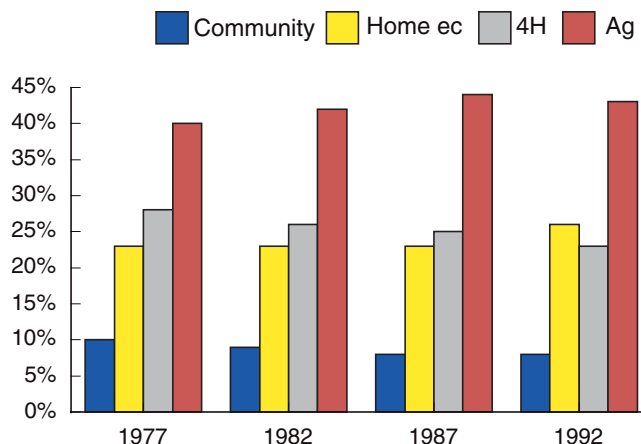
The regional differences by program area are fairly small for the latest time period (1992) for which program area data are available. Of the total FTEs in 1992:

- Agriculture and natural resources varied from 42 percent to 48 percent.
- Home economics and human nutrition varied from 24 percent to 29 percent.
- 4-H and youth activities varied from 22 percent to 23 percent.
- Community resource development varied from 4 percent to 8 percent.

The trends in Extension FTEs by program area in the North Central region (fig. 3) are similar to those described for the national trends. This is true in spite of the fact that a larger share of the population of this region is connected to agriculture in some way. The North Central region accounts for about 40 percent of the farms and farm marketings in the United States. In 1992, there were 434 farms per Extension FTE in the agriculture and natural resources program. This is 1.5 to 2.5 times the number of farms per FTE of the other major regions. A number of factors could account for this allocation, including economies of size associated with the provision of services in the region, but an analysis of factors is beyond the scope of this report. About 8 percent of the FTEs are dedicated to community resource development, which is the highest of all four regions. FTEs dedicated to 4-H and youth activities declined in this region, both in absolute numbers and as a share of the total FTEs in the region.

Figure 3

North Central FTEs by program areas



The Northeast, significantly more urbanized than the North Central region, had a faster decline in FTEs devoted to community resource development and a faster increase in the FTEs dedicated to agriculture and natural resources, than the North Central region between 1977 and 1992 (fig. 4). The Northeast had the fewest farms per Extension FTE of any region. The Northeast had somewhat more FTEs (29 percent) devoted to home economics and nutrition than the other regions in 1992.

About 46 percent of the Extension FTEs in the South (fig. 5) were dedicated to agriculture and natural resources. The South had the smallest share of FTEs devoted to community resource development of all the regions for all the time periods. Extension FTEs went from 439 in 1977 to 278 in 1992. Following the national trend, the share of FTEs devoted to 4-H and youth activities declined slightly and the share devoted to home economics and nutrition increased slightly.

The West had a larger share of Extension FTEs dedicated to agriculture and natural resources than any of the other regions over the entire time period (fig. 6). This may be a result of the relatively more important resource policy issues in this region, e.g., water rights and grazing rights. In 1992, 48 percent of the West's FTEs were in this major program area. Correspondingly, shares of FTEs in the other program areas were slightly less than the national shares.

Figure 4

Northeast FTEs by program areas

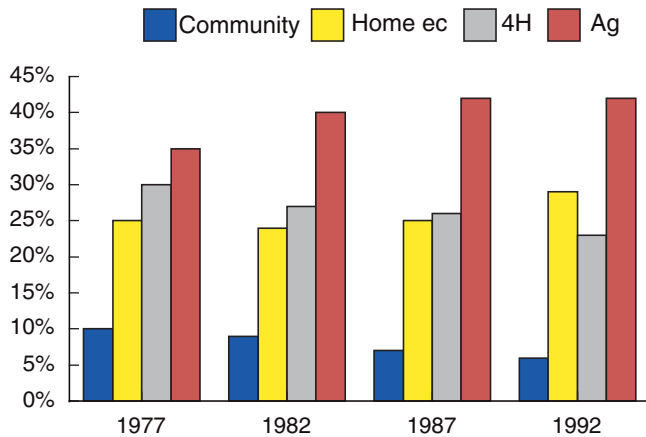


Figure 5

South FTEs by program areas

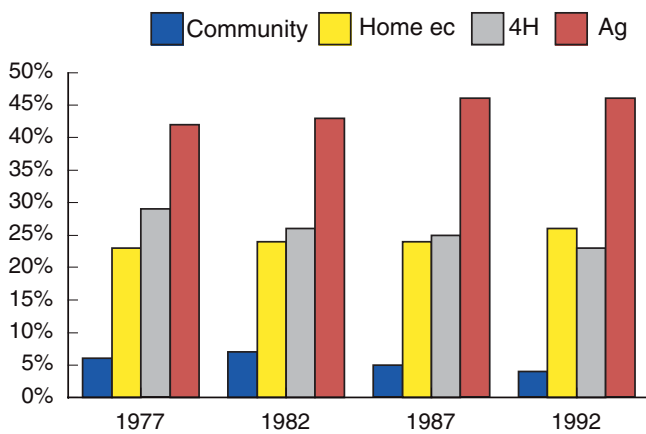
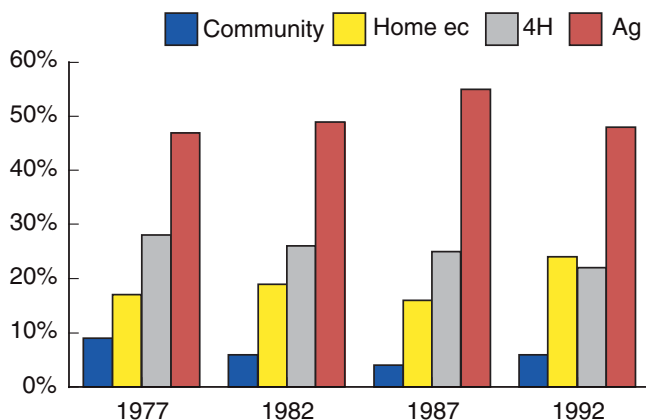


Figure 6

West FTEs by program area



Conclusion

The demand for information as a commodity is derived from its value in reducing uncertainty in decisionmaking processes. Lack of accessible information about technical issues may be an obstacle to addressing a variety of contemporary issues related to the Extension and land-grant system, from obesity and acceptance of genetically modified foods to adoption of sustainable production practices and local land use issues. From that point of view, there continues to be a strong need for the Extension Service, though perhaps with Extension addressing a more diverse set of issues. The National Association of State Universities and Land-Grant Colleges says, “The Cooperative Extension System is constantly changing to meet the shifting needs and priorities of the people it serves” (NASULGC, 2001). As the total number of Extension FTEs has declined in recent decades, the shifts in needs and priorities are mainly reflected by declines in community resource development and 4-H and youth Extension FTEs.

The most useful type of indicator of performance of an educational enterprise, such as the Extension System, is one that measures the desired outcomes of the educational process. Development of outcome indicators will likely continue to challenge administrators of the USDA land-grant system charged with evaluating the benefits of public investments in Extension activities. Input measures are an obvious and important complement to the outcome indicators under construction. Results of technical economic research on the returns to investments in Extension, such as those presented in Yee et al. (2002a) regarding agricultural productivity trends, are likely too aggregated to be useful in short-term and detailed program administration. But they can provide information for long-term systemwide goals. However, without accurate measures of the Extension inputs, such as program area FTEs, the performance-based assessments of Extension cannot be quantified.

References

- Accountability Task Force. "Extension-Related Indicators." Insitutute of Food and Agricultural Sciences, University of Florida,Gainsville. 2001a. Available at: <http://www.ifas.ufl.edu/~atf/doc5.htm>
- Accountability Task Force. "Report of the Accountability Task Force." IFAS. 2001b. Available at: http://www.ifas.ufl.edu/~atf/aftreport/aftrep_bkgrnd.htm, 2001b.
- Ahearn, M., H. Bahn, P. Barry, S. Cordes, T. Hewitt, G. Norton, K. Smith, and A. Thurow. *Views from the Inside: Results of the Survey of AAEA Members on Priorities for Agricultural Economics*, paper presented at the C-FARE conference on Economics Research and Education Priorities, Annapolis, MD, 1997.
- Ahearn, M., J. Yee, E. Ball, and R. Nehring. *Agricultural Productivity in the United States*. Agriculture Information Bulletin No. 740. U.S. Department of Agriculture, Economic Research Service. January 1998. Available at: <http://www.ers.usda.gov/publications/aib740>
- Association of Leading Ag Media Companies. *Trends in Producers' Attitudes about Decision-Making*. St. Louis, MO: Drake and Company, 2001.
- Fuglie, Keith, Nicole Ballenger, Kelly Day, Cassandra Klotz, Michael Ollinger, John Reilly, Utpal Vasavada, and Jet Yee. *Agricultural Research and Development: Public and Private Investments Under Alternative Markets and Institutions*. Agricultural Economic Report No. 735. U.S. Department of Agriculture, Economic Research Service. 1996. Available at: <http://www.ers.usda.gov/publications/aer735>
- Griliches, Z. "Hybrid Corn: An Exploration in the Economics of Technological Change," *Econometrica* (25):501-522. 1957
- Huffman, Wallace. "The Productive Value of Human Time in U.S. Agriculture." *American Journal of Agricultural Economics* (58):961-74. 1976
- Huffman, Wallace, and Robert Evenson. *Science for Agriculture*. Ames, IA: Iowa State University Press, 1993.
- Ladewig, Howard. "Organizational Accountability and Program Evaluation in the Cooperative Extension System." Paper presented at "Enhancing the USDA-1890 Partnership: Building an Analytic Framework for Assessing Outcomes and Benefits Workshop." Washington, DC: Sept. 1-2, 1999.
- NASULGC. *Strategic Directions of the Cooperative Extension System*. National Association of State Universities and Land-Grant Colleges. Washington, DC: December 2001. Available at: http://www.nasulgc.org/publications/Agriculture/ECOP2002_vision.pdf).
- National Research Council. *Colleges of Agriculture at the Land-Grant Universities: A Profile*. Board on Agriculture. Washington, DC: National Academy Press, 1995.
- National Research Council. *Colleges of Agriculture at the Land-Grant Universities: Public Service and Public Policy*. Board on Agriculture. Washington, DC: National Academy Press, 1996.
- National Research Council. *Natural Gas Data Needs in a Changing Regulatory Environment*. Report of the Panel on Statistics on Natural Gas, Committee on National Statistics. Washington, DC: 1976.
- National Research Council. *Setting Statistical Priorities*. Report of the Panel on Methodology for Statistical Priorities, Committee on National Statistics. Washington, DC: National Academy Press, 1985.
- Padgett, M., D. Newton, R. Penn, and C. Sandretto. "Production Practices for Major Crops in U.S. Agriculture, 1990-97." *Statistical Bulletin*. No. 969, Aug. 2000. Available at: www.ers.usda.gov/publications/sb969.
- Report of the Futures Taskforce to the ECOP. *Extension in Transition: Bridging the Gap Between Vision and Reality*. Blacksburg, VA, 1987.
- Rogers, Everett. *Diffusion of Innovation*. 4rd edition. New York: The Free Press, 1995.
- U.S. Dept. of Agriculture. CSREES, CRIS, Inventory of Agricultural Research, various years.

U.S. Dept. of Agriculture. CSREES, Funds Management Branch. Annual report, Table 3, FY2000, 2001.

U.S. Dept. of Agriculture. "Salary Analysis of Cooperative Extension Service Positions, Dec. 2000." Human Resource Division. 2001. Available at: <http://www.reeusda.gov/hrd/report.htm>

Willis, Robert. "Wage Determinants: A Survey and Reinterpretation of Human Capital Earnings Functions." Chapter 10 in O. Ashenfelter and R. Layard (eds.), *Handbook of Labor Economics, Volume I*. Amsterdam: Elsevier Science Publishers, 1986.

Yee, J., M. Ahearn, and W. Huffman. "Sources of Agricultural Productivity Growth for the Southern Region." Paper presented at the SAEA meetings, Feb. 2-6, 2002, Orlando, FL. 2002a

Yee, J., W. Huffman, M. Ahearn, and D. Newton. "Sources of Productivity Growth at the State Level, 1960-1993," in E. Ball and G. Norton (eds.) *Agricultural Productivity: Measurement and Sources*. Norwell, MA: Kluwer. 2002b.