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The National Research Council Report on the Colleges of Agriculture at the Land Grant Universities: Implications for the Northeast

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The National Research Council report entitled *Colleges of Agriculture at the Land Grant Universities: Public Service and Public Policy* was released in spring 1996. Several of the study recommendations may be particularly pertinent and interesting to the land grant colleges of the Northeast. This article reviews the study background, process, and general conclusions. It highlights several specific recommendations of potential interest in the Northeast, including those relating to federal support through formula funds and competitive grants, regionalization of programs, and integrating and balancing teaching, research, and extension.

This is the first opportunity to discuss the recently released National Research Council (NRC) report entitled *Colleges of Agriculture at the Land Grant Universities: Public Service and Public Policy* (NRC 1996) with an audience of agricultural economists. It may be particularly appropriate to make this first presentation in the Northeast. The demographic, economic, and policy developments that spawned the NRC's interest in the land grant study—the urbanization and suburbanization of the nation, the changing profile of agriculture, and the growing public interest in how agriculture interfaces with environmental quality, human health, and rural communities—are probably nowhere more evident than in the Northeast. Furthermore, several of the study recommendations may be particularly pertinent and interesting to the land grant colleges of the Northeast.

Background

The NRC Board on Agriculture's principal mandate is to bring the best of science to the resolution of agricultural and food policy issues. Through this mandate the NRC has a keen interest in the con-

duct and quality of agricultural education and research, and thus in the land grant system. Land grant colleges of agriculture (LGCAs), initiated by the Morrill Act in 1862, historically have been entrusted with these functions and supported by public (federal, state, and local) monies to carry them out.

The NRC undertook a study of the land grant system because of two main observations. First, the client base for food and agricultural research and education has changed dramatically as the nation's economy has developed and its population has shifted to cities and suburbs, and the policy issues have shifted accordingly. Second, the land grant system is defined not only by its distinctive heritage but also by a set of institutional arrangements unique within higher education in the United States. These arrangements have changed little since the system's early years despite major changes in the food and agricultural system. The institutional arrangements include:

- a federally legislated mandate to embrace a three-part mission of making education accessible to students of ordinary means, conducting scientific research to underpin teaching programs, and extending research findings to off-campus users in order to ensure that science serves people;
- a federal-state partnership that produced at least one land grant college in each and every state and territory;

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- a federal funding mechanism that distributes research (Hatch) funds¹ and extension (Smith-Lever) funds to LGCAs based on the state or territory's share of total farm and rural population;
- and a network of separate (and not equally well supported) historically Black land grant colleges.

In initiating the land grant study, the NRC believed an assessment was needed of these long-standing arrangements in light of changes in the colleges' operating environment. In addition to changes in agriculture and its role in society and the economy, the committee considered developments in science and science policy and was mindful of the federal funding environment.

The Study Committee and Process

NRC studies are conducted by committees of volunteers with the relevant experience and expertise. The twenty-one-member land grant committee met for the first time in January 1994 under the chairmanship of former Wisconsin governor Anthony Earl. The committee was balanced for age, gender, and ethnicity; geographical location; and disciplinary expertise. It was composed of participants in the land grant system—administrators and faculty with teaching, research, and extension expertise—as well as representatives of public interest groups, state government, agribusiness, and the nonagricultural science community. Three agricultural economists participated: Allen Rosenfeld (Public Voice for Food and Health Policy), Ed Schuh (University of Minnesota), and Kitty Smith (Henry A. Wallace Institute). There were six members from the Northeast region: John Gordon (Yale University), Daryl Lund (Cornell University), Mortimer Neufville (University of Maryland, Eastern Shore), Allen Rosenfeld, Charles Saul (Ag-way, New York), and Kitty Smith.

The committee's work involved three stages. During the first, the committee collected, reviewed, and assessed public data and information about the LGCAs and their operating environment, and solicited the expert opinions of observers of and participants in the land grant system. The committee published its historical review and collection of public data on academic programs, research, and extension in *Colleges of Agriculture at the Land Grant Universities: A Profile* (NRC 1995). This paper draws on the *Profile* report to

make some observations on the characteristics and programs of the Northeast in relation to the rest of the country.

During the second stage, in the spring of 1995, committee members held public forums at land grant colleges in five states—Connecticut, Missouri, New Mexico, North Carolina, and South Dakota. The forums were an important means for each committee member to broaden his or her personal experience and to garner public input on the relationship between college activities and public needs and priorities; nonetheless, the small number of forums in relation to the number of colleges of agriculture, coupled with the impossibility of guaranteeing attendance (because of timing, distance, and resources) by the full spectrum of stakeholder groups, precluded basing recommendations directly or solely on comments and discussions at the forums.

It is noteworthy that the Connecticut forum, hosted by the University of Connecticut, differed significantly in focus and tone from the others. In relation to other forums, there was larger attendance by representatives of urban-based food access and distribution groups. There was a keen interest in and appreciation by producers—particularly dairy farmers—of the role of the college in helping them meet regulatory demands such as water quality standards. There was an understanding and, indeed, acceptance of the profound changes seen in agriculture, such as the outmigration of dairy and the expansion of specialty agriculture such as mushroom and flower production and tree farming, and there was discussion of the need to reorient programs accordingly. There was an atmosphere of open dialogue and debate among college clientele of different backgrounds and interests (in the spirit of the New England town meeting), which may still be forthcoming in much of the rest of the country. And, in talking with staff and administrators, there was an appreciation for the growing need to take regional approaches to education and extension in order to employ tight resources more efficiently.

During the third phase, from July 1995 through January 1996, the committee synthesized and integrated information from the first two phases and engaged in the deliberative process that resulted in a consensus report. Producing the report was not "hard science" and involved a great deal of the committee's own "best judgment," but concepts from economic theory clearly had a role. The committee considered the expanded intellectual property protections for biological inventions and the changing structure of agriculture, and the implications for the growing role of the private sector in

¹ Other formula-based research funds that benefit land grant colleges include McIntire-Stennis funds for forestry research, formula funds for animal health research, and Evans-Allen funds to support research at 1890s institutions.

conducting research and providing extension services traditionally in the public domain. The committee members drew from the theory of public goods—and their recognition of the important role of the food and agricultural system in providing public goods of national importance—to make recommendations for continuing but refocusing federal funding.

General Conclusions and Selected Recommendations

The committee concluded that a national science and education infrastructure that underpins continued advances in the performance of the food and agricultural system and federal support of that system remain squarely in the national interest. It also concluded that although the land grant system has served the nation well, there is a need for change in four principal areas:

- The LGCA system must increase its relevance to contemporary food and agricultural system issues and concerns. It must also continue to develop programs that include a wider array of students, faculty, and clientele of diverse backgrounds and perspectives.
- The system must organize its programs and projects more efficiently and more in keeping with the regional and multistate requirements of many modern food and agricultural system problems. There is a need for a “new geography” for the land grant system.
- The system must reinvigorate its commitment to the linkages among teaching, research, and extension in order to fulfill its mandate of conducting science in service to society.
- The system must enhance its accountability to the public and its reputation for quality in the science community.

Twenty recommendations were developed in support of these key themes. Several are cross-cutting and others address the teaching, research, or extension components specifically. A significant number recommend refinements in federal policy as a means of reorienting incentives and signals to the LGCA system. Several of those are discussed here, although they provide only a glimpse into the full scope of the report’s topics and recommendations. They are chosen and discussed with reference to their significance to the land grant colleges of the Northeast.

Involving the Stakeholders

LGCAs have a responsibility, based on their philosophical roots and legislative mandate, to be relevant and accessible to the general public and particularly to citizens of ordinary means. This mandate is reinforced, in the opinion of the committee members, by the high expectations held by the U.S. public for the performance of its food and agricultural system. The committee concludes that many colleges are reaching out to build relationships with a new and emerging constituent base. Nonetheless, it finds that there is still too little connection between many of the LGCAs and urban and suburban residents, consumer and environmental interest groups, small and alternative producers, and ethnic minorities. The committee believes these connections must be enhanced to ensure that resource allocation increasingly reflects the broad and diverse national interest in the food and agricultural system, an outcome the committee believes is crucial to extending the colleges’ relevance into the twenty first century.

In order to enhance these connections, the committee’s first recommendation is that in setting program priorities that guide resource allocation, LGCAs should garner effective input from a wide variety of stakeholders; in fact, receipt of federal funds should be contingent on the demonstration of such input. Some Northeastern schools may have a leg up in meeting this mandate. Their close proximity to urban centers, if the University of Connecticut forum can be used as evidence, appears to have offered opportunities to diversify clientele to reflect contemporary demographics and to do so in a way that has not alienated traditional constituents. Data presented in the Profile report show a relatively larger focus on food and consumer issues in the Northeast than in other parts of the country. Northeastern LGCAs confer relatively more doctorate degrees in food sciences (28% of all 1992 doctorate degrees) than does the system as a whole (8% of all 1992 doctorate degrees). Because of this emphasis, northeastern LGCAs are also relatively diverse in terms of representation by women and minorities on faculties and student bodies. It is in the food and nutritional sciences that women and minorities are best represented within the agricultural sciences (NRC 1995, table 3-13).

Northeastern LGCAs also devote significantly larger shares of their experiment station resources to food science and human nutrition research than the national average, which is 3%. In 1992 Cornell allocated 12% of its agricultural experiment station expenditures to food sciences and human nutrition research; Rutgers allocated 15%; the University of

Massachusetts allocated 22%; the University of Connecticut allocated 12%; the University of Rhode Island allocated 14%; and the University of Vermont allocated 21% (NRC 1995). Furthermore, 13% of the Northeast region's extension staff are working in nutrition, diet, and health programs, in comparison with 8% in the North Central region, 10% in the Southern region, and 8% in the Western region (NRC 1995). Also, several northeastern colleges, such as Rhode Island and Vermont, conduct relatively more research than the national average on "people, communities and institutions, including rural development" (NRC 1995).

Revising the Formula

In keeping with its interest in seeing the full range of food and agricultural system beneficiaries served well by the land grant system, the committee recommends the design and implementation of a new formula by which food and agricultural research funds are allocated within the land grant system. It makes the same recommendation for extension funds. The committee makes the following point: "Current and future research is neither just—nor even primarily—for the benefit of farmers and rural residents. Although this fact is reflected in changes in the names of many land grant colleges of agriculture, it is not reflected in how their formula funding is calculated" (NRC 1996, p. 80). Although reluctant to propose a precise equation for reallocations by formula, the committee recommends the consideration of variables such as states' proportionate contributions to total

U.S. population, relative poverty rates, or shares of cash receipts from farm and food marketings as appropriate reflections of the LGCA system's broadened contemporary customer base.

Any reallocation of the formula would be intensively political, as it would result in winners and losers. If total population is a factor in a new formula, a number of northeastern states are likely to be winners. Although northeastern states have over 21% of the U.S. population, they receive under 17% of the federal formula funds to experiment stations and employ slightly over 14% of all extension staff nationwide (table 1).

Creating a New Geography

The 1862 land grants and the historically Black (or 1890s) land grants together comprise seventy-six institutions in fifty states, six territories, and the District of Columbia. The committee concludes that if the land grant system is to adopt a research and education agenda that responds to the priorities of consumers and the many specialized needs of diverse producer groups, then it must realize organizational efficiencies by reducing duplication and strengthening multistate and multi-institutional partnerships that build upon the specializations of individual institutions.

The committee also feels that the nature of contemporary food and agricultural system issues calls out for regional or multi-institutional efforts. Many natural resource and environmental issues, such as watershed management, cross state lines. Many consumer issues, such as nutrition and disease, know no political boundaries, or they may be en-

Table 1. Northeastern Shares of U.S. Population, LGCA Students, Formula Funds for Research, and Extension Staff

State	Percentage of:				
	U.S. Population	LGCA Undergraduate	LGCA Graduate Student	Formula Funds for Research	National Extension Staff
Connecticut	1.3	.73	.80	.57	.53
Delaware	.3	.91	.52	.73	.30
District of Columbia	.2	N.A.	N.A.	.28	.12
Maine	.5	.86	.24	1.26	.71
Maryland	1.9	1.25	1.30	1.41	1.30
Massachusetts	2.4	2.91	2.12	1.27	.74
New Hampshire	.4	2.10	.91	.91	.63
New Jersey	3.0	3.86	2.99	1.56	.97
New York	7.1	4.09	5.59	2.40	4.30
Pennsylvania	4.7	2.91	2.06	3.43	2.81
Rhode Island	.4	1.07	.94	.70	.22
Vermont	.2	.96	.42	.74	.47
West Virginia	.7	1.75	.94	1.59	1.19
Northeast	21.1	23.40	17.90	16.85	14.27

demic to similar populations located in spatially separated parts of the country. Even within the farm sector, production issues are often pertinent to producers in a region made up of all or parts of several states. The regionalization of research is evidenced by a cluster analysis discussed in the Profile report, which grouped states into nine clusters based on the commodity research portfolios of their LGCAs. Most northeastern states (six of them) grouped into the same cluster—one with a focus on dairy cattle, vegetable, and poultry research.

The strong justification for regional or other multistate and multi-institutional approaches, coupled with the committee's belief that there is a special need for federal funds to provide incentives for such partnerships and collaborations, led to the following recommendation: Significant shares (25% or more) of USDA-administered funds for teaching, research, and extension should provide incentives for regional centers, consortia, programs, and projects that effectively integrate and mobilize multistate and multi-institutional resources, and for distance learning and other technologies that expand access, broaden clientele, and enhance multi-institutional collaborations in teaching, research, and extension. Again, northeastern colleges may be well positioned to benefit by this recommendation. Because of their relatively small size and close proximity, northeastern schools have already begun to confront the constraints and challenges to regionalization as a means of stretching resources further. The committee's final report cites the efforts and progress toward coordinated cooperation made by the New England Cooperative Extension Consortium. Sharing poultry specialists among states is a big step in the land grant system! The report also cites an experiential summer education program in organic farming designed jointly by Cornell, Rutgers, the University of Vermont, and the University of Maryland. Students at any of the four institutions will be able to match their interests by participating in a summer program at the appropriate school. This is the type of initiative the land grant committee would like to see encouraged and rewarded by federal policy.

Integrating Teaching, Research, and Extension

Federal land grant legislation and thus LGCA administrations, faculty appointments, and budgets are structured along the lines of teaching, research, and extension. The committee concludes that although its historical commitment to its tripartite mission has distinguished the LGCAs, the separate administrative and funding structures too often

hinder true integration of the three functions. The different statuses implicitly, if not explicitly, assigned to each function by the university community contribute to the disconnection.

The integration of teaching, research, and extension is valued by the committee for several reasons. Research-extension linkages, when they work well, spawn a two-way flow of insights and information that enhances the relevancy of research and uses research findings where they are most valuable to the public. Strong research-extension linkages also help ensure that outreach programs reflect the most up-to-date scientific knowledge. The integration of teaching, research, and extension is of special value to students because it involves them in both the conduct of science and public service. To put a renewed emphasis on an integrated tripartite mission, the committee recommends that federal formula funds for research and extension be combined into a single allocation; the committee further recommends that 50% of the combined funds be used to support programs, projects, and activities that explicitly integrate teaching, research, and extension or, alternatively, the work of multiple disciplinarians.

Northeast colleges may have a special interest in the issue of balance among teaching, research, and extension programs. Northeastern colleges account for over 23% of the undergraduate students enrolled in the LGCA system (table 1). With 17% of the formula funds for research and 14% of the extension staff, they appear to carry a disproportionately large share of the teaching responsibilities while garnering a disproportionately small share of federal resources (because federal funds for teaching are very limited in comparison with federal funds for research and extension). In fact, four of the ten largest undergraduate programs in the LGCA system are in the Northeast, in contrast to only two of the ten largest graduate programs (the size of which tends to correlate with research funding) (NRC 1995, tables 3-3 and 3-4). Although the committee's recommendation to combine federal formula funds for research and extension will not necessarily favor the Northeast, the committee's support for a balanced and integrated three-part mission could be seen as lending impetus to the case for reallocating formula funds toward states where student populations are large in relation to research and/or extension funds.

Expanding the Role of Competitive Grants and Enhancing Accountability

The committee believes good management of public funds requires:

- a priority-setting process that incorporates input from a wide variety of stakeholders;
- principles that guide the choice of LGCA projects and define the relative roles of the public and private sectors in undertaking food and agricultural research and extension;
- goals and measures that can facilitate evaluations of program performance;
- greater use of competitive mechanisms and peer review for allocating public research and extension funds.

The committee recognizes that USDA-administered research funding differs from other R&D funding in the much smaller percentage allocated to individuals and projects on the basis of merit review and competition. This difference is because of (1) the relatively large share of agricultural research conducted intramurally by USDA, and (2) the use of formula funds and Congressionally designated grants in allocating extramural funds to institutions. The committee presented and weighed arguments for and against both formula funding to institutions and competitive grants to individuals and projects. It finds that some of the early reasons for formula funding of experiment stations, such as the need to draw each state and territory into agricultural research and the site-specific nature of agricultural research, carry less weight today. Today most states provide far more financial support than is required to match the federal dollars; and many types of food and agricultural research, such as nutrition, food safety, and biotechnology, have little or no location specificity. Other arguments for formula funds, such as the support they provide for structural linkages between research and extension and for certain applied research projects that require long-term continuity, remain quite compelling.

The committee recommends that the federal partner should increase its use of competitive grants to fund projects and individuals on the basis of merit as determined by peer review. The committee believes greater use of competitive grants in relation to formula funding and Congressional earmarks will enhance quality and accountability, and lessen the perception that experiment station re-

searchers are insulated from competition with the rest of the research community; nonetheless, the committee sees a continued role for formula funding, particularly in supporting linked teaching, research, and extension programs.

The committee recognizes that redirecting funds toward competitive grants programs would put some experiment stations and LGCAs at a disadvantage. The committee therefore recommends that USDA strive to enhance participation and success in competitive grants programs by, for example, continuing to designate 10% of an enlarged competitive grants pool for institutions in USDA-EPSCoR (Experimental Program for Stimulating Competitive Research) states—states that have had a funding level from the USDA competitive grants program no higher than the thirty-eighth percentile of all states, based on a three-year rolling average. Connecticut, Delaware, Maine, New Hampshire, Rhode Island, Vermont, and West Virginia were among the FY 1996 USDA-EPSCoR states.

The Profile report indicates that a number of northeastern states continue to rely more heavily on formula funds than does the LGCA system as a whole, even though most also receive relatively small amounts of formula funds (NRC 1995, table 7-7). Why this is the case is unclear. It may be a case of “them that has gits.” In other words, big agricultural schools in big agricultural states may have been able to leverage federal formula funds effectively to expand their research funding portfolios. It may also be that there has been relatively little USDA-administered competitive grant support for the less traditional (less farm-production oriented) research programs of northeastern colleges.

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