Agricultural Education and Research: Academic Crown Jewels or Country Cousin?

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In the September 14, 1979, issue of *Science*, Robert E. Evenson, Paul E. Waggoner, and Vernon W. Ruttan authored a marvelous article entitled "Economic Benefits from Research: An Example from Agriculture." The article showed that the increase in farm labor productivity is outstripping the increase in nonfarm labor productivity; that farm productivity is rising significantly even though the economy has stagnated; that public investment in agricultural research has yielded relatively high rates of return, ranging from 20 percent to 90 percent in the 32 studies they reviewed; and that agricultural research and extension are significant contributors to the productivity of American agriculture.

The authors described the agricultural research establishment as having three distinguishing characteristics — articulation, decentralization, and undervaluation. It is articulated in the sense that there are links among scientists advancing knowledge, scientists inventing technology, and farmers producing food — all in the same locality. It is decentralized in that major decision making about research programming resides in experiment stations and substations. Research is undervalued because its benefits to farmers spill cross state lines to those who do not pay for the research and because the benefits to consumers are portioned into such small amounts that individual consumers cannot feel the connection. One need not believe this explanatory model is complete to be impressed by the evidence the article provides that the agricultural research establishment is very productive and that the nation is poorer because of its failure to invest more heavily in this system.

In the same issue of *Science*, staff writer Eliot Marshall authored a "news and comment" article entitled "Agricultural Network Fights Unwelcome Gift." The first sentence reads:

> For 2 years President Jimmy Carter's staff has been trying to install a small program using modern principles of research management at the Department of Agriculture (USDA), and for 2 years the agricultural community has resisted it.

He goes on to say:

> The reform centers on a project known as the competitive grants program launched with a 15 million budget in fiscal year 1978. Unlike traditional federal grants for agricultural research, divided up among the states according to an elaborate formula, this money is provided for basic research and given only to investigators who win top ranking for their projects in a national competition judged by their peers. Shortly after the program appeared, it was rejected as an alien creature by many directors of agricultural research at state institutions and by their representatives in Congress.

The Marshall article also said that the effort being reported on was the last in a series

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This article is based on a Kellogg Foundation lecture given to the November 1980 meeting of the National Association of State Universities and Land Grant Colleges. Copies of the lecture may be obtained from the author.

of attempts to integrate agricultural research with the mainstream of basic research in the United States. It referred to a series of studies which have described agricultural research as being characterized by lack of imagination, fragmentation, duplication, with little use being made of peer review.

What's going on here? Is the "agriculural research establishment" described by Evenson, Waggoner, and Ruttan the same as the "agricultural research network" referred to by Marshall? If it is, how can it at once be so productive and so backward?

Rationalizations can be advanced to explain away the apparent contradicitons of the two articles. They are addressed to different subjects; one was written by scientists who summarize and interpret scholarly research; the other was a comment by a journalist on a current event.

Yet explaining away the surface contradictions will not remove a fundamental paradox. Why is it that a system which has been such a success has the image of being backward and outside the mainstream of science? Where does reality lie? Is one objective truth and the other subjective myth? Or, is it possible there is validity in both impressions? Stating the question in this way poses a worthy problem whether one has great familiarity with agricultural research and education in the United States, whether one simply is interested in science policy in this country generally, or whether one would just like to know what society is getting in return for its investment in agricultural research and education.

The System and Its Stresses

Descriptions of agricultural research and education programs in this country frequently are limited to the 1862 land grant universities even though the 1890's are an integral part of the land grant system and even though there is agricultural work in many public institutions that are not land grant, as well as in private universities. There is diversity in other respects as well. Size and quality of these activities vary greatly, and the way they are organized and administered ranges all the way from the highly organized research, teaching, and extension activities headed by a vice president or dean to a small group, perhaps one or two principal investigators, working on a particular subject. Diversity also exists in the extent and kind of linkage such programs have with the federal government. Some are supported by formula funding and also have grants and contracts while other programs have no special federal funding.

To refer, therefore, to agricultural research and education as a "system" is at best, an imprecise use of the word; to describe it as a "mosaic" perhaps would be more appropriate. Nevertheless, there is social concern about this complex of activities as evidenced by the Food and Agriculture Act of 1977 (PL 95-113) which established the Joint Council for Food and Agricultural Sciences and by the fact that this lecture was invited. But the complexity of this so-called "system" posed a major problem for me. Obviously, it was impossible to discuss simultaneously the problems and opportunitites associated with all such programs. I decided to focus on the land grant institutions and then to make special reference to other institutions at appropriate points in the discourse. Even though the 1890 institutions are a part of the land grant system, some of their special problems are treated independently.

Four conflicts and stresses have been identified which trouble the system greatly. They are: (1) the universal versus the autonomous university conflict, (2) stresses arising from multiple clientele, (3) national versus international tensions, and (4) state and federal conflicts. As we work through these stresses and conflicts, certain fundamentals should be kept in mind — first, tension and conflict are not necessarily bad; some is needed to stimulate creative effort. Second, agricultural education and research are, in a real sense, "public goods" and because of this there is little incentive for their production except on a group basis. Of course, some research does not have "public good" characteristics and can be done in the private sector. There

needs to be a careful examination of what research is most appropriately performed in the public and private sectors respectively.

Despite the evidence cited at the outset concerning the productivity of agricultural education and research, I see a troubled and uncertain system. This self-doubt and confusion stems in large part from the four conflicts to which I now turn.

The Universal Versus the Autonomous University Conflict

Martin Trow has provided the classic statement of the conflict between the autonomous and the popular university. According to him, the autonomous functions include the conservation and transmission of high culture, pure scholarship, and basic scientific research and the selection, formation, and certification of elite groups. The popular functions fall into two general categories: a commitment to provide places for as many students as can be encouraged to continue their education beyond high school and the provision of useful knowledge and service to every group and institution that wants it.

Land grant universities were created in the popular tradition to provide an education for those who did not have the opportunity for education in the more classic tradition. The service function was later provided for by the funding of research and extension activity. Yet the autonomous functions of the university were never completely absent from land grant universities and currently are attributed considerable importance; indeed, academic prestige and status often are accorded in rather direct relation to excellence in the performance of the autonomous functions. The seeds of numerous conflicts are inherent in this dualism; only one is noted here.

There is an inevitable conflict between disciplinary needs and user group demands. The success of graduate education in the United States is due in large part to the power of the academic department. Yet user group needs do not necessarily fit perfectly with departmental organizations. Originally, of course, agriculture departments such as animal husbandry, agronomy, and horticulture were designed to address farmer problems. As the limits to the application of knowledge were reached and as the imperatives of graduate education began to be felt, such departments became collections of plant and animal breeders, physiologists, and nutritionists; their motivations were no longer identical to those who used their research results and who experienced their teaching. As a graduate dean I observed theses which were responsive to felt need but which did not constitute a worthy graduate student problem. But I have observed even more theses, ostensibly addressed to a user problem, that constituted, at best, a disciplinary investigation or exercise. I have also been thrilled by theses which achieved that exceedingly difficult, but rare, feat of both addressing an important user problem as well as enlarging the frontiers of knowledge.

There is no permanent resolution to this type of conflict. Even if it were to be resolved, it would mean that a source of creative tension inherent in the system had been eliminated. Yet the tension is always present, and it is a part of the essence of agricultural administration in the land grant university.

Multiple Clientele

Even if the popular function of the university were embraced wholeheartedly there would still be a major problem of balancing the response among clientele groups. How are the interests of the urban gardener to be weighed against the needs of the farmer who grosses over $1 million per year? To what extent should the problems of farming be emphasized relative to the problems of the rural community? How do the issues of consumerism get balanced against the requirements for production? Should those who are affected by the stream siltation and the escape of agricultural chemicals from the farm be considered in the design of agricultural research and extension programs?

There is no problem more important to the administrator of agricultural education and research programs than the reconciliation of the interests of multiple clienteles. It is an issue to which I will return several times in this lecture.

National Versus International Tensions

In addition to enhancing the productivity of American agriculture, agricultural teachers and researchers have made major contributions to research and education efforts abroad. And therein lies a conflict. The conflict is between the contribution to world food production through U.S. farmers contrasted to contributing to the agricultural productivity of other countries. It is to the credit of U.S. farmers that generally they have been farsighted about this conflict. But they have not universally been so, and they may not always be so. This potential for serious conflict can be expected to increase with growth in agricultural exports.

Adjustment will be required by U.S. educational institutions to reflect the greater support of agricultural research and education in the developing countries and the improved education and increased sophistication of their personnel. There is, of course, the inevitable desire within the developing societies for the greater prestige which comes from awarding advanced degrees. The comparative advantage of U.S. institutions in this process will change continually and adjustment will need to be made on a continuous basis if the maximum contribution to world food production is to be made.

State Versus Federal

Federalism is undergoing constant evaluation on many fronts, but the unique historic relationship between the USDA and the land grants has evolved into a set of institutional relations that are unrivaled in complexity. The question should be faced squarely as to whether the historic partnership between the USDA and the land grants remains viable. The Food and Agriculture Act of 1977, the numerous constituencies that must be served by USDA, together with the multiple ties between higher education and the federal govenment raise questions as to whether the partners still are marching to the same drummer. What happens during the next four years probably will decide whether the point of no return on the road to dissolution of the partnership has been passed or whether recent events will be viewed only as a series of family spats, not unlike a political party's national convention — a necessary prelude to battle against a common enemy.

Embedded in this federal-state issue are the inherent stresses within the two partners. The organization of the Science and Education Administration brought many of the internal USDA tensions into the open. But of equal or of greater significance are the conflicts that exist within the 1862 Land Grants. I will be more specific.

The land grant universities, through necessity, have created elaborate organizations to administer their research, teaching, and extension programs in agriculture. These organizational arrangements are by no means uniform; numerous permutations and combinations exist. But four major concentrations of power can be identified that have resulted from increased size and the separation of functions — the university president, the vice president or dean of agriculture, the experiment station director, and the director of cooperative extension. The planning framework which has been advanced by the Joint Council has not only brought federal-state conflicts to the surface, but it has also intensified internal land grant university tensions, and these tensions now are being reflected at regional and national levels. To be specific, the regional coordination of extension, teaching, and research may mean that experiment station directors, extension directors, or both will have to subject their regional plans to a regional committee of deans or vice presidents. The result is what may seem to be a significant loss of autonomy

for directors who are accustomed to advancing their regional plans on the national level.

Of course, conflicts between and among these sources of power are not new and have often been manifested on the national level. But what is new is the way the planning mechanism being put in place by the Joint Council has intertwined these conflicts with those between the states and the federal government.

Administrative Degrees of Freedom

The identification of these four major sources of tension does not exhaust the list which could be compiled. Nevertheless, their identification defines the major problems facing agricultural administrators and leads to a fundamental question.

Is the system now so constrained that there is little or no room for creative decision making? Is it to be compared to the absence of degrees of freedom, to use a statistical parallel? Or, do these manifold tensions and processes provide an opportunity for creative administration and innovative leadership?

Much room still remains for administrative action. Every stress which has been identified requires major decisions. The cumulative effect of these decisions will affect the nature of those institutions which have major programs in agricultural research and teaching.

Strategies and Tactics

In this section I have adopted the viewpoint of the agricultural administrator (such as president, vice president, dean, or director) with an assumed planning period of a decade. While the tenure of the typical administrator is somewhat less, I assume that administrators as a group wil adopt a slightly longer planning horizon than they would acting as individuals. Only those items which agricultural administrators can influence are addressed under three main headings — responsiveness, capacity, and credibility.

Responsiveness

I have found little support for the hypothesis that the system has been unresponsive to organized clientele groups. With one major exception the evidence indicates that both research and extension, as organizations, are indeed willing to assume new responsibilities and challenges. In fact, many more responsibilities are often assumed than resources will accommodate.

The major exception occurs when a problem emerges which does not fit established disciplines or university organizations. Although the organized response in the form of integrated pest management, for example, is now impressive, it was slow in coming and often was inhibited rather than aided by the college and university organizational structure.

I refer here to organizational response rather than individual response. In all of the cases I investigated where social problems might have been attacked, there were individuals within the system who did pioneering research or education work before the problem became generally recognized. Thus, the system has produced and contains creative people who also are very socially aware.

The system cannot be given as high marks for its responsiveness to social problems which afflict groups that are not well organized. Contrast the response to the problems of migrant farm labor, displaced farmers, low-income and part-time farmers — including rural blacks — to that for international agricultural education assistance. In one case federal agencies were established to provide international assistance. In the other, the problem often was not legitimized by federal or state programs, and categorical federal funds were not available. Much of the new work that has been undertaken from within the system has been stimulated by funds from outside the system. (Examples can be found in integrated pest management, rural development, nutrition, and resource economics.) Often the innovative people who have spearheaded new developments have

gone outside the system for funding while their more tradition-minded colleagues have been sustained by formula funds and state appropriations. (This situation has changed as pressure has been brought to bear on agricultural faculty in many institutions to provide for all or part of their funding.)

Thus, we come to one of the fundamental problems facing the agricultural administrator. Should he or she attempt to identify, anticipate, and organize to address social need or just follow election returns and simply respond to organized group requests? It would be unrealistic, of course, to suggest that vast quantities of research and educational resources will be devoted to social problems if there is no articulated support in the legislatures or elsewhere. Yet there are those among you who are skilled at changing latent support to active support who believe that if there is a problem in our pluralistic and special interest society, support usually can be stimulated. Even so, these administrators will confirm that which political science and public choice principles tell us — a small number of people who stand to experience large gains or losses are much easier to organize and motivate than large numbers who will experience only small gains or losses.

Yet, the schools and colleges of agriculture are typically associated with universities. They have acquired many of the characteristics of the autonomous university — tenure, academic rank, and freedom — presumably on the grounds that society will be better served if they do so. Does this not imply a responsibility beyond finding more efficient ways to produce food and fiber? One longtime observer of the land grant system has said:

> Of course they should serve more than the agricultural and agri-business interests. They are universities, and I expect a lot of our universities. They should at once be scientific and practical in agriculture. But they should do more — articulate social problems and advance unconventional ideas and proposals.

The history and the evidence suggest two guidelines:

1. The system has a special responsibility to those people engaged in the production of food and fiber. Society derives a high rate of return from its investment in research and education on the improvement of food and fiber production, and additional investment in such programs is warranted. But the program of the system stimulates great social change, and it is appropriate there be concern for the people affected and their educational needs quite independent of the magnitude of their contribution to agricultural production.
2. The long-run survival of the system will depend on more than service to organized commercial agriculture and agribusiness interest groups. Even though small, well-organized interest groups often are politically effective, agricultural administrators are all too aware of the decline in a base of support consisting only of large farmers and agribusiness intersts.

Capacity

Conflicting impressions exist about the quality of work done under the umbrella of agricultural education and research. Rather than render any comprehensive judgment as to overall quality and capacity, I have identified the following as warranting special attention: (1) extension, (2) basic research in the natural sciences, (3) the social sciences, other than economics, and (4) specialization and comparative advantage.

The system, in support of the agricultural industry, seems to be working best between the two extremes of extension at one end of the spectrum and basic research at the other. It is making imaginative research applications of established scientific principles, and research findings generally seem to be promptly reflected in on- and off-campus teaching.

The many problems of extension are beyond the scope of this paper. It is not clear

that extension is providing significant help to the very large commercial farmers and agribusiness firms. But this observer is not especially critical of extension for this state of affairs. In the first place, such firms buy a great deal of research in the products they purchase. In the second place, extension has concerned itself with a broad array of problems affecting large numbers of people. It is my untested hypothesis that extension's problems stem largely from two considerations. First, they have addressed an array of social problems without really mobilizing the recipients of these services in support of their programs. Second, extension is attempting to addres numerous problems that are basically social in nature with personnel who are oriented much more to the natural than to the social sciences.

Agricultural administrators, in higher education and in the USDA, have been much concerned about the condition of basic science and are taking constructive steps to improve the situation. They have communicated their concern in an effective manner to those who are instrumental in providing support for the system — in Congress, in the state legislatures, and in agribusiness. While I am not competent to draw general conclusions about the quality of the basic natural sciences practiced in agriculture, it is my belief that at its best it is very good. I am also of the impression that while there may be a limited number of researchers capable of contributing significantly, dramatic changes in agriculture may soon be triggered by agricultural research. Recombinant DNA and nitrogen fixation provide examples of possible applications. If this is so, then administrators have a base from which to work as they seek to strengthen this essential resource.

The potential contribution of the social sciences other than economics has not been realized even though most experiment stations and extension programs are associated with universities where all of the social sciences may be found. There are only a handful of sociologists and political scientists working in any depth on problems of American agriculture and rural America; even so, some of their contributions have been quite significant. The situation will not be different so long as they are involved only on an ad hoc basis for particular investigations. What would have been the contribution of botany and plant pathology, entomology, microbiology, and statistics to agriculture if they had been treated in a comparable fashion? It is difficult to reconcile the argument for formula funding at the national level with the treatment of the social sciences, other than economics, by agricultural research and extension.

There may be excessive specialization within universities by individual scientists, but certainly the same cannot be said for universities within the system. One is must more impressed by the similarities than by the differences among the schools and colleges of agriculture within the land grant system.

Why is this? One explanation is that the clientele interest groups within a state demand a full rnage of services from their land grant university, often causing resources to be thinly spread over many areas. Another is that peer group pressure within the university results in most universities attempting to emulate the largest and most prestigious ones, which usually encompass the full range of specializations.

No doubt both explanations have merit. Administrators are aware of the problem and have taken steps to foster regional cooperation and institutional specialization. State legislators certainly need to be educated on the need and prospects for such cooperation.

It is those institutions that have the fewest resources that are affected in the most unfortunate way by such academic cloning. This is too bad because almost any university can establish and maintain a few centers of real excellence by exploiting its comparative advantage. This advantage may stem from unique problems from within the state or because of the leadership of one or more faculty people. But even when established, a

center of excellence is a fragile institution. Countervailing pressures, which often arise under the label of "a more balanced program," frequently result in a dreary and mediocre uniformity. The maintenance of such programs requires the attention of deans, directors, vice presidents, and perhaps presidents; disciplinary and departmental pressures often will work in favor of uniformity and against comparative advantage.

Credibility

Public attitudes toward higher education programs in agricultural research and teaching range from those who have an unshakeable faith in the system to those who believe it is a tool of big agriculture and big agribusiness and who doubt both the objectivity and the social usefulness of its output. There are others that view the system as having outlived its usefulness — they believe it now is just another bureaucracy whose major energies are devoted to its survival.

Regardless of the validity of these extreme impressions, herein lies the greatest problem facing agricultural administrators. They need to give immediate attention to the credibility and the legitimacy of their enterprises. How can this be done?

A five-point program is advanced here, which, if implemented, would go far to enhance the credibility of agricultural education and research.

1. *Steps should be taken to reform drastically the system of national planning and coordination of agricultural research, teaching, and extension.*

   This system is a vast exercise in hypocrisy. All experienced administrators know that planning and coordination exercises are not likely to have major impact if control of budget and personnel resides elsewhere. Because decentralization is one of the strengths of the system, the one thing worse than the present planning and coordination would be to give it control over budget and personnel. There are worse things than irrelevance; if budget and personnel were controlled from within the system, the situation would be worse — much, much worse.

   How then, you may say, can we demonstrate to Congress that we are not fragmented, that duplication does not exist, and that we are working on high priority problems?

   One finds little appreciation or understanding in the legislatures of the vast, wasteful, and intellectually sterile planning and coordination process which exists. A much simpler system undoubtedly would serve political needs just as well as the one in existence. Just so the record is clear, permit me to say that the regional planning that existed prior to the establishment of the Joint Council was not much, if any, better. Neither are these remarks intended as an anti-USDA tirade. The realignments stemming from the work of the Joint Council have simply resulted in the current conflicts of which many are so weary. But the fault is not really with the USDA or the Joint Council. As near as I can tell the fuss is over who is going to control an irrelevant, cumbersome, wasteful, planning and coordination system. It just ain't worth it!

   Representatives of the educational establishment should meet soon with the Secretary of Agriculture and Congressional leaders to consider this problem. A new administration soon will be taking office, and this should be an ideal time for such an event. Such a meeting should be addressed to a reform (simplification) of the present system of coordination and planning. The groundwork should be carefully laid for such a meeting, and the discussion and subsequent coordination plans should be based on three fundamental principles:

   (A) A decentralized and open system was essential to past success and must be preserved. A test of any

organization is whether it assesses new information efficiently. Centralized organizations that prevent the dean, director, department head, project leader and, yes, even the research assistant, from playing this role will be weakened as a result.

(B) The agricultural education and research establishment which makes use of federal funds will endorse, welcome, and pledge to cooperate in a truly rigorous and professional review process. Such a review process should be used to link land grant and non-land grant scientists and should be concerned with scientific merit and usefulness but not budget allocation. It should not be controlled by administrators of the units being reviewed.

(C) The agricultural research and educational establishment will cooperate in a program which will assess its productivity. There are now established methodologies for calculating social rates of return, and many such studies have been made. But such studies play no official role in the evaluation of system productivity. There are also other means of measuring productivity, and a good faith effort to develop appropriate criteria should go far to demontrate willingness to be held accountable for the expenditure of federal funds. A sharp distinction should be drawn between *ex post* or historical productivity and projected *ex ante* or anticipated "pay-off." Respectable methodologies exist for the former; the same case cannot be made for the latter.

2. *The land grant institutions should exercise leadership in enhancing the contribution of non-land grant universities to research and education in agriculture and rural America.*

The Food and Agriculture Act of 1977 makes it quite clear that Congress does not view the land grants as the only institutions that could or should contribute to agricultural research and education. Yet the kind of coordination mandated through the Joint Council probably will be of value mainly by creating an awareness of the existence and potential of these institutions; genuine cooperation and coordination cannot be mandated.

Twenty-five percent of the undergraduate agriculture enrollment in the United States is in non-land grant colleges and universities. Three-fourths of these institutions also offer graduate degrees, and most of the faculty have doctorates. Experiment station and extension directors have a responsibility to utilize and draw upon these institutions if they are to best serve their states. There are some states, such as Wisconsin, which have developed innovative approaches to such problems, but these cases seem to be the exception rather than the rule.

Although a part of the land grant system, the 1890's pose special problems. They were established to be parallel to the 1862's. In fact, of course, they have not provided resources for such development and for many years were isolated from meaningful participation in the agricultural research and education community. For 69 years black land grants and other black institutions were excluded from membership in the American Association of Land Grant Colleges and State Universitites.

A policy is needed based on the following principles: (1) the 1890 land grant universities should be accorded substantial freedom to develop their own areas of emphasis and excellence; (2) development in all fields is not in accordance either with past traditions of the 1890's or social need at present; (3) in keeping with the land grant tradi-

tion, the 1890's should be expected to have a combination of research, teaching, and extension activities.

It would be consistent with these principles for the federal government to grant a sizable endowment — that is, a special land grant — to each of these institutions to permit the development of areas of emphasis consistent with the land grant philosophy of research, teaching, and extension. Such grants could be approved by a special panel, appointed at the federal level. The panel could invite, but would not necessarily be bound by, comments from other educational institutions from within the states. It is important, of course, to examine the pattern of continuing support that goes to these institutions, but the great need is to recognize the circumstances that have shaped their development to this time and then to permit them to develop in a way that best suits their circumstances and serves social need.

3. *Establish and Document Research Needs in a Professionally Defensible Way*

Any friend of higher education research and teaching familiar with the Washington establishment is likely to be disturbed by the extent to which the educational establishment is viewed as a self-serving bureaucracy. And to a great extent it is. But when friends are unable to distinguish between those requests that represent real social need and those that are simply a part of someone's wish list, credibility suffers.

Generally, agricultural administraors are failing to use the social science capability available to them to develop an intellectually respectable base for research planning, resource allocation, and resource acquisition. Since I have been preparing for this paper I have become conscious of the arguments and the data agricultural administrators use to convince others that agricultural research should be supported. Without any special effort on my part, numerous cases of exaggerated claims and the questionable use of data have come to my attention. This has been especially true of statements about the contribution of U.S. agriculture to feeding the world now and in the future. Can it be assumed that others are ignorant of conditions which exist here and around the world and that they are unfamiliar with available data?

4. *Develop a Program and a Philosophy to Reconcile the Conflicts between Competitive Grants and Formula Funding*

The effort to impose a system of competitive grants on top of the tradition of formula funding has done much to damage USDA-land grant university relationships in recent years as well as intensify conflicts within the university system. At least since the release of the "Pound Report" periodic consideration has been given to the establishment of a competitive grants program. We should recall, however, that the "Pound Report" recommended that competitive grants be funded from increased appropriation. Much of the current concern developed because it appeared there was a "trade-off" between competitive grants and formula funding in the FY 1978 budget.

There are two powerful traditions involved. Formula funding is traditional in the land grant system and without doubt is responsible for much of the substantial institutional capability which exists. Competitive grants, on the other hand, with associated peer group review, are well established in the scientific community at lage. Experienced administrators know the two affect the research unit and the investigator in very different ways and that the most appropriate funding method will depend upon the objectives to be served. Relatively stable recurring funding is more useful than project

funding in establishing institutional competence. Competitive grant funding may be the more useful tool if the objective is to identify the most competent researchers to work on predetermined problems. When land grant personnel take strong stands against competitive grant funding, generally they run the risk of having others doubt their competence.

The matter goes to the heart of the USDA-land grant partnership. If a community of interest remains and if the partnership is to be maintained, formula or some type of recurring funding should be continued, at least to the point where the real value of appropriations is increased. However, at some level of increased real appropriations, competitive grants might be used to enhance basic science in support of particular missions. Competitive grants for support of the typical applied research at land grant universities would violate the articulation and decentralization characteristics of the system as identified earlier.

If one takes the position that the USDA and land grant partnership is dead, then competitive grants, across the board, would make the USDA consistent with other government agencies. If the partnership is to flourish, not only must some form of recurring funding be retained, but the universities must have confidence that such fund will be sought as vigorously by USDA officials as funds for the remainder of the USDA budget.

The universities do not speak with a single voice. Many agricultural administrators prefer a system of recurring funding which would not pay overhead to the university. The central university administrator, on the other hand, usually is greatly interested in the payment of overhead. When considering the overhead issue one should recognize that all university-federal relationships are not the same. When the work to be done serves state as well as national needs, a case can be made for cost sharing. But if the benefit is primarily to the Nation and only incidentally to the State, full cost payment seems appropriate. All federal money need not be treated in the same way; the universities probably will not be able to have their cake and eat it too.

5. *Establish and Maintain an Arm's Length Relationship with all Special Interest Groups Including Agriculture and Agribusiness Interests*

We are in a difficult period. The objectivity of scientists is being questioned because of the source of their research funds, including just being on the payroll of an agricultural experiment station. At the same time, representatives of interest groups which are critical of the agricultural industry often make statements that have little scientific validity and which reflect a lack of familiarity with agriculture. The result is often an unfortunate polarity which contributes little to intelligent policy. The agricultural research and educational establishment should attempt to move from a defensive to a leadership position, but it will not be able to do this if it speaks on controversial issues only when it can defend or support commercial agriculture and agribusiness interests.

The existence and the perception of objectivity do not necessarily coincide. There probably is not a great deal of difference between scientists inside and outside the agricultural research system with respect to objectivity. The best scientists I know, both in and outside the system, may permit their value judgments to influence their selection of problems but not their research findings nor their interpretation of data. But the matter cannot stop here.

Administrators usually influence greatly the agenda for their units and,

in any case, must accept responsibility for that agenda. The program mix is an index of what is believed to be important and what is believed amenable to research and educational efforts. It is here that a great deal is done to affect the perception that those outside the system have regarding its objectivity and credibility. I cannot visualize a major agricultural education and research program associated with a university remaining aloof from such problems as environmental quality, human nutrition, rural taxation, and gasohol. Yet it will not be sufficient to just include these items on the agenda and insist on scientific objectivity in a narrow sense if certain aspects of these problems are "off limits" to the researchers or are not investigated. Neither can such problems be approached only from the standpoint of the farmer or the agricultural interest unless credibility is to suffer. Agriculture must be served without getting into bed with agricultural interests, and this must be made clear to both critics and defenders by word and deed. Rigorous peer group review of research findings that bear on conflict situations should be practiced. The institution must not take positions on issues even though faculty have the freedom to do so. The administrator taking a position on a controversial matter should make clear he or she is *not* speaking for the institution. What is said can then be evaluated as to whether the speaker has special competence in the subject or whether the speaker is without special portfolio. The question should be asked whether the same audience would be commanded if the speaker did not hold an administrative position.