American Agricultural Economics Association
Fellows Lecture

August 17, 1971
Carbondale, Illinois

1971

THE QUEST FOR RELEVANCE IN AGRICULTURAL ECONOMICS

by

Glenn L. Johnson

Our knowledge producing and teaching institutions are under sharp criticism and pressure. Many students question whether universities and nonuniversity research institutions are properly related to the issues and problems of our time. Within faculties and staffs, we find some who defend our traditional disciplinary organizations and others who would drastically reshape them to better handle our problems and issues. Wolfle has recently argued in Science (22), I think mistakenly, that the traditional disciplinary department has so outlived its usefulness that it is now time to "honor its achievements with a ceremonial and sentimental retirement party;" others defend the department with equal zeal. Similarly, some administrators defend traditional disciplinary structures while others would abandon disciplines in favor of problem-solving, issue-oriented organizations. Individual academicians, staff members, students, and legislators are also uncertain and uneasy. They vacillate between traditional academic interests and efforts to serve society while exerting random, chaotic pressures on administrators (21). In short, we are in a period of general uneasiness in which our entire intellectual establishment is under close critical examination.

I am indebted to the following for helpful comments and criticisms: James Bonnen, John Brake, Dale Hathaway, Francis Idachaba, Mark G. Johnson, Herbert Kriesel, Olasupu Ladipo, Lester Manderscheid, Kenneth Parsons, James Shaffer, Rainier Schickele and Lewis Zerby. Earlier and partial versions of this paper were presented this last year at Michigan State University, Clemson University, Texas Agricultural and Mechanical University and at the North Eastern Farm Management Research Committee. Helpful comments and criticisms were received at each of these presentations.

Agricultural economics, while less bothered with unproductive student disruptions than many other disciplines, is no exception with respect to the thinking of its productive, hard-working students, its faculties, staffs and administrators. The same conflicting quests for social relevance and disciplinary excellence affects our students, faculties, researchers, extension workers, and administrators.

Recent changes in the list of problems and issues before society have combined with the decline in our agricultural population to cause many U.S. agricultural economists to question the need for agricultural economics. This concern produced Gray's (10) and Firch's (8) delightful allegories in which they liken agricultural economists to blackfooted ferrets who live on prairie dogs (farmers), and administrators to great-horned owls who live on both. Gray noted that prairie dogs are being exterminated by the Department of the Interior and that this eliminates the food supply for the blackfooted ferrets, a protected species. Firch and Gray alledged that it is now difficult to identify even one agricultural economist, asserting that the rest have transmogrified themselves into all sorts of other beings because, in part, they have no more agricultural problems to solve. Somewhat similarly, James Shaffer has argued (20) that agricultural economists should transmogrify themselves into applied social scientists, and that they should then work on urban as well as rural problems in order to find appropriate and adequate levels of employment. Ernest Grove (11), Samuel Crockett (5) and David Narrie (18) have made some revealing points about relevance, disciplinary irrelevance, and the lack of problem-solving, issue-oriented work on the part of agricultural economists. Other pertinent recent statements by agricultural economists include those of Emery Castle (4), Peter Dorner (6), Dale Hathaway (12), James Bonnen (2), and Clifton Wharton (21). As opposed to the tendency of departments of agricultural economics and individual agricultural economists to transform to other ways of addressing

themselves to the problems of society, there is also a tendency for agricultural economics to revert to general economics. The merging of agricultural economics into general economics is, of course, the opposite of the tendency of departments of agricultural economics to become departments and institutes of resource development, food and nutrition, applied rural social science, etc.

The above summary indicates a need to gain perspective with respect to agricultural economics at this point in time. I propose to do this by looking at:

1. The general characteristics of the problems and issues before agriculture and rural society which agricultural economics might help solve.
2. The processes of solving these problems.
3. From these examinations of the characteristics of problems and issues and of the process of solving them, I will derive operational guidelines for agricultural economics in the decade ahead.
4. These operational guidelines will have specific implications for teaching, research, extension, administration, and individual agricultural economists.

Some Issues and Problems

Current rural and agrarian issues and problems include, but are by no means limited to: poverty, problems of minority populations in rural areas, regionally maldistributed populations, unionization of hired farm laborers, lack of individual control over one's destiny[1/], environmental quality problems, impacts of urban renewal development and welfare programs on nonmetropolitan areas, inadequate community services to rural areas, undernutrition in both

---

[1/] Includes the problem of the concentration of industrial control in agri-business as well as elsewhere stressed by Shaffer (20).

rural and urban areas, the multitudinous important developmental problems of the LDC's, malfunctions in the private control of resource use and production in U.S. agriculture, overpopulation, and the inappropriate geographic distribution of population, not to mention continuing farm management, agricultural marketing, and agricultural policy problems. As I see it, there is little danger that we will run out of work to do despite those who feel there is nothing left worth our attention.

Nature of Current Issues and Problems

These issues and problems have several common characteristics which are far more stable through time than the problems and issues themselves. It is the commonality of these characteristics which will permit us to deduce certain guidelines for agricultural economics in the years ahead. Rural and agrarian problems and issues can be characterized as:

1. continuously changing;
2. being practical, not disciplinary;
3. multidisciplinary but not interdisciplinary;
4. having solutions involving both market and nonmarket adjustments;
5. so complex that few, if any, of the many disciplines required to handle them have adequate theories, descriptive information, and quantitative techniques;
6. individualistic as well as social;
7. requiring normative knowledge to reach prescriptions for their solution.

With this by way of a quick introductory outline, I will now examine the characteristics of problems and issues in more detail.

An outstanding characteristic of the issues and problems which demand our attention is their changeability. Just a moment's historical reflection indicates that such problems and issues have always been with us and that they continuously change. I need only mention the Country Life Commission, Teddy

Roosevelt and the conservation movement, the Greenback movement, Upton Sinclair and "the jungle", antitrust investigations, the Grange, the farm board, the great depression, soil conservation, mobilization to produce farm products for World Wars I and II, the Farm Security Administration, the poverty commission, etc., to establish empirically the changing nature of agrarian problems and issues.

I have noted that these problems and issues are practical, not disciplinary. The distinction drawn here is between problems of the nonacademic world which private and/or public decision makers cannot avoid as contrasted to the problems of academic disciplines which they can avoid. When a practical problem exists nonacademic decision makers have to live with it. Even if they decide not to try to solve it, that is, in effect, a decision to live with the problem and its consequences. By contrast, a theoretical or descriptive problem may exist for years in an academic discipline such as economics without practical consequences and without pressure from nonacademic decision makers for its solution. The problems and issues listed above can be seen to be practical from examination of an example. Environmental quality problems are before nonacademic decision makers, both public and private. If nothing is done about them, they continue and we all live with their practical consequences. As such, they contrast sharply with those purely theoretical and descriptive questions of disciplines which have no known practical consequences.[1/]

I have also noted that the problems and issues before society are multidisciplinary and not interdisciplinary. By this I mean that information from a multiplicity of disciplines is required to solve the problems and issues which are before society, and that information which falls between or among disciplines is inadequate. Generally speaking and over the years the physical

---

[1/] As soon as a disciplinary concept, theory, or bit of descriptive information has recognized practical consequences, it becomes practical as well as disciplinary and, as such, relevant.

science disciplines have been of about equal importance with the social sciences and there is no evidence that this has changed.

By a discipline, I mean a field of study which produces theoretical constructs and descriptive information either because they are thought to be generally useful or to satisfy disciplinary curiosity. By this definition, fields such as agronomy, animal husbandry, and horticulture can be regarded as disciplines as well as such more fundamental fields as genetics, economics, physics, mathematics, and philosophy.

If interdisciplinary knowledge is different than disciplinary, it must mean bodies of knowledge and investigations which do not fall in any of the generally recognized disciplines but fall, instead, between or among them. Emery Castle has correctly pointed out that if such bodies of knowledge were significant they would become disciplines themselves (4); for instance, biochemistry has emerged as a discipline in its own right. Thus, persons who try to have command over the interrelationships among or between many disciplines without mastering any of the disciplines themselves seldom have command over knowledge of much practical or disciplinary significance. Whether the motivation for seeking such command stems from the problems dealt with or from breadth in interest, three things tend to happen for interdisciplinarians: 1) their concern with interrelationships among disciplines leads to shallowness in their command of specific disciplines, 2) both their interdisciplinary knowledge and their mix of commands over specific disciplines seldom remain appropriate to the changing sequence of problems and issues before society, or 3) they create a new discipline such as bio-chemistry.

Let me illustrate the differences between the interdisciplinary and multidisciplinary from work on rural development problems of Nigeria (13).

This work drew on personnel from many disciplines--economics, sociology, zoology, botany, genetics, and such applied disciplines as dairy husbandry, animal husbandry, nutrition, soil science, and veterinary science. It did not involve a need for interdisciplinarians specialized in the interrelationships between and among disciplines. When a geneticist or plant breeder was needed, the very best was required--a Borloug or a Sprague--in full command of the heart of his discipline. When an economist was needed, we required one who knew the theoretical and descriptive subject matter of economics and was prepared to modify old theory and to develop new theory and descriptive information to handle the problems at hand. The same was true with respect to sociologists, veterinarians and animal husbandry men. There was a shortage of people with adequate command over the hard-core concepts, descriptive information and quantitative techniques from the very hearts of the different disciplines involved in each particular problem but no shortage of interdisciplinarians--in fact, interdisciplinarians were in oversupply relative to their low productivity![1/]

The fourth listed characteristic of the problems and issues facing agricultural economics is that their solutions involve both market and nonmarket adjustments. Initially, the possibility of solving, say, a pollution problem with market adjustments is not great. Ordinarily the market has gone about as far as it can go toward solving pollution problems without assistance

---

[1/] At this point it should be noted that many people have hard-core disciplinary skills and knowledge from more than one discipline. Common combinations include economics along with such second disciplines as statistics, a technical agricultural science, mathematics, and sociology. Multidisciplinarians have disciplinary command over the hard core of their disciplines as contrasted to interdisciplinarians who concentrate on the interrelationships among and between disciplines; as such, multidisciplinarians can provide such command to problem-solving teams requiring such disciplinary skills to solve the problems to which they address themselves whereas interdisciplinarians cannot.

in the form of nonmarket adjustments. Typically, consumers and producers have not made the required changes because of costs and benefits external to their private calculations. We note and stress, however, that nonmarket adjustments to internalize previously externalized costs and benefits automatically throw the market into a disequilibrium which leads, in turn, to market adjustments. Thus, devising, designing, and instituting both market and nonmarket solutions to our problems requires full command over the disciplinary economic theory of market adjustments.

Another characteristic of the problems and issues before our society is that they are so complex that the demands they place upon our disciplinary concepts, information, and quantitative techniques exceed the present capacity of our disciplines. Almost without exception the real world practical problems and issues which we have mentioned remain unsolved in part because of disciplinary inadequacies. For instance, at my own university, we are working on a major practical problem of purifying and recycling water from the sewage disposal system into the natural underground water system for reuse. The chemical, physical, and biological theories, concepts, and information required to design and operate such a system greatly exceed those now available. In this connection earlier work on fertilizer rate application problems done cooperatively by economists and soil scientists provides interesting insights. When first starting such work, production economists thought that agronomists possessed the necessary chemical, physical, and biological concepts, and descriptive information. All that was needed, we thought, was some simple economic theory, appropriate experimental designs, and the application of well-known econometric techniques. However, it soon became painfully clear that the concepts of soil chemistry, soil physics, and soil biology were inadequate. Further, measurement techniques were so lacking that the supply of nitrogen in the soil could not be measured with any degree of accuracy. Also, our economic theories as well as the

experimental designs offered by the statisticians and biometricians were woefully deficient. Though we lack sufficient disciplinary information to handle fertilizer rate experiments dealing with only a few cubic feet of soil in the top two or three feet of plots as small as 1/250 of an acre, the MSU project for recycling sewage effluent involves cubic miles of earth and an even larger volume of atmosphere. Thus, the complexity of the recycling problem simply exceeds our extant chemical, physical, and biological knowledge and, as such, is similar to many other current problems and issues. And, when we turn to the economics side of it, we will find that the task of evaluating the necessary public and private investments and disinvestments also exceeds our disciplinary capacity. For instance, such modern books as Ferguson's (7), Naylor and Vernon's (19), and such older books as Sune Carlson's, A Study on the Pure Theory of Production (3) are all deficient with respect to investment and disinvestment theory.[1/]

This is not the place nor is there time to enumerate and document all of the other disciplinary shortcomings of economics revealed by past work on problems and issues; however, there is time to call attention to one more major deficiency in doing practical research on the agricultural problems and issues of our times. The maximizing theories we are so wont to use are based upon four requirements all of which are seldom met in dealing with the

---

[1/] Some of them touch on investment. None of them distinguish carefully between investment costs and salvage or disinvestment values. Opportunity costs, if mentioned (and they are not in Ferguson's book!) are not related to investment costs and salvage values. More fundamentally, the economics of deciding how much service to extract from fixed durables is inadequately handled. This, of course, is the user cost problem which was opened up by John Maynard Keynes (15) and discussed but not solved by Arthur Lewis (16). As long as user cost theory is inadequately handled, the theory of investment and disinvestment in major physical facilities for recycling and utilizing sewage wastes will not be well understood.

nonmarket aspects of the problems and issues under discussion. First, before we can maximize, we must have an objective function--a normative common denominator. It must be possible to add the various "bads" together and subtract them from the sum of the various "goods" in order to define a single objective function to maximize. In general, the objective function must deal with the goods and bads of both individuals and groups. Far too often we perjure ourselves by assuming that we have a common denominator when we do not. The second requirement is particularly important in the case of nonmarket adjustments; it is that the common denominator or objective function have interpersonal validity. If the common denominator does not, we cannot arrive at solutions to those major problems and issues, such as poverty and racism, whose solutions require the redistribution of property (rights and privileges) among people. The third requirement is implicitly recognized by our use of the laws of diminishing productivity and utility. These two laws establish the second order conditions mathematically necessary for the existence of the optima we seek as bases for prescribing right as opposed to wrong actions (17). When we design programs to introduce technological, human, and institutional changes, there is no automatic guarantee that anything like the laws of diminishing returns and utility hold. Not, at least, until much prior investigation has been carried out to rank alternative projects, programs, and policies in the order of their decreasing net advantage per dollar spent or per sacrificed unit of some nonmonetary value. In economics, we commonly employ the decision rule of simply maximizing the difference between good and bad in order to define a right action. Under imperfect knowledge, this is not necessarily the appropriate decision making rule. There are a large number of alternative rules including minimaxing, satisficing, maximization of the present value of expected future net returns, etc. Our fourth requirement, then, is that we have objective agreement on a decision

rule. This is the fundamental problem of institutional economics. What I am really saying here is that economics is woefully deficient with respect to theory to guide what I have recently started calling premaximization work. Most of our present theories are for use after we have met the conditions for maximization. Yet, the problems and issues we have faced historically and face now demand that we spend a very large portion of our time 1) finding interpersonally valid common denominators, 2) establishing optimal orders in which to take the different steps required to implement alternative projects, programs, and policies, and 3) finding an appropriate decision-making rule to use.

Before leaving this discussion of the inadequacies of our physical and social science disciplines, we should note that these inadequacies have already created a credibility gap for us with students and the public. Our inadequate biological, physical, economic, political, sociological theories, descriptive information, and quantitative techniques make the public skeptical of our pronouncements on such practical issues as those concerning DDT, the SST, minority rights, welfare assistance, phosphate detergents, and mercury contamination. I believe that decision makers, students, legislators, and the public at large sense the underlying disciplinary deficiencies of the solutions we offer. Thus, we have a credibility gap which requires (regardless of how the gap is conceived by the public) that disciplinary progress be made and that disciplinary excellence not be permitted to deteriorate. When the use of logic and appeal to experience are discredited, people begin to reach conclusions emotionally and in an unobjective, inaccurate way (9). As some of the young people put it these days, they "feel it in their guts". Guts were made for digesting food not for thinking and observing. We have brains with which to reason and senses with which to observe, and we should not discredit them by using inadequate normative and positive theories and erroneous descriptive information

to incorrectly interpret sense impressions while failing to learn and develop more appropriate theories and better information. Disciplinary excellence is a necessary ingredient of problem-solving, issue-oriented work. As economists we are responsible for learning, improving, and teaching the logic or theory, quantitative techniques and basic descriptive information of our discipline.

The problems and issues under discussion typically involve the interests of both individuals and groups in a manner not adequately or fully reflected in the distinction between market and nonmarket adjustments. Not all individual values can be satisfied by private adjustments in the market; indeed, fundamental institutional reforms and redistributions of the ownership of the means of producing income are often required before individuals can attain their values in the market place. Conversely, group or collective values are attainable through the market as well as through nonmarket adjustments. Market and nonmarket adjustments, however, are only part of the total process of solving many problems. Underneath are both the individual and group(or collective)values sought in making adjustments. We encounter the difference between individual and group values when we deal with the goodness of self-identification, the badness of alienation, and the goodness of group identity. We need only think of the problems of racial minorities, of ADC mothers, of the aged poor rural whites, and of agricultural labor unionization to begin to see the important distinction. We must consider both individuals and groups as basic units in our society in designing institutional, technological, and human alternatives to solve many of the problems and issues of our times. Thus, we are required to have a philosophic orientation which permits us to address ourselves to the identities of both people and groups. We need to be both existential and communal. This need to consider both individual and group values is not met

by simply adding psychologists and sociologists to our problem-solving teams; instead, it is a need met by an appropriate philosophic orientation.[1/]

The next characteristic of the practical problems and issues before the decision-making units of our society is that their solutions take the form of prescriptions as to what it is "right to do" (17). Prescriptive knowledge contrasts with normative and positivistic knowledge by being dependent upon both of them.[2/] Disciplines such as chemistry and physics produce positivistic knowledge which describes the world in a neutral way having little directly to do with good and bad. Conversely, other disciplines such as ethics and economics produce normative knowledge--knowledge about goodness and badness, per se. Alone, neither positivistic nor normative knowledge indicates which action is right or wrong to select as a goal or to do. A prescription as to what is right to do depends upon both 1) positivistic descriptions of what has, is, and can be if so and so is done, and 2) descriptions of goodness and badness which provide performance criteria--"objective functions"--for decisions. As soon as we realize that solutions for the issues and problems are prescriptive knowledge, we have to insist that our philosophic orientation be broad enough to include

---

[1/] Both sociology and psychology, for instance, can be so positivistically-oriented that no objective attention is paid to the values, hopes, and aspirations of either individuals or groups. Economics, too, can be unduly positivistic; however, it has been and can be normatively productive. Adam Smith, J.S. Mill, and Jeremy Bentham are classicists for philosophic value theorists as well as for economists. Modern day price and welfare theory is normative. Kenneth Arrow's modern book on individual preferences and social choices promises to become classical in both economics and philosophy (1).

[2/] Pragmatism, in making normative and positivistic knowledge interdependent, really limits knowledge (as I view pragmatism) to the prescriptive. As such pragmatism is intolerant of both normativistic and positivistic dogmas, a view which I share and apply to prescriptive knowledge, as well.

prescriptive work.[1/]

General Orientational and Specific Guidelines for Agricultural Economics

We have seen that the problems and issues of society change continuously and that, hence, the problems themselves are not stable enough to yield organizational guidelines for our work. The characteristics of agricultural problems and issues, however, are quite stable and provide the basic stable orientation to be exploited in orienting agricultural economics. These characteristics of problems and issues lead to orientational guidelines. In order to relate to the practical problems and issues, we:

1. need to be able to mobilize hard-core knowledge from the combination of disciplines appropriate to the practical problem or issue at hand. This is taken on the basis of extensive practical problem-solving work to be empirically truth. Economics is one of the important commonly used disciplines.

[1/] Among the philosophies, pragmatism concentrates specifically on prescriptions. As such, it regards positivistic and normative knowledge as interdependent and not separately knowable. By contrast, positivism which asserts the unobjectivity of normative knowledge is disqualified. A thorough-going positivist cannot objectively conceive of defining a practical problem, let alone prescribing its solution. The productivity and respectability of positivism in the physical sciences have caused certain social scientists to "ape it". Such attempts have, however, tended to sterilize social scientists by reducing their ability to define and solve problems. As a consequence, some of the positivistically inclined social scientists have taken the intermediate position (conditional normativism) of assuming answers to normative questions and then defining problems and reaching prescriptive solutions without the benefit of objective empirical work on normative questions. Because, despite their shortcomings, all three of these positions have demonstrated their usefulness in tackling problems and issues, it would seem a wise course for us to insist that none of the three be eliminated from our philosophic orientation but that none of the three be permitted to restrain us from exploiting the advantages of the other two. Existentialism is another important philosophy so long as group interests are not forgotten and if existentialism's emphasis on establishing individual identity is not perverted into something which rejects logical analysis and experience in reaching prescriptive conclusions. The individual is important but we don't "gotta be me what else can I be", as the popular song says, without regard to logic and experience. It is also important that our philosophic orientation permit us to consider group values, aspirations, incentives, and hopes.

2. need to remain flexible with respect to the combinations of disciplinary skills and knowledge which we can bring to bear. It is observed to be empirically true that the combination of disciplinary skills varies from problem to problem and issue to issue both at any point in time and through time.
3. need to have skills and knowledge from the normative as well as positive disciplines. It is taken to be empirically true that determination of which act is the right one to prescribe as the solution of a problem depends on normative knowledge of good and bad as well as on positive knowledge.
4. need to be able to work with the problems and issues faced by both individuals and collectivities of people such as families, social organizations, government units, producer and consumer organizations, etc. It is taken to be empirically true that we, as collectivities, have problems and face issues which are more than the sum of the problems and issues we face as individuals.
5. need to work on nonmarket adjustments in full recognition that (a) initially, at least, the preconditions for application of maximizing theories are not met and that, hence, (b) much premaximization work including close pragmatic interaction with nonacademic decision makers will be required.
6. need to develop improved disciplinary skills. It is taken to be empirically true that the lack of disciplinary skills from many disciplines constrains our ability to solve the practical problems and issues before society and that this is particularly true for economics.

7. need to further develop disciplinary knowledge both theoretical and descriptive. It is taken to be empirically true that the lack of disciplinary knowledge from many disciplines constrains our ability to solve the practical problems and issues before society and that this is at least as true for economics as for any discipline.

As these guidelines are stated in general, we need now to examine their specific implications for 1) the teaching of agricultural economics, 2) agricultural economics research, both practical and disciplinary, 3) agricultural extension, 4) administration of problem-solving, issue-oriented programs, and finally, 5) individual agricultural economists.

Implications for the teaching of agricultural economics:--The crucial agricultural problems and issues before our society make it desirable for agricultural economics teaching to be oriented to these problems and to appropriate approaches for solving them. Solving these problems also requires disciplinary excellence. For the most part, this means both 1) learning experiences with or in multidisciplinary, problem-solving studies and efforts, and 2) hard-core disciplinary training in economic theory and quantitative techniques. At the undergraduate level, field trips, special problems, and special course programs can provide the necessary practical experience. Most practical issue-oriented undergraduate courses such as farm management, marketing, policy, cooperation, etc., should be taught on a multidisciplinary level and, as such, require administrative support at college and/or university levels. At the graduate level, a wonderful opportunity for practical experience has always existed with respect to dissertation efforts. As agricultural economics is relatively well financed, dissertation efforts can be part of multidisciplinary projects which give the student interested in working on problems and issues exactly the kind of experience he needs. Descriptive information relevant to

current problems and issues should be taught at both graduate and undergraduate levels. It must be stressed, however, that problems and issues change and that issue-oriented teaching programs and practical dissertation research must be continually adjusted to the changing pattern of problems and issues.

Our examination of problems and problem-solving processes also indicated a basic need for the disciplinary content of economics. The challenge here is to teach theory, quantitative techniques and disciplinary data in an inspirational way without becoming superficial. The complementary relationship between problem solving and disciplinary concepts and techniques is to be exploited without dilution of disciplinary excellence while refraining from disciplinary irrelevance. In my opinion, interdisciplinary and pseudo-disciplinary subjects generally contribute little to either disciplinary excellence or to problem solving, particularly when taught as if they have lasting theoretical and fundamental descriptive content. By contrast, multidisciplinary courses can provide meaningful problem-solving, issues-oriented experiences.

Still on the disciplinary side, full attention needs to be given in <u>both</u> undergraduate and graduate teaching to the assumptions underlying the maximization theories, models and techniques of economics to insure that they are 1)fully used as appropriate, and 2)not used in lieu of less elegant but more appropriate premaximization approaches. As a high proportion of undergraduates have practical career objectives, this is particularly important for them.

Philosophically, our undergraduate and our graduate teaching should be such that our students will be free, and will find it respectable, to work as economists on values, objectives, and aspirations both as problem solvers and as disciplinarians. It should also be such that they will be given guidance on how to work with normative questions in an objective way.

We have also seen that the problems and issues are individual as well as group oriented. This requires that our problem-solving and disciplinary teaching have a philosophic orientation which pays attention to individuals as well as groups. We cannot insure proper orientation to individual and group values by simply including psychology and sociology in the curriculum. These disciplines, like economics, can suffer from philosopic orientations which restrict capacity to work with the normative, either individually or collectively. And, just as it is important to consider both the individual and group, so it is also important to consider the interactions between the two. In one sense, the history of human societies is one of balancing the interest of groups against those of individuals. The current issues and problems are no exception. There is a relevant economics of groups as well as of individuals to be taught (1).

Implications for research:--Our general guidelines also have specific implications for problem-solving research and investigations as well as for disciplinary research.

Demand for the disciplinary concepts and quantitative techniques of economics originates in problem-solving research and investigations. As members of multidisciplinary, problem-solving teams, agricultural economists are expected to be able to use these theories and techniques in close cooperation with others using fundamental theories and techniques from such disciplines as genetics, sociology, agricultural engineering, law, animal husbandry, psychology, political science, etc. Economic theories are particularly useful in predicting the consequences of both market and nonmarket adjustments to solve problems and handle issues. Despite the inadequacies to be noted below, economic theories probably provide a better basis for prescribing right actions as solutions to practical problems than available from other disciplines. Contrary to often expressed popular opinion, economic theory is centrally concerned with the

nonmonetary as well as with monetary values, the former being as "economic" as the latter and major concerns of both consumption and welfare economics.

As for teaching, problem-solving, issue-oriented research must have a philosophic foundation permitting objective work on normative questions (14) both individual and group or communal in nature. It is also crucial that normative and prescriptive work be respected and recognized both professionally and administratively. I believe that the awards program of this Association has been remiss in this respect and should be modified to give relatively more recognition to practical prescriptive research.

There are also implications for disciplinary research in economics. In discussing nonmarket adjustments and the inadequacies of economics, it has already been noted that current rural and agricultural problems and issues place tremendous demand on improvement in our theoretical concepts, descriptive information, and quantitative techniques. The deficiencies in our discipline revealed by problem-solving research and investigations provide specific priorities for our disciplinary research. Some of the priority areas are: investment/disinvestment theory; stock/flow conversion theory; user cost concepts, benefit/cost concepts; the relationships between effective demand and production; the generation, saving, and investment of farm-produced capital; dynamic managerial theory; and premaximization concepts to use in establishing the necessary conditions for applying maximization theories. Other important deficiencies involve theories for dealing with the formation of and trade-offs among individual and group values. These and other subjects all need disciplinary research to make our problem-solving research and investigations more effective.

Also, our quantitative deficiencies indicate need for a more thorough understanding of the usefulness and advantages of informal, simple, paper and pencil projections. These have long been used effectively in doing premaximization work on nonmarket adjustments to solve practical problems and issues.

A modern replacement for this time-tested approach is the computerized, systems-science, simulation approach. As this approach is not fully developed, it is a relevant area for disciplinary research in economics as well as in other disciplines.

While we still have difficulties in estimating the parameters of economic functions and sets of simultaneous equations, I believe that we have overemphasized improving such estimates at the expense of failing to improve other more needed estimates and sources of information. In the last 20 years, we have also made great efforts to improve maximization computations, particularly modification and refinements of linear programming. I believe that this area of work has also been overemphasized relative to the use of projections, simulations, and premaximization computations. Our quantitative techniques for dealing with normative questions (while probably better developed than in any other discipline including philosophic value theory) are inadequate and in need of much more disciplinary research.

Implications for extension:--In this connection there are a number of points to be made. Fundamentally, there seems to be no real further need to maintain a distinction between problem-solving, issue-oriented research and extension investigations. The distinction excuses researchers, on one hand, from adequate contact with the decision makers for whom their practical research is being done and excuses extension workers, on the other, from adequate contact with the hard cores of the different disciplines including economics on which they depend.

It is my observation that the problem orientation of agricultural economics extension has not been as flexible as it should be though teaching and research are also subject to the same criticism. Historically, extension efforts have concentrated heavily on agricultural production, farm management, and marketing and, more recently, have placed great emphasis on resource development and policy. Soil

conservation, rural poverty, community services, zoning and land-use planning have tended to be given somewhat peripheral attention. The new agrarian and rural issues of our time are not adequately handled by all of our U.S./State cooperative extension services nor by the extension services of other countries.

Implications for Administration of Problem-Solving, Issue-Oriented Programs:--The general guidelines developed above place a heavy burden on administration by calling simultaneously for (1) flexibility in forming multidisciplinary teaching, research, and extension teams appropriate to changing agricultural problems and issues, and 2) the preservation and strengthening of disciplinary skills, concepts, theories, information, and quantitative techniques. The first is necessary to close the increasingly obvious gap between the expectations of the public, students, and faculties, on one hand, and our handling of the practical problems and issues of our times, on the other. The second is required to maintain and expand the stock of skilled personnel, concepts, theories, and descriptive information required to do the first. In the long run, these two requirements are complementary and, as such, must both be attained for either to be productive.

As I see it, the problem for administrators originates in part with three nonadministrative groups, all of which sometimes fail to recognize the essential complementarity between disciplinary and problem-solving, issue-oriented research. I refer to 1) disciplinarians, 2) those concerned primarily with agricultural issues and problems, and 3) interdisciplinarians and pseudo-disciplinarians who neglect both disciplines and practical problems.

The credibility gap which the academic and intellectual world faces today results, I believe, in substantial part from the failure of administrators and the above three groups to evolve a modus operandi. These groups have had enough power to keep administrators and administrative units off balance (21), and

hence, unclear and ambiguous partly as a result of 1) being staffed by recruits from each of the three groups, 2) seeking student, faculty or staff, and public support from each of the three groups without at first reconciling the conflicts among them, and 3) being required to spend a high proportion of their time on budgets; departmental, college, university, division, bureau, agency and/or company politics; and personnel recruiting. It has been all too easy for administrators to paint themselves as servants of their staffs and as dependent for their success on the unadministered and unguided performance of the conflicting staff they recruit. The consequent failure to organize problem-solving, issue-oriented programs justifies student complaints about irrelevance and the absence of connections between academic disciplines and real world problems and issues. We, both as administrators and as those administered, are responsible for correcting the situation.

The multidisciplinary nature of the practical problems dictates that the administration of problem-solving, issue-oriented activities be at a point in the administrative command above the administration of disciplinary interests. In universities this means at the college or university level. In the USDA this means above the administrative units dealing with agricultural economics, plant breeding, data collection, forestry, etc. In foundations and other government agencies, it occurs at the program level, not in the level of disciplinary divisions of plant science, agricultural economics, the humanities, agricultural engineering, medicine, etc.

Among the valued colleagues I asked to criticize and review this paper were a number of experienced administrators and perhaps some would-be administrators. Several of them resisted the idea that administration must coordinate problem-solving, issue-oriented programs across college and department lines or, in the case of nonacademic organizations, above the

disciplinary level. One colleague even wrote about an earlier draft of this paper that no college president in his right mind would attach a unit for coordinating issue and problem oriented research, teaching, public service, etc., across college lines to his office. All I can say is that if the president does not take responsibility for doing this, who can? And if within colleges, the deans do not, then who can? It is precisely such failures to administer that I, students, faculties, staffs, and the public are concerned about. Students and legislators can validly state that we are irrelevant and ineffective when they observe:

1. professors and others concentrating on disciplinary interests to the neglect of issue-oriented, problem-solving work.
2. administrators failing to coordinate problem-solving research across departmental and college lines.
3. faculty, staff members, and even administrators creating institutes, centers, and interdisciplinary programs which neither promote disciplinary progress nor solve problems and issues but provide, instead, tenured comfortable bureaucratic homes.

Obviously, my conclusions in this regard have implications for the administration of agricultural economics teaching. In order for agricultural economics students to participate in issue-oriented, problem-solving experiences in multidisciplinary teaching programs, it is necessary that such programs either have full administrative support at the college or university level as well as at the departmental level or be administered at college and university levels. Higher administrative level support is needed to 1) guarantee cooperation from other departments, and 2) police the administering department lest it subvert the program to its own disciplinary and bureaucratic objectives. Departments should avoid becoming multidisciplinary in nature, thereby partially duplicating either the college

or the university itself. We must also note that when it is necessary to draw on personnel from more than one college, administration support is needed from higher than college level, possibly a special administrative branch of the president's office having to do with university-wide teaching programs. If any sub-administrative units or projects are established for administering or running multidisciplinary courses and programs, I believe that no tenure should be granted in them so that it will be easier to reallocate disciplinary resources in them to new courses and programs on emerging problems and issues.

Severe administrative problems arise in connection with problem-solving research and investigations. When contributions are required from more than one disciplinary unit within the college of agriculture (or agricultural division of a nonacademic organization) the problem-solving programs need to have the support of the chief agricultural administrator. If such a project unit is used, it should not be permanent. The research program will remain more flexible if no tenure is granted as project members or to the project itself. Personnel tenure should remain with the disciplinary department to permit the "chain or line of command" to reallocate disciplinary resources to new projects to handle the everchanging stream of problems and issues. Furthermore, departmental tenure for project members will help impart a needed sense of relevancy to the disciplinarians therein. Similarly, when the multidisciplinary demands of a problem or issue cross college or division lines, administration support will be needed from someone more powerful than the competing deans or division heads involved. In a university this means the president's office or someone working out of the president's office.

Fortunately, the administrative difficulties associated with doing purely disciplinary research are not large. Colleges, universities, and fundamental research agencies are commonly organized along disciplinary lines. This means

that most departments of agricultural economics are able to address themselves to disciplinary research projects without serious difficulty in crossing departmental lines. Occasionally, problems do arise in the relationship between agricultural economics and general economics, or mathematics and statistics. By and large, the research budgets of the departments of agricultural economics have been such that they have been able to acquire necessary quantitative and theoretical skills either directly or in cooperative arrangements with the other departments. Another factor reducing the administrative burden for disciplinary research is that much of it can be done by individuals as contrasted to teams. The main difficulty is in keeping disciplinary research relevant which, in turn, takes us back to the problems of administering practical research.

Though agricultural economics extension is often administered out of the dean's office with tenure being maintained at the departmental level, difficulties are still encountered. These often originate in 1) lack of flexibility in adjusting projects to changing problems and issues, and 2) failure to develop administrative structures for crossing college lines to mobilize competencies from disciplines in other colleges.

I have what I believe to be an important recommendation to make on administration. Our association has set up and operates awards programs to improve research, teaching, undergraduate debating, and extension. I believe that these programs have had the expected salutary effects. I now believe it is time to do the same thing for administration. And, within administration, I believe we should concentrate on the administration of multidisciplinary programs dealing with agricultural and agrarian problems and issues as contrasted to departmental administration. Further, the award should not go to project or program leaders; instead, it should go to administrators in position to assemble the needed disciplinary mixes needed to solve practical

problems and issues. Such an awards program would have to be sponsored by at least three associations representing different disciplines concerned with agrarian and rural affairs. To this end, I recommend that our association take steps to see if such an awards program can be established in cooperation with two or three other associations. The awards could be designated for "Distinguished Public Administration of Multidisciplinary, Issue-Oriented, Problem-Solving Agrarian Programs".

Implications for Individuals:--Our operational guidelines also have specific implications for agricultural economists or individuals. Whether of practical or disciplinary inclination, the individual needs to recognize the essential complementarity between disciplinary and problem-solving, issue-oriented activity. Full recognition of this implies that agricultural economists will:

1. refrain from pushing administrators to support either disciplinary or problem-solving, issue-oriented activity at the undue expense of the other.
2. push for administrative action to organize multidisciplinary teams to tackle current problems and issues. For individual agricultural economists this involves:
   a. willingness to be Indians as well as chiefs on such teams and to recognize that the chief may very advantageously be from a different discipline as economics has no crucial central role to play in problem solving despite often repeated empire building assertions by economists on this point.
   b. recognition that such assignments must be for no longer than required to make one's contribution to the solution to each of the everchanging, rapid succession of problems and issues.

c. refrain from interfering with formation of multidisciplinary teams when one's own particular speciality is not important.

d. take the lead in pointing out constructively how the discipline of economics can contribute to the solution of practical problems and issues.

e. take the lead in identifying and mobilizing support for problem-solving, issue-oriented projects. It is too much to expect administrative personnel to carry this burden alone. There are not enough administrators, they often do not have the competencies to organize and execute the project which the sources of support seek, and their contacts with the problems and issues of the nonacademic world are much more limited than those of their much more numerous faculty and/or staff members. Further, regular administrative duties typically prevent administrators from giving enough time to design and execute major projects.

f. refrain from organizing and supporting programs, institutes, centers, etc., which purport to solve problems and deal with issues but which, in fact, become personal empires which contribute neither to disciplinary excellence nor to the handling of agrarian problems and issues.

3. support disciplinary attempts to teach, maintain, expand, and make more relevant the economic concepts, theories, quantitative techniques, and generally useful descriptive data.

4. adopt a philosophic orientation which subjects both the normative and positive aspects of prescriptive analysis as well as the prescriptive analysis itself to logical analysis and tests of experience.

5. adopt a philosophic orientation which places emphasis on both individual and group or collective problems, issues, and interests.

Summary

In quick summary now, I have argued that agricultural economics has not died just because the problems now faced are different than those of a decade ago. Indeed, and to the contrary, we are particularly fortunate as agricultural economists to have the challenge of important, rapidly-changing agrarian and rural problems and issues. Our opportunities are both disciplinary and practical, and our future lies in fully exploiting the complementarity between disciplinary and problem-solving, issue-oriented work. In order to do this, we will have to grant full recognition to problem-solving, issue-oriented work; be flexible in adjusting to changing problems and issues; preserve and extend our disciplinary competencies; and have a philosophic orientation which permits us to work prescriptively. This means working on the normative as well as the positive and on group as well as individual problems and considering nonmarket as well as market adjustments in seeking adjustments and solutions to prescribe. We need to reorient our teaching, research, extension, administration, and personal commitments to exploit this complementarity while avoiding disciplinary irrelevance and the pitfalls of interdisciplinary and pseudo-disciplinary efforts which neither promote disciplinary progress nor contribute to issue-oriented, problem-solving work. Administration services are crucial in mobilizing and controlling multidisciplinary teams required to do successful problem-solving, issue-oriented work. Much of the current sense of irrelevance is due to lack of adequate administrative services for such team efforts, the failures being due to both staff

and student inadequacies as well as to administrative shortcomings. Thus, it was recommended that our Association join three or four other associations in sponsoring an annual award for "Distinguished Public Administration of Multidisciplinary, Issue-Oriented, Problem-Solving Agrarian Programs". This award should be reserved for administrators functioning above disciplinary levels in public agencies and should not be given to project leaders and department heads.

Bibliography

1. Arrow, Kenneth. Social Choice and Individual Values. New York: Wiley, 1963.

2. Bonnen, James. "Present and Prospective Policy Problems of U.S. Agriculture: Viewed by an Economist." Journal of Farm Economics. Vol. 47, No. 5, December 1965.

3. Carlson, Sune. A Study on the Pure Theory of Production. London: P. S. King & Son, Ltd., 1939.

4. Castle, Emery N. Priorities in Agricultural Economics for the 1970s. Technical Paper, Oregon Agricultural Experiment Station, Oregon State University, Corvallis, Oregon.

5. Crockett, Samuel. "Relevance--Where Do You Find It?" Communication, American Journal of Agricultural Economics. Vol. 53, No. 1, February 1971, pp. 137-138.

6. Dorner, Peter. "Needed Redirections in Economic Analysis for Agricultural Development Policy." American Journal of Agricultural Economics. Vol. 53, No. 1, February 1971, pp. 8-15.

7. Ferguson, Charles E. The Neoclassical Theory of Production and Distribution. London, Cambridge U. P., 1969.

8. Firch, Robert S. Discussion of "Agricultural Economics: An Orientation for the 70s" by Roger W. Gray. Proceedings of the Western Agricultural Economics Association's 43rd Annual Meeting, July 19-22, 1970, p. 27.

9. Gambino, Richard. "Man--No Ecological Monster." Freedom at Issue. No. 8, July-August 1971, pp. 7-10.

10. Gray, Roger W. "Agricultural Economics: An Orientation for the 70s." Proceedings of the Western Agricultural Economics Association's 43rd Annual Meeting, July 19-22, 1970, pp. 22-27.

11. Grove, Ernest W. "Irrelevance is Where You Find It." Communication, American Journal of Agricultural Economics. Vol. 52, No. 1, February 1970, p. 138.

12. Hathaway, Dale E. "The Economics of Agricultural Economics." Presidential Address, American Journal of Agricultural Economics. Vol. 51, No. 5, December 1969, pp. 1010-1026.

13. Johnson, Glenn L.; Orlin J. Scoville; George K. Dike; and Carl K. Eicher. Strategies and Recommendations for Nigerian Rural Development 1969/1985. Consortium for the Study of Nigerian Rural Development, Michigan State University, East Lansing, July 1969.

14. Johnson, Glenn L. and Lewis K. Zerby. 150 Plates of Spaghetti. Forthcoming, Publisher being determined.

15. Keynes, John Maynard. The General Theory of Employment, Interest, and Money. New York: Harcourt, Brace and World, 1936.

16. Lewis, Arthur. Overhead Costs, Some Essays In Economic Analysis. New York: Rinehart and Co., Inc., 1949.

17. Lewis, C. I. The Ground and Nature of the Right. New York: Columbia University Press, 1955.

18. Narrie, David B. "Irrelevance Is Where You Find It." Comment, American Journal of Agricultural Economics. Vol. 53, No. 1, February 1971, p. 138.

19. Naylor, Thomas H. and John M. Vernon. Microeconomics and Decision Models of the Firm. New York: Harcourt, Brace, and World, 1969.

20. Shaffer, James D. "On Institutional Obsolescence and Innovation--Background for Professional Dialogue on Public Policy." American Journal of Agricultural Economics. Vol. 51, No. 2, May 1969, pp. 245-267.

21. Wharton, Clifton R., Jr. Continuity and Change, Academic Greatness Under Stress. State of the University Address, Michigan State University, East Lansing, February 15, 1971.

22. Wolfle, Dael. "The Supernatural Department." Science. Vol. 173, No. 3992, July 9, 1971, p. 109.