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# Agricultural Economics in Multidiscipline Research and Extension: Leading, Following, Integrating

Thomas Dobbs  
*South Dakota State University*

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AGRICULTURAL ECONOMICS IN MULTIDISCIPLINE  
RESEARCH AND EXTENSION:  
LEADING, FOLLOWING, INTEGRATING\*

by

Thomas L. Dobbs\*\*

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\*\*Professor and Extension Economist, Economics Department, South Dakota State University.

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## **Agricultural Economics in Multidiscipline Research and Extension: Leading, Following, Integrating**

### Introduction

Multidiscipline agricultural research and extension provide special challenges to natural and social scientists. Each discipline, including agricultural economics, has unique strengths which can contribute to the effectiveness of multidiscipline programs. Each also faces special challenges and difficulties in such endeavors. This paper is intended to convey some of the major roles and challenges concerning involvement of agricultural economics in multidiscipline research and extension. It is hoped that a better understanding of these roles and challenges will enable agricultural economists and their colleagues in other agricultural disciplines to more effectively work together. Thus, the intended audience for this paper includes economists, natural (biological and physical) scientists, other social scientists, and administrators. Although much of the paper's discussion is in the context of U.S. Land Grant universities, most of the "lessons" which are offered also apply to multidiscipline research, extension, and technical assistance in other settings, including ones in developing countries.

The unique value of multidiscipline research and extension programs derives from the ability of such programs to address complex, real-world problems in a more complete and realistic way than is generally possible in single-discipline efforts. Various agricultural disciplines provide different perspectives and information in multidiscipline efforts to understand and explain the real world. The special contribution of agricultural economics rests on its analytical framework for conceptualizing and measuring the public and private tradeoffs associated with alternative courses of

action--such as recommending particular agricultural technology packages. The tradeoffs are often stated in terms of costs and benefits, though they are not restricted to monetary items. Because of their particular analytical framework, agricultural economists often find themselves in an integrating role in multidiscipline programs. They also sometimes are in either leading or following roles. As is pointed out later in the paper, however, the following role places some severe limitations on the effectiveness of agricultural economists' contributions; the following role can be restricting to other disciplines, as well.

A brief background on agricultural economics involvement in multidiscipline research and extension is provided in the next section of this paper. Then, a general framework for multidiscipline research and extension involving agricultural economists is provided in the following section. That section is followed by a discussion of the role of social scientists other than economists in systems oriented agricultural research and extension. Following that, attention is given to tensions--both healthy and unhealthy--involved in multidiscipline work with agricultural economics. Included are tensions associated with the "limitations" perspective of economics and with different disciplines sometimes viewing each other as "parasitic". The paper closes with some thoughts on the appropriate balance between "discipline" and "multidiscipline" work within the agricultural economics profession.

## Background<sup>1</sup>

Agricultural economics emerged in the United States around the turn of the century as a hybrid discipline, frequently as a merging of agronomy and economics. Many of the original research and extension concerns of this new discipline were "multidisciplinary" by their very nature. Farm management concerns were at the forefront. The early work of Cornell University in this area is often recognized (DeLoach). Questions of appropriate farm technology and management of farm resources were central to the orientation and thrust of early agricultural economists. The disciplines of agronomy, animal husbandry, engineering, and economics had to be combined in tackling research questions and farmer education programs dealing with these farm management concerns. It is fair to say that agricultural economics was an integrating discipline in its early years.

The profession of agricultural economics soon began to take on more of an economics sub-discipline shape at some institutions, including the University of Wisconsin, Harvard University, and the U.S. Department of Agriculture. However, the farm management approach, with its heavy agronomy emphasis, prevailed through the 1920's at many Land Grant colleges and universities. Some institutions, such as the University of California, were also placing emphasis on agricultural marketing by the 1920's (DeLoach).

As farm policy concerns of the 1930's Dépression years and the 1940's war and post-war years rose in importance, agricultural economists increasingly dealt with those concerns. This required greater strength in the discipline of economics. Institutions such as Iowa State University helped further the establishment of agricultural economics as a "legitimate" branch

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<sup>1</sup>An excellent discussion of the U.S. evolution of agricultural economics is found in DeLoach. I have borrowed some from that source in preparing this section, but have also included observations and interpretations of my own.

of economics during this period. Multidiscipline, farm management oriented work continued, but discipline, policy oriented work increased in importance. This trend continued in the 1950's and intensified in the 1960's, when advances in computers made possible large-scale modeling of agricultural economy problems. Most other disciplines in the field of agriculture were also becoming increasingly specialized during this time period. In many cases, agricultural economics played a leadership role within agriculture during the 1950's and 1960's, as policy and market forecasting work pointed the direction for fruitful technology oriented research and extension by natural science specialists.

The 1970's and early 1980's have witnessed a renewed interest within agricultural economics in farm management oriented work. The new term is "farming systems analysis", however, with a connotation broader than, though similar to, farm management. Farming systems work generally involves the old fusion of economics with such sister agricultural disciplines as plant and animal science and agricultural engineering. It also frequently involves integrating cultural and policy considerations into analyses of appropriate technology and management of agricultural resources.

The seeds of this renewed interest in farm management or systems oriented work were in part planted by U.S. and other agricultural economists working in developing countries in Asia, Latin America, and Africa during the 1950's and 1960's. Questions of what technology to introduce to improve agricultural productivity in these countries, and how to introduce it, were similar to those faced by agricultural economists earlier in this century in the U.S. However, these questions were compounded by cultural and policy considerations that--at least to the "outsider"--were extremely complex. Agricultural research and extension work therefore called not only for

economists and natural scientists, but for sociologists, anthropologists, and political scientists, as well. As the "Green Revolution" in developing countries seemed to stall in the early 1970's, interest in farming systems research and extension methods spread substantially. Systems methods came to be viewed as means of untangling the complexities of farm productivity constraints and solutions.

Questions of "appropriate technology" gained renewed interest in the U.S. during the 1970's. With that interest, multidiscipline, systems oriented work involving agricultural economists experienced a mild resurgence in the U.S., as well as in the developing countries. This work, both in developing countries and in the U.S., has sometimes found agricultural economists in a following role, carrying out evaluations of technologies already developed by natural scientists or introduced by extension or other agencies.<sup>2</sup> In other cases, agricultural economists have served in an integrating role--conceptualizing and pulling together technical, social, economic, and policy considerations in an on-going process of technology assessment.

Some valuable lessons could be drawn from the historical experience of agricultural economics involvement in multidiscipline research and extension, both in the U.S. and in other countries. A more modest attempt is made in this paper to draw some lessons on multidiscipline work largely from personal observation and experience. These "lessons" may be helpful to agricultural economists and to other agricultural specialists who find themselves working with economists in multidiscipline research or extension programs. I believe these lessons apply both to work in the U.S. and to work in developing countries.

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A good example of agricultural economics involvement in assessment of an already developed and introduced technology is the University of Minnesota study of commercial corn production (Sundquist, Menz, and Neumeier).

### General framework for multidiscipline research and extension

A general framework for multidiscipline research and extension involving agricultural economics is outlined in this section. Agricultural economics is seen to play an integrating role in this framework. The following and leading roles are also encompassed in the framework, however. Figure 1 can be used to illustrate the framework in its most simple terms.

In this framework, agricultural economics plays a leading role when it pre-sorts technology, commodity, management, or other economic alternatives. This pre-sorting narrows down the alternatives for the technology or production oriented work by natural science disciplines. The natural science discipline studies of particular alternatives then provide "hard" data on physical and biological relationships, to be used in detailed feasibility assessments by agricultural economists.

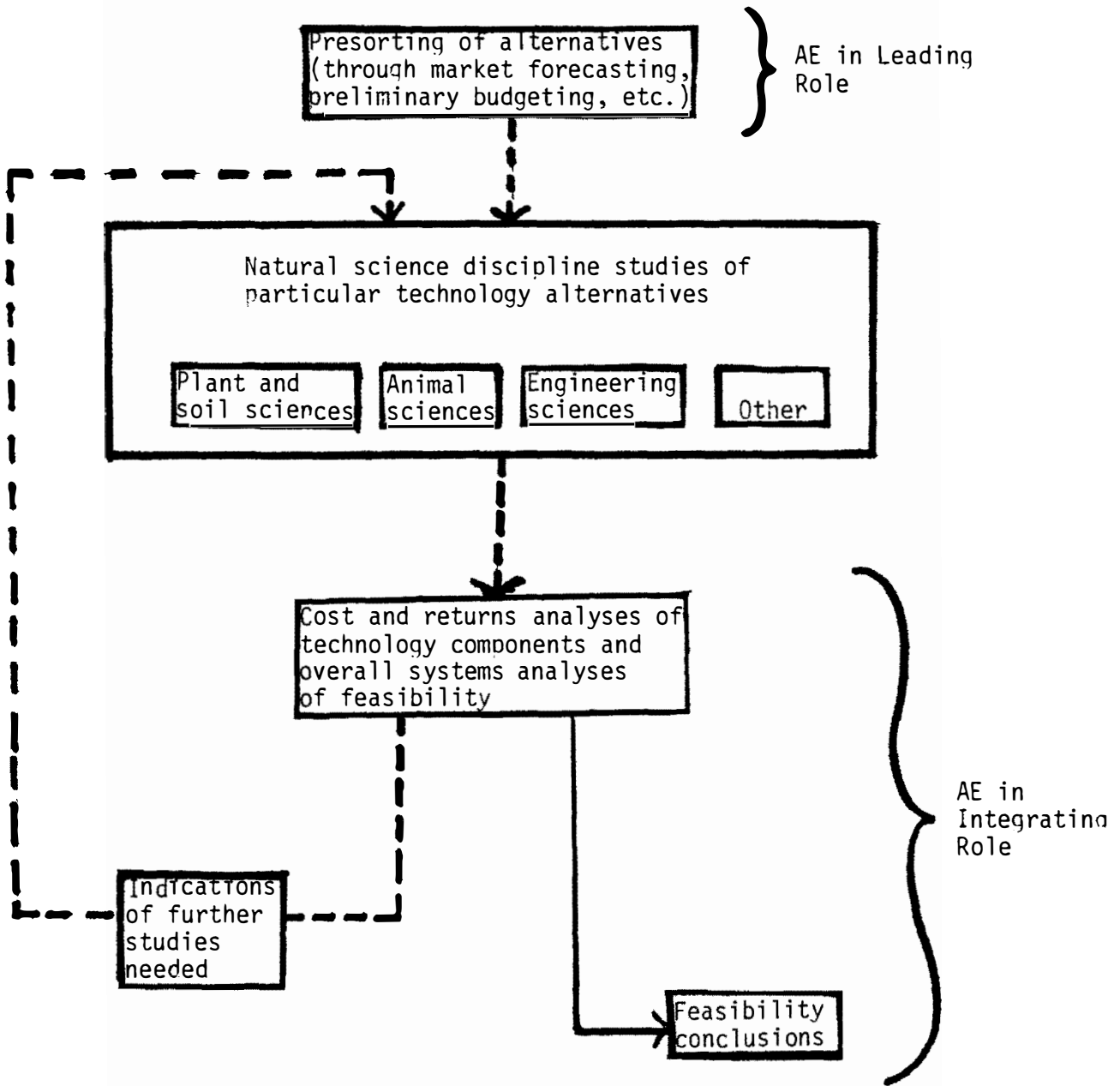
Agricultural economists play an integrating role in these feasibility assessments by both (1) providing a broad, systems framework to guide the natural science studies and (2) combining the physical and biological data from different discipline oriented studies with economic data to reach management and policy conclusions.

Sometimes the leadership and integrating roles of agricultural economics are not present in multidiscipline research and extension work. For example, agricultural economics may be brought into the process late, only to do cost or market analyses on agricultural technologies already developed or being introduced by natural science research and extension specialists. This following role of agricultural economics is often better than no involvement at all. However, it has severe limitations, to which I will return later.

The framework and roles just described can be explained with greater clarity by referring to a specific example. The multidiscipline fuel alcohol



FIGURE 1. Framework for multidiscipline research and extension involving agricultural economics (AE)



research and extension program carried out at South Dakota State University (SDSU) over the past five years can be used as such an example. The general framework for the research part of this program is illustrated as Figure 2.<sup>3</sup>

Natural science, discipline oriented studies have been carried out in three categories or subsystems in the SDSU fuel alcohol research program. These subsystems include the following: (1) an agronomic subsystem, which concerns variety, production, and harvesting considerations for alternative fuel alcohol feedstocks; (2) a processing subsystem, concerned with storage and conversion of various grain, sugar crop, and cellulosic feedstocks into alcohol; and (3) a utilization subsystem, dealing with on-farm utilization of alcohol and the feed byproducts of alcohol production. Physical and biological data forthcoming from the subsystem studies are used by agricultural economists and engineers to conduct cost and energy balance studies.

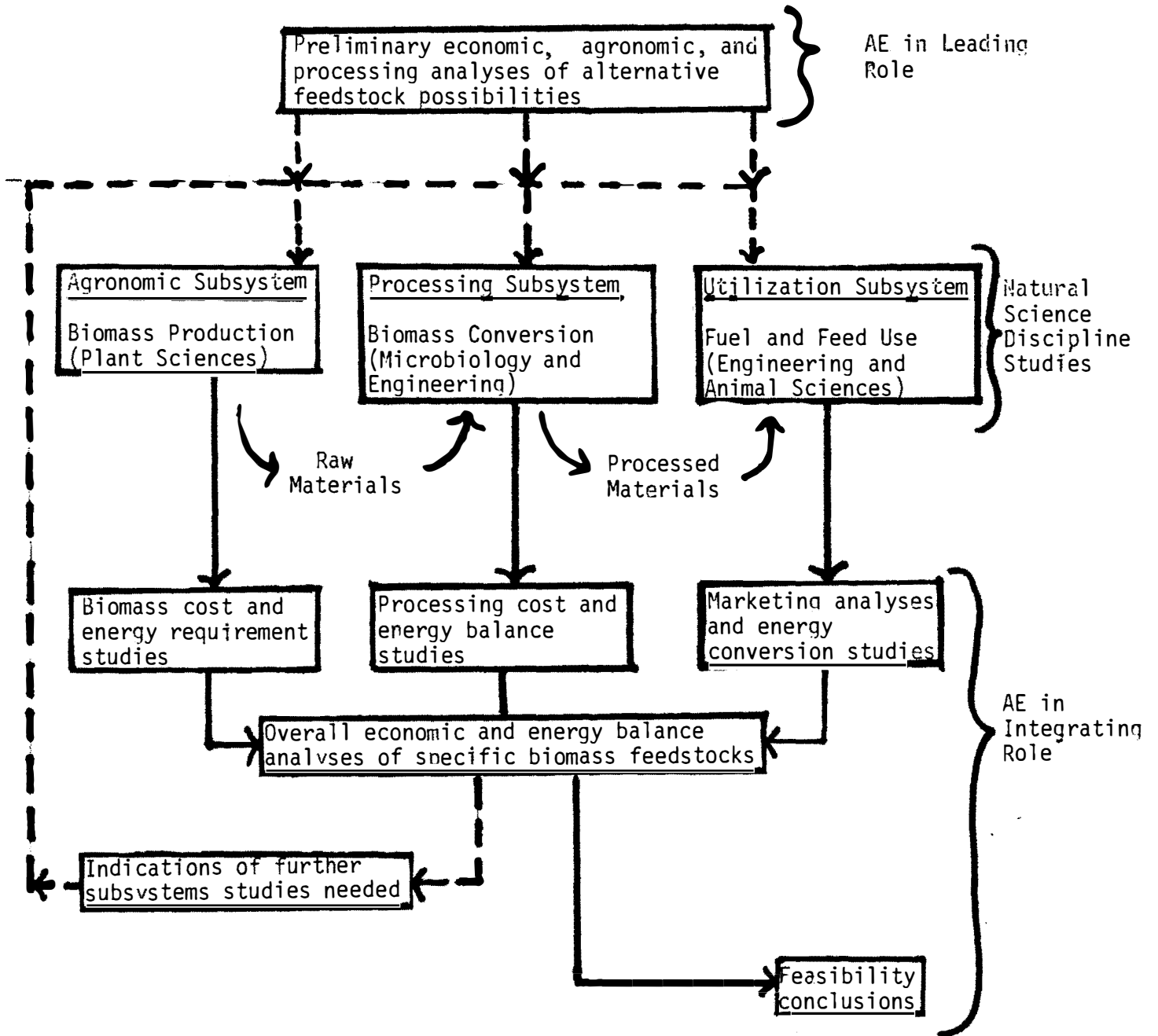
Agricultural economics plays an integrating role both by "pulling the pieces" of subsystem studies together for economic analyses and by providing "economic guidance" for the selection and conduct of subsystem studies. The process is continuous and circular--involving (1) natural science subsystem analyses, (2) cost and energy evaluations, drawing on subsystem results, (3) overall feasibility analyses, drawing on cost and returns evaluations of system components, (4) guidance for the direction of additional subsystem studies, (5) and so the process continues.

Prior to a multidiscipline research team being assembled, some distillation (processing subsystem) work was being conducted at SDSU. When a multidiscipline team was assembled, agricultural economists conducted a preliminary cost analysis of small-scale fuel alcohol production from corn,

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<sup>3</sup> Michigan State University also carried out fuel alcohol research during the early 1980's with a similarly organized multidiscipline, "systems" approach (Waller, et al.)

FIGURE 2. Framework for multidiscipline fuel alcohol research involving agricultural economics (AE) at South Dakota State University



Source: Adapted from a diagram developed previously by the author and others at SDSU for research proposal purposes.

drawing in part on the fermentation and distillation work already carried out. At that time, there were many gaps in physical and biological data needed for economic analysis purposes. After the multidiscipline team of natural scientists and agricultural economists was organized and members began to interact on a formal basis, however, data needs were identified and steps were taken to generate the necessary data over time. Agricultural economics then had input to decisions about subsystem studies conducted by other disciplines, so that data useable in economic analyses would be forthcoming.

A clear lesson here is that agricultural economists should be actively involved at the outset of multidiscipline research projects. They should not just be followers, trying to pick up the pieces of natural science work already conducted. Agricultural economists are much more valuable in integrating roles than in narrow, following roles in technology assessment studies. Early involvement is essential for that integrating function to be effectively carried out.

The pre-sorting, leading, role of agricultural economics shown in the uppermost box of Figure 2 was not present in the early stages of SDSU's fuel alcohol research program. (However, some earlier work in agricultural economics at SDSU had pointed to the probable economic infeasibility of corn-based ethanol production.) In fact, it did not evolve until well into the program. Most of SDSU's fuel alcohol research until 1983 focused on the use of corn as a feedstock. As evidence of small-scale plant economic infeasibility with corn as the feedstock accumulated, the research team's attention increasingly shifted to other feedstocks. However, a question arose concerning which feedstock(s) to study in detail. Agricultural economists took the lead in 1983 of a small team of researchers, including plant scientists and microbiologists, in a comprehensive literature review and

preliminary analysis of alternative feedstock possibilities. The purpose of this exercise was to sort and narrow down to one or two alcohol feedstocks (other than corn) which might hold sufficient promise to merit detailed, subsystem studies. It simply would not have been possible, nor would it have been a wise use of research resources, to initiate detailed subsystem studies at SDSU on a substantial number of alternative feedstocks.

While this preliminary sorting process involved several disciplines, agricultural economics was well suited for the lead role because of the "systems" view employed all along in its integrating role on the multidiscipline team. Essentially, the task in this lead role is to anticipate the likelihood of economic feasibility of particular technology options, using such studies and data sources as are already available. The lesson here is that this preliminary sorting step should be employed whenever possible in multidiscipline research programs, to conserve and carefully focus the scarce resources available for subsequent detailed, discipline oriented studies on components of a system.

In some cases, persons other than economists will play the lead role. Natural science members of multidiscipline teams who are broad in training and experience may provide leadership for the kind of pre-sorting analysis just described. For example, systems engineers and systems oriented crop scientists sometimes fill such a role. Which team member provides the leadership in any given project is a function of several factors--including training, experience, and professional personalities of the individuals involved. Even when the leadership is provided by others, agricultural economists need to be involved very early in multidiscipline projects, in order for economic data needs to be adequately accounted for in the design of subsystem studies.

I have referred until now to the example of SDSU's multidiscipline fuel alcohol research program. SDSU has, at the same time, carried on a multidiscipline fuel alcohol extension program aimed at farmers, other investors, lending institutions, and policy makers. This extension program was quite intense during the 1979-81 period when public interest in fuel alcohol production was strong. The discipline makeup of the extension team has been similar to that of the research team. Some individuals, in fact, have played both research and extension roles. Agricultural economists, animal (including dairy) scientists, and agricultural engineers have had major responsibilities in the extension program.

In many ways, the framework for this multidiscipline extension program has been similar to that of the research program. In fact, because the programs have been carried on simultaneously and because research and extension functions overlapped, it would be difficult to make any clear distinction between the organizational approaches of the research and the extension programs. In both programs, agricultural economics played an integrating role. There was little time for any discipline to truly lead the extension program in a conceptual sense, because public needs for the program arose on short notice and with great force. The program had to be launched quickly, requiring all the discipline specialists to pool their knowledge and quickly develop educational materials. Ideally, the extension program would not have been launched until the corresponding research efforts were further along. The immediacy of public information needs did not permit that, however.

Another lesson can be drawn from both the research and the extension programs at SDSU on fuel alcohol. Strong leadership at the top appears essential for the effective undertaking of multidiscipline programs involving several disciplines. Research and extension efforts involving only two

agricultural disciplines, or perhaps even three, can frequently emerge and be successful as "bottom-up" efforts, resulting from the shared interests and personal compatibilities of individuals. In contrast, the success of research and extension programs which involve more than two or three disciplines often depends on "top-down" initiatives.

At SDSU, the agricultural research and extension leaders--the Directors of the Agricultural Experiment Station and the Cooperative Extension Service, respectively-- exercised such leadership. They made it clear that fuel alcohol work was one of their priorities. This made Department Heads and individual research and extension specialists willing to reallocate resources on short notice. Researchers and extension staff then felt they could make a professional commitment to the complicated, uncertain, sometimes frustrating multidiscipline effort that would be entailed. Though this diverted individuals' attention from many of their own, discipline oriented programs, the perceived institutional commitment made individuals willing to make the necessary adjustments and investments in multidiscipline, team work. Once the fuel alcohol research and extension programs had been successfully initiated, SDSU's administrators did not need to play very active roles in actual execution of the programs.

#### The role of other social sciences

The discussion up to this point has referred primarily to agricultural economics. That should not imply, however, that other social sciences do not also have an important role to play in multidiscipline farm or rural systems research and extension. Unfortunately, funding reductions have recently reduced the involvement of rural sociologists, and there never has been much

funding for such disciplines as political science, in U.S. agricultural research and extension.

Social sciences in addition to agricultural economics have played a very active role in agricultural and rural development research in developing countries over the past three decades. Rural sociology, anthropology, political science, and public administration have all been involved in that work. The U.S. Agency for International Development (USAID), for example, has encouraged multidiscipline research and technical assistance involving various mixes of social and natural sciences, through both its own staffing and its funding of efforts by university and other contractors.<sup>4</sup> Systems oriented on-farm water management work supported by USAID in Pakistan, India, and elsewhere is a case in point.

Even in multidiscipline efforts involving both natural scientists and other social scientists, agricultural economists often play the lead and integrating roles. Agricultural economists' theoretical foundation in social science in combination with their experience in agricultural problem applications frequently give them a comparative advantage in playing those roles. Natural scientists examine water losses, cropping systems, irrigation practices, and soil-water-fertilizer-crop relationships, for example, in developing country on-farm water management studies. Sociologists, anthropologists, and individuals trained in extension techniques are responsible for identifying existing and alternative water allocation institutions and means of fostering group action for water course improvement and maintenance. There is also a need for political scientists and individuals trained in public administration to examine the institutions governing water administration at

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For an excellent discussion of interdisciplinary and multidisciplinary research in the international agricultural research centers serving developing countries, see Flinn and Denning. These centers are partially funded by USAID.



the regional level and to determine how those institutions interface with water management institutions at the village or local watercourse level.

Agricultural economists on multidiscipline water management research or technical assistance teams conduct cost and return studies of specific technology or institutional intervention alternatives--such as land leveling, watercourse improvement, or changes in the water rotation or allocation method. However, their role on these multidiscipline teams is often broader than that. The agricultural economists are frequently expected to provide a systems view of the entire water management process and to intergrate the insights of soil and water science, agronomy, sociology, and political science, for example, as well as economics, into a coherent and comprehensive view of water management problems and solutions. Of course, systems oriented individuals from the natural sciences and from other social sciences sometimes also fulfill those lead and integrating roles.

Contrary to the popular perception held by non-economists, economics is not a narrow discipline confined to monetary accounting of income and expenses. It is a broadly based discipline based upon concepts of utility and resource scarcity. These concepts are extremely powerful in tackling a broad range of agricultural problems, both at the farm or individual management unit level and at the societal level. Some of the benefits and costs associated with individual or societal resource allocation options may be calculated in monetary terms. Others often can not be. Both kinds--those measurable and those not measurable in monetary terms--are inherent in complex, real-world problems. Economics is able to handle both kinds in its conceptual framework. The strength of multidiscipline work involving natural scientists, agricultural economists, and other social scientists is that several different disciplines are usually required to make estimates of and

judgements about various kinds of data and causal relationships which need to be examined within that conceptual framework.

### Tensions between agricultural economists and natural scientists

Anyone who has ever been involved in multidiscipline research or extension programs knows that perfect harmony does not always exist. There are inevitable tensions between different disciplines. Some are healthy. Those same tensions, and others, can be unhealthy if not well understood and reacted to, however.

One tension is between the apparent "pessimism" of economics and the equally apparent "optimism" of many of the natural sciences. Economics involves the allocation of scarce resources among competing wants or needs. The popular catch-phrase for economics in recent years has been "there ain't no free lunch". However, the emphasis on limitations and the pessimism seemingly implied in economics go back a long time. Economics' reputation as the "dismal science" perhaps goes back as far as the writings of Thomas Malthus nearly 200 years ago on population growth and the food supply. Simply stated, Malthus' Essay on the Principle of Population as it Affects the Future Improvement of Society (published in 1798) envisioned "population tending to outrun the means of subsistence" (Roll, p. 195).

The task of most natural science disciplines is to produce basic scientific breakthroughs or applications of science which will forestall the dismal kind of human outcome envisioned by Malthus. In fact, an intrinsic optimism propels good natural science research, in which technical means of improving human well being are sought. If there were no "hope" involved in pursuing the uncertain or unknown, what purpose would there be in most natural science research?

There is no essential contradiction between the underlying philosophy of economics, with its emphasis on resource limitations and the need for reasoned choice, and that of the natural sciences, with their emphasis on technical solutions to resource limitation problems. There is tension, however, in the applied fields of these disciplines, and agriculture is an excellent case in point. For example, the engineer may see new irrigation systems as a partial solution to food problems in a particular developing country and the agronomist may see a doubling or tripling of fertilization rates as a partial solution. Both may see tremendous potential benefits relative to costs for their schemes--on the assumption that everything "goes according to plan".

However, everything does not always "go according to plan". Farmers, for all kinds of very rational reasons, may not increase fertilizer rates as much or as quickly as foreseen by the agronomist. The new irrigation structures advocated by the engineer may not be maintained or well managed, and may thereby fail to deliver as much water as expected to farmers' fields. Moreover, the agricultural economist, with his charge to advise on allocation of scarce resources, realizes that budget limitations will not permit full scale, immediate adoption of both the agronomist's and the engineer's scheme. Perhaps one or the other scheme will have to wait or, more likely, both may have to be modified in objective or approach in order to fit budget realities. While the agronomist and the engineer both rightly view their respective schemes in positive terms, the economist's view may be perceived as negative when he says the schemes' individual opportunity costs are too high.

A recognition and acceptance of this tension can make it productive, rather than destructive. Social scientists, as well as natural scientists,

are for human progress. There must be a strong dose of optimism in all of us--especially when we work in the field of agricultural and rural development! At the same time, however, the optimism must be leavened with realism--a recognition that every technology in which there is hope can not, and should not necessarily, be immediately applied. If both agricultural economists and their natural science colleagues on multidiscipline teams recognize that they share the same goals, but play different roles in pursuit of these goals, this philosophical tension can be healthy.

Another type of tension has great potential for destructiveness. That tension occurs when either agricultural economists or their natural science colleagues, or both, perceive the other group to be parasitic. In applied, multidiscipline research or extension work, this perception sometimes develops out of the way in which data are obtained. A parasitic view of economists tends to arise, for instance, when economists are brought into multidiscipline programs late in the game, as followers. They are expected in those situations, as described earlier, to "pick up the pieces" of physical and biological data and "do an economic analysis" of the technology or intervention which has been under study. The natural scientists then sometimes view the economists as either mere clerks, on the one hand, or as parasites, on the other hand, who are getting professional mileage out of data someone else has worked hard to generate.

Agricultural economists sometimes have similar views toward natural scientists. It is not unusual to find natural scientists tacking on their own "economic analyses" at the end of their studies. Becoming an economist is viewed by some to be "as easy as falling off a log". This "clerical" view of economics implies that "I can do my own economics as well as the economist, so why bother with him". However, the economist observing this

process often sees things differently. He may see the natural scientist as arrogant, irresponsible in use of theory and method, and, yes, parasitic. The parasitic view often results from the fact that, for the natural scientist to "do his own economic analysis", he may have to spend a great deal of time in some economist's office obtaining data and having assumptions and estimation methods explained to him. In effect, he may lean on the economist quite heavily for assistance but not consider the economist a real partner in the process. Economists in this situation, like the natural scientists in the previous paragraph, may feel "used".

This tension is greatly reduced if agricultural economists and natural scientists work together as a team from the outset of a research or extension program. Mutual appreciation of respective roles is more likely to be engendered when that takes place than when agricultural economists are brought in at the tail-end. We should fully recognize, however, that resources will not permit a multidiscipline approach to every agricultural research problem or extension information need. Natural scientists will often have to work alone and to borrow information from agricultural economists for a limited treatment of economic dimensions. Likewise, agricultural economists frequently will not have the luxury of formal collaboration with natural scientists; they must then consult natural science literature and specialists in attempts to assure that physical and biological data used in their economic analyses are the best available. When either natural scientists or agricultural economists must "go it alone"--and often they must--there needs to be a good deal of care and humility in use of data and assumptions borrowed from other disciplines. If that care and humility are exercised, and if due credit is given for assistance provided, then "parasitic" perceptions can be mitigated.

Only two of several possible tensions associated with multidiscipline research and extension have been discussed at length here. Administrative complexities of handling funds, scheduling, coordinating, and meeting deadlines also can create special tensions in multidiscipline work. Lack of appreciation for other disciplines' methodologies can create additional tensions; data collection and analysis procedures most appropriate for one discipline may not be the most appropriate for another. Tensions also arise if time and patience are not exercised to learn the vocabulary and something of the substance of the cooperating disciplines other than one's own. These potential tensions need not be debilitating to multidiscipline research and extension, however, if mutual empathy exists among agricultural economists and their natural science colleagues.<sup>5</sup>

#### Balance between discipline and multidiscipline work in agricultural economics

The focus of this paper has been on multidiscipline research and extension involving agricultural economics. I have indicated that there have been multidiscipline dimensions to work in the agricultural economics profession since the turn of the century. Although the relative emphases on "discipline" versus "multidiscipline" work in agricultural economics have varied over time, the multidiscipline dimensions remain important to this day.

It is important to recognize, however, that every discipline needs on-going, strong discipline efforts if it is to maintain intellectual

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Another type of tension is more "internal" than "between disciplines", but it can be critical. That tension relates to the lower esteem sometimes held by one's discipline peers for multidiscipline research. This lower esteem may be attributable to the frequent necessity in multidiscipline studies of using relatively "unsophisticated" economic methodologies and data collection procedures. Methodology and data "compromises" must often be made in multidiscipline research; discipline purists often react quite negatively to such compromises. These compromises are more well accepted in extension than in research circles.

vitality and, indeed, to make major contributions to multidiscipline efforts. Agricultural economics is no exception. Strong discipline oriented research and extension programs in marketing and price analysis, economic development, firm decision making, and resource economics, for example, are extremely important in university academic departments which house agricultural economists. Agricultural economists who are pursuing and extending new knowledge in their discipline tend to keep current on theoretical and methodological developments and on recent management and policy findings. New theory, methodology, and findings have valuable applications in discipline oriented advice and assistance provided by agricultural economists. Knowledge of them is also critical if agricultural economists are to bring fresh insights to their multidiscipline work with natural scientists and other social scientists. Academic units that do not carry on strong discipline oriented work can expect difficulty over time in maintaining full partnership status in multidiscipline programs.

The job of universities is not only to extend but to seek new knowledge. This requires a strong set of disciplines in the natural and social sciences and in the humanities. Discipline vitality is best maintained in teaching-research-extension administrative units which are organized along discipline lines. Staff from various units can then come together for special, multidiscipline research or extension programs, be they short- or long-term efforts. In this way, each discipline can bring its special and current insights to the program at hand.

It is not really possible to answer in the abstract the question of what mix between discipline and multidiscipline research and extension is optimal in a university department of agricultural economics. The resources and mission of the particular university and department would have to be

carefully considered in answering that question. One can state unequivocally, however, that a strong program of discipline oriented work should be carried on. At the same time, major commitment should be made to selected multidiscipline programs of high priority in terms of the university's mission.<sup>6</sup> In any particular department of agricultural economics, some staff may be involved only in discipline work, some may carry on only multidiscipline work, and some may have a hand in both, over time. If there is strong interaction among the collection of agricultural economists, the strengths of both discipline and multidiscipline work will reinforce each other.

Administrative organization for agricultural economics work in some non-university settings may appropriately differ from the model just described. Multidiscipline technical assistance work in developing countries, for example, often involves a team consisting of agricultural economists, natural scientists, and perhaps other social scientists operating as an administrative unit. Such a unit may perform very well. In those situations, however, discipline vitality depends on new blood being pumped into the team on an on-going basis. The "new blood" is made possible by graduate programs, short courses, seminars, and so forth conducted by discipline-based departments in universities. Without constant and thorough updating through strong university linkages, multidiscipline technical assistance efforts can soon become sterile. The same can be said for any agricultural research or extension programs in the U.S. which are conducted by multidiscipline administrative units.

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An example of needed additional multidiscipline work might be in the area of "integrated reproductive management". The Vice President of the National Dairy Herd Improvement Association recently spoke of the need for all disciplines to work together in this area (Joachim). Many other examples could be cited.



Multidiscipline research and extension programs should continue to be important components of the agricultural economics portfolio. They are neither less nor more important, in principle, than discipline oriented programs. A balanced mix of discipline and multidiscipline programs enhances the on-going contribution of agricultural economics to individual decision making and public policy.

## References

- DeLoach, D. B. The Western Agricultural Economics Association: Aspirations and Achievements. A Western Agricultural Economics Association Monograph, n.d.
- Flinn, J. C., and G. L. Denning. Interdisciplinary Challenges and Opportunities in International Agricultural Research. IRRRI Research Paper Series No. 82. Manila, Philippines: The International Rice Research Institute, 1982.
- Joachim, H. Victor. "Integrated Reproduction Management," Speech presented at meeting of the National Industry-State Agricultural Research Council. Arlington, VA: Oct. 5, 1983.
- Roll, Eric. A History of Economic Thought (3rd ed.). Englewood Cliffs, NJ: Prentice-Hall, Inc., 1964.
- Sundquist, W. Burt, Kenneth M. Menz, and Catherine F. Neumeyer. A Technology Assesment of Commercial Corn Production in the United States. Station Bulletin 546. St. Paul, MN: University of Minnesota Agricultural Experiment Station, 1982.
- Waller, J. C., et al. "The Michigan State University Ethanol Research Project and Complementary Subsystems," in Alcohol and Vegetable Oil as Alternative Fuels. Proceedings of Regional Workshops. Raleigh, NC, Sacramento, CA, and Peoria, IL, April 1981 (97-106).