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# **Realizing Your Potential as an Agricultural Economist in Extension**

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NATURAL RESOURCE ECONOMICS: ALTERNATIVE  
ANALYTICAL FRAMEWORKS AND IMPLICATIONS  
FOR EXTENSION PROGRAMS\*

by

David Mulkey\*\*

Introduction

The purpose of this paper is to address the matter of extension programs in the subject area of natural resource economics with an eye towards contributing to the objective implied by our general workshop title, "Realizing Your Potential as an Agricultural Economist in Extension." Specific questions posed for consideration include subject matter content, target audiences, and program goals and evaluation. The paper proceeds by outlining three alternative analytical frameworks for addressing natural resource problems and by discussing the implications of each alternative for extension programs. Hopefully, the general program suggestions offered will be useful to extension specialists as they develop programs unique to their university and state setting.

Alternative Analytical Frameworks

The question of the subject matter content and the appropriate analytical framework for natural resource economics is, to paraphrase the title of a recent article by Kelso, an upsetting one. If we remain close to our intellectual foundations in production economics, we are apt to treat natural resources simply as factors of production or inputs into production processes. Some argue, however, that the neo-classical economic framework embodied in this approach is woefully inadequate to address the full range of problems surrounding the use and allocation of natural resources.

The analytical alternative to the neo-classical model, dubbed "social microeconomics" by Randall, "analytical institutional economics" by Schmid and "the new natural resource economics" by Anderson, vastly

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expands the intellectual domain of the natural resources economist. Questions pertaining to the role of government, externalities, public goods, common property, property rights, institutional design and non-market evaluation techniques are explicitly considered. In essence, the neo-classical framework is expanded to include the complete institutional environment within which resource allocation takes place. The key difference is that rather than seeking a unique, efficient outcome, the decision maker may be faced with a range of outcomes, each of which may be efficient under the particular institutional set in question.

The institutional expansion of the neo-classical framework, however, does not exhaust the conceptual/analytical possibilities for the natural resources economist. Those who view the earth (and all economic activity) as part of a closed system dependent on non-renewable resources, especially energy, take a different view (Boulding, Barkley and Seckler, Kelso). This view is one which, in Kelso's paraphrasing of Boulding, "stands conventional economic wisdom on its head." Referring to a natural resource economics which combines the inherent institutional nature of resource problems with the concept of earth as a spaceship, Kelso further notes,

. . . it concerns itself first with maintenance or improvement of the well-being state of the system rather than with maximization of the throughput of the system and, second, with minimization of natural resource input in state maintenance or improvement rather than with optimization of natural resource input consonant with efficient throughput maximization.

Clearly, the reasoning involved in this analytical framework poses different problem sets and possible solutions than do either of the other approaches mentioned, just as the two previous approaches differ from each other. This matter of differences between the approaches, though, deserves some consideration.

Are the three approaches to natural resource economics--the neo-classical, the institutional, or the spaceship earth--completely different as has been assumed to this point in the paper? At first glance, they appear to be. But, on a second, closer look they appear to be somehow related, as if they represent subsequent steps in the intellectual development of a natural resources economist similar to Kelso's description of his own grappling with the "upsetting discipline."

The idea of progressive intellectual development, implying increasing breadth and sophistication, is attractive, however, it may wrongfully imply that one approach is a replacement for the other. Actually, each approach represents an appropriate analytical framework for dealing with problems faced by decision makers at a particular level in a hierarchy of decision systems for resource allocation. Firm level resource allocation decisions must be made (i.e., varieties to plant, type of irrigation system, etc.); it seems clear that resources at this level should be used efficiently, and the neo-classical model provides an appropriate and adequate analytical framework. Firms and individuals must then interact with each other regarding the ownership, control and exchange of

resources. Rules and regulations (i.e. property rights, laws of contract, etc.) are necessary to govern these interactions, and changes in the rules provide grist for the mill of the institutional approach. Finally, society as a whole must be concerned with the long term viability of the system, and such problems are clearly within the domain of the third, spaceship earth model.

What do the alternative approaches (or one approach with alternative levels) imply for extension programs? Each suggests a different program or a different component within the same program with each type of program having different problem sets, different clientele groups, and requiring different types of input from extension specialists. Further, the ease with which programs fit within the traditional land grant extension delivery, evaluation and reward systems will vary widely between the programs suggested by the three approaches to (or levels of) natural resource economics. This question along with more specifics on program content and target audiences is addressed in following sections.

#### Implications for Extension Programs

Natural Resources as Factors of Production. The approach whereby natural resources are treated similar to other factors of production needs little by way of further explanation here other than as a base for comparison with the other approaches treated in following sections. Extension programs draw support from research in the area of farm management/production economics, and program content is similar to that of traditional farm management extension programs. Farmers and farm groups are the primary program clientele, and traditional extension delivery systems--state specialist, to county specialist, to user groups--are adequate to reach this audience.

Research and extension programs in this area also produce aggregate results useful to regional, state and national policy making agencies. Such groups are often interested in firm level responses to various resource related policy changes. Some examples include the impacts of pricing and/or allocation schemes on water use and crop output, impacts of pesticide or other pollution abatement regulations on production costs, output levels and commodity prices, impacts of various commodity policies on land use, and the impact of various techniques to encourage soil conservation. Such user groups are usually easy to identify, and they represent part of the traditional audience of the land grant/cooperative extension system.

In brief, extension programs oriented to the efficient use of resources at the firm level and aggregate models of resource use represent little departure from traditional extension programs and delivery systems. Audiences are readily identifiable and pose few unique problems because of the natural resource orientation of programs. Finally, since programs and clientele are traditional, program evaluation should be less difficult. What works for program evaluation in general will work here.

As Ikerd notes, there are problems with both audiences and evaluation of programs, but these are general extension problems rather than natural resource extension problems.

The Institutional Program Area. In contrast with the previous discussion, the institutional approach to natural resource economics places the extension specialist squarely in the arena where rules/policies are made and enforced. Further, this move poses much more difficulty with respect to program content, delivery systems, target audiences and program evaluation.

Paarlberg notes that for agricultural policy in general, agenda items for debate are now largely decided by non-agricultural interest groups. Paarlberg's point is especially relevant for natural resource issues. Here, not only are items placed on the policy agenda by non-agricultural groups, but increasingly, resource policy decisions with portent for the agricultural sector are made by a bevy of local, state and federal agencies who historically have had little impact on agriculture. A typical listing of such issues might include the regulation of herbicides and pesticides, non-point source pollution abatement, water quantity and quality issues, agricultural land preservation, wetlands protection, land use control and growth management. This plethora of issues and agencies provides a wide range of extension programming opportunities to non-traditional extension audiences. First, however, a note about program needs of traditional audiences is in order.

As noted, agricultural producers and other agricultural groups are now routinely impacted by a wide range of issues, rules and agencies which were of little concern a few years back. Further, the necessity of dealing with this new set of realities provides needs for extension education programs. Programs can focus on explaining the nature of current rules and regulations, how these rules affect producers, which agencies are involved in the rule making process, how rules get changed, and most importantly, how farm groups can effectively participate in the rule making process. Further, in the tradition of extension public policy education, natural resource extension programs oriented toward farm audiences can concentrate on the presentation and analysis of various policy alternatives. Programs are likely to be educational in nature rather than service oriented and designed to help agriculturists participate more effectively in the policy process.

Also, depending on the location, the nature of the policy issue and the existence of other educational institutions, other less traditional groups may well provide target audiences for programs designed to increase the effectiveness of participation in the policy process. Examples include environmental groups, homeowners associations, civic organizations, school and church groups and other local groups of citizens. In fact, for publications, conferences, etc., there seems to be little reason to limit mailing lists to agricultural groups. Further, in designing programs there seems to be little reason to limit subject matter content strictly to economics. Woeste notes the need for interdisciplinary cooperation in extension programs in general, and this need seems to be especially true for the natural resources area. Time spent in involving colleagues from other departments in programs and in the preparation of educational materials can be time well spent.

Beyond working separately with various groups to improve their effectiveness as participants in the policy process, there also seems to be a need for educational programs oriented toward decision making agencies and their staffs. Again, such programs and educational materials can be interdisciplinary in nature and designed to improve the technical expertise of agency staff. Similar programs, in a continuing education mode, are used successfully in other areas of extension and by other colleges within many universities and should work equally well for natural resource programs. The potential list of topics (and target agencies) seems almost endless and is as varied as the number of agencies having rule making or enforcement responsibilities for natural resources at the municipal, county, state and federal level. The main ingredient for successful program design and implementation would seem to be an extension specialist with a detailed knowledge of the target agencies and their duties, responsibilities, and educational needs.

The three program areas suggested to this point under the institutional approach place the extension specialist in the role of educator and provider of educational material to both traditional and non-traditional audiences. Program emphasis is on increasing the effectiveness of participation in the policy process, in presenting policy alternatives, and on improving the technical expertise of those individuals working in the various policy making agencies. The institutional approach also dictates programs aimed more directly at decision makers and involving all parties to a decision at the same time. The scope of such programs may be local, regional, state wide, or may include multi-state areas depending on the nature of the policy issue. A statewide conference focusing on alternative solutions to a particular resources problem provides an example of this type of program effort. The role of the extension specialist is one of leadership in providing a forum for the debate of the issue in question, in ensuring that participants represent all sides of an issue, in assembling and providing background materials to participants, and most importantly, in providing follow-up on recommendations coming from the program. Beyond conferences and meetings, extension programs may also produce other types of educational materials such as printed materials, movies, slide-tape sets, television programs, etc. dealing with broad natural resource issues. The list of potential program topics seems almost endless. However, some special points relative to program implementation deserve mention.

First, the audience for issues of statewide (or even local) concern such as land, water, wetlands, growth management, or environmental quality extends far beyond agricultural groups, and in some states, beyond the traditional reach of the extension service. This fact may or may not pose problems with respect to administrative support within the extension service and legislative support within the state. It is, however, a potential problem and deserves special attention from extension specialists.

A second problem arises in the area of program evaluation. As extension programs move away from traditional farm oriented resource programs and into the institutional area, quantifiable program results (i.e. dollars saved per unit of output) are much more difficult to assess. This is due both to the nature of the benefits (contribute to the output of agencies

not producing marketed products) and to the fact that the audience is more diffused. For example, a statewide water policy conference and follow-up educational programs and materials may reach several hundred people with individual impacts ranging from negligible to quite large. Still, although the eventual policy impact may be substantial, such an impact is difficult, if not impossible, to quantify. Devising effective evaluation programs for these types of programs poses real challenges for the natural resources economist.

As Ikerd suggests, evaluation schemes should be devised to fit the programs rather than attempting to change programs to produce quantifiable results. Further, such schemes should attempt to go beyond measuring program inputs (i.e. publications, conference attendance, etc.). Such measures are useful, but somehow, fail to capture the full essence of program impact. One possible alternative is evaluation schemes which assess leadership and initiative on the part of the extension specialist. In other words, did something happen that would not have happened without extension involvement.

Finally, within the institutional framework, some comments are in order with respect to research support for extension programs, or alternatively, the interface between research and extension programs. With regard to research and extension programs in general, Wood notes the need to function on a continuum and that ". . . the point that separates is institutional (budgets and appointments) and not disciplinary." For natural resources this point seems especially relevant due to the nature of the subject matter and to the current state of the art in applied institutional economics.

Subject programs in natural resources are oriented toward policy issues where resolution will result in new or modified institutional arrangements for resource allocation, and there is likely to be little available in the way of immediately extendable, useful results. Beyond teaching concepts and techniques (i.e. project analysis), successful natural resource programs--with success defined as having an impact on policy decisions--will depend on a combination of research/extension efforts which jointly, and in concert with clientele groups, identifies problems, conducts the appropriate research, and then develops extension education programs. Neither the model of the lonely researcher nor the extension economist delivering "off-the-shelf" research results seems likely to succeed.

The Spaceship Approach. The two previous approaches to natural resource programs range in scope from the narrow view of resources as factors of production to the broader aspects of institutional arrangements necessary for the allocation of resources over time. In contrast, the view of a spaceship earth is even more encompassing, target audiences are more diffused, policy issues are more nebulous, and programming becomes more difficult. Hence, questions noted with regard to program content, audience identification, program evaluation and research support are more pressing.

Also, for the state extension specialist, the fact that most, if not all, decisions which fit within the spaceship approach are national or



international in scope (energy policy, population growth policies, economic development policies, etc.) makes matters more complicated. General educational materials and programs such as the ones described in the institutional approach are appropriate. But, beyond providing general information, isolated state extension programs oriented to in-state audiences are likely to have little success in impacting policy decisions.

Thus, the spaceship approach seems to call for a national extension effort, perhaps along the lines of the National Public Policy Education Committee, but with a clear focus on natural resource issues. Such a group could be charged with addressing issues of national and/or international significance. More importantly, the group could be charged with sorting out the implications of this broader framework for day-to-day resource policy decisions and state level extension programs addressing those decisions. This latter objective could be facilitated by using groups of state specialists to conduct the national effort. It is important, however, to note that this is a suggestion for a national extension program and not simply another effort to coordinate state programs.

#### Concluding Comments

The approach to use in natural resource economics programs is a question which, in the end, must be answered individually by each natural resources extension economist. However, it is important to stress that to ensure program success, the question must be answered. The process of identifying target audiences and designing, delivering and evaluating programs requires a clear, well developed conceptual framework. Further, whether the framework selected is one of the alternatives presented here or some other, it must be appropriate to the level of decision making involved. Wallace notes that few people understand what economists do in extension, and programs developed without a firm conceptual base ensures that this problem will be perpetuated to the detriment of program support.

Finally, one other point is important and must be made in ending a paper such as this one. That is, quite simply, that problems surrounding the allocation of natural resources are urgent and important to a wide range of people. In short, education programs to assist people in dealing with these problems are needed now. The old adage, "He who hesitates is lost," has never been more true.

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