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# THE ROLE OF UNIVERSITY RESOURCE ECONOMISTS

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NATURAL RESOURCE ECONOMICS EXTENSION  
Concepts and Actions

Richard Barrows and Lawrence W. Libby\*

Natural resources economics is a sub-discipline of economics and the focus for a significant proportion of the extension work in agricultural economics departments in the nation. Resource economics extension is the application of knowledge from resource economics theory and applied research to the problems of people and the society in general. Resource economics extension is the logical result of the Land Grant philosophy applied to resource economics.

It is sometimes useful to define an activity in terms of what it does not include or encompass. Resource economics extension does not mean "whatever resource economists with extension appointments might do." Resource economics extension is practiced by a great many people who have little or no extension "budget" or formal extension appointment. Conversely, a great deal of the activity of many resource economists with extension appointments should be properly classified as applied research. In this foggy terrain of semantics and definitions of budget and bureaucratic appointment, it is far simpler and more useful to focus on resource economics extension as an activity, the application of the knowledge of resource economics to the problems of people.

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Resource economists play various roles in the policy process. Some are analysts, developing defensible information on the consequences of policy options. To be useful, this information must be "digestible" for the decision maker. The resource economist attempts to maintain a reasonable distance from the decision, to retain credibility for the next request. In other situations the resource economist may be a direct participant in policy as he or she assists in implementation. Economics provides the conceptual handles to clarify the choices. Some resource economists are decision makers. This keeps the lines of communication between analyst, educator and decision maker very short indeed. Resource economics as a sub-discipline has certain qualities that could help the practitioner be a particularly good decision-maker--it depends on the person.

This paper is intended to stimulate thought about the possible roles of extension resource economists. The concepts used in resource economics extension and the distinction between resource economics extension and other areas of extension activity are the subject of the first section. The differences between resource economics research and extension are discussed in the next section and the final section contains a brief discussion of some contributions of the resource economist who works in extension.

#### CONCEPTS IN RESOURCE ECONOMICS EXTENSION

The concepts used by the resource economist in extension are no different from those used in research. They are simply a subset of general economic principles that tend to be more useful

and appropriate in dealing with resource issues than with issues in other areas of applied economics.

Work in resource economics can be separated into three branches. One (small) branch is akin to traditional farm production and management where the products happen to be natural resources or very tightly tied to natural resources, and where the focus is on the producer and the production unit. Parts of forestry economics, such as work with landowners or mills, are good examples. Another (small) branch of resource economics concerns the analysis and monitoring of markets for natural resources, such as the markets for land or forest products. The largest branch of resource economics, and the branch most relevant for most resource economists in extension, deals with resource policy and the institutions that govern resource use.

Institutions. Institutions are the rules that structure the interaction among individuals and groups as economic agents or as participants in the political system. Institutions define the rights and obligations of the participants in the economic or political decision-making process for natural resources. Most other sub-disciplines of economics focus on the activity of economic agents within the structure of existing institutions that define the market. Resource economists tend to focus on the institutions (rules) that define the market, as well as the actions of individuals within a given set of rules. In short, in resource economics institutions are endogenous to the analysis. In resource economics extension this is even more so, because typically some group has defined a natural resource "problem" and seeks to change the rules of the game for deciding on the use of

the resource. The discussion often revolves around changes in public policy and the impacts of such change on resource use and the distribution of benefits and costs.

Externalities. The concept of externality is central to resource economics extension and research. Obviously, externalities are rampant, even ubiquitous, in economic transactions. Although it is impossible here to discuss the conceptual validity of various formulations or typologies of externality, it is sufficient to note that: (1) there is considerable overlap of the elements in the utility and production functions of individuals and firms with respect to natural resource use and output; and (2) the essence of externality issues is the question of property rights. Property rights define who has the ability to impose costs on whom, and who stands exposed to the consequences of the actions of others. The issue at its most fundamental level is who has which rights with respect to natural resource use. These issues often become the subject of resource economics extension programs. For example, in the last decade considerable attention has been devoted to the question of whether a landowner has the right to convert his property from an undeveloped to a developed use, or whether that right is (or should be) jointly held by the landowner and the public. It is extremely important to note that economic theory cannot be used to give an unambiguous answer to the question of the "best" distribution of property rights.

Scarcity and Time. Natural resource economics also emphasizes the distribution of resource use over time. The

temporal pattern of resource use is especially important for stock resources and for flow resources with a critical zone which can be depleted over time. A resource such as copper may appreciate in value while staying safely in the ground, and the rate of appreciation relative to the interest rate has been the subject of much discussion in resource economics. Scarcity can be measured in terms of relative prices. While every resource economist knows all this (and more) the relevant point is that the rate of resource use, the rate of discount for future net benefits and the markets for resource products exist within an institutional framework that may itself be the focus of policy debate. For example, much of the current debate over soil conservation centers on the question of whether future generations are being treated "fairly" by the current generation. Markets suggest that soil is of declining importance in food production. But soil scientists point out the limits to that line of reasoning, because badly eroded soil responds very poorly to soil-replacing technology. The future rate of technological advance is itself a matter of debate. Conservation policy would extend the use rates of the resource through a longer time than would have been the case without any institutional change. In effect, risk is shifted and government takes some of the responsibility for judging the importance of the resource into the future. Again, it is important to note that the resource economist can contribute some important insights in helping decision-makers think through the consequences of different policy options. But economic theory and analysis cannot give an unambiguous answer to the question of the "appropriate" rate of

depletion of the soil resource because such an answer would necessitate an ethical judgment on the relative importance of the welfare of different generations. Any decision rule carries with it, implicitly or explicitly, such a judgment.

Valuation. Natural resource economics, in contrast to other sub-disciplines in economics, frequently involves the inference of value for different natural resource use patterns. The assumption of the resource economist is that resources matter because people think they do. The endangered Kirtland Warbler nesting in the jack pine of northern Michigan is important only because people get some utility from knowing it is there. The problem for the resource economist in extension is to somehow devise a system for measuring that value, or help conceptualize an appropriate mechanism for provision of the good.

None of the concepts that are used in resource economics extension are unique--the same concepts dominate resource economics research and in fact are used to a lesser degree in other sub-disciplines of economics. But the most important fact for resource economics extension is that neo-classical economic theory alone cannot be used to derive the optimal pattern of resource use, the optimal solution to any of the generic types of resource issues, or the optimal resource policy for society. The resolution of the externality issues often hinges on the definition of property rights, the rules of the game for the market system that cannot be specified in optimal form. To do so would require that the social welfare function be known, which of course is impossible. The resolution of the public-goods and



valuation question depends critically on whose preferences count in the decision-making or valuation process, and there is no theoretically correct specification of the process. The matter of resource use over time involves basic values about the relative importance of the welfare of different generations. There are no theoretical concepts that allow the economist to make these judgments in a scientific, as opposed to a personal or ethical manner.

#### HOW DO RESOURCE ECONOMICS EXTENSION AND RESEARCH DIFFER?

The activities and framework of the resource economist in extension differs only in degree from the counterpart in research. In fact, the "extension" resource economist is often the same person as the "research" resource economist. (Recall that our definition of extension is the active application of knowledge to the problems of people, and is not limited to those faculty with an extension appointment or budget). However, two differences in emphasis can be observed. Almost inevitably, resource economics extension draws the economist into the realm of political science and the subject matter of institutional economics in which the institutional rules are analyzed and the process of making resource decisions is the focus of study. Second, unlike the researcher who can define the problems or isolate certain parts of the problem for study, the resource economist in extension often finds that there are very few purely resource economics issues in the real world.

Politics. One of the major contributions of resource economics extension is to bring the conceptual framework of

resource economics into the decision-making process. As a practical matter, this means that the extension resource economist often becomes a part of the political process himself (or herself). Since many of the issues of interest to resource economics are addressed in the political system, and since the objective of resource economics extension is to bring the concepts of resource economics to bear on resource issues, the economist becomes closely involved with individuals and groups who either have the authority to make decisions or have the power, or seek the power, to influence decisions.

The extension resource economist offers three types of expertise to those involved in the political system. First, resource economics offers a system of logic for identifying, organizing and understanding the relevant policy options. Second, resource economics offers a means of assessing how changes in institutions will change behavior of individuals and groups, and therefore how different policy options might perform. Third, resource economics offers a set of analytical and empirical tools that can be used to generate more precise answers to the question of behavioral change--this is the role of the economist as technician.

Although the empirical/technical contribution should not be denigrated, the conceptual contribution is, in our judgment, the most important. Yet the conceptual contribution is the most difficult to make without actually being involved, often on a day-to-day basis, in the decision-making process itself. The ultimate goal is insidious and somewhat subversive--to induce those involved in the political process to think like resource

economists. There is really no substitute for being closely involved in the decision-making process on a regular basis, whether in the executive or legislative arena. The extension resource economist benefits by gaining new insights into the discipline of resource economics as well as a more meaningful understanding of the political process that produces many of the institutions that govern resource use. In return, the extension resource economist is able to offer more useful and relevant information or insights to those involved in the process.

One very powerful insight the extension resource economist usually gains is an intense appreciation of the importance of different values, attitudes and belief systems in determining one's view of a resource economics issue. The differences in the values and philosophical beliefs of various groups cannot be assumed away or dealt with in the abstract when those groups are eyeball-to-eyeball with the extension resource economist at the table. The extension resource economist is forced to rely on the most fundamental principles of resource economics and to directly confront the differences in values of different groups. Not only are the value differences highlighted, but the atmosphere is often highly charged. Resource economics extension is almost always practiced in the context of a policy debate because a conflict over resource use and policy gives rise to the "teachable moment" and interest in the type of insights that the extension resource economist can offer.

Pure Issues. In resource economics extension it is often impossible to find an issue that is "purely" a resource economics

concern or topic. Usually a natural resource issue arises in the public policy arena as a mixture of a resource issue and economic development, farm management, public finance, or other sub-discipline of economics. For example, many forestry issues arise in the context of land management and harvesting decisions in which the local economic development effects are a major concern. Ground water pollution from farm chemicals involves a strong element of farm management and production economics as the analysis inevitably turns to the effects of different chemicals or regulations on farm income. Public finance principles are necessary in the analysis of many land use policy issues such as differential assessment. This mixture of issues makes resource economics extension a mixture of resource economics and other fields within economics.

In general, these differences between resource economics extension and resource economics research are minimal and are really more a difference of degree than a difference of kind. And even these distinctions become less dramatic when it is recognized that in many states the resource economics researcher is the same person who conducts resource economics extension programs, often using the results of his/her own research. In effect, the different components of the Land Grant system are found in a single individual.

#### THE CONTRIBUTION OF RESOURCE ECONOMICS EXTENSION

The main contribution of the extension resource economist comes from the application of the basic theoretical framework of resource economics to public policy issues. The four main

conceptual threads that form the basis for this contribution were discussed in the first part of this paper and do not need to be repeated here. However, it is useful to note that the resource economist has a great comparative advantage in work in the policy arena. Economics cannot often be used to derive an unambiguous "optimal" policy for society. Resource economists, with their attention closely directed to the principles of welfare economics, are less apt to lose sight of this basic point than are their counterparts in other sub-disciplines of economics. (Although if the resource economist does fool himself into thinking that he can devise the optimal policy he has much less excuse for the ensuing flak and loss of credibility). The production economist deals with a firm or a single decision-maker with a single objective function (although Simon's work demonstrates that even the firm may have a bewilderingly complex set of preferences among different managers). The resource economist deals directly with public decisions, institutions and value conflict and is keenly aware of the mix of preferences that characterize those involved in the political process. The extension resource economist becomes wary of attributing an "objective" to any piece of legislation because, from direct observation, there are usually at least as many objectives as there are legislators who voted for the bill. The resource economist has a great advantage in the policy arena because of the focus of the sub-discipline on welfare economics.

Second, the extension resource economist is led naturally to a framework of identifying various facets of the resource issue, the policy options and analyzing the consequences of each option

from a variety of perspectives, with a variety of criteria. This is an appropriate model for the extension resource economist because the essence of resource policy conflict is often the underlying value differences of different groups, as well as the usual differences in the distribution of economic benefits from different options. This approach puts the extension resource economist in an objective position in the political process rather than an advocacy position which is difficult to defend intellectually or politically.

Finally, the extension resource economist is well served by the institutional focus of resource economics. Power and its relationship to the distribution of property rights and income is of central interest in any institutional analysis of resource issues. Similarly, power, the distribution of rights and income are the central themes of many resource policy issues that are resolved in the political arena in which the extension resource economist functions.