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EMERGING RURAL ENVIRONMENTAL ISSUES

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Current perceptions of emerging rural environmental issues reflect an evolution. Over the decades, the key environmental questions asked by agricultural economists have rotated from those addressing the impact of natural resources use, price and policy on farmers' welfare to those addressing the impact of various human activities, including agricultural and forestal practices, on environmental quality and human health.

Encompassed in today's research issues are also the impact of potential technological—including biotechnological—innovations, changing ownership patterns and environmental and agricultural legislation on natural resource quantity and quality, as well as the net benefits offered by integrated pest management and alternative agriculture. Indeed, there is probably a legitimate argument that there has been neglect of the more traditional profit-oriented research questions such as the impact of environmental legislation on the competitive position of various agricultural sectors or regions with one another or with other trading nations.

Emerging Rural Environmental Issues

While not intended to be an exhaustive list of rural environmental problems, Table 1 presents nine major issues. Some represent concerns that are decades old such as irrigation, grazing and soil productivity. Others are emerging issues including ground water contamination, global warming, food safety and occupational health.

However, the real emerging environmental issues are the changing perceptions about the age old question, "who has the right to do what to whom?", with respect to natural resources. Or, more specifically:

- What are appropriate management goals for natural resources? How safe is safe? How clean is clean? How should conflicting uses be resolved? How should we handle uncertainties with respect to future conditions?

Table 1. Rural Environmental Issues

1. Forest and Range Management
   - Quantity and Quality
   - Alternative, Conflicting Uses
   - Forest and Grassland Reserves
   - Severance Taxes and Grazing Fees
2. Soil Conservation
   - Soil Quantity and Quality
   - Off-site Impacts of Sediment Transport
3. Mineral Management
   - Conflicts with Other Land Uses
   - Reclamation and Pollution
   - Mineral Reserves
   - Severance Taxes
4. Water
   - Surface and Ground Quantity and Quality (Chemicals, Toxins, and Salinity)
   - Irrigation Supply and Price
   - Conflicts between Users and Uses
5. Recreation
   - Access
   - Quality and Quantity
   - Conflicts between Users
   - User Fees
6. Land Use
   - Urbanization Conflicts
   - Waste Disposal
   - Biomass Production
   - Farm and Non-farm Conflicts
7. Human Health
   - Pesticide Residues
   - Antibiotics in Animal Products
   - Occupational Health
   - Release of New Genetic Materials
8. Protection of Unique Species or Habitat
   - Wetlands
   - Coastal Areas
   - Endangered Species
   - Wildlife Protection and Biological Diversity
   - Development Preservation Conflicts
9. Climate
   - Air Pollution
   - Global Warming
   - Acid Rain
   - Management for the Extreme Event

- What is the appropriate role of the government in protecting environmental quality, resource quantity and access to natural resources? What is the role among federal, state and local governments? What is the role among agencies at various governmental levels?

- Who should bear the costs of any management strategies? What mechanism should be used for financing? Who has the right to benefits of any management strategy?

- Who decides?

New answers are emerging to these questions and they are redefining property rights to rural natural resources.

Management Goals

The evidence is unrefutable that Americans desire a clean and safe environment. There is also reasonably clear evidence that the public is willing to pay to assure a reasonably safe and clean environment. However, beyond these general statements, lie some murky interpretations.

For example, our ability to detect agricultural contamination of ground water vastly exceeds our ability to understand the significance of our findings. There is much scientific controversy over the association between low levels of pesticides in ground water and adverse health effects (Evans; Blair, Cantor and Zahm). But the scientific controversy is not the concern of the general public which is demanding a high level of protection from involuntary risks such as those that attend the drinking of contaminated water. Yet, zero degration is probably impossible (given our ever increasing ability to measure increasing dilute concentrations) and most assuredly expensive. The questions, "How clean is clean?" and "How safe is safe?", thus also implicitly include the additional question, "How much are we willing to pay to reduce risk even when we do not have information as to what is the current level of risk?"

There are those who argue, for example, that anyone who wishes to control agricultural chemical use must be forced to prove conclusively that the chemical is dangerous (Rice). In contrast, others argue the burden of proof should be on those who stand to profit from the use of the chemical. Not only is this a debate as to who has the property rights to chemical use and the use of the environment to receive chemicals, statisticians will note that this is the issue of whether society chooses to reduce Type I or Type II errors. That is, do we want to reduce the possibility of Type I errors—allowing a chemical to be used under the supposition that it is not harmful to humans and wildlife only to find our supposition proven wrong? Or conversely, do we want to reduce the possibility of Type II errors—unnecessarily banning a chemical that, in fact, is harmless and thus foregoing the benefits it could have given us? Since reduction of one type of error increases the occurrence of the other, the choices are neither easy nor clear.

Ground water is just one of the environmental issues that may bring major readjustments which are long term, nonincremental and that can involve uncertain and perhaps irreversible consequences. Because of many technological innovations that have been widely adopted since the post World War II period, society has been forced to manage externalities that are far less tractable than the more con-

ventional problems studied in the 1970s of noise, congestion or point source effluent pollution. These externalities include those attending the disposal of toxic wastes, ozone depletion, or the so-called "greenhouse" effect of global warming.

We have limited experience with the nature of these externalities; intelligent apprehension exists over the possible damages caused by them on this and future generations (Mishan and Page). Page refers particularly to the "zero-infinity" dilemma—externalities that pose low probabilities of catastrophic outcomes. But there is no such thing as a free lunch and society will have to decide how much insurance it wants to buy to reduce uncertain risks.

Should we as a society, for example, require or subsidize vast reforestation here and abroad in the pursuit of improved environmental quality and reduced air pollution—with the possible, but not certain, payback of reduction in global warming? Such a strategy requires large amounts of resources and perhaps loss of individual freedom for an uncertain payback; yet the costs of not adopting the strategy could conceivably also be quite high. Or, for another example, do we ban toxic waste generation, require recycling or try to dispose of such wastes by burying, burning or dumping? Each "solution" has its own costs.

The Role of Government

There are strong philosophical differences in perceptions about the appropriate role of the government in managing rural environmental issues. The role of the private market or voluntary compliance to achieve proposed environmental protection goals are championed for several environmental issues.

For example, at one time, particularly in Western states, the federal government was very heavily involved in the provision of water resources. As the federal presence has diminished, states have become more active in redefining their water allocation laws (Cummings).

The rediscovery of water law has lead to reexamination of the potential role of private markets and prices to allocate water—so-called privatization of water rights—and to the design of new institutions to enhance water marketing, according to Frederick. He points out that those in support of private markets emphasize the shortcomings of centralized controls; they argue that well-defined, transferable property rights are essential for establishing markets to improve water use (Frederick). "Very different conclusions are reached by those emphasizing the deficiencies of markets for allocating water. These people say that not only must there be well-defined property rights, but that individuals must face the full costs as well as the benefits of their use or exchange of the resource if markets are to work effectively" (Frederick, p. 10). Those in opposition to water market-

ing point to problems of ground water overdrafting or pollution as problems not well handled by markets.

Discussing environmental problems also includes elements of private versus public solutions. If Best Management Practices are viewed as important to reduce pollutant loadings, should voluntary compliance (with or without cost sharing) be relied on and should farmers be provided with appropriate education? This argument holds that farmers' and society's interests can converge with appropriate information-based programs (Abdalla and Libby). Similarly one could argue that private market responses alone could assure the level of environmental quality desired—at least where market goods such as food products are concerned. For example, H.J. Heinz and Company is one of several food processors that have notified producers to reduce chemical residues or find other buyers (Taylor and Meier). Will consumer purchase decisions be adequate stimuli to provide a food supply that is deemed safe?

For some rural environmental issues the private, voluntary solution has proven dominant. In addition to water marketing cases, many land use strategies rely on public incentives within a market context. Examples include use value assessment, scenic easement purchases and purchases of development rights.

In many perceived environmental problems, however, the answer has been to reject the private or voluntary solution and substitute a regulatory approach. With this view, farmers' and society's interests cannot converge with voluntary programs (Abdalla and Libby). Under the "polluter pays" principle, regulation, not cost sharing, is required.

Mishan and Page reject, in particular, the idea that consumer decision will lead to attainment of societal interests because, they argue, consumer decisions are based on a foundation of ignorance:

> Further, inasmuch as the untoward consequences of consumer innovations—including food additives, chemical drugs and pesticides, synthetic materials and a variety of new gadgets—tend to unfold slowly over time, their valuations by market prices may bear no relation whatever to the net utilities conferred over time. Indeed, the very pace of change today with respect to new models and new goods is such that is it is not possible for the buying public to learn from its own experience to assess the relative merits of a large proportion of the goods coming into the market (Mishan and Page, p. 123).

There is also the argument that any societal benefits should be accompanied by societal responsibilities. Thus, the argument proceeds that it is only equitable, for example, that farmers' rights to subsidized irrigation water or farm bill deficiency payments should be contingent on good stewardship.

In addition to the debate about the regulatory nature of proposed public actions, there is also a debate about whether state or federal governments should take the lead. In ground water protection, for example, one can marshal arguments to justify a federal role: the need for coordination; uniformity across state and regional boundaries; and, the trans-state boundary nature of many contamination problems. However, because of the diversity of state ground water problems; the historical dominance of states in land use issues; and because of the vacuum produced by the lack of federal responses to early detection of contaminated ground water, many states are initiating their own programs (Batie, 1988a).

With respect to ground water, there remain disputes over whether federal or state agencies should take the lead. For example, should the United States Department of Agriculture have a larger role in the protection of ground water from contamination by agricultural chemicals? Should the Department of Interior? Or is ground water management strictly a matter for the Environmental Protection Agency? Are these agencies necessarily adversaries? Similarly, in many states, pesticide regulation has historically been a function of State Departments of Agriculture. However, because the original task of the regulation was to protect the farmer from fraud and to assure certification of pesticide applicators, the regulatory personnel were not well positioned or in many cases disposed to broaden their view of their mission to that of protecting the environment. Thus, several states have removed pesticide regulation from their Departments of Agriculture and placed them in Departments of Environmental Protection, Water Quality or Public Health.

The Costs and the Benefits

The answers to the two questions, "What are the management goals?" and "What is the role of government?", will determine who will bear the costs and who will reap the benefits of any use of natural resources. Nevertheless, it seems prudent to raise the issue as a separate one because of its pivotal nature in the politics of environmental legislation.

If society uses conservation reserve programs to obtain environmental benefits, society foregoes whatever service the land would have provided otherwise. In addition, society foregoes the opportunity to use the rental payment expenses in a different way. If we allow hay cutting on conservation reserve program lands, farmers have gained, but we forego some of the wildlife benefits we could have obtained. Different groups are affected and different opportunity costs are accrued if we do not ration access to Yosemite Park; if we ration on a first come, first served basis; or if we ration with reservations. If forest companies pay full and actual costs for access to public timber stands we would expect to see different consumer

prices for lumber products as well as different environmental outcomes than if we subsidized such cutting.

The question of who bears the opportunity costs can be clearly illustrated with ground water examples. Some states such as Connecticut have experimented with a policy of strict liability which make the polluter responsible for damages—no matter how much care was exercised. Other states such as California shy away from strict liability but regulate chemical use (Batie, 1988a).

Costs must also include out-of-pocket, administrative costs for implementation. More policies are adding in user fees or taxes to assist in meeting these costs. Some states, such as Iowa, have fertilizer taxes. The tax is not necessarily levied to change farmers' use of fertilizer but to raise funds to research alternative agriculture strategies. Many states including Virginia raised the taxes on nonfarm citizens to pay for the use value assessment given to farmers.

Who Decides?

The question of who decides is, at least in the abstract, already answered in the United States by the participatory democracy form of government. Generally, when a problem is defined, groups become interested in its resolution. "[T]here are, in each issue area, policy communities made up of specialists, each with their own set of proposals. The specialists may be members of interest groups, agencies, universities, think tanks . . ." (Rushefsky, p. 62). Together they form what can be termed a "policy community" (Kingdom). They generate proposals and those that survive are technically feasible, compatible with the values of many of the policy specialists, and promoted by individual "policy entrepreneurs"—people who invest resources to further their preferred policy. The values reflected by successful proposals include, not only notions of the proper role and size of government, but also concepts of equity and efficiency; they reflect budget constraints as well as the "national mood" (Kingdom). When windows of opportunities open to the policy community because of elections, ideological changes in Congress, the White House Administration, state legislatures, or because of external events, the policy community attempts to get their various proposals enacted. Furthermore, in the politics that characterize participatory democracy, perceptions are reality and questions of equity are more important than questions of efficiency.

In environmental issues, at least at the federal level, there exists a strong, relatively well-organized policy community that attends to environmental issues. The environmentalists of this community use both the legislative process and the court system to obtain their goals and they tend to see themselves as representing society's interests and desires for a safe and high-quality environment.

Perceptions on Emerging Trends

My perceptions on the four emerging trends—particularly in reference to the less tractable environmental problems such as ground water contamination, global warming, disposal of wastes, chemical residual in food and acid rain—are as follows.

With respect to the appropriate goals for managing natural resources, there appears to be an increasing willingness to err on the "safe side." That is, society is more willing to risk a Type II error than a Type I. Society is willing to restrict the use of some natural resource services, such as the ability to receive and assimilate agrichemicals, and relinquish the benefits from using the chemical, even when there is a chance there will be no reduction of health or environmental quality risks. The willingness to reduce chlorofluorocarbons because of the probability they are damaging the ozone layer is just one set of evidence of this increasing willingness to buy insurance against uncertain but potential events endangering health or the environment.

With respect to the appropriate role of government, I believe the trend is to more "top-down," regulatory type actions. When the federal government has failed to enact restrictive policies, the states have increasingly substituted their own. Increasingly the agency assigned responsibility for managing natural resource quality has been an environmentally-oriented agency, neither production nor economic development agencies.

With respect to the incidence of costs and benefits of any public action, more costs are being borne by the landowner, and, thus, ultimately by the consumer of the natural resource products. It is interesting to note, for example, that even though polls consistently show strong public support for the farmer, as well as the need to protect the family farm, respondents condition these attitudes by their perceived responsibility of farmers to protect natural resources (Batie, 1988b). There also appears to be more effort to include revenue generation components such as user fees in any legislation to provide self-financing for public action. Increasingly, beneficiaries are those who desire higher protection of environmental quality.

With respect to the issue of "who decides," I have been impressed with the growth and increasing sophistication of environmental advocates, particularly at the federal level. The members of the community include the Audubon Society, the Natural Resources Defense Council, The National Coalition Against the Misuse of Pesticides, the Sierra Club, The Conservation Foundation and many other groups. They consistently have been key players in legislation affecting natural resource use and have managed to keep opponents of their agenda on the defensive for much of the time. While members of the broader policy community on environmental issues include advocates for the continued pattern on use of natural resourc-

es (e.g., The National Agricultural Chemicals Association), or public interest groups that describe themselves as objective participants (e.g., The League of Women Voters or academics), the community itself has vastly increased the numbers of environmental quality advocates particularly within the last decade. They are broadening their vision as to what issues concern them; many are seeking innovative coalitions; and they will have a voice in the decisions made with respect to rural natural resource use.

Implications for Policy Education

I believe the challenge for policy educators has never been greater. Clientele groups have expanded beyond the traditional farmer, rancher and forester, to include, not only other rural citizens, but other groups interested in rural welfare and rural environmental quality. The expertise needed by the policy educator has expanded beyond farm management skills or farm policy knowledge to include natural resource economics and rural development economics as well as knowledge of the legislation that addresses rural environmental and development concerns. The need for assistance from other disciplines transcends that from production departments to biology, climatology, geology, law, political science, sociology and hydrology. Deterministic planning must yield to adaptive planning more appropriate to the uncertain and stochastic world of today.

To repeat, the challenge to the policy educator has never been greater.

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