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King, D.A.

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TOWARDS MORE EFFECTIVE NATURAL RESOURCE PLANNING*

David A. King

Department of Watershed Management
University of Arizona
Tucson, Arizona 85721

As the world and society become more and more complex, the need for more effective planning for the use of natural resources becomes more urgent. Population and technological growth have resulted in increasing and changing demands for consumptive and nonconsumptive uses of natural resources. Technological advances have also increased interdependencies in the economic system, making technological external (dis) economies pervasive in society and the environment. These increasing and changing demands and interdependencies have resulted in conflicts over natural resource use. More effective natural resource planning is necessary to resolve these conflicts in ways that contribute to maximization of social welfare.

The magnitude of the probable increase in the resource needs of the United States was shown in a study by Landsberg (1964). Landsberg concludes that by the year 2000 there will be: "a tripling of requirements for both energy and metals. . . , almost a tripling for timber, and a doubling for farm products and for withdrawal depletions of fresh water." In addition to these materialistic demands on the environment there are the less easily quantified, but no less real, increasing demands for a quality environment.

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Several authorities believe the quantitative needs can be met, if we work at it. (Landsberg, 1964; McKelvey, 1972). But it is not just a matter of resource quantity; nor is it just a matter of resource quality. We must be concerned about quantity and quality in a world where the resource and resource use interrelationships are complex and difficult to describe, much less measure. The question is, can we attain a desirable balance of quantity and quality in a total living standard?

The role of natural resource managers in providing an affirmative answer to this question will be of increasing importance. To fulfill our role we must apply the planning process in the management of natural resources to a greater degree than ever before. To accomplish this will require more planners, better planning information, better planning models, more favorable planning climates, and more coordination at all levels. In order to fulfill these requirements we will need the best efforts of everyone in the field of natural resource management: educators, researchers and administrators.

EDUCATION

In order to discuss the role of education in providing more effective natural resource planning it is necessary to define the role of the natural resource manager in planning. While every natural resource manager need not be a professional planner, some should certainly attain that degree of competency, and others will be needed as resource specialists on multi-functional planning teams. Thus, it seems that, at a minimum, a natural resource manager

should be sympathetic to planning, have a broad mind with respect to disciplines and resource specialties other than his own, and have an ability to recognize and contribute to objectives larger than those represented within his own area of expertise.

Based on my experience in several planning efforts, this minimum is not being met. Too many natural resource managers do not recognize the value of formal planning processes. They are men of action who have little patience with the apparent, but necessary, wheel-spinning typical of many planning efforts. They want to get the job done so they can get back to what they regard as the important things, the pile of paperwork on their desks.

Natural resource managers often are committed to specific resource uses and/or clientele groups and, when such commitments are strong, they stand in the way of effective planning. As resource use priorities change, these commitments become obstacles to the needed realignment of management objectives and efforts. Rigid commitment can lead to unbalanced natural resource planning. Another consequence can be unnecessary conflict among members of multifunctional planning teams. Of course, some conflict is worthwhile in bringing out all viewpoints in a planning situation. Blind commitment to particular resource uses or obsolete priorities also leads natural resource managers to be more concerned with means than with ends and unable to identify new management alternatives (Churchman, 1968).

Beyond the minimum, which is primarily a matter of attitude and philosophy, few natural resource managers have sufficient educational background in the application of planning techniques, the organization of planning efforts, and the utilization of available decision-making tools. They are

poorly educated for the task ahead. Since education is a continuous process, professional schools of natural resource management and the natural resource agencies must work together to improve the situation.

With respect to attitudes and philosophy, it seems that there is a need for a reorientation of natural resource management education. The schools need to give the students a different image of what a natural resource manager is and does. Because planning is so important and the need for managers who can participate in the planning process is great, students must be taught that they will be contributors to planning and that planning is the essence of management. Students must be indoctrinated with the concept that the goal of natural resource management is to serve the needs of society, not the resource per se or some segment of society.

Changes also need to be made in natural resource curricula and course content. Responding to criticisms of the narrowness and technical orientation of their curricula, most schools have developed four year curricula that provide a very liberal education during the freshman and sophomore years. But not very large changes have been made in the final two years of these curricula. However, some schools are making changes and breaking with tradition. One school has collapsed all of its forestry courses into a single program during the junior and the first semester of the senior years. The objectives are to obliterate the boundaries between courses and to utilize a systems analysis approach. (Schultz and Thompson, 1971). Other schools have introduced integrated management and planning courses in which students learn to apply their knowledge to management decision-making and planning (University of California, 1971; University

of Montana, 1970). Another change being made is to make basic professional courses common to all natural resource majors within a school.

Without changing curricula or introducing new courses, much can be done through modification of course content and greater coordination among course instructors. In too many instances, instructors do not force students to utilize what they have learned in earlier courses, nor do they relate the content of their course to that of other courses. Students find it difficult to understand why they are required to master the calculus when they never see it used in their professional courses. Perhaps professors are guilty of underestimating the abilities of their students.

One of the responsibilities of the natural resource agencies is to keep the schools well informed about their changing personnel needs. The agencies should also recognize that they need a variety of talents to get the job done and to communicate this need to the schools. There is no single mold that will provide a "man for all seasons" in the field of natural resource management.

The other major educational responsibility of the agencies is career training. Most agencies at the federal level have active training programs utilizing a variety of methods. The state agencies could do more along these lines. More emphasis on planning is needed in these programs. The schools are willing to participate in these programs and perhaps more use should be made of them by the agencies.

RESEARCH

Planning Information

Research provides much of the information, data and input-output relationships, necessary for effective planning. In the typical planning situation there is insufficient information of both kinds, as well as insufficient time and money to develop it. While it is true that a planner can never know as much as he would like, more and better information can be produced by research without large increases in research budgets. And greater utilization of existing information is possible.

The simple lack of information is one kind of information problem. This indicates that the problem is so new that no research has been done or that the problem has not attracted the attention of research. The result is that the planner must guess or use the judgements of experts. We typically lack information about the demand for resource uses. It is terribly difficult, if not impossible, to have timely demand information available because of changes in the elements of demand over time. When more physical and biological information is available than demand information, the result can be an excellent specification of the situation, but very poor development of alternatives and analysis of their consequences.

Often a planner may not be able to use available information properly because he can't interpret it relative to the planning situation or he is unable to recognize the assumptions underlying the research results. This can lead to invalid or incomplete application of the information.

A third information problem exists when a planner doesn't find useable, existing information. The result is the same as a complete lack of information.

When no information exists and the problem is not new, research must bear a large portion of the blame. Researchers in the field of natural resources need to realize more fully that they are working in an applied field. The prestige factors and the reward system under which researchers operate encourages pure research rather than applied research. And much so-called applied research is not useable because of a lack of contact between researchers and planners. A feedback system between researchers and planners is needed. Greater efforts must be made by researchers to identify researchable problems related to current or foreseeable management problems. A very good way to do this is for the researcher to get involved in a real world planning situation to the extent, at least, of discovering what the planning information gaps are. Planners can help by coming to researchers for information, ideas, and help. University researchers also need to instill in their graduate students the desire to work towards solutions to real world problems.

When information is available but the planner is unable to use it properly, it is all too easy to blame the planner. But more often than not, the researcher has not interpreted his findings in a way that is helpful to management. The planner needs to come to the researcher, or another researcher in the particular subject, and ask for interpretation. When asked, it is the responsibility of researchers to ensure that research results are properly used in planning. No one knows the limits of a research

study's results better than the person who conducted the research and he should be called upon for help when there are any questions of applicability.

When available information is not found by a planner, again it is easy to blame the planner. But the planner simply cannot be aware of everything; he needs help, should ask for it, and be given it. In addition, researchers should make every effort to get their results to planners.

Planning Model

Another of the functions of research is the development of planning or decision-making models. It is my judgement that the development of these tools is outstripping the availability of input data and the ability of planners to use them properly. There is a strong impetus for quantification of decision-making and, where quantification is obviously impossible, to express nonquantifiable decision elements as constraints. This can be dangerous because it gives the appearance of a greater reduction in uncertainty and subjectivity than is actually the case.

Uncertainty can never be completely eliminated and, therefore, value judgements can never be completely eliminated. Rather than mask these value judgements, it seems far better for planners to recognize them explicitly so they can be tested by public opinion.

ADMINISTRATION

Planning Climate

The natural resource agencies have not yet fully recognized the need for more effective planning. While planning is done at the top levels,

planning at the basic management unit level has been primarily a facade, and, if not that, oriented to management based only on physical resource potential without regard for the various needs of society. Too many administrators view the goal of planning as avoiding conflict or minimizing public displeasure. Planning does not avoid conflict; it resolves conflict in a way beneficial to society. This means, most often, that some segments of society will be unhappier than other segments. Since natural resources are scarce, this situation cannot be avoided.

Land use planning for the basic management units of many agencies is something that is done in addition to other work. Planning is a full time job and a planning team must be freed from the day-to-day administrative work in order to be effective. Specific budgeting for planning as a permanent function at the planning unit level should be instituted.

Too often planners are called upon to justify prior decisions. If planners are to be useful, they must be given the freedom to develop and consider all feasible alternatives. This does not mean that line officers should be excluded from planning efforts, but it does mean that the planners must feel perfectly free to disagree and pursue their own analyses. Line officers can contribute to the planners' efforts by aiding in problem definition and providing information on political constraints.

Support services for planners must be provided. Where planning is conducted at basic management unit levels, upper level administrative units should provide basic data and sources for additional information. They should also provide access to planning models and computer services.

Administrators need to encourage their planning personnel to utilize the talents of researchers and educators in planning efforts. I think

natural resource managers are not aware of the willingness of academic and research people to help them. The benefits of such cooperation go both ways. The planners have the benefit of good information properly applied and, perhaps, of a different perspective. The researchers and educators have the opportunity to test their results and ideas in the real world and to identify new research problems.

In some agencies the functional organization of staffs based on resource uses can stand in the way of effective planning. This type of organization reinforces commitments to specific resource uses. The planning function and personnel should be separated, organizationally, from the other functional divisions.

Planning that is not used is useless. When plans are not used, a negative attitude towards planning develops and planners lose dedication and desire. Agencies must give more than lip service to planning as a way of making management decisions.

Planning should be a continuous process, no plan is ever complete. Day-to-day management decisions should be made in the context of the plan and line officers should be expected to demonstrate this. However, slavish devotion to a plan can be disastrous if the plan is not updated as conditions and priorities change. Using the plan is the best way of discovering and correcting obsolescence.

Coordination

There is a great deal of overlapping responsibility for resources and resource uses among agencies. Because of the interdependencies among resources

and resource uses, an agency unit cannot plan in isolation and do it effectively. Yet, removing this isolation is difficult unless it is made clear to management unit planners that it is expected by the upper echelons of the involved agencies.

An important factor here is interagency jealousy and bureaucratic politics. Agencies have tended to become defenders of more or less specific clientele groups. Here we see a reflection of resource use commitment. It is sometimes argued that competitiveness among agencies results in bringing out more points for consideration by legislative committees. However, when different agencies report to different committees, the effectiveness of such competition is questionable.

Coordination among federal agencies could be improved by creation of a single Department of Natural Resources. Even then there would be the problem of coordination among bureaus within the agency and with other departments. Effective coordination will not occur until managers and planners recognize, accept, and attempt to implement the proper goal of public natural resource management: the management of public natural resources so as to contribute to the maximization of social welfare. The responsibility of achieving this change in attitude lies with the natural resource professional schools, government leaders, and the natural resource professional societies.

CONCLUSION

The changes that are needed require the efforts of everyone in the field of natural resource management. While I think these changes are important, I also am convinced that natural resource managers have built a

strong foundation upon which to make them. No other group has been so concerned, for so long, with the general problem of environmental management for tangible and intangible benefits. No other group has the basic background and orientation required to provide effective natural resource planning.

There does seem to be recognition of the need for change as evidenced by the changes that have already been made. We need to encourage these changes and to continue to make progress. Further progress is necessary because, if more effective natural resource planning is not achieved, the needs of society will not be met.

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