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The Role of the Economist in Resource Planning

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Resources for the Future was established in 1953 as a non-profit research organization devoted to studies of natural resources in the political economy. It is funded entirely by the Ford Foundation, currently at the rate of $1,400,000 a year.

The reason why the organization was established was because it was felt that there was a good deal of research work on the scientific aspects of resource problems and almost nothing on the economic and other social science aspects other than in agriculture.

We operate in several different divisions. We have a Division of Land Use and Management under the direction of Marion Clawson. Under this division many recreational studies are being undertaken, particularly: how you evaluate outdoor recreation, the growing needs and demand for outdoor recreation, and other studies along those lines. We also have a section on water resources which is focusing on questions of meeting water needs, on allocation problems, and on how better decisions are reached in developing water resources. Some work is also being done on the price of water resources.

We have a Division on Energy and Mineral Materials. Primary emphasis is on the demand and supply of the energy and mineral materials but there are also studies on efficiency, conservation regulations, and on pricing. We have a section on Regional Planning and Urban Development. Here we step a little outside the traditional understanding of natural resources and get involved in some of the urban resources and urban problems.

Then we have a division established fairly recently on the quality of the environment. This arose out of our work in the water section in which we were dealing with pollution problems and with the realization that there are similar problems in land pollution through pesticides, or the destruction of the natural environment, and in air pollution.

Our earlier studies had also indicated that many of the natural resource problems of the United States were not so much quantitative as they were qualitative. Our initial efforts dealt mainly with raw material demand and supply. Then several of our studies pointed out that scarcity of raw materials was not generally a significant problem for the United States. But we did realize that there was a qualitative aspect, and this, again, was one of the reasons we established a section on the quality of the natural environment.

It is about these qualitative resources that I would like to say a few words today. To begin my remarks, I would like to recall a sight that I have frequently seen when flying over the Chesapeake Bay from Washington to New York. One can see from the window of the jet, a sailing fleet on the waters below. This is the last commercial sailing fleet in the United States. It is made up of the Chesapeake Bay skipjacks and bugeyes, which are very beautiful vessels. They are out there dredging for oysters, because under Maryland law the only way you can dredge is under sail power. The reason for this law is that Maryland maintains the archaic principle of the freedom of the bay. There is open access to the oysters; anyone who wants to can go out and harvest them. Consequently, they must have these stringent regulations and controls.

The situation with respect to Maryland's oyster industry is similar in many respects to some of the qualitative resources that are of interest to us. That is, if there is open access to them, they are common property or shared resources. The problems of congestion, depletion and conflict encountered in the Maryland oyster

industry also tend to occur with many of the qualitative natural resources. Examples of these resources that are shared are: the air we breathe, large open vistas, the landscape, flowing bodies of water (streams), large bodies of water--the Great Ponds in Massachusetts for example--public camping grounds, hunting and fishing resources. These resources are shared and no single user can exclude others from participation. Since they are shared resources, they fall within the public domain and require public decisions and planning.

There are several approaches to the problems that arise in the use of these qualitative resources. One approach is based on the awareness that the use of these resources is frequently accompanied by external diseconomies--those costs created by a user of the shared public environment that are not borne by him but by other users. Studies are necessary in order to figure out how the public can best allocate the costs created under these conditions, and how one can overcome, or help to internalize, the external diseconomies.

Another important approach to a study of qualitative resource problems is the measuring of their value. Because these resources are being shared, there is no real market place to determine the price. What is the price of good, clean air? What is the price for a beach, or for a hunting or fishing experience? Here again, Resources for the Future is doing some work in the development of techniques for the evaluation of benefits and costs.

The third approach that is important is one that has been largely neglected thus far. It is not really among the problems for economists but is extremely important and needs immediate attention. This is the problem of defining the resource. We don't really know what we mean by outdoor recreation. We sit down and look at charts and extrapolate trends off into the future, and say that this will be the future demand. But we don't really understand what is behind this demand, what specifically is demanded.

By understanding the nature of the demand, we may be better able to provide the resources that are desirable, better able to design those that will be useful to society. For example, take a stretch of beach. For some people, the demand may be for solitude and the great horizon. For others, it may be surf fishing. For others, it might be swimming or sunning. For still others, it may be watching bikinis, which is a perfectly bonafide demand. For each of these different uses, there will be different concepts of congestion or depletion. If you are there for solitude, a lot of people who are there for other purposes may disrupt your own enjoyment of the resource. How can a public agency design resources to meet these varied perceptions and needs? I think it is really critical that we begin to understand the nature of these demands. As I say, I don't think it is so much the role of the economist as the sociologist, perhaps. But anything that can be done to stimulate studies along these lines will be very helpful.

Finally, there is a fourth approach, one that I would like to talk about in a little more detail. This one has received little attention by economists thus far. Yet it focuses on at least one of the critical aspects of the qualitative resource problem. The approach has been borrowed, as I indicated initially, from the fishery economists who have pointed out that the freedom of open access to the resource leads almost inevitably to economic inefficiency and waste, to physical waste, and to conflict between the users. For these resources, there is no single unified authority that controls the amount of effort that can be applied; the number of people who can enjoy the resources. Therefore, any economic rent that is produced under this kind of an industry is shared by all the users who participate. Since this rent is shared, it will attract more and more users into the industry until the total rent is dissipated. In the fisheries field, under equilibrium conditions, it turns out that the industry operates where total cost and total revenue are equal, rather than at the margin.

There are some examples of gross economic waste in the fisheries field that I'll give you. In a study of the Sacremento fishery for salmon, it was determined that the roughly $3,300,000 of gross revenue that are taken each year could be taken with an effort costing something on the order of $300,000 under rational management. Because of the redundant amounts of capital and labor coming in, the total cost of the effort is close to the amount of gross revenue with an annual waste of about $3 million per year. In the salmon industry of the Pacific Northwest, Alaska and Washington, economic waste has been estimated on the order of 30 to 40 million dollars per year out of the $55,000,000 industry. In the George's Bank haddock fishery an estimate is that maximum economic revenues would be produced with 50 percent of the effort now applied.

These are all indications in the fishery field of this dissipation of rent, of waste, of economic inefficiency that occurs because of this open access to the resource. Aside from the question of economic waste, these resources tend to become depleted because no single user can afford to restrain his own efforts in the interest of the future. If he holds back on his catch in order to save for tomorrow, someone else is likely to take it today. There is no incentive to conserve or control the use of the resource. Conflict also develops because a common property resource is like a vacuum. Society abhors common property, just as much as nature abhors a vacuum. Conflicts arise because of the attempts to fill this emptiness, attempts to appropriate and acquire exclusive rights to the resource.

These problems that are evident in fisheries are also becoming evident with respect to our qualitative natural resources. You know what it's like on a fishing stream on opening day with the banks lined with fishermen, the crowded beaches, the neon signs in areas where they are so close together that no message at all gets through. Smog is an example of this waste. Traffic on rivers and on the small bays and lakes, the polluted rivers, all of these are evidence of this open access to the resource. For example, where no one owns a view, anyone can make use of the view by putting up a billboard. No one owns the great ponds or lakes; anyone with a boat can enter. And no one owns the striped bass; anyone with a rod and patience, I guess, can catch one.

There are, of course, some costs in entering and participating in these resources. Generally the costs are far too small to restrict the number of producers. Now, the situation is going to get far worse before it gets better. Demand, in so far as we can determine it, is growing. Not only that, technology is reducing the cost of participating in these resources. The spinning reel takes less skill than the fly or bait casting rod. The rugged motorbikes, four-wheel drive jeeps, and snow vehicles make it far easier to enter the wilderness areas. Helicopters, when they become sufficiently lower in cost, will also put tremendous pressure on some of the wilderness areas. Fiberglass boats, aluminum beer cans and the many technological developments make it easier for people to enter, enjoy, and deplete the shared resources. Inevitably, the consequences of this congestion will become more severe, and the controls will have to become more stringent.

In general, there are three kinds of approaches to the resolution of these problems. For some resources one approach may be more effective than another. Usually a combination is desirable. Two of the approaches have been followed; one has not. I think that, in a sense, it is the function of the economist to analyze the "pros" and "cons" of these different approaches, and to figure out which is the best alternative or combination of alternatives.

The first and most frequently used approach is to expand the supply of the resource. This is a quite natural reaction in a market-oriented economy where there is a growing demand and a short supply. Thus, when public beaches become crowded, it is desirable to extend these beaches or to open more of them. The quantities of parklands are increased. When fisheries become overfished in the streams, there is investment in hatcheries and

planting of fish. The augmentation of low flow on rivers is another way of increasing the supply of water that can help dilute the pollution effluents.

For many of these resources, not all of them of course, the marginal costs of increasing the supply are mounting very rapidly. There is only so much clean air over Los Angeles. There are only so many miles of beach along the New England coast. The numbers of tuna on the high seas cannot be readily increased. Therefore, other forms of controls have to be adopted.

The second approach that is generally followed is one that controls the use of the resource, while maintaining a semblence of the principle of freedom of access to it. This control can take various forms. Gear restriction is one technique. In the case of the Maryland oyster industry, the gear restriction is a very severe one because of the nature of the industry./ There are regulations against the use of motor vehicles in certain areas, a form of controlling the gear used. Regulations against bait fishing on certain streams is another kind of restriction. These may be desirable and effective in many cases because technological innovation that occurs, or because the efficiency of the devices that can be used, would deplete the resource very rapidly.

Another form of control on use is through bag or creel limits, where there is a limit to each person's enjoyment of the resource. If there are a certain fixed number of fish and this can be divided by the number of people who will be using the resource to arrive at a creel limit of five units or whatever it is, per day. Or the length of time one can stay at a campground can be limited. Restrictions on the size of neon signs is another example of this type of control.

There are several other kinds of controls along these lines that I won't go into. Some of them are very essential in working out the conflicts in different uses of the same resource, such as surf fishing in a swimming area. Obviously, many of these regulations on use are both necessary and desirable. I think it is important to understand the real objectives behind them, and the extent to which these objectives may be met. In part at least, some of the gear restrictions may be imposed not so much to prevent depletion of the resource as to preserve the use of the resource for a certain group of people. Perhaps some of the gear restrictions on the use of the wilderness areas are designed to appropriate the wilderness by those who have the skill and equipment to backpack. This may be a perfectly bonafide objective, in view of the fact that the interests of the minority in many of the shared resources tend to be overwhelmed by those of the majority. It is important to understand the reason why these restrictions are imposed.

Then there is another question as to the effectiveness of this technique. As the demand increases, and where supply is limited, these restrictions will have to become more and more stringent. In the beginning it may be possible, for example, for the users to enjoy the solitude of a wilderness, and the restrictions against four-wheel drive vehicles, tote goats, helicopters, or things along those lines can help preserve this semblence of solitude. But as demand grows, more and more people will be willing to incur the costs of acquiring the skill, the stamina, and the equipment to backpack into this wilderness area. Each person that enters in is going to create external diseconomies for everyone else. Inevitably, if the demand keeps on increasing, the enjoyment of the resource, the solitude aspect at least, will be depleted. If you have creel limits, how far down can you cut this limit before the individual user loses any enjoyment whatsoever, if there are only a certain number of fish that can be produced?

Under these conditions, the value of the resource tends to become dissipated, just as the economic rent of the fishery is dissipated by the excessive applications of capital and labor. Individuals will find their satisfaction decreasing because of the

decreased shares that each can obtain. Thus, total costs and returns in satisfaction will become equal rather than the marginal costs and returns.

There is a third approach, aside from the one of increasing the supply and the one of controlling the use of the resource. It is one that must be faced up to in certain instances, although it does create very real and difficult problems. The approach is control on the number of users, but if you are going to control the number of users it raises very difficult questions about the traditional freedoms we have had, and also very difficult questions about the effect on income distribution. These questions will have to be addressed by economists, I think, in helping to provide a more rational use of these shared resources. The traditional freedom is represented by the oystermen of Maryland, for example, who say that they have a God-given right to go out and take oysters when and where they want. Many of us also feel we have a traditional freedom to hunt, to fish, to enjoy the outdoors when and where we want, and anything that works to the contrary is going to have difficulty in becoming adopted. On income distribution, if we impose restrictions on the number of users by establishing an entry fee or use tax of some sort, this obviously works to the detriment of low income users.

There are three ways of achieving some control on the number of users. One is by rationing the use; another is by some monetary tax or fee that is imposed; and the third is by appropriation of exclusive rights to the resource itself.

Some rationing schemes are already employed. Some are direct, such as the lotteries which grant permission to hunt certain game animals out west. Others are indirect, such as restrictions on the number of parking lots or the number of camping sites in certain areas. These reduce the opportunity to participate in the enjoyment of the resource, but they do not directly impose costs on the users. They restrict the traditional right of access but they do not directly redistribute income. There are two difficulties with this kind of an approach. The first is that indirect costs may frequently be incurred as the demand increases and as the rewards for participation become more attractive. These costs include waiting in line to get there first or actually buying the privilege that someone else has obtained.

The second difficulty is that the value of the restricted entry, which is a form of economic rent, goes to the users, or to those who are able to capitalize on this use, rather than to society. There is a question here as to whether or not it should. In addition to that, where the value goes to the users, incentives develop to break down the system, to open up more parking lots, more campsites, and thus lead to more congestion on the resource.

The second form of control is by direct imposition of taxes or use fees. To be effective, these have to be high enough to prevent the excess entry from occurring, and they should be related directly to the resource itself. The Golden Eagle Pass, for example, may produce revenues to the government and may diminish use slightly, but will not change the pattern of congestion on the most popular grounds. Again there are restrictions on the traditional freedom of access, and such fees work to the detriment of the low-income users.

The third alternative is to permit private individuals and groups to appropriate exclusive rights to the resource itself. There are some examples of this. Certain states permit the riparian owners of a fishing stream to get together and acquire exclusive rights to the fishery in their stretch of water. There is an amusing example on the Alleghaney Front in West Virginia. The road goes up the magnificent Alleghaney Front escarpment but there is no place to turn off until you get to the very top. At this spot, there is a large, chain-link fence between the public and the public's resource, i.e. the view. No one can appreciate the view unless he pays an entrance fee

to get on the other side of the fence. In essence, the owner of this particular land has appropriated the exclusive rights to the view because this is the only way people can appreciate it.

The advantage of the appropriation approach is that it tends to come closer to the market situation, to get better pricing and better allocation of resources. The disadvantages are obvious. The scale of investment is frequently far too great for any private entrepreneur to take. We don't know how to enclose an open vista, except by this Alleghaney Front business, or how to enclose fish and wildlife. Also, this kind of an approach removes the freedom of opportunity and redistributes income in the form that would be detrimental to the low-income user.

In summary, I think that the problems of qualitative resources are very severe ones, very difficult ones. How do we respond to the growing demand? How do we deal with the question of open access? These are, perhaps, two of the most significant problems. We can increase the supply of the resource, but there are limits. We can control the kind of use, but this also has limits. So I think it is inevitable that we will have to deal with controls that prevent excess numbers of users from participating, and here again are difficulties.

A great deal more research is needed in this whole area, research in the definition of the resource--what do we mean by it, what is being utilized, how do we measure the demand accurately. And we need research on methods of controlling entry, or the number of users or participants in the resource, in order to prevent the wastes that will inevitably become more and more severe as the demand increases.