

Better Use of Water Management Tools

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Emery did a very good job this morning expressing the nostalgia that's felt by those of us who worked with the Bank so long ago. I was thinking more about that when Harvey Banks was speaking. A story occurred to me that was making the rounds of the Research Division of the Bank when I was working there. Emery and I both worked in the Research Division and there were sometimes somewhat delicate relationships with other divisions. I'm sure that doesn't happen any more. At the time, the Bank used to have tours. They would take people around to view the money and such. I don't know if that happens anymore or not. Anyway, the tour was being made in the Bank one day (this was during the era of Joseph McCarthy). Somebody on the tour asked the tour director, "Do you have any economists at the Bank?" (Harvey reminded me of that story because he briefly misspoke "economist.") The tour director thought that the person had asked if there were any "Communists" in the Bank. A really strange notion! But anyway, "No," he replied. "No, there are none." And the person on the tour said, "Well, I heard there were some in Research." "No." The director thought a minute and added, "But if there were any, that's where they'd be."

John Timmons has done a good job of reviewing what economists and others have been doing in the area of environmental quality as applied to water resources. He's sort of focused where we are and how we got there and discussed some economic aspects of the problem. I would like not particularly to disagree with anything that he says—because I basically don't—

but rather to take the opportunity to supplement some of what he did say and possibly also to place it a bit more into the national policy context and the context of the current kinds of problems that we have to face. Most of the effort that has been given to water quality improvement, at least at the national level, has focused heavily on point sources of pollution and on a particular set of pollutants—primarily the massive amounts of organics that are associated with municipal sewage and several kinds of industry.

In the course of time, there has been a tendency to centralize the policy more and more at the central government level and to try to get more and more uniform standards right across the nation, regardless of the diversity of conditions that Dr. Timmons referred to. That's a very simplified, quick statement of where I think policy has come à la the 1972 Water Quality Act Amendment, which is the law that still governs.

But we are now facing what I would like to refer to as the "new generation of water quality problems." And, in my opinion, they are much knottier, and much more difficult, than anything that we've faced so far. They're knottier, and more difficult, both from the technical point of view and from the policy angle. John Timmons has referred to some of them. Let me speak briefly about one of this new generation, and that is toxic substances. They are, so far, essentially unregulated. But, in response to a law suit by the Natural Resources Defense Council, the EPA has now started to try to implement the toxic substances provision of the Clean Air Act. And it has identified sixty-five classes of toxic pollutants for regulation. This is going to be an extremely difficult task. Very little is known, and it is going to involve an enormous amount of data collection. Under the Act there is a requirement, for example, that the economic impacts of each regulation are to be assessed, and they are supposed to do all this by the early 1980s. This is going to be a far more difficult task than was confronted in the effort to regulate the more conventional kind of pollutants.

But, we may be facing some situations that are even more difficult than that—again, from a technical point of view and also from a policy point of view. And I'd like to make reference to one or two situations that have particular bearing on this part of the world.

Over the last few years, I've been directing a research project called the "Southwest Region Under Stress Project," which has involved research groups from around the country and chiefly the southwest region. One of the parts of that project has dealt with the question of air pollution control. I won't try to even sketch the whole range of things to be considered, but one part has been an effort to provide better models of dispersion pollutants from sources. Two results of that have been (1) that pollutants are transported much farther than was long believed and (2) that the deposition of materials in them takes place selectively at high altitudes. Both are what you would pretty much expect. But that leads to the suspicion that these materials might get into upper watersheds—specifically, into the snowpacks. There is presently no monitoring of that possible effect. Now, we say it is a possible effect. We know it happens some, but we don't know how much it happens, and we don't know, if it happens, whether it is necessarily that important. But one can be suspicious that this might be another kind of toxic pollution of our water courses. And we do have a contract with the Department of Energy to try to at least get some scope of how important this effect might be.

Another tough problem area is the possible development of energy resources. Some people believe that the main possibility for developing the shale resources of the region, for example, is an in situ process because of the cost of the processes and the difficulties that are involved with doing retorting above ground. With the in situ procedure that's now proposed, we'd mine part of the shale and then blast the rest of it, break it up, and have underground combustion. Now the shale, as with coal, contains many things other than hydrocarbons, including a good many heavy metals. Combustion itself could produce dangerous hydrocarbons, which would stay behind. The shale formations are water-bearing structures. They have to be pumped in order for such a process to take place. And the question is, What will happen when those water-bearing structures refill with water? What are their connections to surface hydrology? They are things I think are not at all well understood, and we may be playing Russian roulette in not understanding them better before we proceed with programs, for example, such as those the president proposed.

Another area I'd like to look at on the matter of this new generation of water quality problems is the nonpoint sources. Dr. Timmons spoke some about them. He gave some estimates from a very interesting study they had done in Iowa. But looking at it a little more broadly, the recognition is occurring that nonpoint sources are an extremely important part of the overall water pollution problem. As a matter of fact, some people have begun to wonder whether we can get much further at all in improving water quality with further work on the point sources that are our policy and regulation focus at the present time. I wouldn't want to bet my life on the following numbers, but they are from the Council on Environmental Quality. What they report is that sediment flows from nonpoint sources is 360 times the load that comes from municipal and industrial sources. We are not going to make much progress on that problem by further looking at the point sources. That may not be so surprising with respect to sediment, but they further say that BOD and nutrients from nonpoint sources are probably five to six times as large as from point sources. This is, of course, one of the chief pollutants that we have been trying to attack. They also report, and you see it to some extent in this region, that runoff from old mining operations is a major contributor of heavy metals to water courses.

Now, these are the members of the new generation of problems that we are just now coming to grips with. As I mentioned before, they are technically very difficult. There are very few data. It's hard to know what kind of policy would be effective with respect to them. But there are some characteristics they have in common. One is that to try to deal directly with them, we must understand better the natural systems that are involved. This may extend to systems other than the water system itself. We must understand the hydrology of the river basins better than we do. We must understand the chemistry of the river basins better than we do at the present time. But we may also have to look at how things get into them more carefully than we have in the past.

I've already mentioned the possible problem of heavy metals and other toxic materials getting into the watershed from the atmosphere. It is now becoming apparent that quite a lot of

different things have polluted the water resources from the atmosphere. The most notable example, in the sense of having received most of the discussion, is acid rain, which is afflicting large areas of our northeast, much of the Laurentian shield in Canada, and great parts of northern Europe. This is a deleterious input to water courses from the atmosphere, having been generated largely by the combustion of coal—sometimes at very remote locations. One of the characteristics, then, is that there are systems involved that we don't understand as well as we need to if we are going to be able to manage these more subtle problems effectively. And those systems are more often than not of a regional character.

A second aspect, as is obvious, is that they cannot be controlled fully by conventional water pollution control measures. Dr. Timmons mentioned the sediment question. Here we are talking to a large extent about changes in agricultural practices on a relatively large scale. We are not equipped to handle such problems at the present time. Furthermore, it is sometimes possible to change the quality of a water course by doing things to the water course itself. A very often cited example is low flow regulation, which catches water during high flow periods and releases it during low flow periods when usually the quality of water in the stream is most degraded. There is, furthermore, the possibility of such a thing as a sediment-catching structure. There is even a possibility—and this is practiced to some extent in Germany, for example—of introducing air into the rivers at critical points where otherwise it would drop too low. Along this line there is considerable literature that has tried to look at pollution problems as a problem of regional water quality management upon which a wide range of policies and priorities can be brought to bear. And that literature has concluded that, even with respect to point sources, it is possible to achieve the water quality goals or standards that Dr. Timmons mentioned at much lower cost if a regional approach is used so that a wide variety of actions can be taken.

Now when we look at this new generation problem, which is even more inherently regional in character in a way, it seems to me we really have to think hard about the approach to water quality that has evolved at the national level. There has been

more and more centralization and more and more of an effort at uniform rules across the country. A brief effort was made in the 1965 Water Act Amendments to begin to understand the water courses and to relate water quality policy to that understanding. That was completely wiped out later on. An effort was made to do everything with effluent standards, which were based on technology and had no relationship whatsoever to what happened in the rivers. I think we can't afford to do that anymore. I think we have to rethink that policy and begin to try to nurture regional institutions that are intended to come to grips with these problems and manage them. The tendency of our federal policy has been to destroy or weaken such regional institutions.