

developed. Simple models also could be developed on a gross basis for regional and even national planning and programming.

In making a critical examination of the alternatives, an assessment should be made of the cost (both in the sense of capital outlay and in the sense of adverse effect on resources if no action is taken) and the utility or benefits or gains associated with each of the alternatives.

Having defined broadly the problem and then addressed attention to concept and methodology, specific evaluation studies should be made on a geographical regional basis with attention directed first to those areas of known major problems. Obviously, since over 80 percent of the population is expected to be located in the 200 some odd standard metropolitan areas in the next few years, primary attention should be given to those Federal installations located in or adjacent to these centers of population.

It seems feasible to reduce some of the detailed planning of actual programs and control systems to the typical network analysis and programming documents used in the PERT system to establish appropriate reporting and control systems to measure progress toward the previously developed objectives. Inherent in this is the continued "roll forward" of the near-term plan, on an annual reprogramming cycle.

In applying the systems methodology and the techniques suggested above, it must be kept in mind that neither the plan nor its implementation is solely the province of the technical expert. Specialists in public administration, law, sociology, and economics must be involved and must participate with the professional environmental pollution abatement workers of the Federal departments in developing a truly Federal plan. Professor Morrisy Gonzley of the University of Colorado, in his paper, "Proposal for a Program of Research and Graduate Training in Environmental Economics," makes this point very well as follows:

Thus in the end, scientific analysis of the economic and social problems involved in maintaining and improving the quality of the natural environment becomes interdisciplinary. This view is of course inherent in the nature of systems analysis and program budgeting.

While there may be violent disagreement in some quarters regarding the results of the so-called systems analysis, and other efforts to integrate all of the multifacets of the pollution problem into a manageable form, the fact remains that some of the experience and expertise of resource management inherent in these approaches can be applied with suitable modification to the pollution abatement problem. While "experts" may disagree with the results, depending upon their specific orientation, the systems approach does produce analytical assistance upon which policy judgment can be based. There is a great need in the environmental pollution program as there is in those of defense and space for an assessment of alternatives, and of the effect thereon of what the economist terms "land, labor, and capital." The very pervasive nature of the questions concerning environmental quality and environmental pollution abatement make it vital that the requirements, constraints, and side effects on other national policies be examined in a systematic manner. In so doing, it must be recognized that the very nature of the problem, with many different governmental jurisdictions and varying public interest involved, indicates that there will result from such analysis a spectrum of program choices. The ultimate