

of it systematically related costs and benefits of suggested policies or made systematic comparison of alternatives. The Department of Defense in 1961 had a huge backlog of accumulated analyses and policy recommendations from organizations like RAND, and much of what was done in 1961 and 1962 resulted directly from the intellectual investments started in 1951 and 1952.

I think we in OEO did a good quick planning job in this first year but it was narrow and shallow because of the time constraints. It was narrow in that we did not consider as many alternatives as we should have; it was shallow because analysis did not go as deep as it should have. But, at least we know where the bodies are buried—we know what shortcuts we took and what simplifications we made.

What I would like to do today is to describe what we did and to draw some conclusions, but first, I want to expose a prejudice. We have done a set of system analyses of which we are pretty proud and I think that systems analysis properly done is bound to improve government planning and operations. Nonetheless, I am a bit skeptical of some of the uses made of systems analysis. For one thing the numbers used in systems analysis are always imperfect and to make decisions on the basis of small quantitative differences derived from very fuzzy inputs is wrong and is dangerous. If differences are small, then an entirely different basis for decision should be arrived at. Indeed, if quantitative results do not accord with one's intuition, one had better check his numbers very carefully, because by and large intuition is the better guide.

A similar danger is that too much concentration on quantity, as is sometimes the case with systems analysis and systems analysts, can lead to asking the wrong questions. It is all too easy to substitute the concrete for the important, and it is frequently done.

I know some pretty horrible examples of misuse of analysis from my time at Rand and in the Defense establishments, but these are classified Secret, so I will give two other examples of systems analysis badly used.

The first comes from the cost-benefit analysis of water resource projects. (Incidentally, cost-benefit analysis and systems analysis are not identical. Cost-benefits analysis can be an important part of systems analysis but it is not the whole. The imposition of non-quantitative systems on decision making—the construction of qualitative alternatives, for example, can be just as important.) In any case, some work on water resource projects goes into an immense amount of intricate detail to try to establish the interest rate which should be used to discount future benefits from the water in order to match them against current costs of the project. Should it be the interest rate the government must pay for its borrowed funds, (should it be the opportunity cost of using the same funds for private capital projects, or what should it be? To me, this whole debate is meaningless when estimates of proper interest rates are very imprecise and the final choice of an interest is arbitrary. If a Go-no-Go decision were made on the basis of such an arbitrary choice of interest rate it would be the wrong decision half the time.

Fortunately, the study I have in mind came out with the answer that at *any* interest rate the particular project under consideration was uneconomical. The costs, no matter how defined, were substantially greater than the benefits. The water system proposed would have provided a major subsidy to agricultural programs which would otherwise have been uneconomic. Now, this is the best use of highly legitimate cost-benefit analysis: the analytically discovery of *large* quantitative difference on the basis of simple generally acceptable *ceteris paribus* assumptions. The project was clearly unjustified.

And to end the story, the uneconomical project was adopted with great popular and political fanfare which shows another sort of limit on the application of cost-benefit analysis.

The second example of the dangers of systems analysis comes from some of our own work in the War on Poverty. Again it is a question of the use of cost-benefit analysis. It illustrates the possible use of quantity to narrow the focus down to the wrong questions. We of course avoided the error, but we could have made it.

In our OEO programs we do much training. For the evaluation of training programs, a frequently used method is that of matching the cost of the program against estimated increases in lifetime earnings derived from the training. If lifetime earnings, discounted properly, are greater than the cost then the train-