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The Value of Water in Alternative Uses

By

A SPECIAL COMMITTEE UNDER THE DIRECTION OF
NATHANIEL WOLLMAN:
RALPH L. EDGEL, MARSHALL E. FARRIS, H. RALPH STUCKY,
ALVIN J. THOMPSON, AND NATHANIEL WOLLMAN

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The avowed purpose of The Value of Water in Alternative Uses is to establish a set of models that will indicate how new water could be allocated in the San Juan and Rio Grande basins in New Mexico to maximize the net product in the basins and, by implication, in the state as well. It makes no claim to exhaust the full range of possible choices among uses. What it does do is test relevant criteria of choice for the selected objectives and indicate whether and how they could be used for making water resource development policy decisions. These criteria include capital and labor requirements for new investment, net income generated, and benefit-cost ratios in addition to gross product. The rank orders among alternatives indicated by the various criteria are the same for all models.

This study is distinguished from the burgeoning array of reports on basin development by a straightforward strategy and a discriminating sense of what is relevant to policy and decision. Rather than attempt to make a claim for attention by embroidering the obvious, the authors accept the obvious for what it is, the raw material of public policy decisions. The data are collected and analyzed from conventional sources and by conventional methods. The significant contribution is the way that these are focused on real issues to produce useful answers. It stands as a prototype of analysis that would considerably improve policy and decision making in many river basins.

Before the Second World War, economic growth in the two basins under scrutiny was halting and without direction. With the development of atomic weapons the economic environment was transformed into a technological wonderland. In a few short years the world of Helen Hunt Jackson was scattered before the doctrines and legions of C. P. Snow. Not only was there a violent change of pace and direction, but past experience gave few guide lines to the future. Now the question is not whether development is possible, but rather how to manage it. As the authors state the objective of their study, it is to discover “how can development proceed by an orderly phasing that will allow full use of available supplies [of resources] and also provide for an advantageous transfer to higher valued uses as they emerge?”
Three types of economic activity are selected as potential users of a maximum diversion of 235,000 acre feet of water annually to the two basins. These are irrigation agriculture, municipal and industrial uses, and recreation. Eight models test two types of variation, a redistribution of the available water between two basins, and a change in the distribution among the three major new uses.

The models produced no surprises. Greater gains could be made from changes in the pattern of production than from additions to the water supply. The value added per acre foot of water consumed by agriculture ranged from $28 to $51 while manufacturing and municipal uses added from $1,300 to $4,000 per acre foot. Furthermore, the most favorable industrial-municipal use models probably could generate sufficient capital for needed new investment and provide the necessary levels of employment to sustain growth. Recreation, if measured by the gross product of sales to fishermen and campers, outproduced irrigation agriculture from four to eleven times.

The way in which recreation is incorporated into the model indicates a general limitation of the method. Even if one ignores the inadequacies of measuring the economic value of recreation by the magnitude of sales to campers and fishermen, there remain equally serious short comings. The most important of these is the substantial undervaluation of recreation. This may be justified on the grounds that in the case of recreation it would be better to err on the low rather than the high side. Essentially, this is an effort to reach an equilibrium by balancing the romanticism of "Poor Richard" thrift against the romanticism of the unbuttoned nature lovers.

The point at issue here is, is the rationality of decision making better served by muffling the economic values under penurious prices or by depending on intuitive values to reflect the probable relative significance of recreation in the balance with goods bearing market prices? The authors are not unaware of this issue. They point out the difficulty of generating strong incentives for investment in producing recreation goods and services in the private sector because of this ambivalence. The magnitude of calculated net product suggests that recreation investment would be justified in the public sector, but present exchange values are adubious clues as to how much, what kind, or when. In any event, to secure real support for necessary public investment in recreation will require, among other things, an understanding of the full value of recreation which includes a large number of goods and services not measured by market prices.

Recreation is merely the most obvious exemplar of the general problem of determining the best combination of investments as distinguished from that of setting a goal of the optimum quantity of output. It is not enough to find that mix of output that maximizes gross output. Some determination must also be made about the quality of life made possible by economic activity. Quality and
quantity are not synonymous, the past and present neoclassicist notwithstanding.

Developing societies have at hand a relatively large array of uncommitted resources. As a consequence they have the opportunity to make substantial resource allocations to the amenities and services that not only enhance the quality of living, but by that device also draw to them those human resources that have the greatest production potential. Thus, an analysis of investment opportunities must go beyond measures of gross output of conventional goods and services and include with their proper weights the output of those things that enhance the quality of life.

A large share of such investment falls in the public sector. These are investments that go beyond avoiding external diseconomies. They require a positive program for generating and capturing external economies in the public sector. This is particularly important for water resources development policy which by its very nature falls primarily in the public sector. The mix of investment to go with physical water development must be based on an assessment of the advantages of public vs. private investment, social opportunity costs, the composition of goods and services produced to obtain the optimum in both quality and quantity of output, the optimum distribution of output among claimants and over time, and the proper degree of flexibility to improve the process of choice. Persistent undercounting or ignoring of such elements in development models means that real choice does not include many of the most important alternatives.

The models developed in this report are not designed to weigh all of these issues, certainly not those the reviewer may think to be more important than do the authors. They do offer discrete answers to these seven propositions, but for obvious reasons, not simultaneously:

1. The labor supply that can be absorbed by the predicted development.
2. The maximum per capita income that can be generated.
3. The maximum aggregate income.
4. The minimum capital requirement.
5. The maximum surplus of savings generated over capital needs.
6. Maximum subsidy to the state.
7. Maximum gross income in each basin simultaneously.

Cavil about detail, system of counting, inadequate attention to the quality aspects of development notwithstanding, there is a formidable array of useful information. The general policy recommendations that flow from it are that investment opportunities be reconsidered from three points of view. First, is welfare being improved by subsidies to attract resources to irrigation agriculture, given present opportunity costs? Second, would welfare be increased if
subsidies similar to those offered to agriculture were granted to new industries
to stimulate industrial and municipal development? Third, should irrigation de-
velopment be continued so that all of the presently available water could be
put to immediate use and thus forestall the possibility that it would be
awarded to another state during the interval before New Mexico could develop
industrial demand for it?

There is strong evidence that the State of New Mexico could profitably
subsidize industrial development to use the water to be made available. The
case for a federal subsidy is considerably less persuasive in spite of the authors'
assertion that the favorable benefit-cost ratio indicated the net regional advan-
tages of New Mexico. A more difficult problem, and one not fully explored in
the study, is the determination of the mix of industries and supporting services
and amenities that should be stimulated by such a subsidy. It is agreed that
under present criteria, recreation that should bulk large in any subsidy pro-
gram would probably get short shrift under present subsidy award criteria.

Political reality, if nothing else, dictates that at least present irrigation ag-
riculture be continued. In spite of the fact that in one model agriculture would
have a net annual loss of $2,912,000 if farmers paid for water on the same
price basis as industry, the authors make and underline the point: "The results
cannot be used to support a conclusion that no new irrigation is warranted in
the San Juan basin." The impact of this mitigated by the following clause:
"unless it is demonstrated that the water is needed immediately or in the near
future for other purposes."

The essence of the allocation problem is thus time and composition of in-
vestment. It is argued that immediate investment in irrigation, the opportunity
for industrial development not being present, will stimulate general develop-
ment and hence hasten the time when industrial opportunities can be realized.
No proof is offered for this assertion, and the strong plea for guarantying
flexibility in new investment decisions suggests that the authors themselves are
not quite sure of its validity. Certainly in the past, once water has been com-
mitted to agriculture both the institutional resistance and the cost of realloca-
tion have been very high, in some instances prohibitive. At present growth
rates in the two basins it would seem that the need for agriculture as a "pump-
primer" would at least need strong support from sources not yet specified. As
a minimum it should be compared with alternative investment in areas affect-
ing the quality of the economic environment such as health, education, trans-
portation, aesthetic, and other amenities as well as recreation.

The virtues of this study, and they are indeed substantial, are the relevance
and completeness of the analysis to meet the assigned objectives. The text is
supported by thirteen appendixes which in sum are three times the size of the
text itself, but unfortunately there is no index. Second, this study is an excellent
prototype to be applied to other areas to provide useful answers and to serve a base for exploring improved new developments of this approach. It produces policy recommendations that are persuasively supported.

To suggest that the analysis does not go far enough to grapple with the most significant allocation problems is not to deny that this is a significant contribution to water resource analysis. The authors did, in general, meet the limited objectives they selected. They do not claim that they are sufficient to provide all of the answers. In any event, whether or not they should have expanded the range of inquiry, what they have done makes that task easier for those who have the courage or temerity to tackle the job of assessing the contributions of resources to the quality of choice as well as to the sheer bulk from which the choices must be made.

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