

INCOME VALUE OF WATER WHEN USED FOR VARIOUS
INDUSTRIES IN NEW MEXICO

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The subject assigned me for presentation to this group is the "Income Value of Water for Irrigation in New Mexico." It is a part of a broader discussion of the income value of water when used for various industries. Possibly my approach to this subject needs some explanation. The other three panel members are reporting the findings of a study of a specific plan of water allocation for the San Juan-Chama Project in which they all participated. Consequently, their presentations follow the same general pattern, and they are able to give the actual figures, for the income value of water, that were obtained by the particular procedure used. Since I did not participate in this study, my approach must be on some different basis. I have chosen to explain two of the methods of determining values that are now generally used and point out some of the difficulties in their practical application. They are the "benefit-cost" and the "repayment" methods.

The evaluation of the benefit to be derived from any action is instinctive. A person either voluntarily or involuntarily weighs the benefit expected from an action against its cost in terms of effort required. Similarly, all public programs have been evaluated in some manner before being inaugurated and their costs have been considered justified by the economic or social benefits to be derived.

In the field of water-use development, the wide variation in the methods of evaluation led the Federal Inter-Agency River Basin Committee, acting under the authority of the President's Water Resources Policy Commission, to start a study in 1946 of the procedures being used by all of the Federal Agencies.

After some 5 years of study the Commission issued its recommendations for a set of criteria which it felt would enable the benefit-cost type of analysis to be conducted on the basis of improved measurement standards which, because of their uniformity, would facilitate comparison of projects and greater understanding by public and Government alike. Many agencies insisted that the method could not be applied fairly in their own highly specialized fields. Never-the-less, a few years later, under instructions from the Bureau of the Budget, Federal agencies started submitting analyses on this basis for every water utilization project proposed. The criteria and instructions advanced by the Commission comprise some

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forty pages in a 6" x 9" pamphlet and like other procedures for this purpose are complicated and difficult to apply uniformly.

Briefly, the method consists of determining the monetary benefits assignable to a specific use of water and comparing them with the appropriate costs to obtain a benefit-cost ratio. This ratio shows the dollars in benefits received for each dollar invested and, if the basis of measurement is comparable, can be used to compare either the various uses of water within a project or the complete water utilization projects. The method is considered to give an "income value" for each use of water analyzed.

There are many difficulties, however, both in measuring the benefits and, since most projects are multi-purpose, in allocating the joint costs. In the matter of cost allocation, the prescribed policy requires that the Separable Costs-Remaining Benefits method be used unless some other method is justified. The tendency is to use this method rather than attempt to justify another, even though the economist may feel that the Use of Facilities, the Benefits, or some other method would result in a more reasonable apportionment of the costs.

In the determination of the benefits, it is apparent that using the same procedure, so called "liberal" economists will consistently compute higher benefits than "conservative" economists. Benefits determined by economists in specialized fields frequently appear to run consistently higher or lower than in other fields. Some agencies seem to have worked out satisfactory methods of evaluating the special water-uses for which they have responsibility; others have not.

Irrigation benefits, for example, are measured by the standard farm budget method. This method is taught in the Agricultural Colleges and is generally used throughout the field of farm management. The results obtained by this method, being widely checked, are likely to represent reasonable values for the benefits to irrigators, or the direct benefits. However, the determination of benefits to others, or indirect benefits, is more difficult. They accrue, at times, far from the project and some of them frequently are overlooked. On the other hand, some people feel that indirect benefits should not be computed. The controversy over this point has not been settled.

Under existing procedures municipal water benefits are usually derived in terms of alternative costs and, therefore, are not comparable to other measured benefits. As a result of the procedures used, higher benefits per acre-foot may be found for irrigation even though it is generally recognized that water is more valuable for municipal use than for either irrigation or industry.

In recent evaluations of the benefits of recreation in water utilization projects the responsible agency has determined the necessary basic recreational facilities required, computed the costs, and assigned as the benefits an amount equal to twice the costs of the facilities provided. The value of water for recreation, when determined by this method, obviously is not comparable to the value for irrigation obtained by a farm budget analysis.

Some of the procedures for determining the benefits of other water uses, such as for fish and wildlife, flood and sediment control, and soil conservation purposes, have been developed in great detail by the responsible agencies. While few people maintain that the benefits obtained by these methods are comparable, the constant efforts to improve the procedures results in continually improved evaluations.

The second method, that of determining payment capacity, is required by law on Federal Reclamation projects and is considered by many to give the best measure of the income value of water for irrigation. Payment capacity is defined as the maximum annual amount available to the water users from the farm income for payment of all irrigation charges, after deducting other obligations on gross farm income including expenses necessary to maintain the farm family living at an appropriate level, those necessary to produce and market crops and livestock, and those necessary to retain the farm, such as taxes and interest.

Payment capacity, like benefits, is determined by the farm budget method. Because of the difficulties of projecting net earnings over an extended period and because of limitations of existing data and analytical processes, no single method of payment capacity analysis is considered sufficient. Conclusions must be checked by one or more other methods. The "income to land", "comparative cost", or "credit experience" methods are commonly used for this check. It must be recognized that payment capacity comprises only a part of the direct benefits and only a small fraction of the total benefits usually measured.

Payment capacity is the important factor in reclamation project analyses, as the law requires that all reimbursable costs be repaid either by the water users or from other project revenues. The lack of such capacity has long been the greatest difficulty to overcome in developing feasible irrigation projects. In many areas, particularly the small projects in the Rio Grande tributaries of northern New Mexico, both the economic and social benefits from rehabilitating and expanding irrigation facilities would be high, but the irrigators cannot repay the costs.

For many years, in projects that include hydroelectric power, power revenues have been used to help pay the reimbursable costs allocated to irrigation. The vast development in the Lower Colorado River Basin were brought about largely because of the power and water revenues that were available to pay for project facilities. In the Rio Grande Project, although water users have contracted to pay the full cost of their distribution system, arrangements have been made to pay a large part of the costs of Elephant Butte Dam with power revenues. The Colorado River Storage Project, authorized in 1956, provides that power and other revenues shall be used to help pay the reimbursable costs of participating projects. The San Juan-Chama Project is one of these participating projects, and offers the only opportunity to finance the rehabilitation of small projects in the upper Rio Grande Tributaries.

This explanation of the various methods of evaluation is not intended as a criticism of any method presently used, but is given to point out the fact that judgment must be exercised when using such evaluations. Benefit-cost ratios are one of many factors that influence the allocation of water to specific uses. In the plan for the Initial Stage Development of the San Juan-Chama Project, for example, the State's policy precluded allocation of any water to fish and wildlife purposes. No doubt the benefits of a small amount of water for this purpose, determined at the most favorable location, would have been greater per acre-foot than for any of the uses included in the plan.

In summarizing, I have explained the two most commonly used methods of evaluating water uses, and have pointed out the differences in procedure that make a valid comparison of uses, on the basis of these methods, difficult if not impossible. These methods can be construed to measure income value. I have indicated that other factors frequently are more important than income value in determining the allocation of water to specific uses. I also have outlined the provision under which power and other revenues from the Colorado River Storage Project can be used to help pay for the rehabilitation of irrigation units proposed in the San Juan-Chama Project. It is important that this provision be utilized, and the water allocated to New Mexico under the Upper Colorado River Compact be developed before it is put to use in some downstream state and is lost.