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More Effective Procedures
Are Needed For Establishing
Payment Terms And
Development Periods For
Irrigation Projects

Bureau of Reclamation
Department of the Interior

**UNITED STATES
GENERAL ACCOUNTING OFFICE**

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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

RESOURCES AND ECONOMIC
DEVELOPMENT DIVISION

B-125045

The Honorable
| The Secretary of the Interior 33

Dear Mr. Secretary:

² We have reviewed the Bureau of Reclamation's procedures and practices for determining the payment terms and development periods used to recover that portion of multipurpose water resource project costs allocated to irrigation. Our work was performed primarily at Bureau regional offices, in Sacramento, California (Mid-Pacific Region); Salt Lake City, Utah (Upper Colorado Region); and Boise, Idaho (Pacific Northwest Region). ⁷⁶

During our review, Department of the Interior officials said that many of the Bureau's concepts and policies for determining payment terms and development periods used to recover allocated irrigation costs have been changed or are scheduled for change in the near future. A Bureau task force on water marketing policy has recommended changes in policy, and we were told that the Commissioner of Reclamation will notify the Bureau's regional offices of the recommendations approved for implementation.

Consequently, our findings are being brought to your attention so that action may be taken on our recommendations along with those identified by the Bureau task force. Our findings concern the need for (1) uniform guidelines for establishing irrigation payment terms and development periods and (2) provisions in future contracts for periodic redeterminations of irrigation repayment rates.

INTRODUCTION

From the time of the Reclamation Act of 1902 (43 U.S.C. 391) as amended, through the Reclamation Project Act of 1939 (43 U.S.C. 391a), the reclamation program has undergone a requirement change. Formerly, irrigation water users repaid to the Government within 10 years the total cost of irrigation facilities. Now, water users are required to repay, over a period of about 50 years, only that part of irrigation costs which they have the "ability to pay." Thus, the 1939 Act and subsequent legislation provide the basis for the present Bureau repayment policies, which embrace the following:

- An ability-to-pay concept was adopted whereby irrigators are required to repay only that portion of the Federal costs of irrigation facilities which the Secretary determines that they can afford to pay.
- The remaining portion of the Federal costs of providing irrigation water will be repaid from power and other miscellaneous revenues.
- A development period, not to exceed 10 years, is allowed to irrigators to develop their land and achieve the financial position necessary to meet any added costs before the start of the repayment period.

The Bureau has been authorized to construct multipurpose water resource projects having an estimated cost of \$13 billion. Of this amount, about \$7 billion has been allocated to the irrigation function and is repayable to the Government. Repayment of the irrigation costs are to be made by irrigation water users (\$3.2 billion) and by users of power and other project purposes (\$3.8 billion) for that portion of the allocated irrigation costs which is beyond the irrigation water users' ability to pay.

The irrigators' ability to pay is determined by ascertaining the estimated difference in farmers' income with and without an irrigation project and involves estimated projections of farm sizes, type and quantity of crops, and crop prices. As a result, the ability-to-pay determinations involve many subjective evaluations--each of which can substantially affect the amounts determined to be available for repayment. Because of this situation, Bureau officials have expressed concern that ability-to-pay determinations should be used only as a guide for repayment ability. The establishing of two task forces by the Bureau to conduct studies of its water marketing policies have evidenced this concern.

These task forces issued two preliminary reports, one in February 1972 ("Task Force Report on Economic Aspects of Plan Formulation") and the other in January 1974 ("Task Force Report Preliminary to Final Recommendations Regarding Reclamation Water Marketing Policy").

The recommendations in the first task force report were superseded by the Bureau's guidelines prepared for implementing the Water Resources Council's "Principles and Standards for Planning Water and Related Land Resources," which have been effective since October 1973. The second task force report is being reviewed and Department of the Interior officials told us that the revisions and recommendations are scheduled to be completed shortly.

The January 1974 report proposed that the charges to irrigators for water be based on more than just ability-to-pay studies. The report suggested that judgments be based on (1) competition for water, (2) current cost of nonproject water, (3) ability-to-pay determinations, (4) costs of supplying project water, and (5) alternative cost of other water supplies. Some other pertinent issues in the Bureau's task force report were:

- Irrigation ability-to-pay studies should consider enlarged farm sizes from the standpoint of operationships rather than ownerships. Also, project criteria should be more severe, to encourage eliminating lands in the lower range of productivity.
- Updating ability-to-pay calculations should be required to insure that they are current by the date of contract negotiations. Also, consideration should be given to implementing an escalation clause to be applied periodically to the negotiated water rate for increases in project cost.
- Contract repayments should be periodically reviewed to ascertain whether any changes in cost, cost allocations, and water use require changes in contract repayment charges. This should be made a standard contract provision.

Although the Bureau is studying various factors which should be evaluated in establishing water charges, ability-to-pay determinations remain as one of the factors which the studies indicate should be considered.

NEED FOR UNIFORM GUIDELINES FOR
ESTABLISHING IRRIGATION PAYMENT
TERMS AND DEVELOPMENT PERIODS

Our review showed that financial data applicable to all farm sizes and types of crops were not used in computing irrigators' ability to pay and that inconsistent criteria were used for establishing development periods. An analysis of this data showed that any determination of irrigators' ability to pay could vary substantially, depending on the data used, and that a wide range of data was available from irrigation districts, the Department of Agriculture, Bureau surveys, and States and counties.

In fairness to the multipurpose water resource project customers, who are required to repay irrigation costs beyond

the irrigation water users' ability to pay, it is important that irrigators pay as much of the costs allocated to the irrigation purposes as can be reasonably expected. Also, because interest is not required to be paid to the Government on costs allocated to the irrigation purpose, granting irrigators unnecessarily long development periods will increase the interest costs to the Government, which borrows funds to finance its construction program.

Because of the importance of the Bureau's determinations of irrigators' ability to pay and development periods, and because such determinations are made by the Bureau's seven regional offices, we believe that the Bureau needs to issue written guidelines setting forth factors to be considered and the weight to be assigned to each factor.

Need to consider all farm sizes

In preparing farm budgets for determining ability to pay, Bureau instructions provide for the use of family farming operations which do not exceed 320 acres of irrigated land. This requirement stems from reclamation law, which provides that project water shall not be furnished to irrigable lands in excess of 160 acres under single ownership or 320 acres owned by husband and wife. In practice, farm budgets prepared by the Bureau included farms with irrigated land ranging in size from 40 to 320 acres. We noted, however, that in some cases the irrigated land in the counties to be served by the Bureau projects was in farms larger than those used by the Bureau as a basis for its farm budgets.

In an earlier report ^{1/} we pointed out that a substantial number of farmers are obtaining project water for considerably more than 160 acres by leasing land and by establishing corporations, family partnerships, and trusts. Of 502,499 acres receiving project water in seven irrigation districts in the Central Valley Project, about 14 percent--71,645 acres--was on farms ranging in size from 1,774 to 40,404 acres. Although ownership of irrigated land was limited to 160 acres per individual, several such 160-acre farms were often operated by a single corporation or individual.

^{1/}Report to the Congress, "Congress Should Reevaluate the 160-Acre Limitation on Land eligible to Receive Water from Federal Water Resources Projects" (B-125045, November 30, 1972).

Because these types of farming operations are recognized forms of owning and operating farms and have functioned this way for a long time, the Bureau should attempt to analyze the irrigators' ability to pay for water on the basis of actual farming operations in the area to be served with project water. In some cases, this analysis might result in determining an increased irrigators' ability to pay, because large farms generally realize a higher income per acre than do small farms, due to the economies of scale.

A study conducted by the University of Idaho, College of Agriculture, entitled the "Relationship Between Farm Size and Ability to Pay for Irrigation Water," shows that larger farms generally have a larger net income per acre than smaller farms. For example, the study shows that a 600-acre farm realizes an ability to pay of about \$2.50 more per acre per year than does a 160-acre farm. By projecting this amount over irrigation districts of assumed sizes for the normal 40-year contract period, we find the following.

Irrigation districts of assumed size (acres)	Difference in ability to pay per acre (160-acre farm vs. 600-acre farm)	Additional ability to pay per year	Additional ability to pay over 40-year contract period (note a)
5,000	\$2.50	\$12,500	\$ 500,000
10,000	2.50	25,000	1,000,000
20,000	2.50	50,000	2,000,000

a/This table demonstrates the effect small decreases in per acre cost could have when projected over 40 years for a large number of acres. It does not represent an actual case, and all farms in a district would not be 600 acres.

Bureau officials told us that a study made by the California Agricultural Experiment Station indicates that all cost savings due to farm size have been realized by a 640-acre farm, although some minor project advantages may continue to accrue as the size increases. Bureau officials also stated that the increase in ability to pay shown in the above table of about 5 percent between a 160-acre farm and a 600-acre farm is well within the margin of error of a farm budget analysis and is not considered to represent a major difference in ability to pay.

While we recognize that estimates in a farm budget are subject to a margin of error that may exceed 5 percent, we believe that all pertinent factors should be considered in ability-to-pay determinations to reduce the margin of error.

Bureau officials told us that their guidelines provide that the ability-to-pay determinations should consider the fact that farmers lease land and are obtaining water for more than 160 acres. As noted previously, however, in actual practice farm budgets prepared by the Bureau include farms from 40 to 320 acres, although substantially more acres were being operated as a single farm unit.

The Bureau, when preparing farm budgets used to determine ability to pay, should base its determinations on information which will best account for the size of farms likely to be operated as a single unit, regardless of the number of individuals who may own the farms.

Need to consider all crops

Bureau instructions provide that estimates of normal yields should be developed for principal crops under the projected probable pattern of land use. For two projects reviewed, the Bureau excluded plant and flower nurseries and other high-value crops from the determinations of the irrigators' ability to pay.

The data supporting the Bureau's 1961 economic studies, which were used in computing ability to pay for the San Felipe Unit of the Central Valley Project in California, shows that the unit will ultimately irrigate about 94,000 acres of land, consisting primarily of such crops as small fruits, sugar beets, tomatoes, pasture, and miscellaneous truck crops. The Bureau used these crops in determining ability to pay.

A report prepared by the Bureau in 1962, however, showed that the cropping pattern in the San Felipe Unit would most likely include increasing acreages in plant and flower nurseries and other high-value crops such as berries. Bureau officials told us that they excluded these high-value, high-risk crops from their ability-to-pay studies because they felt that their inclusion would unduly affect study averages.

The data supporting the Bureau's 1963 economic studies for the Tualatin Project in Oregon showed that berries and nursery crops had not been included in the ability-to-pay computations. The Bureau's land use studies indicated that

berries were a relatively minor crop at the time and that the acreage for such crops was expected to decline. Nursery crops were omitted from farm budgets because they were considered a specialized commercial enterprise outside of the family farm concept.

The County Agricultural Extension Agency told us that nursery crops had become a major factor in the Tualatin Valley area served by the Bureau's irrigation water. The Agency also told us that the Valley is well known for its strawberries, which it has produced for the past 30 years. The county records, which included crop information on the Tualatin Valley, indicated that of the total cash crop sales of about \$29 million for 1969: (1) sales of small fruits and berries, mainly strawberries, represented about \$5.2 million or 18 percent, and (2) nursery crops represented about \$5.5 million, or 19 percent.

However, a Bureau report prepared in 1970 for the Tualatin Project, which was the basis for the repayment contract with the irrigation district, was not revised on the basis of the changes in the farm economy which had occurred during the period 1963-70. We believe these high-value crops should have been included in the Bureau computations since the farmers would probably benefit by having such crops irrigated with project water.

Bureau officials told us that its analysis of crop patterns is based on typical situations and that it is difficult to obtain meaningful data on speciality crops which may represent the nontypical situation. Bureau officials stated, however, that specialty crop production does result in greater benefits to fewer people and that larger farms growing these crops may return more dollars to the Treasury in less time, but this production would not necessarily be in the best public interest. Bureau officials indicated that its policy is to include in a farm budget those crops most likely to be grown in the family-size farms to recognize the Congress' continued support of the family-farm concept.

As discussed on page 4, the small family-farm concept has been implemented in a manner that tends to control the size of farms owned rather than operated. Consequently, farm budgets should include crop patterns based on information which will best determine the type and size of farm operations which experience has shown can be anticipated under the family-farm concept.

Need for uniform guidelines
for establishing development periods

The 1939 Reclamation Act provides for a development period not to exceed 10 years before starting to repay a project's construction cost obligation. Generally, the development period is the time between initial delivery of project water to the irrigation district and the first annual payment of the project's construction costs allocated to irrigation.

The Bureau uses the development period as a means to allow irrigators sufficient time to (1) develop their land and adapt their farming techniques and cropping patterns to the new supply of water and (2) achieve the financial position necessary to meet any added costs. The Bureau has not issued to its regional offices uniform guidelines setting forth the factors to consider in determining the length allowed for development periods. As a result, we found several instances where the regional offices did not follow uniform practices in establishing development periods.

Each of the regional offices used informal procedures for determining the length of development periods. The Mid-Pacific Region allows a development period of 1 to 3 years to water districts that had irrigation activities before the Bureau's irrigation water service. In the same situation the Upper Colorado Region generally allows a development period of 3 years. On the other hand, the Pacific Northwest Region allows no development period to districts where the amount of water supplied by the project would not significantly affect the established farming operations.

The Mid-Pacific Region allows a 1-year development period for each 10-percent portion of unirrigated land in a district. The other two regions have similar procedures for determining the length of development periods.

We noted several examples in the Central Valley Project in California where the local procedure of allowing a 1-year development period for each 10-percent portion of unirrigated land in the district had not been applied consistently. For instance, the Terra Bella Irrigation District, of which 36 percent was irrigated before the development period, was allowed a 4-year development period. The Arvin-Edison Water Storage District, of which about 82 percent was irrigated before receiving project water, was allowed a development period of 5 years.

Mid-Pacific regional officials agreed that the local procedures were not always applied consistently. They stated that sometimes they allow varying development periods on the basis of contract negotiations between the Bureau and irrigation districts. Also, the Bureau told us that the 5-year development period for the Arvin-Edison Water Storage District was judged to be reasonable and equitable on the basis of the complexity of the irrigation management plan, which involved extensive water percolation and installing extensive groundwater pumping capacity.

Six other irrigation districts in one of the regions reviewed were allowed development periods primarily of 2 to 5 years (one for 10 years) by the region, although these districts were nearly fully developed at the beginning of the development period. A regional official indicated that factors considered in allowing these development periods included the need for (1) a shakedown period for the newly constructed distribution system and (2) a period during which farmers may write off the capitalization of wells and equipment which the new surface water supply is replacing.

The value of the repayment contracts with these six districts totaled about \$67 million. Based on interest rates from 2.3 to 4.1 percent, the additional interest costs incurred by the Government on the outstanding contracts during the development periods allowed these water districts, as compared to no development period, will amount to about \$11.4 million. The interest rates represent the average yields on long-term Treasury obligations outstanding for the year that the contracts between the Bureau and the irrigation districts were signed.

The Bureau agreed that, in hindsight, some development periods allowed may have been longer than necessary. Although agreeing that there may be room for improvement, the Bureau indicated that its procedures for determining development periods have been adequate and pointed out that there were many variables involved, including predictions for the future.

We recognize that variables are involved in determining development periods and that some of them may be difficult to evaluate precisely. Because of the additional interest cost to the Government of unnecessarily long development periods, however, and in the effort to make uniform standards for the regions, the Bureau should issue to its regional offices written guidelines which will set forth the nature of the

variables and other factors to be considered in establishing development periods.

ADJUSTMENT PROVISION NEEDED IN
CONTRACTING FOR IRRIGATION WATER

The Bureau's long-term contracts with irrigation districts in the Pacific Northwest, Upper Colorado, and Mid-Pacific Regions generally did not contain provisions for adjusting the construction cost obligation and water rates during the 40-year life of water contracts. The subjective nature of the Bureau's projections of the irrigation districts' ability to pay and the changing economic conditions that occur over a 40-year period indicate that irrigators' ability to pay should be periodically updated.

Rate provisions reviewed for 11 contracts administered by the Pacific Northwest Region and 15 contracts administered by the Upper Colorado Region showed that most of the contracts contained a provision which gave the water districts an opportunity to change to a different method or rate of repayment. One contract provided for periodically adjusting irrigation water rates as changes in water use occur from that initially estimated. None of the contracts, however, provided for changes in the total construction cost obligation to be paid by an irrigator because of changes in the irrigators' ability to pay.

In the Mid-Pacific Region, irrigators are usually required to repay the full construction cost of federally financed water distribution systems over a specified number of years--generally 40 years. Distribution facilities usually consist of a system of small canals, pipelines, and laterals which convey water from the main canal to the water delivery points on a farm. Our review of 12 contracts indicated that none of the contracts for distribution systems contained provisions which would allow adjusting the repayment rate on the basis of changes in the irrigators' ability to pay.

Also, the Mid-Pacific Region enters into 40-year water service contracts whereby the Bureau sells project irrigation water at fixed rates which should be sufficient to recover an appropriate share of annual project operation and maintenance costs and a portion of project construction costs. These contracts, however, did not contain provisions for adjusting the operation, maintenance, and construction cost components or rates charged to irrigators for changes in the irrigators' ability to pay.

Bureau officials stated that ability-to-pay studies are predictions and only time will tell if they do, in fact, represent actual conditions. They added that the dynamics of the agricultural sector have resulted in rapid changes and future change may not be projected without risk and uncertainty.

Bureau officials cited examples of several water districts in the Mid-Pacific Region which have experienced financial difficulties, even though the construction cost obligation and the water rates were less than the irrigators' computed ability to pay. They stated that some of the contracts for the examples cited were amended to provide relief; others, unknown at this time, may also require relief by contract amendment.

Provision should be made in long-term irrigation contracts for periodically adjusting the total construction cost obligation and the related water rates and other payments on the basis of changes in the irrigators' ability to pay. It is not fair to the Government to amend contracts to reduce water rates on the basis of decreases in irrigators' ability to pay--as the Bureau states it is doing--and not to be able to increase rates based on increases in irrigators' ability to pay.

RECOMMENDATIONS

We recommend that you require the Bureau to:

- Prepare and issue to the Bureau's regional offices uniform guidelines for establishing irrigation payment terms and development periods. Such guidelines should require that ability-to-pay determinations be based on information which will best account for all the various sizes of farms likely to be operated as a single unit, regardless of the number of individuals who may own the farms and all the types of crops actually anticipated on the basis of experience. The guidelines should also (1) identify the variables that all regions should consider and (2) provide guidance as to the weight that should be assigned to each variable.
- Make provision in future irrigation contracts for periodically adjusting the total construction cost obligation and the related water rates and other payments on the basis of changes in the irrigators' ability to pay.

In commenting on matters discussed in this report, an Interior official told us that many of these concepts and policies have been changed or are scheduled for change in the near future. He pointed out that two Bureau task forces, established to conduct water marketing policy studies, discussed matters similar to those reported by GAO. The Commissioner of Reclamation will consider these matters in approving the recommendations of the latest task force and in requesting their implementation by the Bureau's regional offices.

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We appreciate the cooperation received during our review and would like to be informed of any action taken on our recommendations. We would be glad to discuss this report with you or your staff.

We are sending copies of this report to the Director, Office of Management and Budget, to appropriate congressional committees, and the Commissioner of Reclamation.

As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal agency to submit a written statement on actions taken on our recommendations to the House and Senate Committees on Government Operations not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

Sincerely yours,

Henry Eschwege

Henry Eschwege
Director

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