Year 2002 *Paper* 937

The Central Arizona Project

W. M. Hanemann
University of California, Berkeley

DEPARTMENT OF AGRICULTURAL AND RESOURCE ECONOMICS AND POLICY
DIVISION OF AGRICULTURAL AND NATURAL RESOURCES
UNIVERSITY OF CALIFORNIA AT BERKELEY

Working Paper No. 937

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by

W. Michael Hanemann

California Agricultural Experiment Station
Giannini Foundation of Agricultural Economics
October 2002

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A Brief History of CAP

The Central Arizona Project (CAP) is the largest and most expensive water transfer project ever constructed in the United States. The 335 mile long aqueduct has the capacity to transport annually 1.5 million acre-feet (MAF) of Colorado River water from Lake Havasu to central and southern Arizona. Fourteen pumping plants lift the water 2,400 feet in elevation between the Colorado River and the terminus in Tucson. Construction of the project was completed in November 1992, at a cost approaching $5 billion.

Although the project was first conceived in the 1920's, the main planning effort started after World War II. In 1947, the Bureau of Reclamation completed a planning report on the CAP and, in the same year, a group of prominent citizens formed the Central Arizona Project Association (CAPA) to lobby Congress to authorize its construction. They argued that the CAP would enable Arizona to make use of its entitlement to Colorado River water, protect its agricultural prosperity, and promote its future economic growth. Legislation to authorize the CAP was introduced into Congress in 1947 but was blocked by opposition primarily from California, which was a rival to Arizona for Colorado River water. Arizona subsequently sued California before the US Supreme Court, which ruled in 1963 largely in Arizona's favor. After five more years of haggling and log-rolling, Congress finally passed the authorization for the CAP in 1968. Construction on the project started in 1973. However, the controversy over the project had not ended. In 1977, President Jimmy Carter placed the CAP on his "hit list" of nineteen federal water projects to be canceled. In the end, the CAP was saved, but at a cost: the State of Arizona was pressured by the Carter Administration into enacting the 1980 Groundwater Management Act, which significantly restricts groundwater pumping in Arizona and commits the state to eliminating groundwater overdraft by 2025. Moreover, the federal law authorizing the CAP stipulated that no *new* areas of land could be irrigated with CAP water and that, for every acre-foot of CAP water delivered for irrigation, one less acre-foot of groundwater could be pumped.

The original plans had assumed that agriculture would receive 60-80% of CAP water, and had conceived CAP as a "rescue mission" that would save Arizona agriculture from the growing problem of groundwater overdraft. Groundwater pumping in the main agricultural service area in central and southeastern Arizona averaged about 4.5 - 5 million acre-feet per year over the period 1953-1968, while the natural recharge was only about 1.5 million acre-feet per year. Consequently, groundwater levels had declined substantially between 1940 and 1968, in many areas by over 125 feet, and by 1968 pumping depths in many parts of the CAP service area were 300-600 feet.

In 1967, the view that CAP would be the savior of Arizona agriculture was rudely challenged by two young economists at the (state) University of Arizona. They published an economic analysis of irrigated agriculture in Arizona which showed that CAP water, if priced at the cost of delivery, would turn out to be substantially more expensive than pumped groundwater for many years into the future and, if they had to pay for CAP water, many Arizona farmers would be driven out of business (Young and Martin, 1967). The publication of these findings triggered a firestorm of criticism from public leaders and politicians, so intense that it almost led to the dismissal of the authors from their academic positions. In the end they survived, although financial support for their research was cut off for a time. Ten years later, two other economists published a study which reached a similar conclusion (Barr and Pingry, 1977). They found that CAP construction and repayment costs would be higher than originally predicted, the variable costs of CAP water would be twice those of pumped groundwater, and the postage stamp pricing of CAP water would significantly increase the cost of the project. They predicted that taxpayers and urban water users would eventually end up paying the majority of the costs incurred to supply irrigation water to farmers.

In fact, by the late 1970s urban water agencies in Arizona were becoming seriously interested in CAP water. The urban population was booming and several cities, especially Tucson, depended on diminishing groundwater supplies; moreover, as the water table fell, the water quality declined. The urban water agencies also took the restrictions embodied in the 1980 Groundwater Management Act more to heart than the farmers. Consequently, when the CAP allocations were announced in 1980, urban water agencies were allocated a firm supply of 640,000 acre-feet of CAP water, more than half of the state's unused, non-Indian allotment of about 1.2 million acre-feet of Colorado River water.[1] Agricultural users were assigned the remaining 550,00 acre feet, but with a priority below that of urban users. To market CAP water to the non-Indian users, the Central Arizona Water Conservation District (CAWCD) was formed – CAWCD would buy CAP water from the Bureau of Reclamation and re-sell it to individual agricultural and urban water agencies within the three counties that formed the main CAP service area. Through CAWCD, agricultural and urban users would be required to repay the federal government $2.1 billion of the nearly $5 billion cost of CAP; the rest would be covered by hydropower users and federal taxpayers.

In 1984, as the aqueduct began to approach the first irrigation service area, the Bureau and CAWCD announced prices for CAP water. All users would pay for operations and maintenance (O&M) costs based on the current actual cost to the Bureau in each year, but the construction costs would be allocated differentially; the capital cost for agricultural users was set at $2 per acre foot, while that for urban users was set at $44 per acre foot. Allowing for O&M costs, the Bureau estimated that the canal-side delivery cost would be $58 per acre foot for irrigation districts and about $100 per acre foot for urban agencies.

In March 1984, an initial contracting period of six months was set for agricultural districts to sign contracts with CAWCD. By the end of that period, nine of 23 potential irrigation users had signed long-term contracts with CAWCD amounting to 71% of the quantity allocated for agricultural use. While this left 29% of the agricultural allotment unclaimed, some economists were in fact surprised that so many irrigation districts had committed to purchase CAP water. Allowing for efficiency losses of 5-10% in transporting the water from the CAP aqueduct through local distribution networks to the individual farm headgate, the effective marginal cost of CAP water at the headgate would come to about $65 per acre foot (Martin, 1988). In addition, in some districts farmers would have to pay for the construction of new within-district distribution systems; these cost as much as $100 million in some districts. Moreover, farmers already had sunk capital in the form of groundwater wells and pumps, and their marginal cost of pumped groundwater was about $30-50 per acre foot, depending on the pumping depth – much lower than the marginal cost of CAP water.[2]

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[1]The federal government allocated 310,000 acre feet of CAP water to Indian reservations in Arizona with priority over all urban and agricultural deliveries.

[2]An analysis by Bush and Martin (1986) found that, while there were some agricultural areas where CAP water would be competitive with groundwater, these were only a small minority of the CAWCD service area. Moreover, CAP water was competitive in these areas only because it had access to cheaper energy than that available for most groundwater pumping. The Navajo Power Station, the exclusive source of energy for CAP, provided electricity at a price of about 20 mills per kilowatt hour, while most farmers in the CAWCD service area paid between 25 and 75 mills per kilowatt hour for electricity to pump groundwater (Martin, 1988).

Why, then, were farmers such loyal supporters of CAP? Martin, Ingram and Lacy (1982) conducted a survey of farmers in the CAP service area to investigate this question. They found that the farmers did not expect to actually pay the rates prescribed in their contracts for CAP water. They were signing up for CAP water now in order to make sure that the project got built. Once it was built, past experience with federal water projects had shown that the Bureau of Reclamation would be willing to modify contracts to fit the farmers' situation rather than holding rigidly to the original contract terms. Since the farmers would still have groundwater available as an option after CAP had been completed, they would be in a favorable position when bargaining with the Bureau and they felt that, in the end, they would be able to receive CAP water on their own terms. In short, the farmers were playing what Martin, Ingram and Laney called *the water development game*, and their readiness to contract for CAP water signaled a *willingness to play*, not a willingness to pay.

After the agricultural districts had contracted for CAP water, contracting was opened up to urban water agencies. However, the urban agencies balked at having to pay more than agricultural users for CAP water, especially since the agricultural allotment had not been fully subscribed, and they successfully lobbied CAWCD to offer them the same $58 price, at least for the early years of the project. Only after the price was reduced did Tucson agree to sign a long-term contract for CAP water; it was still somewhat hesitant because groundwater was currently available for about $45 per acre foot in Tucson and less elsewhere. However, by August 1985, Phoenix, Tucson and 48 other small urban water agencies had signed long-term contracts amounting to 73% of the urban allocation of CAP water. Thus, between agriculture and the cities, CAWCD had failed to sell about 28% of the planned CAP supply.

After the contracts were signed, water deliveries commenced. The first agricultural delivery of CAP water occurred in 1985. By 1986, the aqueduct had reached Phoenix. In 1987, deliveries began to irrigation districts south of Phoenix, and in November 1992 households in Tucson began drinking CAP water.

Between 1986 and 1992, as CAP approached fruition its financial condition deteriorated. In October 1986, because of lagging demand, CAWCD offered CAP water temporarily and on an interim basis to anybody who wished to buy it, not just those who signed a long-term water service contract. To boost sales, CAWCD also proceeded to cut water prices under the signed contracts, first to $47 per acre foot for farmers and $50 for cities, and then even lower by postponing charges for repayment of capital costs. These temporary measures were supposed to end when the construction of the aqueduct was completed through to the terminus in Tucson. However, events turned out differently. Between 1987 and 1992 there was an downturn in the agricultural economy of Arizona. Cotton yields started to decline and, when combined with a long-term decline in cotton prices, rising real costs for inputs (especially CAP water), and a tightening of lending practices by agricultural lenders, the economic decline triggered a reduction in irrigated farmland acreage in Arizona of 200,000 acres (a decline of about 1.5% statewide). Agricultural sales of CAP water, which had peaked at 501,000 acre feet in 1989, declined to 260,000 acre feet in 1991. On the urban front, after using CAP water for a year, Tucson decided in the fall of 1993 to discontinue the delivery of CAP water to residential customers due to widespread complaints of poor water quality. The city subsequently decided to recharge to groundwater a significant portion of its CAP allotment and to sell the remainder to agricultural districts at a low price that would be competitive with the cost of groundwater.[3]

By the spring of 1992, water managers and political leaders in Arizona had come to recognize that there was a serious problem of underutilization of CAP water. The Governor of

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[3]Tucson finally resumed direct consumption of CAP water in May, 2001.

Arizona formed two task forces to study the issue and develop what was essentially a workout plan for a financially bankrupt institution. Yet, while the task forces deliberated, the situation continued to worsen as agricultural districts struggled to escape from their contractual obligations for CAP water. In December 1992, after hovering near bankruptcy for two years, the first irrigation district to accept CAP water was able to make an arrangement to sell its rights to CAP water back to the federal government. In late 1993, another other agricultural contractor sold its rights to CAP water to several cities in the Phoenix area. In January 1994, an agricultural contractor filed for bankruptcy, the first bankruptcy filing by a federally supported irrigated district in US history. There was another bankruptcy filing in August 1994 by the second largest agricultural contractor, which noted in its deposition to the court that the 1967 study by Young and Martin had shown that CAP water was not economically viable for Arizona farmers (an interesting reversal of fortune given the vilification of those authors when their study was first published). In 1995, the largest agricultural contractor announced that it, too, was planning to file for bankruptcy.

The workout plan that was implemented in 1995 and 1996 by the State of Arizona accepted the reality that water sales to agriculture could not be sustained unless the price of CAP water was competitive with the local cost of groundwater. However, this was not enough of a cushion because farmers would still be burdened by the take-or-pay provisions of the CAP contracts, as well as by debt repayments for the district distribution systems. After extended negotiations, it was agreed that the eight CAP agricultural contractors would be allowed to give up their long-term contracts to CAP water and instead receive subsidized, short-term leases for CAP water for a period of at least 10 years. These leases would provide CAP water to the agricultural contractors as a group at a cost of $27 per acre foot for the first 200,000 acre feet, $17 per acre foot for the next 200,000 acre feet, and $41 per acre foot for any water beyond that (these prices were to rise by $1 per year). These rates were deliberately chosen so as to be competitive with the variable cost of pumped groundwater in the CAP service area. With these rates, all of the water in the first two tranches was leased through 2003. The State of Arizona initiated a massive effort to bank the unused CAP water in the ground for future use and, rather than raising charges to urban contractors, it has sought to make up the deficit in CAP revenues by selling surplus hydropower generated by CAP to outside users at more favorable rates and also, on occasion, by selling Colorado River water to California.

In 2001, with the workout plan in place, CAP was able to sell about 830,000 acre feet to urban and agricultural users, about 72% of the non-Indian, urban and agricultural allotment of CAP water. In addition the State of Arizona used about 295,000 of CAP water in groundwater recharge for future use. However, while Arizona was thus able to utilize almost all of the CAP supply, it earned well under half of the annual revenues that had originally been projected for CAP water sales both because only 72% of the usage was revenue-earning and also because the rates charged for these sales were below the levels required for cost recovery. The capital charge allocated to urban users in 2001 was $43 per acre foot, and the O&M charge was $29 per acre foot, but the rate actually charged that year to the long-term urban contractors was $58 per acre foot. Meanwhile, agricultural users were charged $34 and $24 per acre foot, depending upon the tranche. Consequently, the complete repayment of the $2.1 billion of CAP construction cost allocated to urban and agricultural uses will now take substantially longer than the 40 years originally planned. Thirty years later, economists' predictions that what was intended as a rescue project for Arizona agriculture would end up being paid for by the general taxpayer and urban water users have been totally vindicated.

Some Lessons from the History of CAP

Clearly, the Central Arizona Project did not turn out as its supporters had anticipated when it was authorized by Congress in 1968. From an engineering perspective CAP is, no doubt, a substantial success. However, from an economic and financial perspective it must be judged something of a failure. Where did the civic leaders and water planners who sponsored it go wrong?

The civic leaders made the mistake of being carried away by the symbolic importance of water in an arid region and the political and emotional issues associated with protecting Arizona's share of the Colorado River. Water *is* crucial to the prosperity of an arid region, and from Arizona's perspective it *was* essential to protect its allotment of Colorado River water. But, while water may be more important than money, that is a viable philosophy only if one can find somebody else's money to pay for the water. Moreover, the obsession with *supply* led to a fatal neglect of *demand*. As Kelso, Martin and Mack (1973) observed: "Water scarcity, even growing scarcity, is far less costly to the Arizona economy than is popularly supposed; whatever costliness the scarcity does impose, amelioration is far more a matter of reforming man-made institutional inefficiencies in water administration and management than in reforming its nature-made physical scarcities. ... The problem and its solution are far more man-made problems of ownership, management and transfer of water than they are nature-made problems of scant and declining supplies."

In addition, the water planners made a number of important technical mistakes, which have been enumerated by Kelso, Martin and Mack (1973), Bush and Martin (1986), and Wilson (1997).

A crucial question in analyzing the economics of CAP is whether CAP water will cost more or less than the pumped groundwater which it is supposed to replace. The feasibility studies conducted for the Bureau of Reclamation concluded that CAP would cost *less*. For example, Wilson (1997) cites a study by Beck and Associates in 1977 which estimated that, while CAP water would cost \$58 per acre foot (in 1992 dollars), pumped groundwater would cost farmers \$109 per acre-foot. The estimate of the cost of CAP water turned out to be reasonably accurate, but the estimate of the cost of pumped groundwater turned out far too high – the actual marginal cost of pumped groundwater in the area considered by Beck and Associates was about \$50 per acre foot at the time CAP water became available (Martin, 1988). Reasons why the Bureau's estimate of future groundwater pumping costs turned out to be too high include the fact that the pumping efficiency of groundwater wells was increasing with improving technology, and energy prices for farmers stayed fairly low (Bush and Martin, 1986).

The Bureau's feasibility studies were also somewhat over-optimistic regarding farm acreage and revenues in the CAP service area. The feasibility studies assumed that all eligible acreage in the service area would be farmed every year, for 50 years. In fact, only about 50% of the eligible acreage in the CAP service area was farmed during the first years of the project due to the effects of government set-aside programs, difficulties in obtaining crop financing, the 1980 Groundwater Management Act, and other factors. Moreover, the feasibility studies exaggerated the ease with which farmers served by CAP would be able to find a marketing channel that would permit them to grow and sell very high value crops. As an example of this, Wilson (1997) notes that the feasibility studies for the two largest irrigation districts served by CAP assumed that together they would produce over 18,000 acres of lettuce, an especially high valued crop. The reality turned out to be that only 2,600 acres were planted to lettuce in the entire county.

Wilson (2002) points out that the feasibility studies failed to allow for uncertainty in the economic analysis. They used point estimates of commodity prices, crop prices, yields, water prices, government programs, the acreage of high value crops, and other economic parameters. These were all treated as known numbers over the fifty year span of the planning horizon. Looking back with the hindsight of what actually did happen in the years after the studies were completed, it is obvious that there is considerable variability in agricultural markets and therefore great uncertainty regarding future values of economic variables. Overlooking the uncertainty left the planners blind to the downside risks in the project. Wilson observes that, if they had at least performed a sensitivity analysis in their models, they would have discovered that a realistic 10% drop in gross farm revenues could reduce the estimate of farmers' maximum ability to pay for CAP water from as high as $100 per acre foot to about $20 per acre foot.

But, what is perhaps the greatest single flaw in the feasibility studies is that *they asked the wrong question*. They focused on what is known as *an ability to pay analysis*. This asks: given the quantity of project water the farmers are expected to use and the expected price of project water, is this expenditure greater than the farmers can afford? The question is answered by assessing the expected revenues, production costs, and profits for the farmers and then checking whether the cost of the project water leaves them with a positive profit. However, whether or not farmers can break even is emphatically the *wrong* question. As free entrepreneurs, farmers are at liberty to vary how many acres they plant, what crops they grow, and how much water and other inputs they use to grow these crops. They do this, typically, with the goal of *maximizing their profit* -- not just breaking even. Merely because a farmer can use 500 acre feet of CAP water and not go broke does not mean that he will do so *if he can make more money by doing something else* – using groundwater, for example, switching to a more efficient irrigation system, changing crop acreage, or modifying his production practices in any of a number of ways. The ability to pay analysis ignores all such behavioral adjustments.

In fact, the ability to pay analysis contains a whole series of flaws. It ignores profit maximization as a motivator of farmer behavior. It assumes farmer behavior is inflexible and the demand for project water is entirely price inelastic. It focuses on the total value of water to the farming enterprise and asks whether or not this exceeds the total cost of CAP water, thereby implicitly posing an all or nothing choice: either the farmer maintains his water use at the current level and switches his entire usage from groundwater to CAP water or else he stops farming and goes out of business. The reality, however, is that farmers do maximize profits, they make decisions at the margin, their demand for water is price elastic, at least to some extent, and their demand for project water is even more elastic than their total demand for water. What is of the essence, therefore, is the *marginal* value of water, not the total or average value. As profit maximizers, farmers will want to use CAP water to the extent that its cost to them is not more than its marginal value. By contrast, the ability to pay analysis compares cost to average value. Given diminishing returns, the marginal value is less than the average value. This is why a profit maximization analysis gives a different answer than an ability to pay analysis.

Which is correct? With CAP, the Bureau of Reclamation conducted an ability to pay analysis and concluded that there would be an adequate irrigation demand for CAP water; Young and Martin (1967) and Kelso, Martin and Mack (1973) conducted a profit maximization analysis and concluded that farmers would find CAP water to be uneconomic. What transpired clearly demonstrates that a profit maximization analysis provides more reliable guidance to what actually will happen than an ability to pay analysis.

<u>How Representative is the CAP Experience?</u>

CAP is the most recent, and the most expensive, large water transfer project in the United States. Its financial fate is also the most dramatic, involving the first bankruptcy filings of a federal irrigation contractor in history. Nevertheless, its experience is by no means unusual – it is, in fact, highly representative of the overall experience in the United States with large water projects. Throughout its history, the Bureau of Reclamation has relied on an ability to pay analysis when conducting feasibility assessments for water projects. Almost without exception, the ability to pay analyses provided an exaggerated impression of the irrigation demand for project water. The resulting shortfall in demand adversely affected the project's finances. Often, in order to avoid an embarrassing under-utilization of project capacity, the Bureau was compelled to reduce the payment required of irrigation contractors. The result has been that Bureau projects take far longer to be repaid than was originally anticipated. The statistics tell a sad tale. Between

1902 and 1994, the federal government spent \$21.8 billion to construct 133 water supply projects in the western United States. Although most of the water supplied by these projects goes to irrigation, the cost allocated to irrigation amounted to only \$7.1 billion (33%). Of this amount, \$3.7 billion was subsequently waived because it was more than farmers could afford to pay. Of the remaining \$3.4 billion payable by irrigation contractors, only \$0.95 billion had actually been repaid as of September 30, 1994 (General Accounting Office, 1996). The remainder of the irrigation obligation will not be paid off until well into the twenty first century.

This is strong testimony in support of Martin, Ingram and Laney's (1982) assertion that federal irrigation contractors play a "water development game," which they characterize as follows:

> "Western water users will compete very hard to keep open the option of having water available as a basic ingredient to profitable activity. The actual possession – the physical presence of water where and when it may be useful - is the ultimate prize in water politics. ...While legal entitlement is an important resource, it is not immediately efficacious. Being in a position to actually use water is often more significant than legal entitlement to it. ... Further, once users acquire immediate access to water, they are in an excellent position to determine the conditions of its use as well as to thwart outside interference. ...
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> Basically the game is simply to keep your options open. As long as the costs of doing so are minimal and there is possibility of benefit, farmers need not take action now to avoid uncertain future costs. Even if future developed water costs presumably will be greater than it would be economically rational for them to pay, experience has shown that once the physical development is in place, the cost of water will be negotiable "

They cite Maass and Anderson (1978) who studied six irrigation communities in Spain and the United States, Maass and Anderson (1978) and reached a similar conclusion:

> "The most powerful conclusion that emerges from the case studies is the extent to which the farmers of each community have controlled their own destinies as farmers, the extent to which the farmers of each community, acting collectively, have determined both the procedures for distributing a limited water supply and the resolution of conflicts with other groups over the development of additional supplies."

In short, the aim of the game is to ensure the physical development of a water project and then get somebody else to pay for the cost and/or delay one's own repayment.

One might ask why the delay in repayment matters. After all, the physical capital involved in water projects is very long-lived and the project *does* eventually get repaid. Discounting is the reason why delay matters. With an interest rate of 5%, if a dollar of revenue is received, say, 25 years later than originally anticipated it is worth only 30 cents, and the lender -- in this case the general taxpayer – loses 70 cents on the dollar.

The long life of water projects has another economic consequence which seriously complicates their financial viability. Water supply is extremely capital intensive; the fixed, capital costs of water supply are a much larger component of total cost, and the variable costs a much smaller component, than in any other utility industry. Consequently, once a project has been built, the ideal way to finance it would be through revenues from fixed charges, such as an assessment of property taxes in the project service area, rather than through revenues from water sales. This was done in the case of CAP, but only to a limited extent: there was an ad valorem property tax of \$0.10 per \$100 of assessed value within the CAWCD service area, but the bulk of CAP revenues came from the per unit charges on water sales. The general experience in the US has been that it is politically difficult to persuade water users to accept fixed charges, whether in the form of property taxes or take-or-pay contracts. Water users don't want to commit to paying for water they might not use, most especially if they already have an existing source of water which is less expensive.

However, revenues from water sales are immensely vulnerable to fluctuations in demand, as CAP soon discovered. Moreover, there are interactions between the agricultural and urban water contracts whose implications CAP planners did not fully anticipate. If the variable charge of project water is set too high, there is insufficient demand for project water. In the face of a shortfall in sales, project managers are driven to raise the unit charge to the remaining users, since there is a smaller base of water sales over which to spread the fixed short-run costs of operation as well as the repayment of capital costs. But, a higher charge per unit volume discourages demand and creates an even greater shortfall in sales. In response to this, project managers have to raise unit costs even higher in order to break even. The vicious circle can turn into a death spiral unless it is somehow broken. In the case of CAP, there was a double problem: not only did urban water contractors have access to groundwater at roughly the same cost as the irrigation contractors, which made them reluctant to accept a higher variable charge for CAP water, but they were also mindful of their differential obligation with respect to the repayment of capital costs. Irrigation contractors for all Bureau projects are relieved of the obligation to pay interest when repaying their allotment of the capital costs of project construction; urban contractors, by contrast, are required to pay interest. Therefore, if any of the capital costs is re-allocated from agricultural to urban contractors, the urban contractors now become liable for interest payments from which the agricultural contractors were exempt. In the case of CAP, this limited the cities' enthusiasm to bail out their agricultural colleagues. The end result was that, in CAP as in other Bureau projects, much of the revenue shortfall has ultimately been shifted from project beneficiaries to the general taxpayer.

One last feature of Bureau projects should be noted. The contracts for the sale of CAP water were not negotiated until 1984 and 1985 – 11 years after construction had begun, and within a year of the arrival of water inside the service area. This is typical – in the case of California's Central Valley Project (CVP), the contracts for irrigation service in the San Joaquin Valley were not negotiated until 1948 or 1949, about 12 years after construction had commenced and within a year or so of the arrival of water inside the service area. Bargaining in the shadow of a completed water project places the seller – the Bureau of Reclamation – at a great strategic disadvantage. Having earlier lobbied most vigorously for the construction of the project, the potential customers now drag their feet. Since they are using an existing groundwater of source, they are in an excellent position to hold off from accepting project water for a bit longer. Often, as with CAP and the CVP, this is not just a good bargaining strategy but also it is good economics since the new project water is more expensive at the margin than the existing water supply. The seller, however, cannot afford to wait: once the construction of the aqueduct is completed it would be immensely embarrassing not to have water flowing into the field. The Bureau is under political and administrative pressure to get a contract signed as soon as possible.

In other capital-intensive industries run by for-profit enterprises rather than government bureaucracies, the common practice is to secure long-term sales or payment contracts before embarking on costly long-run investments. They first negotiate contracts that will guarantee the revenue stream and then construct the factory. Water project managers have not done this, partly because of the very long construction period, and partly because as government bureaucrats they do not feel the same financial pressure. However, this neglect greatly enlarges the project's downside financial risk.

While some form of take-or-pay contracts may well be a minimal requirement for a well planned water project, it is certainly not a panacea because, as the bankruptcies in Arizona illustrate, it is not impossible for a determined party to default on a contract. Given the opportunity for bankruptcy, the only guarantee of a financially successful project is that the underlying economics are favorable. In the end, if the project is not economically viable, the economics will eventually catch up with the law and the politics, and overwhelm them. This is the enduring lesson of CAP.

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