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ALTERNATIVE INCENTIVES TO ENCOURAGE DESIRABLE
IRRIGATION PROJECTS UNDER THE
SMALL RECLAMATION PROJECTS ACT LOAN PROGRAM

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Projects Under the Small Reclamation Projects Act Loan
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Introduction

This is a preliminary report based upon some of the material collected under a Cornell University Agricultural Experiment Station project in water supply management. The primary emphasis of the project is to evaluate the so called infrastructure problems of municipal water supply in the rural Northeast. Western experience in irrigation supply maybe relevant, thus, this review of the Small Reclamation Projects Act (SRPA).

It is not surprising that investment has fallen and disinvestment through deferred maintenance has increased. In the face of property tax resistance, a structural shift in both the supply and demand sides of the market for local government securities that, along with inflation, raised bond interest rates dramatically, something had to give. As a number of studies at Cornell and elsewhere have shown, the small rural communities that support much of the farm sector, are prone to significant water supply problems in terms of quantity, quality, reliability, affordability, and other measures. The issue in this project is what to do about it.

In addition to analyses conducted in the East, particularly in New York State, it seemed advantageous to study a program that had been suggested for duplication in the East by Senator Moynihan of New York. The author's sabbatic leave allowed for this review. The Bureau of Reclamation was kind enough to provide some office space, several months of salary for a graduate research assistant, and travel funds. The principal support for the project was from the New York State Agricultural Experiment Station. Work supported by the Environmental Protection Agency and a program now in the Geological Survey also contributed to the background for this project.

While on sabbatic leave the author was able to interview over sixty informants selected because they were knowledgeable about the Small Reclamation Projects Act (SRPA) loan program. Also, a computerized data base is in the process of being developed. A more detailed report reviewing the SRPA program will be issued in the fall and after that a report will be prepared on the concepts that should be taken into account in any similar program for the East.

The enthusiasm of knowledgeable western water practitioners for the SRPA program is very impressive. It is viewed as a program where the local sponsor is very much in charge. Local leaders with the assistance of their consultants make the key decisions within the SRPA rules. Federal grants are prepared for flood control, recreation, fish and wildlife, and interest bearing loans for part of these, water supply and hydropower features, plus the zero interest feature on irrigation are major financial features. They provide the

scope to achieve objectives important to the managers and recognized professionally but not always easy to sell to developers and other local interests. More detail on these largely unrecognized benefits of the program is given below.

The program is managed with a minimum of red tape; generally the technical reviews are seen as competent and not as drawn out as for other Federal projects. Local control of construction and the incentive from the local interest, both fiscal and managerial, lead to speed and efficiency in planning and construction. The program is managed by only a little over a dozen professionals and help from other parts of the Bureau of Reclamation. Their commitment to the program is widely regarded.

Background

The original \$600 million authorized in 1957 is exhausted with 132 projects that have been or are about to be funded. Authority for an additional \$600 million is being sought in pending legislation (S. 1171 and H.R. 2025). The first 124 projects averaged \$3.9 million and the last eight will be over \$12 million on average. In 1985, \$55 million was appropriated. But due to the inflation there won't be that many projects from the next \$600 million, even with the current higher rates of local cost sharing. Local shares of 15 to 20 percent in current financing have been common.

This reflects some increase in the size of projects interested in rehabilitation. The last 37 projects, six years of new starts will average 26,000 acres in size. This totals 956,000 acres with more secure water supply or roughly 2 percent of the nations irrigated acreage, a tenth of that receiving some water due to Federal assistance. Very little new land was brought under irrigation in most of these projects. Most are small projects with small districts, half are about 10,000 acres or less. Some are small projects with large districts, one tenth are in the 90 to 110,000 acre range.

The vast majority of farm ownerships are below the 960 acre limit considered excess land under reclamation law. Most projects have gone to districts composed of predominantly modest sized farm businesses, something the acreage limitation indicates only very imperfectly. A better data base on these projects would be helpful here.

The natural client of the SRPA program is the irrigation organization which is usually concerned with surface water distribution either exclusively or in conjunction with ground water. This is only part of the 48 million acres or so that are irrigated in the west. Individual private wells dominate ground water use. Surface water withdrawals have held about steady around 88 million acre feet in recent years. Ground water was at 56 million acre feet in 1975, or two-fifths of the total, and growing rapidly. It is however, of increasing concern to organizations as the opportunities for conjunctive

management are recognized. A number of recent projects have facilitated the take over of private wells by irrigation organizations. But about 25 percent of surface water diversions are carried out directly by the user under senior rights to the summer flow. Thus, something over 45 percent of the irrigation in the west is supplied by irrigator run cooperative management organizations. About one-fifth of all irrigated acreage receives some or all of its water from Bureau of Reclamation projects already. Those that remain, 25 percent of the acreage, or 12 million acres, are the potential customers for this program.

Under current laws and regulations, small reclamation projects are developed under various rules and cost sharing designed to encourage desirable projects. For example, lands to be irrigated must be certified as having soil and climate likely to allow successful farming. Organizations acting as sponsors have to have adequate powers to manage a project. Flood control, demonstrably difficult to fund locally at adequate levels, is liberally cost shared. Local commitment and financial feasibility are encouraged by limiting the Federal subsidy for water supply to 50 percent on a present value basis (the so called loan factor) and requiring that the full farm repayment capacity is utilized. Also, local sponsors have to fund planning initially and are able to effect many cost controls through direction of construction as well as planning. Reviews of engineering by the Bureau protect the Federal investment from technical errors.

Interest free funds for irrigation water supply allow local public officials and community leaders with the help of their consulting engineers to put together projects that achieve desirable water management practices, many project elements they could not achieve with the funding available to them otherwise. A common situation is where one entity, say an irrigation district, needs more capacity but by itself cannot mount the best available solution. Typically those who might share in the project are not as ready to act but the prospect of the Federal funds moves the beneficial cooperation along. Besides facilitating cooperative and lower overall long run costs, political and technical risks are made easier. Few irrigation projects would include fishery features without significant inducement. Conjunctive use of ground and surface water, reuse of sewage and other impaired supplies, fishery and recreation features, shifting water from irrigation to municipal use, and preserving agriculture as open space in an urbanizing area, slowing the shift to large corporate farms, supporting the economy of an otherwise depressed community, substituting conservation for supply expansions or the adoptions of new technology that needs to be tried before it is accepted, all of these and other desirable measures have been made possible by the zero interest feature and by packaging them with the irrigation water supply. This is particularly significant where local circumstances make these steps unusual or innovative.

Many times the Federal Government is the only source of loan funds for a public entity to borrow for resource development. Some Indian project developers are seeking the enterprise building discipline of a loan, yet one that is at a level where the development of managerial and technical farming skills are possible. Not being able to pledge land to secure bonds the tribes are dependent on this program for irrigation development. But there are many existing irrigation farming situations that face fiscal opportunities as bleak, or nearly so, as those of Indians.

Remember 80 percent of the irrigated land in the west receives no federally subsidized water today and much of that 80 percent was developed many years ago. Facilities are old, wasteful, and worn out. And like the Indians, there are situations that can best be handled in small increments as people are ready to face the task.

But many were developed in a very different economic setting. While not subsidized by Federal funds, they were funded by investors that either never did get their money out or did so only over a very long period of time. Facilities that were built with cheap money face the prospect of replacement and modernization with very expensive money often where the local entity hasn't the financial rating to sell bonds at all. Indeed this comes at a time when the market for local government securities is in disarray and the small rural governments are at a particular disadvantage.

The challenge to sort out those projects that should continue and those that should not is very great. Not only are there farm businesses at stake, but also communities that depend upon those farm business for their viability. At present the requirement for full use of the repayment capacity to repay the Federal loan and to the limit of the Federal subsidy on water supply at 50 percent of the present value of the cash flows impacts on the choice process. Essentially, small projects for small districts of only moderately well financed farmers with no high value crops and no opportunity to share costs with M&I and hydropower customers are at a significant disadvantage. Without partial state funding they usually cannot qualify for a SRPA project. Projects in urban areas and that enjoy high value crops are not as restricted by those policy measures. Proposals for greater up-front contributions, interest payments on water used on surplus crops, or interest on all irrigation water supply would further this bias in the program.

Whether or not measures are adopted to reduce Federal financial contributions, or to penalize the growing of surplus crops, consideration should be given to alternative incentives to encourage desirable features of irrigation projects under SRPA (Public Law 84-984).

Eligibility Measures

There is some reluctance to provide Federal funds to local sponsors who are both quite capable of borrowing at reasonable rates elsewhere and likely to do so if denied the Federal funds. This reluctance is not shared by those who view such programs as a question of fair shares, i.e., if others got interest free money for irrigation development they should too. Eligibility measures have been successfully used in other programs to either exclude some participants or to provide the basis for more liberalized treatment of some participants.

Farmers Home Administration (FmHA) has long served as a lender of last resort for rural municipal water supply and waste water treatment. An applicant, in addition to having a population under 10,000 people, has to demonstrate to the satisfaction of the Administration that they cannot borrow at a reasonable rate from other lenders. Statements from bankers and brokers, data on debt load compared to income and property values, and relative incomes are used to provide a basis for a case by case decision. FmHA has successfully resisted the use of arbitrary measures to define an unreasonable alternative loan such as 2 percentage points over a Triple A bond rating. Such an approach could be used to provide a threshold for when higher levels of up-front cost sharing or extra interest charges would not be applied. Note the FmHA also gives priority to communities under 5,500 people, for rehabilitation of infrastructure, consolidating municipalities and those serving significant low income areas.

Interest charged is varied by the median family income in the project area. Below the poverty levels, interest is 5 percent; over the state non-metropolitan median income, interest is at market rates, and for local median incomes between poverty and the state non-metropolitan median an intermediate rate is charged.

Finally, the size of the FmHA loan may be reduced by a grant depending upon the local median income and the relation of user charges to that income. Communities with poverty level median incomes and below are expected to pay user charges up to 0.5 percent of their income; over 80 percent of the state's median and no grant is available to reduce the size of the loan. Communities with a median income between the poverty level and 80 percent of the state median outside of metropolitan areas are expected to pay one percent of the median income for water service. While such neat relationships between payments and income may not be feasible for the highly diverse irrigation situations the principle of differential grants and interest rates should be explored.

One approach to determining the ability of local entities to borrow is to consult the bond rating services. However, very few small communities find it feasible to have themselves rated. The cost wipes out the benefit if any, and often they know they cannot obtain a favorable rating such as A or Aaa. An alternative is to draw a sample of perhaps 200 communities in a state to use as a standard for credit measures and indicators of likely problems in borrowing. States differ so greatly in terms of local finance arrangements that multistate samples are to be avoided. Studies of financial capacity have shown three indicators to be sufficient.

1. Current debt per capita
2. Ratio of per capita debt to per capita income
3. Ratio of current debt to full valuation of taxable property

An entity that fell above the state sample average in two or three of these measures would have a high probability of financial difficulty. Below average on all measures promises little financial difficulty. Above average on one measure suggests caution.

Recommendation on Means Test

SRPA provides the potential for integrated management of complex water resource situations, therefore a "lender of last resort" role is not appropriate. The Federal Government is not simply in the business of expanding or stabilizing irrigation. But a "hardship" test would be valuable to determine cases where waiving various stringent fiscal requirements such as the loan factor, usual local cost sharing, full use of the repayment capacity, and to establish developmental periods where repayment is reduced. The Bureau of Reclamation should be given authority to develop such "hardship" criteria and be required to document its use in such cases. This is consistent with the "case by case" approach to cost sharing established in the so called "Laxault letter" and reaffirmed by the Secretary of Interior on several occasions.

Special Handling of Funding of Conservation Innovations

Water quality impacts of irrigation, water use efficiency, energy savings, erosion and sedimentation, coordinated use of groundwater and surface water, water reuse including the use of sewerage and other conservation innovations are in many cases inter-related. Achieve one and you get some of another, cheaper. They often require some inducement to be fully implemented at both the farm and district level. In most cases the zero interest loan is a sufficient inducement to

overcome the impediments caused by perception of risk, the uncertainties of new technology, the higher discount rates that individuals and localities apply to investments as compared to the nation as a whole, the lack of incentives because water and energy cannot always be put to an higher value alternative use by those who save them, and because the benefits to others of these actions are often difficult or impossible to turn into cost sharing from those benefitted. Encouragement from consultants, farm advisers, and existing rules and regulations have produced many projects that have made major strides in achieving these modern conservation objectives.

However, the SRPA program has the potential to achieve more if there were clearer statements of modern conservation objectives on the part of the Congress, the basic policy making body of the nation. This should be translated further into authority to provide modest facilitating grants for these purposes over and above the zero interest rates for irrigation, and excluded from the computation of the loan factor. However, the computation of the grant should take into account the benefit to the individual irrigator of the conservation practices and the restraint on the adoption of the practice due to the commitment of repayment capacity, and benefits beyond the fiscal participation in the project.

In other words, the irrigator should be held accountable to pay for those benefits which he should recognize as profitable in his business, computed at the discount and interest rates he would be expected to use in that business. Similarly other beneficiaries who can be made a part of the project fiscal package should be expected to pay for values they receive and on terms most everyone should recognize as fair. The Federal grant should be just enough to insure that desirable conservation features are in fact achieved, and that the interest of those who practically cannot be a party to the project are vigorously represented by the Bureau of Reclamation. Grants should not be needed in most cases and in those where they can be justified they could be limited to 10-20 percent of project costs for irrigation.

Management of Environmental Problems from Irrigated Land 1/

SRPA has potential for many projects in the future that would deal with the rapidly emerging environmental problems of irrigated agriculture. SRPA's advantage is that the scale of the projects fit the scale at which much action must happen to facilitate changes at the farm level.

As many students of the problem have concluded, the nature of the problems, their importance and the appropriate corrective measures vary widely among and within regions. National, even state standards in some cases, and uniform control measures are inefficient and costly. Water conservation is the solution to all major environmental problems except salt buildup in the soil, where flushing the salt somewhere must be dealt with in a neighborhood specific way.

The recent concern for salinium in the Kesterson Wildlife Refuge due to the failure to provide an adequate disposal for drainage water is a case in point. To a greater or lesser degree, the potential for such problems exists with 25 to 35 percent of the irrigated acreage in the west.

Perhaps the most effective potential means to achieve conservation is to facilitate the compensation of the farmer for unused water that in fact has a higher value use. Increasing the vendability of water depends in part upon changes in state water rights administration. This is beyond the scope of the SRPA program. More to the point, is the fact that for greater vendability and for more effective conservative in many irrigation areas, some changes will be desirable in the system that collects and distributes the water to the users. Even with full vendability there will be some remaining environmental problems, more in some cases than others. Thus, there will be a need to induce changes beyond what can be achieved with education, technical assistance, and the few regulatory measures that are apt to be found feasible. Incentives at the project level will have a role even after adjustments in water rights and other measures are taken, and until then, are one of the few approaches available.

Salinity is the most pervasive environmental problem in irrigation. On occasion this is combined with a heavy metal or other toxic constituent such as the selenium problem in the west side of the San Joaquin Valley. But one informed guess is that this is still only 25 to 35 percent of irrigated lands although the problem is growing. Outside of

1/. In addition to interviews with key informants associated with SRPA projects this section drawn heavily from Frederick, Kenneth D. and James C. Hansen, Water for Western Agriculture, RFF, Washington DC, 1982.

the two large problem areas, Lower Colorado and Western San Joaquin, the problems are scattered and fit the scale of SRPA projects. Even within those large areas many of the larger than farm level actions needed fit the SRPA scale of project.

Erosion from irrigation occurs when flood and furrow systems are used on land not adequately leveled. About 35 percent of irrigated crop land is prone to either this or some other erosion threat. Changing the type of irrigation system, often encouraged by changes at the project or district level, is a means of reducing erosion. Two thirds of irrigated acreage is serviced by gravity flow and that includes 41 percent of the highly erodible irrigated soils according to the US Soil Conservation Service.

Percolating irrigation water appears to have leached nitrates into southern California aquifers. Several areas have had problems with pesticides in return flows. Are these warnings for the future? Prudent irrigators should be interested in assistance that will ensure that their district has evaluated such risks and taken any reasonable and prudent steps to avoid problems. Just as in the case of domestic and industrial effluents it is reasonable to expect the Federal Government to encourage such steps. Unlike those cases, there is some considerable incentive on the part of the individual to share in the costs due to water and energy savings involved.

Tail water recovery systems improve application efficiency from 50-75 percent (assuming a 200 ft well pumping lift.) Energy costs can be reduced by 25 percent. As compared to unlined ditches and siphon tubes, underground pipe and gated pipes to deliver water to the furrows provide 16 percent higher application efficiencies saving from \$4 to \$12 per acre, depending on fuel costs. Water management, leveling, lining of canals can improve efficiencies of surface systems to 60 or perhaps 70 percent from a base of rarely more than 50 percent, i.e., gains of 20-40 percent over the base. Shifting to sprinklers can achieve 70 or 80 percent application efficiencies, gains of 40-60 percent over the base of surface system without improvements.

Scheduling services can be provided efficiently by off-farm specialists at \$4 to \$5 per acre. They pay for themselves in fuel cost savings and can be made much more effective if the delivery system is capable of controlling the timing and quantity of water. But many old canal companies cannot do so without renovation. Indeed, in many cases all the above changes are enhanced when carried out with changes at the district level.

Given the frequently repeated conclusion that higher water costs will encourage conservation, reduce the demand for supply development, and eliminate some if not most of the

environmental problems caused by irrigation, why not simply eliminate or reduce the zero interest feature of Bureau of Reclamation projects or require irrigators to pay the full cost of water i.e., no subsidy from power revenues. In SRPA projects these steps would have little practical effect; indeed, they would be counter productive. First, there is little subsidy from power, and even less subject to Federal influence, in these projects. Second, when a district takes on a project it usually represents a major increase in the cost of water and with full use of the repayment capacity little additional water cost increase is feasible for the life of the loan, which is usually longer than the typical farmer planning horizon. Third, many projects that have alternative funding possibilities would be driven to plan formulations that would be less environmentally and conservation sensitive.

Recommendation on Environmental Quality

The SRPA program should be given explicit guidance to seek projects that will prevent environmental impacts. Cost sharing or measures to achieve environmental protection should provide for full participation by the landowner up to the savings accruing to the landowner or his water supplier. Grants to cover justifiable costs beyond those covered by savings to the landowner should be authorized.

Encouraging Multiple Organization Management of Water Resources

One tenant of the conventional wisdom about water management is that there is excessive fragmentation. Too many organizations are too small to gain the economies of scale available from managing the water system as a system. Cities and irrigation entities alike, consolidation and rationalization of collection and distribution facilities can save money, and increase effective water yield. But these are organizations that also represent the effective demand of their members as well as involved in trying to supply it. Unlike the private market there is no separation of supply and demand. As long as they do not give up too much in their capacity to represent that demand their members should be and are willing to consider consolidation or at least federation, to achieve project advantages. But not everyone is equally ready for new capacity at the same time. Advantageous outside funding can speed up this cooperation as well as encourage the consideration of project features such as environmental enhancement, conservation, and the like, that would not otherwise come about.

In 1969 the last census of irrigation organizations identified a distribution by type. While unincorporated mutuals accounted for over half of the number of

organizations they supplied only one-tenth of the total acreage supplied by organizations. Incorporated mutuals serviced about one-third of the land and were about one-third of the total number of organizations. Districts were a tenth of the total but served half the land. Districts frequently are the result of a merger of mutuals attracted to the municipal corporation form of organization by its taxing powers and debt financing advantages.

It is important to be clear about the likely Federal role in encouraging changes at the inter-local level of governance. Public districts and mutual companies operate under state law. In practical and legal terms, a Federal agency can have little to say about how local people organize to manage water. Nonetheless, it is well established that loans and grants should not be made to organizations that lack the appropriate powers to manage the project being formulated. Under this mantle and from the incentives provided by the physical development opportunities, which are often too much for one entity to handle, much cooperation has been achieved.

There has been a preference in the program to work with the lowest management unit feasible for the project. That is desirable. Only on very few occasions have we identified projects that might have been more successful if a more inclusive organization had been utilized.

Nonetheless, the Congress should consider giving more explicit guidance in this area, recognizing that funds to facilitate these desirable changes are important. Requirements for more local cost sharing, arbitrary limits on subsidies, and the like, reduce the potential to achieve these desirable results. On the other hand, under present rules there are times when more subsidy is paid than is necessary to achieve such changes.

Recommendation on Consolidation

The SRPA program should be given more explicit guidance and authority to provide grants to facilitate consolidation of facilities between water management entities. Grants should be limited to the incremental costs for consolidation not directly separable by purpose or use. Such grants should be limited to the irrigation interest and to use reimbursable shares of other functions, and follow the separable costs remaining benefits approach, except where a hardship determination can be made.

Unique Fish and Wildlife Opportunities Require Special Measures

Water resource management and fish and wildlife habitat are inseparable, but some projects have the opportunity to make truly unique contributions to habitat development. Unfortunately present arrangements and approaches make it unlikely that these truly unique opportunities will be captured. The existing arrangements for mitigation and enhancement and the long history of antipathy between irrigation and wildlife interests get in the way of progress. What is called for is the development of a series of demonstration projects that can provide the basis for a new partnership in resource management.

In interviewing project participants on the fish and wildlife potentials available, several points became clear. With the present 50 percent local cost sharing for enhancement (and the opportunity to finance the local share at interest,) there is a temptation to call it mitigation and finance the whole cost at zero interest. The point is that the technical distinction between mitigation and enhancement is often vague at best. Second, whether mitigation or enhancement, the features agreed to did not have the benefit of being a part of an overall wildlife management plan. The suspicion is great that if given the dollars involved the fish and wildlife managers would not have spent the money on the features in the SRPA project. But these were the ones that could be gotten through bargaining against the other proposed features at hand.

We were not able to discover a project where a fishery opportunity, for example, had suggested to someone that he approach local irrigation interests to see if they would like to join in a cooperative venture through SRPA. Yet some SRPA projects start with someone interested in flood control, municipal supply or hydropower. The reason for this is simple, fish and wildlife interests rarely have much financing capacity to bring to the bargaining table.

If the partnership is ever to move beyond one built on the tenuous foundation of blackmail, some new arrangements must be found. One possibility is to develop some pioneering projects that feature fishery development, or redevelopment, in addition to irrigation. But this will not work unless the program recognizes the impecunious nature of the fish and wildlife sponsors to pay for their share of the planning, the structural features required and, perhaps most important, to compensate those whose water rights have to be diminished in favor of the fish and wildlife values.

Extending anadromous fisheries in Pacific Coastal streams is a good case in point. At the large project level, the Bureau of Reclamation and the Corps of Engineers have spent millions

on fish related measures. Mitigation measures already extracted from the system only achieve part of the apparent potential. Under planning carried out by the Northwest Power planning council, many more dollars and considerably more water will be committed. However, at the small project level there are a number of opportunities for SRPA.

One example is a project now being considered by the Monterey Peninsula Water Management District and not yet involving the SRPA program. The Carmel River now runs when the steel-heads do in February. Perhaps 1000 adults make the journey encountering two small dams. The potential according to state fishery biologists is some 3000 to 5000. The California American Water Company developed some of the river's potential and there is a need for more supply. While the existing and potential use by irrigation is limited, none is apt to be provided for under current plans. This steel-head run is the most southerly well recognized run on the coast. While even at full potential it will provide only limited fishing, the symbolic value of a healthy fishery in that stream and in that community is very great. Even if one could successfully tap the interest of fishermen for cost sharing, perhaps through a state agency, it is unlikely to be enough to make a dent in the costs. Traditional mitigation approaches may have more success in this community than most, but certainly irrigation interests would have little incentive to cover fishery costs considering the limited and declining use they may make of any water.

Recommendations for Unique Fish and Wildlife Projects

SRPA should establish a special review procedure, such as a panel of outside experts, to determine unique habitat development opportunities early in the planning process. Currently the bargaining that takes place is often triggered by the NEPA -EIS process and comes very late in the plan formulation process. A project sponsor could ask for such consideration before the full proposal is submitted. The attraction to do so should be the prospect of a grant to cover the habitat development part of the planning and project costs with the stipulation that any resources reasonably expected to be raised locally as a result of the habitat improvements be made available for a portion of the cost that could be so paid over the life of any other loans involved.

Indian Water Rights Development Under the SRPA

Water development in small manageable projects, designed for the development of farming and managerial skills, offer a way to break the welfare syndrome for some Indians in the west. Since the Winter's Doctrine was taken seriously, well after the 1908 decision, the search has proceeded for a workable format. The large project approach with a fast track

development plan has not given the results hoped for, large projects provide the potential for large mistakes. Small projects properly supported may provide a better potential for individual growth and independence. Certainly the loan feature of SRPA provides a desirable discipline for the development and stability of a sponsoring organization.

In the Colorado Basin there are 28 million acres in 29 reservations with 300,000 acres leased for agricultural use, most to non-Indians. Further development is attractive as a means to protect their water rights and to produce income.

The Gila River Farms, an independent Indian nation enterprise, was the first Indian project approved by SRPA. Jack Palmer, the manager, said it was the only source of loan funds for land and water development that he could find. Many conventional sources of funding are not available to the Indians because of limitations with respect to immunities to suit, the extent of the trusteeship status, and the like, make attorneys for lenders very nervous. Such nervousness leads to higher interest rates, extra collateral, and many denials of credit. For long term debt, this is compounded. All knowledgeable persons contacted agreed that SRPA was still the only source of funds for developmental projects outside of the trust funds and internal tribal funds.

In the case of the Gila River Farms, they have progressed from a "catch as catch can" approach to financing to the point where on their second loan they were asked by OMB and agreed to qualify as a category I project, i.e., like virtually all non-Indian projects, they shortened the repayment period and/or found enough up-front non-Federal funding to hold the subsidy to 50 percent. Initially, a cotton gin, who in turn borrowed from the Bank of Cooperation, lent Gila River Farms operating capital so that they could start with already irrigable land. Now banks are willing to loan for such purposes. The tribe does some self financing and will do more. Half of the farm profits now go to the tribe and half into the leveling and ditch lining. The first SRPA project (1978) was used to rehabilitate a major part of the system, the second will put the Farms at 20,000 acres. Unsatisfactory work by contractors and advantages of labor use distribution have encouraged the Farms to do their own development work.

The Farms now hire between 100 to 150 Indians, 90 percent of the work force. Managers are responsible for 2500 to 4000 acres each depending upon complexity. Training and advancement of all workers is an important objective for the Farms. Workers are switched from task to task and supervisors are expected to be skilled in the tasks they supervise; managers, in all tasks. Managers share 10 percent of the profits. Two Indian employees have gone out to develop their own farms; one was successful. More are expected to do so, especially if product prices improve.

The Gila River Farms application process was easily one of the longest in the SRPA program history. From the notice of intent through the formulation, design, and construction for a SRPA project several years are usually consumed. Gila River started the process in 1969 and broke ground in 1978. In the meantime, many if not all, of the uncertainties for an Indian project have been resolved and they go through the process as fast as any other.

The potential for Indian projects is considerable. The Gila River Indians are in the process of developing a comprehensive land and water development plan, and certainly have the potential for a number of more projects. In 1978 it was estimated that 68,000 acres of the 266,000 acre potential is irrigated. After a considerable history of farming in the 1800, production on the reservations came to an end when Anglo settlers upstream diverted the river.

The Ak-Chin are completing their second project and with that will reach their potential of 14,500 acres. They will share in a distribution system with two non-Indian districts under a complex federation arrangement.

The Papago have submitted a notice of intent and have further potential in the water claims of the main reservation and at San Xavier.

But the Navajo have some of the most exciting prospects. They are the largest reservation and tribe in the United States. They have put great hope in the Navajo dam project. It is said to have been scheduled to bring in 10,000 acres per year, all on grants, and to have actually achieved 40,000 acres in 12 years. Their national goal of self sufficiency maybe more effectively achieved through a series of smaller projects. As many as 70 of the 110 Navajo chapters may have viable small projects. Four in the 4,000 acre range are being considered currently, widely separated over the reservation that includes parts of three states.

The Many Farms project is a good example. With tribal resources and a bank loan secured by tribal deposits, the Many Farms Cooperative has begun farming 800 acres of land that could have been allocated by the land committee set up decades ago to provide small semi-subsistence farms. They expect to consolidate and operate 1,200 that were allocated in 20 to 40 acre units.

Like many Indian lands, development is expensive. Besides the usual leveling, ditch lining, pumps, and canals the soil needs to be mixed to a level of 5 feet to breakup sodium induced layers. While an old dam provides some water renovation is needed and beyond resources of the tribe strained by pressure for social services. A loan for further development, perhaps

up to 4,000 to 5,000 acres, is seen as necessary both as the only way to achieve the development and as an important source of commitment and discipline in the operation of the cooperative. It was explained that with a pickup and food provided by the Navajo Nation and the Federal Government, and shelter relatively easy to put together, subsistence was not the issue. But with a sense of commitment to the local chapter of the tribe it was likely that the cooperative could succeed.

Skill and managerial development are a challenge however. It was felt that in many ways the Indians were where non-Indian farmers were, technologically, 30 years ago. Sub-management units with varying provision of central services are being considered as both a realistic organizational device and as a way to build skills and respectability. In addition to the vagaries of price and weather variable results due to their development period can be expected. All informants familiar with Indian projects agreed that a combination of modest training grants to cover critical on-the-job-training and a variable repayment arrangement were sensible changes, comparable to some of the proposals for depressed urban area enterprise zones. Likewise some technical assistance in district or mutual management would probably make the development process proceed more smoothly, and with less risk.

It should be noted that these provisions are needed by some non-Indian projects as well. Several were visited where the repayment schedule had been projected in most unrealistic terms. In hindsight it was clear that district revenues had not been designed to deal with the vagaries of price, weather, and/or managerial development.

Most associated with Indian projects were concerned over rumors circulating that interest may be added to irrigation development loans. The feeling was that this would be inequitable for Indian projects because given the delays in implementing the Winter's Doctrine of 1908 they had a special claim. Others had been given the chance to develop often with Indian water, and it was only fair they got the same treatment now.

Recommendations

Developmental grants up to 20 percent of the cost of irrigation should be authorized to provide for skill and managerial development in projects that face unusual challenges but are deemed to be viable in the long run. This should not be limited to Indian projects. Any change in the interest free policy for irrigation development should allow the Secretary to take into account equity considerations such as income and prior status with the Federal Government.

Concluding Remarks

I recognize that this preliminary report did not address all the issues imbedded in Federal involvement with irrigation. There are many both symbolic and substantive issues that concern many people that are beyond the scope of our study.

The issue of why any subsidy for agriculture at all is an example. Farming is inherently an industry that will drive the gains from resource development and technology into lower prices to the processor and shipper or into higher values for land. It has been worth it to society to subsidize these. But to sustain resource capacity to produce we must find ways to conserve these resources. The individual finds many conservation measures not profitable in the short run. All of this gets badly mixed up in the response to the inherent instability of prices and incomes in agriculture.

For example, reformers have for years voiced concern over the apparent inconsistency of government subsidizing resource development and new technology development, i.e., stimulating output, while at the same time spending millions to support prices for farm products in the hope of stabilizing incomes. This has led to proposals to require full cost reimbursement for irrigation used to grow surplus crops. If restricted to water used to irrigate new land such a proposal would provide symbolic recognition of this apparent inconsistency between short term and long term policy. If applied to already irrigated land this would seriously reduce the bargaining power of the SRPA program and community leaders to achieve desirable water resource management objectives. But it would not measurably affect the instability problem in American agriculture. The trade off between the costs of surplus management and costs of improved water management would probably be unsatisfactory if we could devise a way to estimate them. Even if the whole Bureau program were to pay full costs for water, after the shake out of land values changes, farm business and project refinancing and the like, the effect on Federal costs for price support would be temporary. Fine tuning between programs is difficult, often impossible, within a simple program it is hard enough.

Perhaps more to the point are some of the fine tuning suggestions above. Explicit objectives, regularly reviewed to insure adjustment to the times, with authority to match the objective, provide a base for holding public programs accountable for what they do and how they spend the taxpayers' money.