



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.

University of California, Berkeley
Department of Agricultural &
Resource Economics

CUDARE Working Papers

Year 1978

Paper 0056

Some economic implications of the
current and future administration of the
Reclamation Act of 1902

E. Phillip LeVeen

Working Paper No. 56

SOME ECONOMIC IMPLICATIONS OF THE CURRENT
AND POSSIBLE FUTURE ADMINISTRATION OF THE
RECLAMATION ACT OF 1902

by

E. Phillip LeVeen

SOME ECONOMIC IMPLICATIONS OF THE CURRENT AND POSSIBLE
FUTURE ADMINISTRATION OF THE RECLAMATION ACT OF 1902

E. Phillip LeVeen

INTRODUCTION

After 75 years, Reclamation law appears to be headed for a major overhaul. Several forces have converged to focus attention on the failings of the present law and its administration by the Bureau of Reclamation (henceforth BOR). Citizens groups have successfully publicized glaring discrepancies between the actual implementation of the laws and the general purposes of the Reclamation Act, especially regarding the disposition of excess land. A federal task force, convened to study the largest federal irrigation district, the Westlands Water District, has found ample evidence that the law has been grossly abused, and recommends a re-evaluation of the law. This echoes a similar theme raised by an investigation into the administration of the law by the GAO in 1972. Recent court decisions have affirmed the applicability of the acreage limitation to large portions of California which had hitherto been regarded as exempt from the restriction. During the summer of 1977, the Department of the Interior proposed a new set of regulations to apparently force a greater administrative compliance with the purposes of the Act of 1902. These proposed regulations have stirred a substantial reaction from affected farmers and landowners who are attempting to have the acreage and residence limitation requirements removed. Finally, a recent audit of the Central Valley Project shows that it will soon be several

billion dollars in debt unless the pricing policies of the BOR are dramatically altered.

The purpose of this paper is to clarify some of the central issues which will emerge as part of the debate on how to change the law. The issues are addressed from the perspective of economics. To give the discussion greater intuitive appeal, many of the points will be illustrated using the example of the Westlands Water District. The analysis is divided into three parts: the first deals with the current practice of subsidizing water, the benefits this practice bestows on landowners, and the relationship between these benefits and the subsidy; the second part shows how the benefits of the subsidy are distributed under the current regulations and compares this distribution to that which would occur under the newly proposed regulations; the third part describes and critically evaluates alternative approaches to the reformulation of the law.

Part I

THE BENEFITS AND BURDENS OF RECLAMATION POLICY

It is widely known that farmers do not pay the full cost of the water they use, but the magnitude and impact of the irrigation subsidies are much less well understood. This section shows that the subsidies to irrigators are very large, but it also shows that irrigators may not realize comparable benefits, especially in the more recent projects such as the Westlands Water District (henceforth WWD).

The Nature of the Subsidy

Reclamation policy was not initially based on the notion of subsidizing irrigators. It was believed that irrigation of the West would be relatively inexpensive and that farmers would repay the entire costs of the projects within a short period of time. The reality was very different; projects turned out to be much more costly than anticipated, and very quickly the requirement of full and rapid repayment was dropped. Farmers no longer repay the full construction costs of the projects, nor do they repay the interest costs which accrue over the 40 to 50 year repayment period. As a result, farmers pay much lower water prices than they would were they forced to pay the full costs of delivery. The difference between the full economic costs and the costs actually paid is termed a "subsidy" and will be briefly illustrated.

The Westlands Water District contains roughly 545,000 irrigable acres in a region the size of Rhode Island located largely on the westside of Fresno Co.^{1/} To irrigate this district, four different kinds of facilities are used. First, Shasta, Folsom, and other dams store winter runoff and release water during the summer months into the Sacramento River. The second set of facilities includes pumping plants in the Delta, the California Aquaduct which carries the water to the San Luis Reservoir with the aid of additional pumping plants. From the reservoir, the water is released into the San Luis Canal which takes the water into the WWD. These facilities are shared with the State of California which helped to build them and which uses them to transport water to state water projects south of the WWD and to Southern California. The third set of facilities includes distribution canals within the

WWD which take the water from the main canal to the individual fields, a drainage system which collects polluted runoff for eventual disposition, and a system of deep wells which will provide groundwater to supplement the other water. The fourth facility is the San Luis Drain which will eventually carry the polluted runoff back to the Delta.

The subsidy to irrigators in the WWD has been calculated for all the facilities except the storage dams; thus the following figures are understated by the share of the costs of these dams allocated to Westlands farmers. The total construction cost of the last three sets of facilities, including only the federal share of the joint facilities, will be at least \$700 million when completed.^{2/} No interest will be paid on this sum; the total foregone interest cost amounts to over \$3 billion over the 40-50 year repayment period.

Only part of the construction costs will be repaid by the farmers. Unless there is a change in the current contract price, very little of the cost of the jointly shared facilities will be repaid. In 1963, the BOR negotiated a 40-year contract with the WWD to deliver water at the price of \$7.50 per acre/foot (plus an additional \$0.50 for the drain). This price cannot be changed and the revenues it produces must be used to cover the construction costs as well as the annual operation and maintenance costs of the main supply facilities. By 1980, it is estimated that the entire sum of \$7.50 will be needed to meet the annual costs, and none will be left to repay the construction costs (see CVP audit). This means that of \$300 million used for these facilities, farmers will repay approximately \$20-\$25 million during the next 40 years. The deficit will be made up through sales of power and water (from other BOR facilities

not associated with the Westlands project) to cities and industrial users. If these are insufficient, then taxes will be used to support the costs.

The WWD must repay the full cost of the distribution, drainage, and groundwater integration within its boundaries. However, repayment of these costs will not begin until the facilities are "substantially complete" which will not occur until after 1981. In the meantime, irrigators have had the full use of water without paying for these facilities. This deferral of repayment will be seen to have a major impact on the distribution of the benefits of the overall project; it has the effect of increasing the subsidy because farmers will repay the cost of the facilities with future dollars which have a lower economic value.

There is an additional subsidy which the BOR does not acknowledge. In order to convey the water from the Delta to the San Luis Reservoir water must be pumped uphill which requires a large input of electrical energy. The BOR provides this energy from its cheap hydroelectric plants and charges the project a fraction of the true cost of the power. If the power were purchased for its market value, it would amount to an additional \$15 million each year at current commercial rates.^{3/} This is a subsidy to irrigators in the sense that the BOR could sell this power at higher rates and return the revenues to the treasury -- that is, return the profits to the public. Instead the BOR uses the cheap power generated from its older and more efficient projects to make its new projects less costly to irrigators and hence to guarantee a continuing demand for more projects.

Table 1

PRESENT VALUE OF THE COSTS AND BENEFITS
OF FEDERALLY SUBSIDIZED WATER IN
THE SAN LUIS UNIT OF THE CENTRAL VALLEY PROJECT, 1977^{a/}

<u>Costs</u>	<u>Amount</u>	<u>Percent of Total Water Costs</u>
<u>Water Supply Facilities</u> (Canals, reservoirs, drain)		
Present Value of Total Cost	609,000,000	49.5
Present Value of Repayments	21,000,000	1.7
Present Value of Subsidy	588,000,000	47.8
<u>Distribution and Drainage Facilities</u> (Facilities within WWD)		
Present Value of Total Cost	410,000,000	33.3
Present Value of Repayments	92,000,000	7.5
Present Value of Subsidy	318,000,000	25.9
<u>Cheap Power Subsidy</u>		
Present Value of Total Cost	217,000,000	17.6
Present Value of Repayments	21,000,000	1.7
Present Value of Subsidy	196,000,000	15.9
<u>Total Economic Costs</u>	1,236,000,000	100.0
<u>Total Subsidy</u>	1,102,000,000	89.6
Present Value per Acre ^{b/}	2,022	
Average Annual Cost per Acre/Foot ^{c/}	54.25	
Average Annual Cost per Acre Benefits	144.40	
<u>Total Present Value of Benefits</u>	480,690,000	39.1
Present Value per Acre ^{b/}	882.00	
Average Annual Benefit per Acre/Ft ^{c/}	23.25	
Average Annual Benefit per Acre	63.00	
<u>Benefits as a Percent of Subsidy</u>	43.6%	

a/ For detailed description of assumptions and data, see technical appendix.

b/ Based on 545,000 acres irrigated.

c/ Based on 1,450,000 acre feet/year

Because of the difficulty of comparing dollars of cost and repayment which take place over a 50 year period, it is necessary to express these figures in terms of their present value (1977). The estimates of costs contained in Table 1 are based on three different studies, and are explained in more detail in the technical appendix. As can be seen, the public cost not reimbursed by irrigators amounts to about \$51 per acre foot, or \$144.40 per acre. Farmers currently pay the BOR \$7.50 per acre foot and they pay the WWD another \$3.50 for operation and maintenance costs for a total of \$11.00 per acre foot. After 1981, the cost of water will rise to approximately \$32 per acre foot when the currently deferred costs of the distribution and drainage facilities are imposed. If, in addition to this cost, farmers were required to pay approximately \$86.27 per acre foot of water, over eight times the current rate and about 3.5 times the discounted value of the post 1982 water charge. At the non-subsidized water price, the cost of irrigation per acre would be about \$240, which is so high that even if the land were given away free, very few crops would be grown in the region.

The Westlands is the newest and probably the least efficient of all the BOR's projects. It is not likely that the costs of providing water or the subsidy in other projects even approaches the figures given above; however, the relative share of the costs repaid by farmers in the WWD (i.e. 10.4 percent) is typical of other districts.

This discussion has focused on a narrow definition of the costs of irrigating the Westlands and other regions of the West. The total public costs of these projects are considerably greater than

indicated above, although the magnitude of these costs is not known. The irrigation of the West increased the supplies of crops which are produced in the non-irrigated parts of the nation. It should be recalled that since the 1920's, the predominate problem for U.S. agriculture has been low farm prices and incomes caused by over-production. The brief respite of the 1973-76 period has led many to forget this point. Currently the surplus problems are again threatening farm welfare. While it is frequently argued that irrigation of the West increased the output of vegetables and fruits, which do not compete with crops in surplus supply, in fact many of the irrigation districts are predominately cultivated in the crops subject to price supports and acreage set-aside programs. For example, only 16.5 percent of the Westlands and only 14.8 percent of the Imperial County acreage are devoted to vegetables or fruit. This means that close to 800,000 acres of irrigated cropland in these two districts are devoted to crops which contribute to the surplus problem. Because of the superior growing conditions and especially because of low water prices, Western farmers can survive on prices which drive Eastern farmers out of business. Thus some of the increase in productivity of the Western lands comes at the expense of farmers who rely on rain in other parts of the nation. In sum, part of the cost of irrigating the West is the lower incomes of farmers elsewhere and the higher taxes necessary to support farm prices and reward farmers for reducing their output which are the result of the additional supplies of irrigated crops.

A second kind of cost of the overdevelopment of water resources for agriculture is related to environmental decay and the reduction of recreational benefits associated with the damming of rivers and

the reduction of run-off into the Sacramento-San Joaquin Delta. Were farmers required to pay the non-subsidized cost for water, there can be little doubt that more water would be available for the maintenance of Delta water quality and for other activities. There would be little need for an expensive project such as the Peripheral Canal.

The Benefits

There is no necessary relationship between the size of the subsidy and the size of the benefits created by the subsidy. If a project is economically "efficient" it produces benefits in excess of its costs; if it is inefficient, the subsidy may exceed the benefits bestowed on landowners. The Westlands is in the latter category of projects.

To measure the project benefits it is necessary to estimate the net increase in the productivity of land related to the additional water supplies. This land productivity can be measured either in terms of the change in the income accruing to land (rent) or in terms of the change in the capitalized value of the rent (i.e. by examining changes in land values). The former method is used here because of the availability of data on annual production costs for Westland farms.

According to data described in the technical appendix, the net return to land under the current structure of costs and prices averages roughly \$81.50 per acre. This figure is based on costs and prices which neither reflect unusually high or low commodity prices, and therefore should reflect the normal productivity of land under the project.

To estimate the productivity of land without project water it is necessary to estimate the amount and type of cultivation which would occur with the available supplies of groundwater. Using BOR estimates of sustainable groundwater supplies, its estimates of the amount of land which would have been cultivated, its estimates of the cropping patterns which would have prevailed, along with prices and costs of these crops, it is estimated that the return to land would average \$18.80 per acre (including the land which could not be cultivated at all).^{4/}

Subtracting this latter sum from the return which presently prevails, the average benefits associated with the project amount to \$62.70. This is the increase in income to landowners over and above all of their costs associated with increasing and intensifying crop production. It is a "windfall" benefit which landowners derive from being at the right place at the right time. The capitalized value of this windfall benefit is roughly \$882 per acre. It should be pointed out that even those landowners who have not signed recordable contracts with the BOR to sell their excess land and who do not receive deliveries of project water still receive these benefits. Project water allows them access to a continuing supply of groundwater as other farmers stop pumping this water and as project water percolates into the groundwater supplies.

The benefits are \$81.40 per acre lower than the public, non-reimbursed project costs. This means that for each dollar of subsidy, only \$0.44 of benefits is created. Alternatively, this means that even if farmers paid the government the equivalent of the benefits received, it would still cost taxpayers and power and municipal water users an additional \$621 million to provide them water. If

the full costs of the Westlands were known, and if the indirect costs of overdevelopment were included, it is likely that this sum would be considerably larger.^{5/}

Part II

CURRENT AND PROPOSED REGULATIONS IN RELATIONSHIP TO THE GOALS OF THE RECLAMATION ACT

The justification for providing public subsidies to the West has been the extension of the principle of homesteading to arid lands, the promotion of widespread economic opportunity, and the development of a family farm mode of agricultural production. Therefore, the benefits of projects are intended to go to family farmers and are to be distributed in as broad a manner as is feasible. In general this distribution is to be achieved by prohibiting project benefits from accruing to anyone except owners of 160-acre parcels who reside on and farm their land. The reality is very different from the ideal.

In 1972, the G.A.O. found that the ten largest farms in each of seven irrigation districts in the Central Valley Project controlled a total of 46 percent of all the land in the districts. The average size of these 70 farms was 3300 acres, 1900 acres of which were typically owned and 1400 acres of which were leased. While some of these farms may have been in violation of the acreage limitations, most had achieved their position as a result of loopholes in the law and a series of administrative decisions made by the BOR which substantially weaken the effect of existing regulations.

This part of the paper compares the actual consequences of the current administration of the law to the hypothetical consequences which might have resulted had the proposed regulations been adopted before the Westlands began delivering water. Such a comparison

provides insight into the relative importance of the various provisions of the Reclamation Act.

A Note on the Capture of Project Benefits

The benefits of irrigation water accrue in one of two forms: as increased annual income from higher returns to land, or as increased income as a result of the sale of land for capital gains. If the original landowner is allowed to sell his land at full market value, he/she will capture the entire benefits of subsidized water. The buyer of the land will take into consideration the higher land productivity and will be willing to offer a price which incorporates all future earnings of the land (discounted to the present time). The new owner who pays the full market price receives no "windfall" loss. Therefore the original landowner has the choice, if allowed to sell the land for full market price, of taking the benefits in terms of a higher annual income or of capitalizing the future benefits by selling the land. No matter in what form the benefits are chosen, the total benefit cannot amount to more than the capitalized value of the annual increment income. Once the benefits are thus captured through land sales, no public policy can recapture them.

The only way the windfall benefits can be protected from capture by the original landowner is to prevent the sale of the land at its market value. This means restricting land prices long before the first deliveries of project water, for the future earnings of the land are reflected in its price and once a project is anticipated, the land price will begin to reflect project benefits. To prevent the capture of any project benefits, the original landowner must be prevented from selling land above the price which reflects the

value of the land without project water and the owner must be prohibited from earning the higher incomes by farming the land with project water.

Under present and proposed policy, land sales prior to the delivery of water are not restricted, and owners are allowed to farm with project water on land in excess of 160 acres prior to disposing of the excess land. Moreover, the assessment practices used by the BOR generally allow the sale of excess land for more than the true "pre-water" (or better, "non-water") value, so for all of these reasons there is a substantial leakage of project benefits. Indeed, in the Westlands virtually no project benefits will be available to future purchasers of the land unless there are major and unanticipated changes in the regulations.

The Distribution of the Project Benefits in the WWD

To illustrate the probable distribution of the benefits in the WWD five categories of landowners are defined and the magnitude of the benefits to each group is estimated.

(1) Landowners who sell before the first deliveries of water are not required to abide by the pre-water price. Buyers of the land may be unwilling to pay the full market price of the land because of possible restrictions on use and resale of the land once the deliveries of water begin; however, the original landowner can realize a large portion of the expected benefits through such sales.

(2) Owners of non-excess land who purchased their land at or below the true pre-water price, receive the full benefits of the project if they continue holding the land. About 117,250 acres were initially placed in this status (21.5% of the entire project land). They may also receive most of the benefits from selling the

land, since there is no requirement that non-excess land be sold for any particular price. However, the price received for the land may be lower than full market value because of the restrictions on its use, especially with regard to the residency requirement (should it ever be enforced).

(3a) The owners of excess land who sign recordable contracts with the BOR agreeing to sell their land within ten years at the BOR established "pre-water" price and who receive project water in the interim, capture a major portion of the benefits created by the project on their land. About 226,000 acres of excess land remain to be sold by 1982. In the Westlands, these owners reap virtually 100 percent of the windfall benefits, as can be seen from the calculations in the technical appendix. The reasons so many of the benefits are passed on are first, ten years of immediate benefits (as opposed to benefits in the distant future) are worth more because of discounting. Second, the BOR accepts land sales at prices reflecting project benefits, so owners capture a portion of the benefits which might otherwise be passed on to future farmers after ten years. In the Westlands there is an additional factor. Because of the delay in completing a major portion of the project, farmers pay nothing toward these facilities until well after most of the land is scheduled to be sold. Therefore the benefits in the early years of the project are two to three times greater per acre than they will be after 1981; see technical appendix. Additionally, the BOR allows owners to sell land at approximately \$700 per acre, even though its true value without project water is closer to \$250-\$300. Therefore what benefits are not captured by holding the land for ten years are captured when the land is sold. In fact, the cal-

culations suggest that at \$700 per acre, the new owners will be forced to farm at an economic loss, which implies that either the current landowners will be unsuccessful in finding buyers at \$700 per acre after 1980, or that the new owners, by paying the high price, will confer additional benefits (above and beyond those estimated above) on the original owners!

(3b) Some excess landowners have sold their land in the Westlands before the end of the ten year grace period. About 125,000 acres have been sold so far. This behavior is not irrational however, for it is unlikely that these owners pass on any benefits to the new owners. The reason is simple. The BOR does not restrict the sale price of land once it has been transferred to non-excess status, so the owner simply arranges two sets of sales -- the first at the pre-water price, and the second at the market price. In this way, the owner captures all of the windfall benefits on the excess land. This strategy has been used by some owners who want to retain control over the land as well as to capture the windfall benefits. For example, the eventual buyers of the excess land may simply lease the land back to the original owner so that the actual farming operations are not changed, and remain under the control of the original owner. Since the rent paid to the new owners is just enough to cover finance charges, the income of these new owners is not increased. In fact, there have been several instances of "friendly foreclosures" in which the title of the land actually reverted back to the original owner who financed the sale when the new landowners could not meet financial payments (see San Luis Task Force Report). Apparently the BOR no longer regards the foreclosed property within its jurisdiction, so the original owner is able to transfer his or her land

from excess to non-excess status without losing the benefits or the control over the land.

(4) Landowners who do not sign recordable contracts for their excess holdings do not receive project water directly, and they are not forced to sell their excess land (they may receive project water for their non-excess lands, however). There are about 75,000 acres in this category. Instead, these owners receive project benefits indirectly through the groundwater system (as discussed above), which increases their land productivity just as if they received project water directly. These owners can, if they choose, sign recordable contracts in the future, which might become necessary when the WWD develops its groundwater integration system.^{6/} They will then have ten years more to sell their land. Alternatively, they can sell their land for its market value. In either case, the windfall benefits will have been captured.

(5) Buyers of excess land who pay less than \$700 per acre and who are not forced to pay for unwanted equipment or to pay inflated prices on land improvements may derive some of the windfall benefits of the project, especially if they purchase the land before the higher water prices come into effect. However, to date it would appear that none of the land has been transferred under these conditions, and it is unlikely that any will be so transferred until the BOR changes its policies. In other words, new owners may benefit from having access to land, but they will not receive any of the benefits of the subsidy.

To place this analysis in perspective, in 1968, there were approximately 2500 individuals (including corporations and partnerships) who owned land in the WWD. About 88.6 percent of these owners

held only non-excess land and were not required to sign recordable contracts. Their land amounted to 16.4 percent of the eligible project land, and the average windfall benefit received, per owner, amounted to about \$35,720. The remaining 280 owners controlled 83.5 percent of the land, and each received over \$1,400,000 in windfall project benefits. In fact, the largest 56 owners (holding parcels of land totalling more than 5100 acres each) received almost \$4,600,000 each in windfall project benefits.^{7/} Such statistics indicate why the large landowners of the Westlands were willing to accept the federal water project even though it carried with it the acreage limitation and other unwanted restrictions. The existing restrictions have proved of little consequence in directing project benefits to those in whose name they were justified.

The Distribution of the Project Benefits under the Proposed Regulations

In August, 1977, the Department of the Interior proposed a new set of regulations to control for some of the abuses described in the previous analysis. Given the fact that many of the benefits of the project have already been captured, the proposed regulations, even if carried out in their present form, will have little impact on the overall distribution of project benefits in the WWD. However, if the BOR were to enforce a pre-water price of \$280 per acre on the remaining excess land sales and were to effectively prohibit landowners from finding other ways to sell the land at higher prices, then about 9.5 percent of the windfall benefits could be passed on to future landowners (see technical appendix). This is the most redistribution of the benefits which seems possible in the WWD.

However, the proposed regulations will have greater effect on future irrigation projects. This can be seen by evaluating their impact on the distribution of the benefits in the WWD, assuming they had been law in 1968. The most important change is the reduction of the grace period for disposing of excess land from 10 to 5 years. Even assuming that the BOR continued to allow owners to sell the land for \$700 per acre, the shortening of the grace period would reduce the share of the original owners in the windfall benefits from 100 percent to about 86 percent (assuming that the same number of owners sign recordable contracts as under the current regulations and all hold the land for five years). If the BOR also enforced the correct pre-water price of land (which the regulations permit, but which might still be circumvented by administrative practice), the benefits available to the original owners would be about 64 percent of the total windfall.

One of the important related problems which the proposed regulations does not address is the capture of project benefits through the use of groundwater supplies. Indeed, by limiting the benefits available to excess landowners, the proposed regulations will increase incentives for farmers to remain outside of the project. However, the regulations do propose to increase the risks of not signing a recordable contract by prohibiting owners from joining the project after the first deliveries of water. The farmer faces the difficult decision of assessing what his fellow producers will do. If many attempt to circumvent the excess land provision, then groundwater supplies may not be sufficient and the value of the land's productivity will decline. The other side of this is that the BOR will also find few buyers of its water and will face considerable financial difficulties and therefore may not be in a

position to make this regulation effective.

A more effective regulation, which is apparently still part of the law but is not practiced by the BOR, would require the BOR to sign recordable contracts before construction of the project begins. If contracts cannot be signed in sufficient number to warrant the project, then it would not be built. This alternative reduces the BOR's vulnerability to owners who hold out for a larger share of the benefits, and might be successful in forcing more owners to sign recordable contracts on their excess land. If, in conjunction with the other two regulations, this had been in effect in the early 1960s, the original owners would have received only about 56 percent of the windfall benefits, assuming the BOR successfully negotiated contracts for the 76,000 acres which now remain outside of the project.

This last regulation would also reduce the BOR's ability to overbuild its projects in anticipation of future water demand. Overbuilding of projects creates an incentive to find new users. If it were required to show an effective demand for water, subject to the constraints of the acreage limitation and other provisions of the Reclamation Act, the BOR would undoubtedly be forced to curtail its expansion.

The Nature of Agriculture under Current and Proposed Regulations

The family farm of 160 acres was intended to be the beneficiary of the Reclamation Act of 1902, but under current regulations even if all of the excess land were distributed to owners of 160 acres, it is by no means certain that family farm agriculture would be benefited. For example, in 1968, there were 97 farms in the WWD averaging 4600 acres each. In the past ten years roughly 125,000 acres

of excess land have been sold but there are only 216 farms (San Luis Task Force Report). If the new farms averaged 160 acres in size, there would have been 850 farms by now; instead the new farms created by breaking up excess land average at least 1400 acres and probably much larger. In other words, the imposition of the acreage limitation is not sufficient to insure the development of small family farms.

One reason for this is leasing. As mentioned above, land may be leased to a larger farmer who operates very large units. The major reason why leasing has been able to develop is the failure of the BOR to enforce the residency requirement for project beneficiaries. Residency has never been enforced although it remains part of the law. The proposed regulations reaffirm the residency requirement although they would permit an owner to reside as far as 50 miles from his irrigation district. The proposed regulations also allow leasing. Thus while an owner may "reside" on his land, he or she still can lease it to another farmer. The leasing restriction would restrict the amount of land to no more than 160 acres per family member, and thus very large farms with several thousand acres of leased land would be forced to reorganize in smaller units.

The second reason for the instance of large farm units is the administrative decision by the BOR to allow each family member, rather than each family unit, to own 160 acres. Therefore large farms composed of 160 acre parcels owned by both immediate family members and distant relatives are consistent with the current law. The proposed regulations curtail this practice somewhat by restricting ownership in any one farm to members of the immediate nuclear family unit. Even under this provision, however, farms could be

much larger than 160 acres; a family of four would be entitled to own 640 acres and lease another 640 acres.

A 1280 acre "family" farm would provide the family a large income. Assuming that such a farm could have been purchased from excess landowners five years from the first deliveries of water for \$280 per acre, the family would have received an annual benefit of \$22,415 in subsidy benefits on the 640 acres owned, plus approximately \$25,000 in return to labor and management for a total income of \$47,415. The total present value of this subsidy, assuming it could be completely captured by the family, would be roughly \$332,000. The advantage of leasing 640 acres is not additional subsidy benefits, which presumably flow to the owners of the land. Rather the additional acres increase the return on labor and management; in the above example, the additional 640 acres means about \$10,000 in income. It might further be pointed out that if the typical family in the WWD included four individuals, each owning 160 acres, then only 851 families would own the entire region. The public cost of providing water to each of the 851 family farms would amount to \$1,296,000.

In summary, the proposed regulations would curb some of the abuses of the present administration of the law, and would possibly redirect future benefits to a different group of landowners who might otherwise not have obtained access to the land. In this latter regard, the question of using a lottery for the distribution of land will be addressed below. However, the proposed regulations would not promote a widespread distribution of the benefits of subsidized water, they would not promote the maximum possible economic opportunity consistent with economic viability, and they would do little

to insure the establishment of an agrarian system based on family farms. On these grounds the proposed regulations depart significantly from the social goals which have been used to justify the massive subsidization of water. Should these regulations become law, they will greatly reduce any possibility that the BOR can ever become an important agent of progressive change in rural areas.

Part III

ALTERNATIVES

The preceding sections have shown that Reclamation policy, at least in the Westlands, has been both extremely expensive and has been administered so as to exclude from project benefits those very individuals in whose name the subsidization of water resource development has been justified. The proposed regulations, if administered as written, would curb some of these abuses and provide somewhat greater access to project benefits for family farmers, but in light of the high degree of concentration of benefits and the small number of beneficiaries involved, these regulations call into question the entire rationale for Reclamation policy and especially the subsidy to irrigators. Few would agree that in order to benefit a few well-to-do families, the public should subsidize a water project for over a billion dollars, yet this is what the proposed regulations imply. The question is, can the acreage limitation and other traditional policy instruments be used to bring about a reconciliation of Reclamation goals and the development of water resources, or should both goals and policy be changed? As will be seen, the answer to this question is highly ambiguous.

The Strict Interpretation of the Reclamation Act

A strict interpretation of the 1902 Reclamation Act would allow only 160 acres per family (not per family member); it would require the disposition of all excess land as a precondition for the receipt of federal water; it would impose a narrow definition of residency and not allow leasing; it would control the price of excess land to reflect the true non-project value; it would prohibit the turn-around sale of land and all other methods of avoiding the price controls; and it would allow for some fair mechanism for allocating excess land. To this list should be added the requirement that the non-project price of land be maintained indefinitely so that no single family can capture all of the project benefits.

If such a set of regulations had been in effect in the early 1960s, there would be at least 3400 farms in the WWD (assuming the unlikely event that landowners in this district would have still wanted the project). If each farm produced a crop-mix typical of the region in 1976, each 160 acre farm could have produced \$12,000 in return to labor and management of the family, and would have provided an additional return to land (over and above land costs), of between \$6000 to \$10,000. This latter sum is the subsidy; it varies because the 160 acre farm incurs higher production costs than larger farms. The higher figure shows the subsidy assuming no efficiency loss, the lower figure shows the probable subsidy given the higher production costs of the 160 acre farm. The farmer who jointly farms his land with one or two other 160 acre farmers can earn the higher subsidy benefits, since most economies are achieved for the crops produced in the WWD by farms with 320 to 640 acres.^{8/}

Under such a joint farming arrangement, the individual families could each earn approximately \$22,000 under prices and costs described in the technical appendix.

If these families were prevented from selling the land for its market value, the subsidy could be made available to future generations of farmers. However, if the family is allowed to sell the land for market value, the benefits of the subsidy will be captured and the family will receive the total benefits of the public investment, worth up to \$140,000 per 160 acres.

It should be pointed out that these benefits are not available in most existing projects mainly because the land price has been allowed to rise to its market level. For example, in the WWD, if the new farmer pays \$700 per acre for his land, the subsidy will be negative. In fact, farmers would have to give up some \$2100 from their labor and management earnings to meet the higher land costs which means that unless the price of land is forced down substantially below its current sale price, the typical 160 acre farm will provide only about \$10,000 to the individual family, assuming that efficiency problems are eliminated.^{9/} If water prices were raised to cover some of the costs incurred by the BOR, this sum would be even smaller.

The example of the 160 acre farm in the WWD is itself biased in the sense that in most projects farmers would be required to pay land prices of \$1500 to \$2000 per acre, and hence would have even less income. It might also be pointed out that all irrigation districts are not alike in terms of the crops grown. In some districts in which there are a predominance of fruit and nut crops, the incomes might be much higher than in the WWD, which is based on field crops

23.
that produce much lower incomes per acre than fruit and nut crops.

Problems with the Use of Acreage Limitations

This brief discussion suggests two conclusions: First, if future Reclamation projects were to be administered according to the above regulations, the economic benefits conferred on each family would be very large, even with the 160-acre maximum (assuming farmers grow a combination of crops similar to those grown in the WWD). In other words, from the point of view of providing the maximum distribution of project benefits and supporting the maximum number of families, the 160-acre limit may well be too large! Second, in on-going projects which have been receiving subsidized water for several years and in which the BOR has allowed the price of land to rise to its market level, the 160-acre restriction will lead to hardship for families who do not produce high-value fruit, nut, and vegetable crops. These conclusions are not contradictory -- the reason the 160-acre limit is too large in the first case and too small in the second relates to the price of land. If land prices are kept low, mortgage payments are also low, and more of the income created by the land is available for the direct consumption by the family. However, as land prices rise, the family must farm increasing amounts of land in order to meet a given income objective.^{10/} Therefore, in older projects new farmers will be forced to pay the higher price of land, and must consequently have greater amounts of land to produce an equivalent income as a family with much less land in a new project.

In addition to the problem of old and new projects, the use of a single, fixed number of acres to guide the distribution of project benefits will create considerable problems of equity in California agriculture because of crop diversity. The acreage limitation

approach to Reclamation policy reflects a conception of a homogeneous agriculture such as exists in the Midwest. In such a system, farmers generally produce the same crops and earn similar incomes for a given size of farm. In California, however, the diversity of crops leads to little correlation between farm acreage and farm income. For example, it could well require more than 640 acres of wheat, barley, or milo to produce the same net income to a farm family as 5 acres of strawberries or 50 acres of grapes. In other words, 160 acres of grapes would yield a very high income while 160 acres of wheat would yield a very low income (even if there were no efficiency effects). Thus farmers will be led to increase production of the high-value crops if the 160 acre restriction is selected. Unfortunately, the ability of the markets to absorb the high-value crops is very limited, so it is not possible for any major shift into these crops without a damaging impact on prices and incomes of farmers all over the state.

Given the diversity of land prices, crops, and other costs which prevail throughout the Reclamation projects, it might be concluded that a variable acreage limit, set according to the particular crop-mix, land price, etc. of each farmer would be the most effective method of distributing economic opportunity and the most equitable means of distributing project benefits. However, the acreage limit would require frequent adjustments in response to changes in crop-mix and prices, thus making for an administrative nightmare. If project benefits are to be distributed by restricting farm size, then the single acreage limit appears to be the only workable choice.^{11/} As a result, the acreage must be sufficiently large to allow for the survival of families buying land in old projects and for farmers

producing low-value crops. This means that a size must be selected which confers large benefits on farmers producing high-value crops and who obtain access to land in new projects at low prices. There is no way around this dilemma. In summary, any reformulation of Reclamation law based on the use of an acreage limit will lead to a less than optimal use of the agricultural resource from the point of view of maximizing the number of families which could be supported by the existing agricultural economy. Of course, a strict enforcement of the 160-acre limit would increase the economic opportunities for many more families than under the current or proposed regulations, but there is still one other important problem raised by the enforcement of any acreage limitation program.

The Acreage Restriction and the Rural Poor

Among supporters of a strict interpretation of the Reclamation Act, it is taken as an unquestioned truth that the cause of rural development in California would be well served by the introduction of several hundred or even thousands of new family farms in place of the large, industrial farms. The question to be raised here is not whether the small farm is good or bad, but simply what effect the strict enforcement of the Act would have on rural California with regard to the overall distribution of income and welfare among all affected groups. In particular, the question concerns the plight of the hired farmworker who now provides most of the labor to the farms in the Reclamation projects.

The fundamental question is, who will get the excess land? Since the price of this land is suppressed by policy, there will be many more buyers than there is land. Under the current regulations, an informal allocation mechanism decides the issue of who

will receive the land. Only those who can in some way reward the original owner by allowing him or her to extract most of the benefits of the project will obtain the land. The proposed regulations recommend that a lottery be used to distribute excess land. This is a "fair" method because it gives all participants an equal chance of winning. However, the lottery carries the pre-condition that each participant show the ability to finance the farms (which will likely cost between \$100,000 and \$200,000, depending on land prices). Therefore the financial institutions will play a vital role in deciding who gets the land. Since they will require the prospective buyer to have some amount of equity and to have some considerable amount of experience before granting a loan, it seems certain that the rural poor and particularly the farmworker have little chance to obtain land, even with the lottery. In other words, unless the lottery is replaced by an affirmative action program directed at particular groups in rural and urban California, the land will be made available to middle class families who already have a measure of economic opportunity and a reasonably high income level. This means that the problem of rural poverty will be left untouched by Reclamation policy even if interpreted strictly.

Not only will the farmworker not be included in the race for the land, but also he or she may find it more difficult to find work. Table 2 analyzes the impact of imposing the Reclamation Act in the WWD, assuming that 3400 160-acre farms are established, each run by a family which can provide up to 1.5 personyears of labor. Three cropping patterns are chosen; the status quo (1976), a less labor-intensive system as predicted by the BOR, and a more intensive system, as predicted by Goldman et. al. There is considerable

controversy over whether small farmers will grow more of the highly labor-intensive crops or whether they will grow more of the mechanized, field crops; see Goldman and the USDA report. As can be seen in Table 2, it does not matter which of these options is taken -- in all cases hired labor will be displaced by family labor.^{12/} Only in the event that a majority of the new farms are owned and operated by the displaced farmworkers would the welfare of this group of workers be improved by the imposition of the Act. Otherwise, family labor will displace the long-term hired workers, the supervisors, mechanics, and foremen who have steady employment and average incomes.

Because of the nature of specialty crop agriculture, a seasonal labor demand will continue within the WWD, especially if the cropping pattern remains the same or is intensified. In other districts which are more dominated by fruit crops, an even larger number of hired workers, relative to family workers, will be required. Thus California agriculture, even if controlled by families, will remain much more dependent on the hired, temporary worker than family farm agriculture in the Midwest, which generally requires less than 10 percent hired labor. In this regard, the labor system which creates most of the current rural poverty will remain necessary and very much intact. There is no reason to think that family farmers will be more generous or easy to deal with than large, industrial farm owners. In fact, insofar as the unionization of farmworkers and effective collective bargaining are important mechanisms to the eventual reduction of low wages and poor working conditions among farmworkers, the establishment of thousands of small farms would serve to increase the costs of organizing, of negotiating contracts, and of policing agreements. In other words, the development of

Table 2

THE ESTIMATED COMPOSITION OF THE AGRICULTURAL LABORFORCE
WITH AND WITHOUT THE RECLAMATION ACT
IN THE WESTLANDS WATER DISTRICT

CURRENT SYSTEM	160-Acre Farms			320-Acre Farms		
	Status Quo	Intensive	Extensive	Status Quo	Intensive	Extensive
<u>Total Jobs</u> ^{b/} (Full Time Equivalents)	3750	4512	2812	3750	4512	2812
<u>Total Owner and Family Labor Jobs</u> ^{c/}	100	3212	2682	2500	2500	2450
<u>Total Hired, Long-</u> <u>Term Labor Jobs</u> ^{d/}	2275	0	0	0	131	0
<u>Total Seasonal</u> <u>Labor Jobs</u> ^{e/}	1375	1300	130	1250	1881	360
<u>Total Hired Labor</u> <u>Jobs</u>	3650	1300	130	1250	2012	360
<u>Family Labor as a</u> <u>Percent of Total</u> <u>Labor</u>	2.7%	71.2%	95.4%	66.7%	55.4%	87.1%
<u>Total Hired Labor</u> <u>Displaced</u>	--	2350	3520	2400	1638	3290
<u>Displaced Labor as</u> <u>a Percent of Hired</u> <u>Labor Currently</u> <u>Employed</u>	--	64.4%	96.4%	65.8%	44.9%	90.1%
<u>TOTAL CHANGE IN JOBS</u>	--	+762	-938	0	+762	-938

Footnotes to Table 2

- a/ Cropping patterns are based on the 1976 configuration of crops produced in the Westlands (Status Quo); the estimated configuration of crops under 320-acre farms by Goldman, et. al. (intensive); the estimated configuration of crops under 320-acre farms by the BOR in its Payment Capacity analysis (extensive). Intensive farms produce more vegetables and require more land than extensive farms, which primarily produce field crops and cotton.
- b/ Total jobs are estimated by adding the total labor requirements of each of the crops produced (in terms of hours per acre per year). This data is derived from Garrett et. al. The total hours per acre per year figure is used to calculate the total number of hours for the entire WWD (545,000 acres), and this sum is divided by 2500 hours, the estimated hours in one full-time job. This procedure gives the number of jobs in "full-time equivalents." Because of the timing of the work, many individuals may be necessary to perform the work of one full-time job equivalent, and therefore the total number of individuals actually employed for periods of the year may be several times the number of jobs estimates, especially within the seasonal job category.
- The jobs estimated by this procedure refer to harvest, field, and supervisory labor. Farm management is not included.
- c/ It is assumed that family labor will provide up to 1.5 person-years per farm for field work and supervision. If additional labor remains after these tasks are fulfilled, it is assumed that family labor will be used to help harvest the crops, except in those crops which must be custom harvested such as cotton, tomatoes, and lettuce.
- d/ Long-term labor refers to all non-harvest labor used for field work, including irrigation and tractor driving, and used for farm supervision. Does not include hired farm management, however.
- e/ Seasonal labor refers to labor hired for harvest and for specific short-term tasks such as weeding vegetables or pruning fruit and vine crops.

Sources:

Garrett et al. (see citations)
 Goldman, et. al. "
 BOR, Payment Capacity "

many family farms could reduce the effectiveness of farm labor unions.

It is therefore by no means assured that the rural poor will benefit from the imposition of any acreage restriction, even if there are public assistance programs to help farmworkers obtain land. The fundamental problem is that the benefits of subsidized water cannot be finely distributed through the acreage limitation approach, for there is no practicable way of incorporating large numbers of seasonal workers into the agricultural system as landowners short of a massive reorganization of the agricultural economy. Such a reorganization seems unlikely.

New Policy Directions

The administration of the current Reclamation Act, or the proposed modifications of the Act, involve a fundamental contradiction of policy goals. Water resource development and rural socioeconomic development require very different public policies and yet they are both to be served by only one policy instrument -- subsidized water. However, subsidized water is both an inappropriate and an inefficient means of achieving these goals. Therefore the history of past Reclamation policy has been the wasteful development of water resources, on the one hand, and the inequitable development of an agricultural system which is also wasteful in its use of human resources, on the other. While many want to continue to keep these two policy goals linked, there is a strong case for separating them.

The elimination of the water subsidy (which is not entirely possible in projects like the Westlands) will curtail the demand for inefficient projects, and will create new incentives for irrigators to economize on the use of water by adopting new irrigation tech-

nologies and by shifting to less water-intensive crop-mixes. These conclusions hold for both large and small farm agriculture. Even if small farmers are deemed worthy of public support, they too must learn to live with higher water prices and to conserve water. The BOR will find it difficult to pursue an expansionary water resource development under such conditions, but there can be little doubt that the elimination of the subsidy will serve the overall public interest.

The cause of rural development and the support of the family farm should not be tied to water resource development or to the single policy of providing access to cheap land. Not only does the present policy of providing subsidized water lead to the over-consumption of water in agriculture, it has proven to be an extremely expensive form of support. Recall that for every \$2 of public cost to build the Westlands, less than \$1 of benefits was created. This means that even if the Act were administered according to its original intent, family farmers could hope to have only about half of the total subsidy -- the rest is lost in the high costs of building the project. The family farm will need some kind of public support if this form of agriculture is to continue (or revive), but the support should not be restricted to providing access to cheap land (via cheap water) nor should it be restricted to farms in the Reclamation projects. A broad program of providing access to markets, to financial institutions, to technical assistance, as well as to land, must be developed if the family farm is to be helped, especially in California.

Perhaps even more important, effective rural development in California requires much greater public attention be paid to the

57.

system of agricultural labor use. As argued above, the provision of greater access to land for small farmers will not benefit the farmworker unless there is a concentrated effort to reform the entire nature of the agricultural system which has grown up around specialty crops. The original intent of the Reclamation Act was to promote a healthy agrarian economy, and although nothing is said of supporting farmworkers, any effort to modify the Act must take this contemporary reality into account.

Future modifications in Reclamation law therefore must seek to separate water resource development from rural development. This means raising water prices in existing projects and eliminating the subsidy in all future projects. In most existing projects, there are limits as to how much water prices may be raised without destroying agriculture and the repayment capacity of the project. In the WWD, for example, the elimination of the subsidy would mean that farmers would be forced to pay \$159 per acre in addition to their present repayment obligations which amount to \$64 per acre. Therefore an element of subsidy is likely to remain in all existing projects.

Rural development objectives could be pursued through the acreage limitation and residency approach, although at high land and water prices, the 160-acre limit will be insufficient for many crops. This might be combined with a surcharge placed on the water price which would raise revenue to support the retraining of displaced farmworkers or for the promotion of a more rationalized farm labor-force (that is, the greater coordination of jobs to reduce underemployment). Another possibility would be to require employers of

farm labor in federal irrigation districts to hire only unionized labor, or to pay wages equal to the wages of urban blue-collar workers.

Such policies would be difficult, and perhaps impossible to legislate, but they are still worth considering for two reasons. First, if the price of hired labor rises, farmers who are dependent on hired workers will be at a competitive disadvantage with family farmers who use little hired labor, and who, in effect, pay themselves the farm labor wage. Raising farm labor wages will increase the ability of the true family farmer to compete for land, since the cost structure of the large farm will be shifted higher. Second, insofar as farmworkers remain employed, they will earn a greater share of the project benefits through the "trickle-down" process which does not now operate because of the lack of farmworker bargaining power. If these policies were combined with the use of revenues generated by an irrigation tax to retrain farmworkers who are displaced (as a result of the shift to family labor and from increased mechanization implied by higher labor costs), and to help farmworkers who want to become farmers, the original purposes of the Act will be better served.

CONCLUSION

The family farm's appeal goes back to Jefferson and continues to exert a powerful influence in our increasingly industrialized agricultural economy. Yet ironically, this appeal has been manipulated by the large landowners to suit their own economic self-interest and to place the small farmer at an increasing disadvantage.

30.

The family farm may continue to be a worthy social goal, but the danger is that we will forget the rest of the agricultural community in our pursuit of this ideal. Only a few families can benefit from the Reclamation Act, even under the most perfect administration, and it must be recognized that a major portion of the agricultural workforce will continue to consist of hired farmworkers who are likely to be left out of any new arrangements unless there are positive steps taken to avoid this. The reformulation of the Reclamation Act therefore must, as many of its opponents argue, take into consideration the changes in the economic realities which have taken place in the past 75 years. The challenge is to recaste the admirable goals set forth in 1902 into a meaningful new law which can incorporate the realities of contemporary industrial society.

31.

TECHNICAL APPENDIX

Notes on the Calculation of the Subsidy

The calculation is based on the same set of assumptions, with some modifications, as employed by the BOR in calculating the subsidy (see San Luis Task Force Report).

1. The interest and discount rates used to obtain the present value of the subsidy are based on long-term treasury bond rates. Up to 1976, these rates vary between 5 and 7 percent. After 1976, they are set at 6.75 percent. Many economists argue that these long-term treasury rates do not adequately describe the true opportunity cost of the capital -- that the private return on capital is considerably higher and therefore that the real subsidy to irrigators is even larger than estimated.

2. The estimates are based on the most recent (1977) cost estimates and cost projections for future facilities. Unfortunately, the cost of the San Luis Drain is not accurately known (see San Luis Task Force Report). The costs used do not reflect the probable additional costs of construction which may amount to \$400 million more than the sum used in this analysis.

3. It is assumed, in contrast to the BOR, that the entire \$7.50 water charge will be required for operation and maintenance after 1980, and that the total repayments by irrigators for the main project facilities (e.g. San Luis Canal, San Luis Reservoir, the San Luis Drain, etc.) will amount to \$25 million. The rest will be covered by sales of water and power to municipal and industrial users.

4. The subsidy on the drainage and distribution system and the groundwater integration wells follows the calculation of the

GAO analysis (1976), adjusting for its use of a lower interest rate, The BOR analysis of this subsidy does not appear to take into account the cost of deferring the repayment for an additional ten years.

5. The analysis of the power subsidy is based on the analysis of the Westlands subsidy by W. Wilson (1976). The total power requirements of the pumping stations are estimated at 620 million kilowatt/hours, and the cost of this power charged to the operation and maintenance budget of the San Luis Unit is \$1,550,000 per year. The rate is 2.5 mills per kilowatt/hour. The current PG and E rate to industrial users is 25 mills per kilowatt/hour.

6. None of the above calculations incorporate the effects of inflation. Therefore even though a dollar of cost is repaid over a period of 40 years, if inflation has reduced the value of the dollar, the government will not receive the equivalent in purchasing power as it loaned to irrigators. This omission further increases the size of the subsidy.

Notes on the Calculation of the Benefits

The approach is to try to estimate project benefits which are typical of the long-term. The problem is during the early years of the project, agricultural prices and incomes were extremely depressed and were not indicative of the long-term productivity of the land. Then between 1972 and 1976, prices were much higher than typical and agricultural incomes were unusually large. Using this period gives an inflated view of land productivity over the long run. The solution has been to use 1976 costs of production (which had begun to catch up with the higher commodity prices) along with

1977 commodity prices, which are substantially lower than they were during the boom years.

The costs of production are based on the analysis of the BOR (1977) in its estimates of the repayment capacity of Westlands farms. These costs are probably conservative and therefore may somewhat understate the full productivity of the land. The following cropping pattern, yields, and crop prices were used in the calculation.

CROP	PERCENT OF LAND DEVOTED TO CROP	YIELD PER ACRE	PRICE \$
Cotton	29	1040/lb.	.50
Cotton seed		.93/tons	83.00
Barley	22	47.3/cwt.	4.23
Alfalfa Hay	5	6.8/tons	53.00
Alfalfa Seed	14	6.77/cwt.	102.00
Tomatoes			
(processing)	10	26.0/tons	56.00
Sugar Beets	6	27.8/tons	25.00
Canteloupes	7	178/cwt.	10.60
Almonds	6	0.83/tons	790.00
Milo	(9)*	49.7/cwt.	4.00

*Milo is double cropped with barley.

The above distribution of crops differs with the actual distribution in the WWD in 1976. The actual distribution has more cotton and barley, less alfalfa and sugar beets, more tomatoes, and less canteloupes and almonds. In addition, there are several other crops grown in the WWD not shown here. However, the above distribution provides a reasonably close approximation to the actual land use so as to allow an estimate of the productivity of the land.

To obtain the return to land, the total costs of production for a farm producing the above crops were calculated from data in the BOR repayment capacity study. These costs include the return to family labor and management, and the cost of water, estimated

at \$25¹⁾ per acre-foot times 2.8 acre-feet of water per acre. From this total cost the interest on land is subtracted as well as the costs of the farmer's home and related facilities. The remainder is the return to land and is calculated to equal \$81.50.

To obtain the return to the land without project water, it is assumed (after the BOR, see the San Luis Task Force Report) that 221,000 acres would be cultivated, one-third in cotton, two-thirds in winter barley. The return to cotton and barley are estimated using 1976 cost data from the University of California cost analysis work sheets for Fresno County. The return to barley is estimated at \$25 per acre, and the return to cotton is estimated at \$90 per acre. The composite return, including the return (estimated at zero) of the land not cultivated, is \$18.80 per acre over the entire project.

The net benefit to land is therefore \$81.50 minus \$18.80 or \$62.70 per acre. If land were purchased with a loan for 8 percent, the price of land could not exceed \$1020 under the current conditions without reducing the return on labor and management, and it could not exceed \$235 under the assumption of no-project water.

In making these calculations there has been no allowance for the effect of inflation. This procedure is based on the notion that over the long run the basic relationship between prices and costs will be maintained and therefore inflation will not affect the basic productivity of the land. Of course, rising food prices

1) The calculation of the water cost is as follows. The current charge is \$7.50 plus \$3.50 to the WWD. In 1981, the WWD charge is estimated to be \$24.00, thus \$20.50 is discounted five years and added to the \$11.00 to obtain the \$25 water cost.

could raise the future productivity of the land and therefore the estimates of the water benefits may be understated. Because inflation has also been left out of the calculation of the costs of providing water, this procedure will probably not distort the overall cost-benefit ratio. However, it will lead to an understatement of the amount of benefits available to future landowners.

Other Benefit Calculations

To calculate the benefits for an excess landowner who holds the land for ten years and sells it for \$700, it is assumed that the return to land during the ten years averages \$112.50 per acre because of the effect of the repayment deferral. Therefore the net benefit of this land is \$94 higher than it would have been without the project water. The landowner is assumed to receive \$94 per year per acre plus the capital gain on land sales in ten years equal to \$700 minus \$280 (the assumed pre-water price). When this sum is appropriately discounted at 6.75 percent per year and expressed in terms of 1977 values, the total benefit per acre amounts to \$877 which is more than the total benefit available. This means that the landowner will have difficulty selling the land to the next generation of farmers for the full \$700.

The farmer who purchases the land for \$700 will have higher production costs than the original owners who are assumed to have paid no more than \$280 for the land. The higher land costs will reduce the benefits to this farmer by about \$34 per acre, so the net return will be \$28.70 per acre. However, the new farmer will also be required to pay much higher water costs -- over \$60 per acre more than farmers pay during the pre-1981 period. Taking

these into account the total return to land after paying for water and interest is minus \$2 per acre. If the new farmer could obtain the land for \$280, his return to land, over and above costs would be approximately \$32 per acre, which amounts to about \$5120 per 160 acre farm which could be passed on with effective control over the non-project land price.

FOOTNOTES

- 1/ The Westlands Water District is serviced by the Bureau of Reclamation's San Luis Unit of the Central Valley Project (CVP). Approximately 95% of the San Luis facilities are used to provide water for the WWD.
- 2/ The costs of project facilities to be completed are subject to change. This is particularly true of the estimates of the costs of completing the San Luis Drain, now estimated to cost about \$130 million, but which could cost as much as \$400 to \$500 million, depending on the location and design of the drain and the facilities needed to reclaim the water. (See San Luis Task Force Report)
- 3/ The reason the BOR does not regard this as a subsidy is related to its treatment of costs. Unless an expenditure appears on a balance sheet, there is no cost. The concept of cost used in this analysis conforms to the usual economic definition of "opportunity cost." The electric power has an alternative value if sold on the open market hence to give it to irrigators for a low price implies a cost incurred.
- 4/ Although the analysis is conducted in terms of annual income benefits, from the point of view of Reclamation policy, it is useful to identify the "pre-water" price of land. In this case, the correct concept is the "non-water" price (since it is assumed that groundwater supplies would have substantially dried up soon after the beginning of the project water deliveries). The return of \$18.80 capitalized at 6.75 percent, the rate used to calculate the subsidy, is \$278. This suggests a maximum value for what the price

of land without water from the project would have averaged over the entire 545,000 acres of the project.

5/ Supporters of the continuing subsidy argue that this analysis understates the true benefits of the project because the additional economic activity generates more jobs and higher incomes, which, in turn, mean more taxes and government revenue. This argument, however, is incorrect. It should not be forgotten that in deciding to spend one billion dollars in the WWD, it was also implicitly decided not to spend this same sum of money in some other activity. The money might have even been returned to taxpayers! Each of these alternative possible uses of the money would have generated jobs and higher incomes and therefore would have generated higher taxes. So the increase in jobs and income is not a net increase, but simply a redistribution of these jobs and taxes from some other region of the nation to the regional economy around Fresno.

6/ The groundwater integration plan is intended to impose higher costs on non-project participants by pumping the groundwater into the canals of the WWD. This will increase the amount of water available to farmers and it will lower the water table for the non-participants. Interestingly, this system has not yet been built and there is considerable question as to whether it will ever be built.

7/ This data is based on the analysis of the distribution of landownership in the WWD contained in Jamieson, et. al. It assumed the existence of a simple one-to-one relationship between landownership and benefits.

8/ The issue of the viability of the 160-acre farm and the diseconomies of size experienced by 160, 320, and 640-acre farms has

been the subject of considerable controversy. It is assumed that the 160-acre farm has higher costs equal to 6 percent of the average sales per acre. For other evidence, see the USDA report and the two citations to the author's related research.

9/ Proponents of small farms are quick to point out the possibility of joint farming and sharing of equipment. These arrangements are generally not typical in farming, and may involve more costs than might be recognized. See Small Farm Viability Report, Technology Task Force Report.

10/ There is a difference between income and wealth. The family which has large land payments may slowly increase its wealth as it accumulates equity in its land. However, this wealth cannot be used to provide immediate support to the family -- it can only be realized by selling the land, which eliminates the possibility of farming. Thus the system which converts a farmer's current income into long-term land equity will require a large land to family ratio for any given income goal.

11/ The National Land for People has proposed a variable acreage scheme in which the land is broken up into parcels of various sizes ranging from 20 to 640 acres, with an average of 200 acres. The farmer would enter a lottery for a specific size of farm. The problem is, what if the individuals who receive the 640-acre farms decide to grow tomatoes, canteloupes, almonds, and lettuce. Their farms could sell upwards of a million dollars worth of crops and they could become very rich. If a particular crop-mix were specified for each parcel, such a proposal might work, but this would involve an extremely complex administration and policing function, not the mention the planning function of deciding how to allocate crops to farms.

12/ In estimating the number of jobs taken by family labor, it has been assumed that family workers will undertake field work, and part of harvest activities. This assumption may overestimate the willingness of such workers to do very tedious and hard work, especially when workers can be hired for low wages, and when the family may be able to increase its income to a greater extent by working part-time in the non-farm economy. If this is true, then the displacement of seasonal workers may be considerably less than indicated on Table 2. It should also be pointed out that if, on the average, farms are larger than 160 acres, the displacement of seasonal labor will be minimized, although long-term hired *labor* will still be displaced.

CITATIONS

U.S. Department of the Interior

San Luis Unit Irrigation Payment Capacity. Bureau of Reclamation, Mid-Pacific Region, September, 1977.

U.S. Department of the Interior

Reclamation Rules and Regulations for Acreage Limitation. Federal Register, Vol. 42, No. 165, August 25, 1977.

Wilson, M. Woodrow

"Federal Subsidies for the Westlands Water District," Office of Planning and Research, State of California, Sacramento, California, Feb. 1976.

State of California

Report of the Technology Task Force. Small Farm Viability Planning Project, Sacramento, California, Sept. 1977.

Goldman, George, et. al.

Economic Effect of Excess Land Sales in the Westlands Water District. Division of Agricultural Sciences, University of California, 1977.

Comptroller General of the United States

Memorandum from the Comptroller General of the United States to Senators Gaylord Nelson and Floyd Haskell, April 9, 1976.

Comptroller General of the United States

Report to the Congress: Congress Should Reevaluate the 160-Acre Limitation on Land Eligible to Receive Water from Federal Water Resources Projects. Nov. 30, 1976.

National Land for People

Newsletter, Feb. 1978, "NLP's Welfare Reform."

U.S. Department of Agriculture

The U.S. Department of the Interior's Proposed Rules for Enforcement of the Reclamation Act of 1902: An Economic Impact Analysis.

Jamieson, J. et. al.

Some Political and Economic Aspects of Managing California Water Districts, Inst. of Government and Public Affairs, Report No. 109, University of Calif., Los Angeles, 1973.

San Luis Task Force

Report of the Special Task Force on the San Luis Unit, Central Valley Project, California, Jan., 1978.

Garrett, R. et. al.

Estimates of the Impact of Agricultural Mechanization Developments on In-Field Labor Requirements for California Crops.

LeVeen, E. P.

Survival of the Fittest: The Relationship of Size and Viability in California Agriculture, Working Paper No. 55
Department of Agricultural and Resource Economics,
University of California, Berkeley, Feb. 1978.

Hall, Bruce F. and LeVeen, E. P.,

Farm-Size and Economic Efficiency: The Case of California.
Working Paper No. 53, Department of Agricultural and Resource Economics, University of California, Berkeley, Feb. 1978.

~~Central Valley Project Audit~~

*U S Dept of the Interior, Office of Audit and Investigation
"Report on Audit and of the Central Valley Project"
Jan. 31, 1978*