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POST-WAR IRRIGATION DEVELOPMENTS AND THE NATIONAL AND REGIONAL AGRICULTURAL ECONOMY*

By MARION CLAWSON
Bureau of Agricultural Economics

A basic assumption for the discussion which follows is that there will be substantial irrigation development in the immediate post-war years. Some comments will be offered by way of appraisal of this program, but there is little likelihood that additional irrigation development will be prohibited or restricted even should the verdict be unfavorable. Our major tasks are appraisal of the effects of probable irrigation development, and guidance along lines that seem most desirable.

The Place of Irrigation in Western Agriculture

Irrigated agriculture is important in the West. Roughly one-sixth of the national income from agriculture comes from the eleven Western states. Slightly more than half of the cash farm income in these states in 1939 was attributable to irrigated land. At least eighty percent of the livestock and livestock products, but no more than fifty percent of the crops, are consumed within the region. We ship out half or more of our total crop production, but less than twenty percent of our livestock.

Cash farm income in the eleven Western states was $1,356,098,000 in 1939, (Table 1). This was approximately one-sixth of the national cash farm income. California produced forty-four percent of the regional total, Washington eleven percent, and the other nine states the remaining forty-five percent. The regional cash farm income came from a wide variety of crops and livestock; the region as a whole is extremely diversified, although specialization characterizes most local areas. Somewhat more than half of the total cash income came from crops; the most important commodities were fruits—citrus, grapes and apples particularly—vegetables and grains, though cotton was also important. About one-third of the cash income from livestock came from sale of cattle and calves; dairy products were second, with twenty-seven percent of the livestock income, and the remainder was made up of a wide variety of commodities.

Some of the crops were produced under irrigation, and others were produced on non-irrigated land. Some of the livestock were fed entirely on feeds grown on irrigated land; others received no feed from irrigated land, and still others received feed from both irrigated and non-irrigated land. Estimates of the cash income originating from irrigated, non-irrigated, and partly irrigated production are shown in Table 1. At best, these estimates

* The views expressed herein are wholly personal, and are not necessarily those of the Bureau of Agricultural Economics, the Department of Agriculture, or the Bureau of Reclamation.

TABLE 1.—ELEVEN WESTERN STATES: CASH FARM INCOME BY GROUPS OF COMMODITIES, 1939, AND ESTIMATED ORIGIN BY IRRIGATED, PARTLY IRRIGATED, AND NON-IRRIGATED PRODUCTION[1]

Commodity group	Cash income ($1,000)				
	Total	Wholly irrigated	Partly irrigated		Non-irrigated
Crops: total	710,253	514,710			195,543
Food grains	110,863	7,848			103,015
Feed grains and hay	58,778	35,000			23,778
Cotton lint and seed	50,529	50,529			0
Flaxseed	3,759	3,008			751
Total vegetables	178,238	154,165			24,073
potatoes (inc. sweet)	34,104	31,158			2,946
truck crops	119,643	107,889			11,754
other vegetables	24,491	15,118			9,373
Total fruit	211,669	186,671			24,998
apples	29,050	25,641			3,409
peaches	15,111	14,289			822
pears	13,455	11,740			1,715
grapes	30,783	25,743			5,040
strawberries	6,958	3,859			3,099
citrus	73,838	73,838			0
other fruit	42,474	31,561			10,913
Other crops	96,417	77,489			18,928
Livestock and livestock products: total[2]	645,845	144,779	(35%)	183,012	318,054
Wool	38,625	650	(30%)	12,556	25,419
Dairy products	176,682	70,636	(68%)	29,363	76,683
Eggs	46,925	11,859	(50%)	4,718	40,348
Chickens	15,485	4,277	(50%)	1,221	9,987
Turkeys	19,889	4,369	(50%)	11,078	4,442
Cattle and calves	218,166	25,200	(29%)	95,653	97,313
Hogs	37,822	16,238	(50%)	3,000	18,584
Sheep and lambs	82,251	11,550	(31%)	25,423	45,278
Total cash farm income[2]	1,356,098	659,489	(35%)	183,012	513,597

[1] All land receiving any irrigation water has been considered "irrigated," and the production from such land listed as "wholly irrigated." Where livestock obtain part of their feed from irrigated crop or pasture lands, the value of their products is listed as "partly irrigated." The figures in parentheses are the portion of this income attributable to irrigation.

[2] Omitting minor livestock products such as honey.

Source: Publications and releases of the Bureau of Agricultural Economics, showing cash income by sources; Agricultural Census, 1940; and judgment of persons familiar with agriculture in the various states. The assistance of Carl P. Heisig and Wendell T. Calhoun is acknowledged.

are only approximations. The 1940 Census gives estimated gross values for some crops grown under irrigation; the accuracy of these estimates may be questioned, and in any event, they are not the items desired. The gross

value of hay produced under irrigation, for instance, may be a poor indication of the cash income from hay or from animals fed on this hay. Table 1 has been built up from the Appendix Tables for the individual states; these are estimates based on Census tabulations and personal knowledge of agriculture in the respective states. It is hoped that the regional totals are more accurate than the state figures, if errors in figures for the individual states are compensating, of the $1,356,098,000 cash farm income produced in the eleven Western states, 49 percent came wholly from irrigation. An additional 13 percent was produced partly from irrigated, partly from non-irrigated land. The portion attributable to irrigation was 35 percent, or 5 percent of the total. On the assumptions used herein, 54 percent of the total cash farm income of these eleven Western states is attributable to irrigation, and 46 percent to humid land, dry-land and range land.

The proportion of each commodity consumed within the region varies greatly. In general, the livestock products are consumed within the region. This is true of nearly all the dairy products, beef and veal produced within the region. Some production from the northeastern edge moves eastward, but this is nearly or completely offset by imports into the region. The region is deficient in hogs; most of the eggs and chickens are consumed within the region. Lambs, turkeys and wool are largely shipped out. At least eighty percent, perhaps 85 percent or even more, of the cash income from livestock products comes from products consumed in the region. In rather sharp contrast is the situation with respect to crops. Three-fourths of the major fruit and truck crops are shipped outside of the region. Our oranges and lemons, grapes and apples are largely consumed outside of the region; so are our lettuce, asparagus, carrots and other truck crops. Our cotton is not milled within the region, though we import a large amount of cotton goods which probably require an equal amount of cotton. Much of our grain and sugar are consumed within the region, but some of these are shipped out. Though precise data are lacking, it seems evident that 50 percent of the cash income from crops comes from crops shipped outside of the region. Perhaps this portion is as high as 65 percent.

Probable Irrigation Development in the Decade after the War

Though irrigation development in the post-war decade is likely to be relatively large, any estimates of the acreage involved necessarily involves considerable forecasting of political and other developments.

The National Reclamation Association is known to favor a program of irrigation development in the post-war period. The Association has advocated construction of irrigation works during the war as an aid in meeting the wartime needs for food. In its Bulletin of February 3, 1943, thirty-two projects were listed as under construction; the ultimate acreage of new land was given as 2.5 million acres and the area to receive a supplemental water supply as 6.6 million acres. Though no time-table was attached to these developments, there was a clear implication that they could be com-

pleted within a few years after the war. Additional projects might easily be added to this list as the end of the war approaches or during the post-war period. This Association has a fairly large and very influential membership in the West, and has had success in getting appropriations for irrigation developments.

The Bureau of Reclamation has recently presented a post-war program.[1]

TABLE 2.—INVENTORY OF IRRIGATION AND MULTIPLE-PURPOSE PROJECTS FOR CONSTRUCTION IN POST-WAR PERIOD, 17 WESTERN STATES

State	No. of projects	Irrigation (1,000 acres)		Power (1,000 kilowatts)		Total costs, 1940 prices (million dollars)
		New lands	Suppl. water	Installation, authorized projects	Est. firm, projects under study	
Arizona	16	444	328	225	1,093	640
California	31	1,689	3,505	446	289	606
Colorado	18	387	1,924	145	159	330
Idaho	20	308	1,709	70	150	169
Kansas	3	103	0	0	0	19
Montana	33	562	85	0	95	159
Nebraska	10	97	32	0	1	39
Nevada	4	25	106	0	16	16
New Mexico	9	51	243	0	16	54
North Dakota	9	403	0	0	0	59
Oklahoma	9	181	6	0	0	35
Oregon	14	266	93	0	8	60
South Dakota	5	284	14	0	1	41
Texas	11	313	585	18	0	113
Utah	18	90	269	9	109	165
Washington	5	1,131	6	852	622	370
Wyoming	21	371	459	0	20	77
Total	236[1]	6,705	9,364	1,765	2,579	2,952

[1] Total includes individual units of some major projects. Miscellaneous projects not included.

Based on table in Inventory of Irrigation and Multiple-Purpose Projects for Construction on Post-War Period, submitted on June 6, 1944 by Secretary Ickes to Senator Carl Hayden, Chairman, Subcommittee, Roads and Reclamation, Committee on Post-war Economic Policy and Planning.

"The major objectives of the inventory are to show how the development of the unused water resources of the western half of the country could be made most effectively into instruments to cushion the transition from war to peacetime economy."

The inventory includes 236 projects, 40 of which are now authorized for construction (Table 2). These projects, when completed, will make water available for $6\frac{3}{4}$ million acres of land not now irrigated and will provide supplemental water for nearly $9\frac{1}{2}$ million acres. The authorized projects,

[1] Bureau of Reclamation, Department of the Interior—Inventory of Irrigation and Multiple Purpose Projects for Construction in the Post-war Period. June 6, 1944. Statement transmitted to Senator Carl Hayden, Chairman, Subcommittee, Roads and Reclamation, Committee on Post-war Economic Policy and Planning.

out of this list of post-war projects, include $2\frac{3}{4}$ million acres of new land and supplemental water for nearly $5\frac{3}{4}$ million acres. The authorized projects are therefore somewhat less than half of the post-war program.

This post-war program consists of a few large projects—Columbia Basin in Washington, Central Valley in California, Gila in Arizona, Anderson Ranch in Idaho, Colorado-Big Thompson in Colorado—and many smaller projects. Under normal conditions, construction and development of the larger projects would be spread over several years. Many projects, particularly the larger ones, have hydro-electric power development as well as irrigation. Many of them have flood control features and benefits, and some will aid in navigation. The full potentialities of multiple-purpose water development are sought for each project. These benefits other than irrigation should be kept in mind in viewing the costs of these projects.

The Bureau of Reclamation has recently[2] announced a plan for development of the upper Missouri River Basin involving irrigation of 4.8 million acres not now irrigated and provision of a supplementary water supply to .5 million acres. No time-table is given for these estimates, but they are referred to as "post-war." In a statement before the Senate Commerce Committee on May 4, 1944, in discussing H. R. 3961, Commissioner H. W. Bashore stated that, "in the major sub-regions of the West, water could be economically conserved to assure ultimate irrigation results," as follows:

	New Land	Supplemental Supply
	(Million Acres)	
Sub-humid and Great Plains	4.5	.7
Inter-Mountain	6.4	8.0
Pacific Coast	11.1	3.0
Total	22.0	11.7

Considering all factors, provision of a full water supply for 3 million acres and of a supplemental supply for 3 million acres seems probable for the first decade after the war. This is less than half of the "post-war inventory" submitted by the Bureau of Reclamation, and is approximately the same as the presently authorized program. This estimate may prove to be much too low; certainly, it could be far exceeded if funds were made available. Assuming that supplementary water supplies add one-fifth to the productivity of the areas involved, the equivalent of approximately $3\frac{1}{2}$ million acres of new irrigated land will be available for cultivation in the first decade after the war. The full effect will not be felt within the period, because of the time interval involved in bringing newly irrigated land into full production. The probable agricultural production from these lands and its relation to present production in the region will be explored later.

Several factors might accelerate or retard this probable program. On the acceleration side, a need for public works to relieve unemployment might

[2] News Release, May 9, 1944.

easily become a dominant factor. If the nation has several million unemployed, and if it resorts to public works as a palliative, then irrigation construction is likely to come in for its share. The war-time expansion of the construction industry, beyond any reasonable post-war expectations, may call for a program of public works—at least, there will be a strong political support for such a program. Sentiment for land settlement opportunities, particularly for veterans, will be an added incentive. Should circumstances strengthen the influence of these factors, the development program might easily be twice as large as I have assumed. On the retarding side a "balance-the-budget" philosophy in national affairs will be pushed by powerful groups and may become dominant. If so, irrigation projects, no less than other public works, will not receive generous public funds. If agricultural surpluses develop again, renewed opposition to additional irrigation will come from established agricultural producers. In spite of their rumblings in the past, their arguments have not been very influential. Curiously enough, this argument has usually been used by agricultural producers of other regions, who are not likely to be hurt seriously, and has not been advanced actively by the western farm groups who should have been most concerned.

The net effect of these retarding and accelerating forces might be considerable, though impossible to estimate at present. For the sake of illustration, the assumption is made that increased productivity will equal that from $3\frac{1}{2}$ million acres of newly irrigated land. This compares with an irrigated area in the eleven Western states in 1939 of $18\frac{1}{2}$ million acres, perhaps half of which lacked a full water supply.

Consequences of this Probable Reclamation Program

The consequences of an irrigation development in the post-war period will depend, in part, upon the exact character of that program. The various projects differ with respect to several features. The analysis which follows is based on more-or-less average assumptions in regard to the characteristics of the various projects. If the actual program diverges from these assumptions, the differences will be only in degree, not in kind.

The first and most obvious consequence of such a reclamation program will be in the stimulus to business, particularly to the construction industry, due to the expenditure of public funds. Expenditures of the general magnitude of $1,500,000,000 are likely to occur during the decade following the war, if our assumed program is followed. Direct employment on-site and off-site, would be of the general magnitude of 100,000 men annually for several years, and might be much higher at the peak. This compares with approximately 270,000 men in the construction industry of the eleven Western states in 1940, as shown by the 1940 Census. Building of the necessary dams and canals would employ a substantial proportion of the pre-war construction industry specializing in this type of work. A new Henry Kaiser might emerge from this construction program, or at least firms now

in the field would welcome such a relatively large volume of public work.

The employment and income effect of the project construction program will be important but not re-occurring. It will help to maintain employment, particularly in a sector where unemployment is likely to be severe. The effect upon the demand for agricultural products will be helpful.

Less immediate, but more significant for the long pull, will be the increase in agricultural productive capacity. On the average, new irrigated lands do not come into full production for five years or longer. Lands receiving supplemental water will increase in productivity more rapidly. In general, the new irrigation projects will include lands whose productivity will average as high as the lands now irrigated in the West. Since the most favorable irrigation developments have already been exploited, it might appear that further development will be on less productive lands. Future projects are likely to be more costly. But much of the land irrigated in early developments was located at high elevations in the range areas, where hay is the chief crop and yields are low. Future developments will probably include land more productive than the least productive lands now irrigated, though perhaps less productive than the best lands now irrigated.

Some of the future irrigation development will produce feed that will be used by livestock that obtain the rest of their feed from range land; however, this will be the exception rather than the rule. Even where it occurs, the productivity of the range will not be increased greatly. In other words, future irrigation will be productive to the extent of the production on the irrigated land alone.

Market considerations are likely to prevent or inhibit production of intensive, specialty crops, so that these crops will be less important on the new lands than on presently irrigated lands. It is not a lack of suitable land which now limits the production of most fruits and vegetables in the West. We could produce more apples, peaches, pears and grapes if the market would absorb them at remunerative prices. We could produce more oranges and lemons, but in view of the market outlook, may have difficulty in maintaining our present volume of citrus production, in the face of increasing competition from Florida and Texas. We could produce more lettuce, carrots and other truck crops if the market would absorb them without decrease in price. For several of these commodities, California or Western regional production is a major share of the national production. If we expand, the added volume depresses price to a degree depending on the elasticity of demand for the particular commodity, and we feel the effect markedly. Some of the new lands may be better adapted to fruit and truck crops than the present producing areas; shifts in areas of production and some increases in production may occur, but production of fruits and vegetables can hardly increase nineteen percent merely because the total area irrigated increases nineteen percent. The increase may easily be large enough to put substantial pressure on the prices of fruits and truck crops.

For what will the new irrigated land be used? Much of it will be used to

produce forage and feed grains, and these will provide the basis for expansion in livestock numbers. Dairy production will surely increase more than proportionately to the increase in population within the region, and a shift to an exporting basis for dairy products seems probable. There will be an initial loss in price when butter is first shipped out of the region. Further increases, however, will affect the national price but little; the demand for butter produced in the region is almost infinitely elastic once the region gets on an export basis. Considerable opportunity exists for an expansion in livestock feeding, particularly in cattle feeding. The result will be some increase in total weight of meat produced, and also an improvement in quality of meat available. Some of the poorest lands to be irrigated may be used for pastures, on which cattle and lambs may be raised and fattened. There will be some increase in pork production, though scarcely enough to meet the demands of the region.

Considering all factors, our assumed irrigation development equivalent to $3\frac{1}{2}$ million acres of new land in the decade following the war will mean approximately $150,000,000 increased cash farm income for the region, at 1939 prices, when the newly irrigated lands have come into full production. This is an increase of slightly more than ten percent. This estimate is necessarily rough, even granting our assumption as to area to be irrigated. The increase will far exceed ten percent for some commodities, and will fall far short of ten percent for others. The increase will probably vary within the region; it will probably be least along the eastern edge of the region, where dry-land wheat and range livestock are so important, but may be greater in California, Washington, and Idaho.

The irrigation development of the post-war period will mean an increase in hydro-electric power production. Most future irrigation projects will be multiple purpose projects, usually with some hydro-electric power production. The importance of power generation will vary widely from project to project. Assuming that the ratio of power production to irrigated acreage which has prevailed on recent reclamation projects will continue for future projects, our estimate of productivity equal to $3\frac{1}{2}$ million acres of newly irrigated land will mean an increased generator capacity of roughly 2,300,000 kilowatts. The comparison of this figure with pre-war and present generating capacity is shown in Table 3. Pre-war generator capacity in the

TABLE 3.—ELECTRIC GENERATING CAPACITY, ELEVEN WESTERN STATES

Period	Generator capacity (1,000 kilowatts)		
	Total	Hydro-electric	Other
Pre-war (end of 1941)	6,896	4,601	2,295
War (end of 1944)	9,020	6,573	2,447
Post-war increase[1]	2,300	2,000	300

[1] Increase over 1944.

Taken from Statistical Abstract, 1942, and estimates furnished by Federal Power Commission.

West was roughly two-thirds hydro-electric. Generator capacity has risen sharply during the war, and electric energy production has increased even more rapidly. While there may be some recession after the war, installed capacity and output are likely to continue to rise.

It is difficult for an agricultural economist to estimate the economic effects of more, and presumably cheaper, electric power in the region. It may help to draw industries here, particularly those industries which consume large quantities of electric power. More probably, abundant and low-cost power will affect the production methods and processes employed. Use of large amounts of power per worker should aid in maintaining our present high per capita income. Some increased electrification of home and farm may occur, but the region is already largely electrified in the areas where potential demand justifies electrification. Increased power use per consumer is likely. One interesting possibility is substitution of hydro-electric for steam power. Much of our steam power is developed from the use of oil as a fuel With a dwindling oil reserve, we may decide to shift to hydro-electric energy.

Problems and Potentialities of an Expanded Post-war Reclamation Program

Before attempting an appraisal of this anticipated reclamation program, it seems desirable to enumerate and briefly discuss some of the problems, dangers, and potentialities of such a program. Many of these are conjectural; they may or may not eventuate.

Perhaps a major danger is that in one way or another these irrigation projects will become a vast soldier settlement scheme. Here will be new farming opportunities, created by federal funds, available just when economic opportunities for returning veterans are needed. What could be more natural than veteran settlement on these lands? This country has given preferential land settlement opportunities to the veterans of every past war; why should this one be an exception? Every economist interested in land knows that veteran settlement programs after World War I had an unhappy history. Development of raw land into productive farms by persons with limited capital is a difficult process attended by considerable hardship, even at best; when complicated by a rapidly falling price level, and by settlers many of whom are ill-adapted to farming, it is likely to become impossible. If reclamation development occurs on the scale previously assumed, many of the settlers will and should be ex-servicemen. These men will be young and will have limited capital; if they are really interested in farming, they may find their best opportunity on a new irrigation project. The test should be their knowledge of farm life, and their attitude toward farming as an occupation. If they would have made good settlers in the absence of their war experience, then they should be good settler prospects and deserving of special assistance because they are veterans. If aid to veterans is extended in fields other than agriculture, the veteran will be less tempted to undertake settlement of raw land because it is the only oppor-

tunity open to him. Should special assistance be given to veterans for settlement on irrigation projects, it is to be hoped that colonies composed wholly of veterans will be avoided.

A closely allied question is the optimum degree of planning for these irrigation projects. It is idle to talk of planning vs. no planning; even should the decision be to throw the settler wholly on his own, with no help or guidance of any kind, this is still a form of planning. At the other extreme, the settler might be placed on a fully developed farm unit, whose size, layout buildings and other major features had been decided for him. Some would refer to this as over-planning, and would urge that it be avoided. If an adequate supply of settlers is to be available, and if the groups most in need of farming opportunity are to obtain the available opportunities, then some special form of credit must be available to settlers. Farmers with adequate capital will generally choose farms in older, established areas. A major argument in favor of reclamation is that it provides agricultural opportunity to those who would otherwise not have it; if this objective is to be met, some means must be found to provide capital to the settler who lacks it. Special credit programs are needed. The nature of such programs and the most suitable agency to administer them are important problems on which there is unfortunately no accepted consensus. The credit agency must decide the type and degree of planning that it will adopt.

Another major problem relates to the relative emphasis on the various purposes of future projects. Since they will generally be multiple purpose projects, there will be different types of benefits and different groups who should bear part of the costs. Multiple purpose projects can usually be operated with relatively greater or lesser emphasis on each of the project purposes. Flood control is often said to require an empty reservoir as insurance against a flood, whereas power generation and irrigation require the filling of the reservoir whenever surplus water is available. The relative emphasis on the project purposes may vary, and will undoubtedly be a subject of contention as new projects are authorized. A major conflict has arisen with respect to the development of the Missouri River, for instance. Shall navigation improvement be undertaken even though it requires water necessary for irrigation development, or vice versa? This is an issue involving not only the "irrigation states," but more particularly involving an interregional struggle between the up-stream arid states which want irrigation and the downstream humid states which want cheap transportation. This controversy is now active on the Missouri River and has been raised on the Snake River; it will almost surely arise on every other important stream flowing eastward from the Continental Divide. Related to the question of the relative emphasis on the purposes of multiple purpose projects is the question of the agency which should construct and manage multiple purpose projects. If a project is to provide flood control, hydro-electric power and irrigation, some would say that it was immaterial whether the project be undertaken by an agency primarily interested in navigation and flood con-

trol, or by an agency primarily concerned with irrigation. Others would contend that the construction agency was a matter of great importance.

Closely allied to the question of relative emphasis on project purposes is the matter of cost allocation. Under present federal law, costs allocated to navigation and flood control are not reimbursable; costs allocated to irrigation are reimbursable over long periods and without interest; while costs allocated to power must be reimbursed with interest. The amounts allocated to each of these purposes is extremely important to the general taxpayer and to the beneficiaries of each type of project service. Cost allocation is a notoriously slippery, tricky, arbitrary business at best; and when the economic welfare of some groups is at stake, it may be impossible to approach the job without bias. The irrigation interests have sought maximum revenues from hydro-electric power, so that irrigation water costs would be a minimum. On one recent large project, the proposed allocation would require power sales to repay all direct power costs, all joint costs, and half of the direct irrigation costs. On the other side are the power advocates, who contend that low-cost electric energy will promote the economic development and prosperity of the region to the benefit of all, including even the farmer whose irrigation water is more expensive thereby. The members of this group believe that public distribution of power is essential in order to secure the potential benefits of low-cost power. They point to the experience of the Tennessee Valley Authority, which has demonstrated that the cost of power is determined by the price of power, within very wide limits. When the price of electric power is reduced, its use is increased so greatly that the cost falls, often fully proportionately to the reduction in price. The cost of hydro-electric energy is chiefly an overhead cost, with an extremely low marginal cost. A "cheap power" policy may mean rates far below those under a "maximum revenue" policy, and yet maintain earnings almost as high. The public power advocates have prevailed, at least to the extent that reclamation law requires that preference shall be given to public power distributing agencies.

Another important problem is to secure a wide distribution of the benefits arising from irrigation development. Two major considerations arise: (1) to get land into the hands of actual settlers, in units which they can farm and which will produce an adequate income; and (2) to prevent landowners from obtaining large unearned increments in land values, at the expense of the actual settlers. Both of these objectives have been sought through the acreage limitation and anti-speculation features of reclamation law. Under existing law, which has developed and been strengthened over a forty-year period, the owner of raw land must agree to dispose of all land in excess of 160 acres at an appraised price established without regard to the federal irrigation development, if he wishes to obtain irrigation water through the project works. This law has been moderately effective in promoting a wide distribution of land ownership and in making land available to actual settlers at reasonable prices. The Columbia Basin Act of 1943

strengthened these provisions for that project. In addition, studies have sought to make more specifically applicable the broad objectives of "family farms" and "adequate level of living."[3] More recently, an attempt has been made to remove all restrictions on size of landholdings and on prices of raw land, for the Central Valley project. Whatever may be the balance of favorable and unfavorable factors involved in irrigation development, few will deny that prospects for favorable results are strengthened, without any encouragement to unfavorable results, if the economic opportunities provided by irrigation development are widely distributed and if the settler is given the maximum opportunity for success. Retention of acreage limitation and anti-speculation features of reclamation law seems imperative if the broad social purposes of reclamation are to be achieved.

Summary and Appraisal

Is the post-war reclamation program, which we have assumed will be adopted, good national policy? Is it desirable from the viewpoint of the western region?

Before posing even a tentative answer, it seems desirable to repeat one of our introductory thoughts. Much of the support for reclamation, and much of the opposition to it, will not be on grounds of public policy but rather from purely selfish motives. The arguments for and against are likely to include any that are believed to have political potency, and may not be relevant or even accurate. We have assumed that a large measure of irrigation development will occur, even should the verdict be that it was not in the public interest. This does not assume that further irrigation is undesirable, as will be seen shortly, but only asserts that its desirability or undesirability from the standpoint of public policy is a minor consideration with many of its supporters. In this regard, reclamation is probably no different than flood control or other publicly financed improvements. Motives of private gain and pressure group tactics are likely to predominate in any case.

There is no question but that a post-war reclamation program of the magnitude assumed will raise serious problems both for the new areas and for established farming areas. The settler on new land faces difficult problems of developing and paying for his farm. In many projects, it is possible to set up a program under which the able, hard-working man with limited capital can obtain and ultimately pay for a farm. For the man adapted to such conditions, a new reclamation project can be made into a superior economic opportunity. Farmers in older areas are likely to question the need for more farm land in the United States. Most agricultural economists will agree with them. Competent estimates indicate that an increase of

[3] See Columbia Basin Joint Investigations, particularly problems 2, 6, 9, 13 and 14. Also, Fisher, Lloyd H.—What Is a Minimum Adequate Farm Income? Journal of Farm Economics, August, 1943. Vol. XXV No. 3.

twenty percent, or even forty percent, in total agricultural production in the decade following the war is entirely probable even under somewhat less favorable agricultural prices than prevail now. If these estimates be correct, why do we need more land?

Would economists ever have found development of new land profitable and economically rational, in the history of this country? Opening of the Ohio and Mississippi Valleys brought farm abandonment to New England and the Middle Atlantic states. Later, the opening of the western Corn Belt and the Great Plains brought ruinously low farm prices to the older farming areas. The development of the western Cotton Belt blighted the older cotton areas. It has become commonplace to say that it cost $2.00 to mine every $1.00 of gold during the California and Klondike goldrushes May not development of new farms have cost as much or more than they were worth, even to the pioneer, and especially to the nation which saw farm values shrink in the older farming areas? Certainly, there were many, many failures and living conditions were often pitifully poor. Perhaps a careful balancing of marginal costs and marginal revenue would have ruled out a major part of the developments which occurred. Yet out of this process came a great nation.

This nation has a growth complex; nowhere is this stronger today than in the West. We want more people, larger cities, more industries. We are firmly convinced that bigger means better. Our economic planning will fail to find popular support, may even encounter active opposition, if we ignore this deep-rooted attitude. We have an increased population in the West, particularly in California, and we need support for it. Increased agricultural production cannot employ all of the newcomers, or even half of them, but it can assist. Increased agricultural production not only means more people on the land; it means more people in rural areas providing goods and services to farm people, and more people processing and transporting the commodities produced.

If we have adequate nutrition for every class of people, after the war, then we will need all our prospective agricultural production, and more, too. If this situation develops, the production of newly irrigated land can be absorbed without difficulty. On the other hand, inadequate diets for a large segment of our population (roughly the situation prior to World War II), will cause burdensome surpluses even in the absence of irrigation development. In other words, irrigation development, like many other aspects of our economy and social structure, stands or falls on the level of economic activity of the nation. We can absorb—will need—the products, under some conditions; under others, they will be unneeded or even burdensome.

Increased irrigation in the West presents a great opportunity, a great challenge. If properly taken advantage of, the region and the nation will benefit. If fumbled, every problem will rise, full scale, and the advantages will be lost.

DISCUSSION BY: S. T. Harding, Consulting Civil Engineer, Berkeley

Mr. Clawson's paper presents a general background of the irrigation development in the western states and then proceeds to describe and discuss the extent and character of post-war development that may occur. He distinguishes clearly between the facts of the past and the conjectures of the future. He discusses the factors that may determine the extent of post-war irrigation development with his own opinions regarding their individual and collective effect without attempting to set up any single or specific definition of what such collective effect may be. All familiar with the cross currents and purposes surrounding our present publicly financed irrigation projects will recognize the difficulty of making specific forecasts in this field. Comments may be made on some items in Mr. Clawson's paper. These are well within the range of differences in individual points of view in this field.

Under the heading "Probable Irrigation Development in the Decade after the War," Mr. Clawson describes some of the programs that have been presented by interested federal agencies. These programs are extensive and the projects widely distributed to secure general support. In these programs it is difficult to distinguish the desire to meet post-war problems from the ambition to maintain or expand the agency sponsoring the program. While we have the construction capacity to meet the schedules proposed, the rate at which we have absorbed the output of new lands will require long periods for their actual settlement.

Mr. Clawson concludes that provision of a full water supply for three million acres and a supplemental supply for three million acres more seems probable for the first decade after the war. While construction on this scale may occur, this amount of land cannot be settled and developed in this period under any natural processes. These areas exceed the lands irrigated by the federal projects in its past 40 years of activity during much of which the land demand was more active than at present. The projects undertaken to make employment during the thirties have actually been completed to serve only a relatively very small area in the ten years since this type of expenditure began.

There is an eventual limit on the area which our available water supplies can serve. If we proceed too rapidly toward this limit by projects publicly paid for we will exhaust this field for employment relief for later depressions. Conservation of such employment opportunities as well as conservation of their costs may be as desirable as other types of conservation of natural resources.

Mr. Clawson touches on the power features of these irrigation projects. This is an even more controversial field than irrigation. Increased development of by-product power on irrigation projects may also require increased steam power as few of the proposed projects have the amount of assured hydro-capacity of Boulder Dam or plants on the Columbia River.

Mr. Clawson states that the reclamation law requires that preference shall be given to public power distributing agencies. The provisions of the reclamation act in this regard are the same that have been in the Federal Power Act since its original passage in 1920. All that was intended or required is that such public agencies be given an equal opportunity to secure such power and that they should secure it where other factors are equal. There is nothing in these statutory provisions to justify or support the efforts made by some to foreclose sales of power to private agencies.

The writer agrees fully with Mr. Clawson's comments on the dangers of soldier settlement schemes on irrigation projects. Returning soldiers are expected to have preference in securing the jobs they left to go to war. Those in agriculture prior to the war will generally come from and can return to their former places as fully and as well as the returning industrial or commercial workers. It is not a kindness to a returning soldier without agricultural experience to place him on a newly made irrigated farm.

Mr. Clawson concludes that some special credit program will be needed if new projects are to be quickly settled. This conclusion is sound. This condition, however, illustrates how far even our present development has advanced beyond the real demand for new lands. Various group pressures have resulted in our past construction programs getting ahead of the demands of settlers able and willing to provide the funds for land development. We would get a sounder development if we waited for the demand to catch up with the supply.

Mr. Clawson includes some comments on the question of size limitation on land ownership. The discussion on this subject in California in recent months has been voluminous. It is well to keep in mind, however, that the 160 acre statutory limitation does not create small farms; it merely prohibits large farms. It has generally given little difficulty on past federal projects because it has been readily evaded. Such evasion methods will not work easily under California

conditions and some practical solution will have to be found. Small farms have always resulted from irrigation development in California without artificial restrictions and the same factors will function in the present projects if the limitation is remved.

The writer has little concern over speculative land profits. All land purchases are voluntary and lands can always be found at reasonable prices if the buyers refuse to bite on inflated prices. The financial agencies who have been carrying foreclosed lands since the depression, trying to get out their mortgage values without loss, will probably be hard to convince that California lands can be sold at artificially enhanced values. The experience of the last war does not indicate that current inflation in land prices will last until the proposed irrigation projects become operative. There are no indications that the land demand of about 1905 to 1910 which resulted in such high land prices on projects coming into use at that time will be repeated. Subdivision sales on large undeveloped tracts in the Central Valley Project, where the purchaser assumes the costs and limitations there involved, may be difficult to make except at prices representing a close approach to costs incurred in securing and holding these lands to date. We should still leave to the individual the right and the opportunity to lose the money he may have acquired as well as the similar opportunity to make additional profits. To control the opportunities for either profit or loss beyond the needs for preventing general fraud necessarily requires transferring the responsibility and control of property to some regulating agency which would assume the guardianship of the individuals. This would represent a reversal of past principles and practices in this country and should be undertaken, if at all, only when its full results are understood and have been approved by a convincing majority of those to be subject to such guardianship. The average American has not, as yet, been adjudged incompetent to manage his own affairs by any court of competent jurisdiction.

DISCUSSION BY: Roy J. Smith, University of California at Los Angeles

Dr. Clawsons' appraisal of the prospects of future reclamation activity sounds probable. Naturally, as he says, the vagaries of politics are such as to render forecasting difficult. It also seems reasonable that much of the support, and opposition, too, "will not be on grounds of public policy but rather from purely selfish motives." Dr. Clawson is also right in saying there is no such thing as no planning.

When, however, reference is made to the soundness of the reclamation program, there is, it seems to me, a note of fatalism in the paper. First Dr. Clawson regards Federal Reclamation as inevitable regardless of the economists' verdict, and second he thinks it may be desirable anyway. It's sort of a reverse on the fable of the fox and the grapes. We can not prevent it so we must live with it as best we may. Such may be an agreeable philosophy of life, but to conclude that the original analysis was wrong is quite a different matter.

The point at issue is clearly brought into focus by the comment on our past history. Dr. Clawson wonders if economists would "ever have found development of new land profitable and economically rational?" It is quite possible that an economic analysis of marginal costs and marginal revenue, if made from the broad viewpoint of the general public welfare, would have ruled out a major part of the developments of our history. The economist is simply not capable of determining the details of what the individual should do for the benefit of the general public.

Many will hasten to object to such a view and will argue, for instance, that even if such limitations may have been true in the past, say in the days of Adam Smith, we know much more now. Look at our mass of statistics, they might say. But look also at the enormous increase in the complexity of our problems. Spencer long ago noted that development is simply an increase in complexity.

Complexity makes more necessary than ever the division of authority into responsible units. Now as always, development starts from the selfish viewpoint, which Dr. Clawson grants, but also has been checked by individual responsibility, which the Federal Reclamation Bureau discards. The past has had its shortcomings, but many as they are, they primarily demonstrate the difficulties of planning even in the individual's small field of operation. The complexity of the problems when viewed from the standpoint of public welfare rule out a worthwhile dollar and cent evaluation of particular results. This proposition may be illustrated from a few of our reclamation problems.

Government spending for reclamation, like other government spending, is commonly thought of as a stimulus to business and employment. Such is a possibility but is it a necessity or even a probability? Continued government spending means more inflation and more taxa-

tion. Spending is now an old program and only an overdose can be expected to produce any effect. The time may be near when continued inflation or continued heavy taxation will clog our national energy more than the resultant spending will stimulate it. An analysis of government spending which ignores the cost side is certainly a partial one. It is most unfortunate that most of the so-called plans that are being drawn up are nothing more than spending programs.

Dr. Clawson notes correctly the part that the level of economic activity in the nation will play on the results obtained from reclamation. A large enough demand may well absorb the increased production. Moreover it may be viewed as a requirement for success. All the more reason then for regarding a sound national financial policy as a necessity. Another hint at complexity may be given by noting that a sound financial situation may eliminate the need to stimulate business or subsidize economic reclamation.

The complexities imposed by public policy are nowhere more clearly brought to light than in the question of productivity. Few areas wait development which have not been rejected for other land and all too much of the latter should also have been rejected. Our official soil reports are anything but forthright and require the most critical analysis to be of value. Yet the Reclamation Bureau takes their most optimistic statements, surveys vast areas by itself, and virtually ignores all warnings, patent as they may be. It can, moreover, do little else if it wants to maintain good political relationships with its constituents. Public policy may be used as an argument, but as Dr. Clawson points out, selfishness will decide the issues.

The importance of the land quality involved can not be overemphasized. The problems of price changes, settler experience, capital and other factors which Dr. Clawson mentions as causes of the failure of veteran settlement programs after the last war were minor compared with the effect of land quality. The programs after the last war failed because the agencies involved were unable to find land worth developing and for no other important reason.

Choosing land is always a relative matter. A given line of action may produce a certain result, but some alternative may be far more remunerative. Good investment, whether of capital or labor, is a search for the best alternative. The Federal Reclamation program is a poor choice. Our present acreage has demonstrated, both before and during the war, its ability to satisfy any probable demands.

Once subsidization is adopted in developing land any logical basis for choice is eliminated. Soil technicians may divide the land into classes of differing desirability, but the Reclamation Service more logically plans to irrigate everything. By what logic can one draw a line on the desirable degree or amount of subsidy?

The choice of enterprise may be as complex as the choice of land. As an instance of the difficulties involved, reference may be made to the Reclamation Bureau's apparent intention to encourage dairying but discourage oranges. I wonder if it is wise? Why has dairying needed excise tax protection, monopoly power, and subsidies? Why do orange acreages continue to expand in spite of trade hindrances? An answer that does not have reference to particular land and a particular man is largely conjectural.

Settler reaction to governmental appraisal of land productivity and market demand opens still another problem for government planning. More complex than the layout of farms and similar physical arrangements is the determination of human relationships, such as the responsibility for losses. With the production and markets that appear probable, losses are going to be frequent and extreme. Who will take these losses, the settler or the government? At what level of living will the settler be satisfied and above which he will not demand further government aid? In the past the Federal program has been an unending series of disputes upsetting alike to individual morale and political health. Is there any solution between private enterprises and complete communism?

Dr. Clawson maintains, however, that regardless of drawbacks, the program will go on. Probably so because, as he says, western farmers have supported Federal Reclamation even when it meant increased competition. One reason for such support, however, is that the political axiom of live and let live has made practical a working arrangement between the supporters of reclamation, high tariff, hard money, and other similar policies which have made opposition very impolitic. More important the public has been taught in school and out of school that the Federal Reclamation program is highly commendable and advantageous to the general welfare. With such support and such teaching there is nothing mysterious about the support for the Federal program. Our serious problem today is the phenomenal increase in such teaching and its more ready acceptance by the public.

This teaching leads to the question of responsibility. The Reclamation Bureau maintains

that it merely carries out the will of Congress. In fact, however, the Reclamation Bureau has propagandized its program through publications, speeches, and every other possible device. Administrative and research staffs can not escape a considerable amount of responsibility for a program even when they do nothing more than work on it. It is always difficult to draw a line between the performance of technical service and the approval of a program. It is virtually impossible for the economist to do so. Budgets are primarily opinions, particularly when production, markets, and settler are all unknowns. Averages merely serve to evade the detail that is required. The settler will be interested only in his own farm and will place responsibility on the man who does the planning for that farm. I should not want to be responsible for putting an ex marine on some of the land that the Reclamation Bureau contemplates settling.

All this refers us again to the fatalism expressed by Dr. Clawson. Does economic analysis have no value? Is growth proof of wise decision? Is growth precluded if governmental subsidies are eliminated? I think not.

The part of the economist seems as always to be the unpopular one of maintaining the fundamentals of his philosophy and no elements in that philosophy are more important than the desirability of using resources wisely and the need for individual initiative and responsibility.