REPORT SUBMITTED BY ARTHUR M. HYDE, SECRETARY OF AGRICULTURE, TO THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS

WAR DEPARTMENT,
January 30, 1932.

THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
War Department.

GENTLEMEN: In response to your public notice of December 19, 1931, dealing with the proposed development of the Columbia River and in particular the Columbia Basin irrigation project, we desire to submit the following statement.

The Department of Agriculture does not here attempt to report on the economic feasibility of the Columbia Basin project. We want to present some facts which bear upon the relationship between this project and the long-time outlook for the agriculture of the region and of the Nation.

The irrigation project would bring into production 1,200,000 acres. Your engineers have estimated that the combined power and irrigation development would cost more than $400,000,000. This discussion is based on the demand that the United States Government should provide the money, repayable at 4 percent over a long period of years.

I take it that your opinion thus far is summarized in the following sentences from the public notice:

> From the information presented the Board is not convinced of the advisability of the United States participating in the construction of this project at the present time. * * *
>
> It has been estimated that a period of 25 years might elapse after the completion of construction before the entire power could be disposed of. The cost of irrigation by this project is high and it would be impossible to finance the project on the basis of returns from the sale of irrigation water even if no interest charges were considered. The financing of the entire combined project by the combined receipts from the sale of water and the sale of power might be possible under certain conditions. Such financing would require the use of the profits of the power development to provide irrigation. Whether or not such profits would be sufficient would be dependent on the growth of the demand for electric power over a period in the comparatively distant future. The total investment required would be in the neighborhood of $400,000,000. Agriculture in the United States has been suffering from overproduction for a considerable period of years. It does not appear that large expenditures by the Federal Government for the purpose of bringing new land under cultivation are justified at the present time.

We share your skepticism of the economic desirability of the project. Our agricultural plant is already too large. We already have a productive agricultural capacity far beyond our needs. We have 964,000,000 acres classed as land in farms. On about a third of this acreage we are already producing enough products to feed and clothe our population and send vast surpluses abroad. These surpluses are at once the cause of low prices and our farm problem. If we are to have a profitable agriculture, we need to prevent these surpluses. To do so we need to reduce our present cultivated acreage by probably 30 or 40 million acres.

In large part because we have had a decade of overproduction and overexpansion there are these further facts to hurdle: (1) The farmer's purchasing power is 42 percent below the pre-war level (1910–14); (2) taxes on farm property are two and a half times what they were in the pre-war period; (3) farm land values the country

over are virtually back to pre-war levels; (4) the total farm mortgage debt is now almost three times as much as it was in 1910; and (5) forced sales of farms for the 5 years 1926–31 totaled 134 per thousand.

As the farmers of the State of Washington are painfully aware, in their State during the past 5 years more than 147 farms per thousand went under forced sale—a third of them because of delinquent taxes, two thirds of them by foreclosure of mortgage or bankruptcy. Of the Federal land bank loans outstanding on November 30, 1931, Washington reported 18.3 percent of its loans delinquent, a majority of these for more than 90 days.

The market is glutted with farm lands at depressed prices. There are no takers. It is plainly and indisputably against the interests of the farmers of Washington and of the adjoining States to undertake a project that would bring into production 12,000 more farms. Private enterprise would not think of attempting it. For the Government to attempt it would be indefensible.

Those 12,000 additional farms would compete directly with the 71,000 farms already established in the State of Washington, and with the 144,000 farms in the adjoining States of Oregon, Idaho, and Montana, for every new farm competes with every established farm just as surely as every new steel mill, or oil well, or grocery store competes with every established unit.

The men on the 215,000 farms in those 4 Northwestern States have not been lying down on the job. They have produced—until it hurt. The consumers of the Northwest need have no fear of famine. Washington produces 48 percent more per capita than it consumes per capita; Oregon, 61.7 percent more; Montana, 247.9 percent more; and Idaho, 252.8 percent more, according to the figures for 1924–28. The 11 States of the far West represent 9.3 percent of the population of the United States, but they produce 51 percent of all the alfalfa, 22 percent of all the hay, 23 percent of the wheat, 43 percent of the apples, 90 percent of the grapes, 100 percent of the lemons, and 70 percent of the oranges. Therein is enough bread and fruit, milk, and meat for many millions of people.

The hard fact is that because of climatic limitations the Columbia Basin cannot grow a crop of which the Nation does not now produce huge surpluses.

The farmers of the Northwest must look askance at the project for another reason. It is proposed to have the Federal Government spend $400,000,000 to bring 1,200,000 acres into production. That figures down to a construction cost of more than $333 per acre.

To that basic cost of $333 per acre the settler must add the cost of the land (90 percent of the land in the project is privately owned), the cost of leveling, ditching, and draining, and of buildings, equipment, and livestock. If, before he tries to add all that up, he looks around him, he will see an average valuation for farm land and buildings of $57.17 per acre in the States of Washington, $38.12 in Oregon, $11.81 in Montana, and $44.64 in Idaho, according to the 1930 census. Even if the average valuation per acre for Washington were double the present figure the per acre cost on the Columbia Basin project, however, it may be figured, must remain grotesquely uneconomic.

We fail to see how the project can possibly constitute a sound opportunity for any prospective settler. The competition afforded

compared with older agricultural countries, the United States has hardly scratched the surface of the possibilities in the use of fertilizer.

All these factors combined will probably make it possible for the United States to provide for domestic consumption with little or no increase of crop acreage. And if the trend in our exports of farm products continues downward, we may need less land under cultivation 30 years from now. As it is, American agriculture is cruelly out of balance. It will require a good many years to achieve a balance, even if no acreage by homesteading or reclamation is added.

Even if, contrary to our expectations, we should have a sudden and considerable national need for more land in crops, we have more than 500,000,000 unplowed acres to fall back on. Our present crop acreage could be more than doubled. Some 300,000,000 acres would require only plowing to bring them into cultivation.

There are 170,000,000 acres in forest and cut-over land physically capable of crop production after clearing and, in some cases, draining. Of the 113,000,000 acres of wet lands in the United States, some 91,000,000 acres—22 percent of our present crop acreage—would be suitable for crops after drainage and, in some cases, clearing.

Of the 84,000,000 acres in organized drainage enterprises in the United States in 1929, only 65 percent of the total area was planted to crops. Our studies show that there are large areas of productive land in these districts awaiting only the economic need to bring them under cultivation by private enterprise.

Similarly, the 1930 census shows 30,599,470 irrigable acres in irrigation enterprises, Federal and private, but only 63.9 percent of the total actually irrigated. Engineering works were capable of providing water, however, for 84.7 percent of the total irrigable area. The irrigated acreage in 1930 could thus have been a third greater than it actually was, so far as availability of water was concerned. This situation has obtained for many years. It is approximately as true of our Federal reclamation projects as of private irrigation enterprises.

In both drainage and irrigation districts, Federal as well as private, the economic successes to date have not been so numerous as to call for more. Many districts are in desperate financial straits now, as evidence presented to congressional committees will testify. In all too many cases the trouble traces back to the fact that the district was organized without proper analysis of the probable demand for the crops to be grown.

With respect to Federal projects, Congress has passed a series of relief acts during the past decade, among them the Omnibus Reclamation Act of May 25, 1926. This act increased the period of repayment of construction charges, at the discretion of the Secretary of the Interior, to 40 years. It formerly was 20 years. This has permitted the reduction, in effect, of delinquent payments due on construction charges. Another section of the act permitted direct charge offs for a variety of reasons outside the control of the settler. Up to June 30, 1930, a total of $15,578,855.60 was charged off or accounted for as loss.

Our experience thus far, both in private and in Federal reclamation attempts, suggests that the dramatic appeal of turning a desert into a garden spot has too often outweighed considerations of economic feasibility. Fertile soil is not the only factor in cost of production

or in the happiness of the settler. The vision of high yields without regard to cost has led to misfortune for too many settlers.

Discussion of the project, however, cannot be confined to economic facts. Broad matters of national policy are involved.

Let it be noted that the Columbia Basin project has been considered an irrigation project from the start. Dozens of boards and commissions passed judgment on it as such. The proponents for the project considered it as such. For more than a decade they argued for it as such.

That argument failed. Now it appears as a combination power and irrigation project. Nevertheless, its purpose still is to bring more land into production.

To this, American farmers have a right to protest. Obviously as a pure irrigation project it would never be built. As a pure power project it would never be considered by private capital. Combined, it adds power as a further subsidy to irrigation, and is therefore the more dangerous to agriculture. The Government has not yet gone into the power business. The speedy divorce of reclamation and power would be better for both.

The reclamation revolving fund has always been in large part a subsidy from the United States Treasury. Proponents of governmental reclamation usually attempt to justify the expenditure of public funds for such projects on the ground that the source of the reclamation fund is the proceeds of sale of public lands and the income from mineral rights. These public revenues belong to the States, it is argued, in which they originate. It is pertinent to reply that public lands are public property; that they do not now and never have belonged to the States in which they are located; and that the State in which they are located is no more entitled to influence the expenditure arising from their sale or lease than the port of New York is entitled to dictate the expenditure of customs duties collected there or the State of North Carolina to determine the objects upon which tobacco taxes are to be expended.

Since the Coulee Dam and irrigation project would cost upward of $400,000,000, and since the reclamation fund amounts to only $100,000,000 (commitments already having been made in excess of any possible additions to that fund), it is difficult to escape the conclusion that this expenditure must come directly out of public revenues derived from taxation.

Interest-free funds for Federal reclamation have constituted a subsidy for a quarter of a century. The extent of that subsidy has been estimated at more than $200,000,000. Is still another form of subsidy necessary? If necessary, is it sound national policy? It seems manifestly unfair to established American farmers—in the Northwest as well as in the East—who have invested some 50 billions of dollars in the agricultural plant, to complicate their economic difficulties by subsidizing the expansion of new acreage.

The existing Federal reclamation policy has brought into production around 2½ million acres, if Warren Act lands be included. Production from this area is only a small percentage of the total agricultural production of the United States, but is a large and highly important percentage of the surplus production of the United States.

We are not opponents of reclamation nor of the development of the resources of any State whenever such resources are capable of profit-

able development. Generally, private capital is a better judge of the profitableness of any development, and a much better administrator than the Government ever will be. Only when important national interests are involved which private capital cannot or will not serve, should the Government invade this field.

We have already embarked upon a large number of reclamation projects. Few of them, in spite of vast subsidies in the form of write-off charges or forgiven interest, are successful. They need much in the way of betterments before they can support suitably the settlers already there. New projects increase the competition and the problems of such established projects and delay the achievement of any real success. It is our view that the proper field of reclamation service lies not in expansion to new fields, but in the development of the projects we have.

The question here is not one of helping the people of the area involved in the Columbia Basin project, unless it be the landholders. Twenty or more years ago dry-land farmers settled there to grow wheat, under the stimulus of a few wet years. The abnormal rainfall did not long continue. The attempt to farm there was a gamble, with the odds against success. Farms and communities were before long abandoned. At present the area is for the most part unsettled. No one will be displaced or disturbed if we refrain from the development. To build this project with Government funds means that we shall be setting up competition for the millions of farmers already established who are struggling desperately to retain their homes. To increase their problems, in any degree no matter how small or how remote, could be justified only on the ground of urgent national needs which do not, at this time, exist.

Finally, the future of our national-land policy is involved. The day of settlement in this country is about over; the day of resettlement, of regrouping, of adjustment to new economic conditions is here. The farmer of the past, often a pioneer, spent his substance struggling with physical forces. The farmer of today faces a struggle with economic forces.

We have graduated, I hope, from the day when people were lured to the land by means of brass bands and perfervid promises. We may not be able to prevent some private-land agencies from continuing unwise blandishments, but we should at least keep governmental agencies aware of our changed national needs.

The proper size of our agricultural plant cannot be too definitely fixed. Conditions change, and national demands upon agriculture change with them. Nevertheless, one great benefit from a proper land policy would be the approximation of the size of our land plant in the light of economic conditions. We ask the farmer to adjust his acreage. His is an impossible task if the Federal Government is constantly enlarging the total acreage to which he must adjust his own. The Nation, as well as the individual, must do its share to prevent the ruinous blight of overproduction.

Sincerely yours,

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We fail to see how the project can possibly constitute a sound opportunity for any prospective settler. The competition afforded

by the project will, on the other hand, inevitably make the lot of farmers now established in the Northwestern States more difficult than it already is. Nobody will be disturbed or displaced if the project is not undertaken until it is needed; many thousands of established farm families, particularly in Washington and adjoining States, will have to face sharp competition and greater depression if it is constructed.

The proponents of this project are not farmers. Farmers have not beseiged the Congress with demands that the Columbia Basin irrigation project be undertaken. No farmer of the Northwest would, in his right mind, urge the Nation to undertake something that would add to already burdensome surpluses, depress prices of his products, reduce the value of his land, threaten his economic security, and lift huge sums out of the United States Treasury for the avowed purpose of agricultural expansion in an era when precisely the opposite policy is called for.

If the project is not needed for the agricultural development of the Northwestern States, the question arises, Is it needed for the agricultural development of the Nation? The fact that it is to be built with national funds makes that inquiry pertinent. It must be judged largely upon its economic value to the Nation. Unless the Nation as a whole needs the project, it has no economic justification.

The fact that the four Northwestern States already produce 110.7 percent more than they consume proves that the excess must compete for sale in world markets or in the markets of the United States. This competition, as well as the fact that national funds are to be used, reveals the project as a national problem.

We have already mentioned some of the elements in the Nation-wide agricultural situation. We do not expect the present extreme depression to continue. Nevertheless, for agriculture it has been a 10-year, not a 2-year depression. The evidence is by now fairly conclusive that we face a change in the long-time market prospects for agricultural products.

We are witnessing a desperate struggle for self-sufficiency on the part of European nations; increased competition for world agricultural markets from the vastly increased acreage and production of such countries as Canada, Argentina, Australia, and Russia; the significant change in our status from a debtor to a creditor nation; and the distinct slowing up in the rate of population increase in the United States. These factors bear directly on the prospect for consumption of farm products, the prospective demand for crop acreage, and the direction our national agricultural policies should take.

We have to base our plans for the future on the prospect of a stationary population of less than 145,000,000 by about 1960. As late as 1923 population was increasing at the rate of nearly 2,000,000 a year. Now the annual increase is less than a million. Barring a radical change in our immigration laws, we can expect during the next 10 years a population increase of only half of that of the last 10 years.

In the State of Washington population increased during the past decade at the rate of 15.2 percent. The average for the United States was 16.1 percent.

The population trends further suggest that the consumption of farm products in Washington, as in all the far Western States except California, will not increase as rapidly as in the United States as a

whole. To supply the California market with the needed meat and dairy products all the Western States are already in competition with one another. Dry lands compete with irrigated lands; irrigated lands compete with other irrigated land. Hundreds of millions of acres of cheap grazing lands, not to mention irrigable lands—even in Federal projects—are not yet fully utilized.

Nor does there appear to be much prospect for a change in the diet that will materially increase the per capita requirements for farm land. Since the turn of the century the increased consumption of milk and pork has been largely counterbalanced by decreased consumption of beef; the decreased consumption of cereals has been counterbalanced by the increased consumption of sugar and vegetables. The net result has been a total per capita consumption of farm products in the maximum years (1926 and 1928), when urban prosperity was highest, only 6 percent above the average of the pre-war period, 1909–13. For over 30 years the total per capita consumption of farm products has not varied more than 10 percent. It has now (1931) fallen slightly below the average for 30 years ago. It therefore seems probable that for at least several decades to come the domestic demand for farm products will vary almost directly with the Nation's population growth.

Since the domestic demand is hitched snugly to population growth, hopes for any considerable expansion turn next to the export market. The prospects here are least encouraging of all. American agriculture can no longer look to the export market to absorb large surplusses. Even if economic forces turned sharply in our favor, there would still be the fact that in our best market—northwestern Europe—population rates of increase have shown a marked tendency to decline.

There may ultimately be possibilities for expansion of our trade with the Orient. No marked possibilities are visible to the naked eye as yet. Meanwhile, American agriculture has to adjust itself to the outlook which stubborn facts indicate, not to the outlook which our hopes would fashion for us.

How much land, then, will we need in crops in the next few decades?

Recall that since the World War the agricultural production of the United States has increased about 20 percent, whereas total crop acreage has remained more or less stationary, and population has increased only 16 percent. In fact, crop acreage was lower in 1931 than in the peak year, 1919, even though population had increased about 20,000,000 between 1919 and 1931.

Recall also that four factors account for most of this increase in production: (1) Substitution of tractors and automobiles for horses and mules, which between 1918 and 1931 released 30,000,000 acres of crop land for other than horse and mule feed: (2) increased production of meat and milk per unit of feed consumed, which has added the equivalent of 25,000,000 acres to the crop area; (3) a shift from the less productive to the more productive crops per acre; and (4) a shift from beef cattle toward dairy cattle, hogs, and chickens, which produce more food than beef cattle per unit of feed consumed.

The first two and most influential factors are likely to continue. Another factor, increased production per acre, through wider use of cheap fertilizer, seems destined during the next few decades to increase crop yields notably, and probably much faster than population. As

compared with older agricultural countries, the United States has hardly scratched the surface of the possibilities in the use of fertilizer.

All these factors combined will probably make it possible for the United States to provide for domestic consumption with little or no increase of crop acreage. And if the trend in our exports of farm products continues downward, we may need less land under cultivation 30 years from now. As it is, American agriculture is cruelly out of balance. It will require a good many years to achieve a balance, even if no acreage by homesteading or reclamation is added.

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That argument failed. Now it appears as a combination power and irrigation project. Nevertheless, its purpose still is to bring more land into production.

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Finally, the future of our national-land policy is involved. The day of settlement in this country is about over; the day of resettlement, of regrouping, of adjustment to new economic conditions is here. The farmer of the past, often a pioneer, spent his substance struggling with physical forces. The farmer of today faces a struggle with economic forces.

We have graduated, I hope, from the day when people were lured to the land by means of brass bands and perfervid promises. We may not be able to prevent some private-land agencies from continuing unwise blandishments, but we should at least keep governmental agencies aware of our changed national needs.

The proper size of our agricultural plant cannot be too definitely fixed. Conditions change, and national demands upon agriculture change with them. Nevertheless, one great benefit from a proper land policy would be the approximation of the size of our land plant in the light of economic conditions. We ask the farmer to adjust his acreage. His is an impossible task if the Federal Government is constantly enlarging the total acreage to which he must adjust his own. The Nation, as well as the individual, must do its share to prevent the ruinous blight of overproduction.

Sincerely yours,

(Signed) ARTHUR M. HYDE,
Secretary.

APPENDIX TO STATEMENT SUBMITTED BY THE SECRETARY OF AGRICULTURE

Prepared by Division of Land Economics, Bureau of Agricultural Economics, United States Department of Agriculture

THE PROSPECT FOR CONSUMPTION OF FARM PRODUCTS

The future need for farm products from central Washington can be considered with reference to—

(1) The adjacent area of Washington, Oregon, and Idaho.
(2) The 11 Western States.
(3) The United States.
(4) Foreign countries.

The need for farm products in each of these regions will depend upon population growth and changes in consumption per capita.

THE PROSPECT FOR POPULATION GROWTH

It is more hazardous to estimate population growth in a State than in the entire United States, because of unrestricted migration within the United States. It is best, perhaps, to start with the prospect for population growth in the United States, since, assuming no relaxation of the restrictions on immigration, this can be estimated for several decades ahead with considerable assurance.

Population prospect for the United States.—The following table (I), compiled by P. K. Whelpton, of the Scripps Institute for Population Research, Miami University, from census data, but with allowances for incomplete reports of both births and deaths, shows the approximate net increase in population each year 1920 to 1930. In 1931 the returns to the Census Bureau during the first 10 months indicate that the year's births will be about 2,370,000 and the deaths about 1,440,000, leaving a natural increase of 930,000. The net emigration for 1931, as estimated on the basis of 11 months' returns, will be about 90,000 (emigrants exceeding immigrants), leaving a net increase of population during the year of about 840,000.

TABLE I.—*Population increase in the United States, 1920 to 1930*

[Thousands]

Year	Population Jan. 1 [1]	Births [1]	Deaths [1]	Natural increase	Net immigration [2]	Increase in population [3]
1920	[4] 105,711	2,848	1,390	1,458	495	1,948
1921	107,659	2,946	1,255	1,691	280	1,966
1922	109,625	2,772	1,291	1,481	277	1,753
1923	111,378	2,795	1,361	1,434	707	2,133
1924	113,511	2,851	1,326	1,525	295	1,815
1925	115,326	2,790	1,364	1,426	252	1,672
1926	117,008	2,725	1,432	1,293	304	1,592
1927	118,590	2,625	1,355	1,270	252	1,519
1928	120,119	2,491	1,445	1,046	216	1,258
1929	121,377	[5] 2,399	[5] 1,449	950	222	1,168
1930	[6] 122,535	[6] 2,410	[6] 1,390	1,020	90	1,110

[1] Calculated by Scripps Foundation for Population Research, mainly from data in annual numbers of the census reports Birth Statistics and Mortality Statistics.
[2] U.S. Department of Labor: Annual Report of the Commissioner General of Immigration. Washington. Government Printing Office. 1920 to date.
[3] Natural increase plus net immigration, decreased by 0.3 percent each year so the total gain for 10 years and 3 months agrees with that shown by the 1920 and 1930 censuses.
[4] Fourteenth Census, vol. I.
[5] Preliminary.
[6] Census enumeration for 1930, minus gain in population during January–March 1930.

It will be noted that 10 years ago, indeed as late as 1923, the population of the Nation was increasing nearly 2,000,000 a year. Now the increase is less than 1,000,000. (See fig. 1.)[31] Between 1921 and 1931 the number of children born in the United States dropped from about 2,940,000 to about 2,370,000. Immigration declined from nearly 300,000 to a net loss of about 90,000 in 1931, and the number of deaths increased over 100,000. The increase in deaths was not because people were dying younger, but because there is an increasing number of old people. The number of people over 65 years of age increased 34 percent between 1920 and 1930, according to the census, whereas the number of children under 5 years of age decreased 1 percent. Enrollment in the first grade of the public schools has been declining irregularly since 1918, in the second grade since 1922, and in the third grade since 1924. The rapid decline in the birth rate since 1924 has not had time to be reflected in the school-enrollment statistics.

On the basis of these trends in births and deaths, and assuming only as large immigration as is allowed by the quota law, Mr. Whelpton estimates an increase in the Nation's population during the next 10 years about half that during the last 10 years, and a stationary population of less than 145,000,000 people about 1960. This estimate accords with that of Dublin and Lotka, of the Metropolitan Life Insurance Co., and is accepted by all population statisticians of the Nation. A few years after 1960, as the young and middle-aged people of today attain old age and die, a slow decline in the Nation's population may set in. The present birth rate, after allowance is made for the larger proportion of women of child-bearing age, than there will be in the future, is scarcely sufficient to maintain permanently even the present population of about 125,000,000.

WILL THE TREND IN BIRTHS AND DEATHS PERSIST?

But it is fitting to ask, May there not develop a decline in the death rate or a rise in the birth rate? With reference to the death rate, physicians and statisticians of the insurance companies agree that there can be little further extension in the United States of the average span of life. At present a new-born child, it is expected, will live to be nearly 60 years old on the average, whereas in New Zealand, a pastoral country whose record an industrial nation like the United States can scarcely hope to equal, the new-born child will live to be 64 on the average. This is the highest in the world. Although the expectation of life in the United States may increase slightly, a rise in the death rate is inevitable, as the young and middle-aged people, the heritage of a higher birth rate and a heavier immigration in the past, grow older. Only 1 person in 85 to 90 of the Nation's population is dying each year at present, and it is obvious that every new-born child does not live to be 85 to 90 years old. In a few years the death rate will rise, unless a great increase in immigration occurs, simply because there will be more old people to die. There is no hope, therefore, for an increase of population through a decline in the death rate. Let us consider, therefore, the prospect for the birth rate.

[31] Not printed.

The major immediate causes of the rapid decline in the birth rate since the World War are the reduction in European immigration and the increase in migration from farm to city. The immigrants from Europe were mostly young people, recently married or of marriageable age. Moreover, many of these immigrants, perhaps most of them, came from peasant farms where the tradition of large families persisted. The recent rapid decline in the ratio of children to women of child-bearing age in the cities has been confined to the population of foreign birth or parentage. The foreign-born mothers are growing older and, therefore, having fewer children, while the native-born mothers of foreign parentage are adopting urban American ways. For many years native-born mothers in the large cities have not been having enough children to maintain even a stationary population.

When foreign immigration was restricted during and after the World War, a greatly increased movement set in from the farms to the cities, which has persisted until recently. For the first time in the Nation's history (except possibly between 1910 and 1920) the farm population diminished during the past decade. This migration also has been mostly of young people—middle-aged and old people cannot well learn a new occupation and make the many other adjustments necessary. Since farm people have a much higher birth rate than city people (almost twice as high as in cities of 100,000 population and over), this migration of the young to the cities, where they will have fewer children than on the farm, is reducing the Nation's birth rate.

Moreover, the flow has been so great that it has depleted the farm population and diminished the number of people who can migrate from the farms to the cities in the future. There were in 1930 over 650,000 fewer children under 5 years of age on farms than in 1920, a decrease of one sixth; and 350,000 fewer children 5 to 9 years old, a decrease of nearly one tenth. On the other hand, there were nearly 300,000 more people over 55 years old on farms in 1930 than in 1920, an increase of 9 percent. The human population on farms, like the horse population, is growing older.

But the scarcity of children in the cities is much more serious than on the farms. In 1920 there were just about enough children in cities of over 100,000 population to maintain population stationary. In 1930 there was a 20 percent deficit. In the smaller cities (over 2,500 population) the deficit averaged only 7 percent. On the other hand, in the farm population there was still a surplus of children in 1930 of 50 percent above the number necessary to maintain a stationary population and in the rural nonfarm (mostly village) population a surplus of nearly 30 percent. So long as immigration from abroad remains rigidly restricted, not only will the cities be dependent on the rural and principally the farming people for any increase of population, but they will be dependent on movement of people from rural districts to prevent a gradual decline.

A large factor, therefore, in the population prospect is the proportion of the people who live under rural conditions. What is the outlook for change in the farm population particularly? Apparently there are two major forces working in opposite directions. The mechanization of agriculture, which must continue for a few years at least, since there are not half enough colts on farms to replace

those that die or become incapacitated yearly, tends to reduce the number of workers needed on farms. Between 1910 and 1930, in both of which years the census was taken in April, the number of males engaged in agriculture declined over 1,000,000, but practically all this decline occurred in laborers working on "home farm," mostly children over 15 years of age. Number of farmers and of hired laborers remained almost stationary. Agricultural production increased nearly a third, but this increase was not owing to mechanization alone.

On the other hand, there is a notable movement of urban factory workers, professional, and business men to small farms or suburban places where they can have a garden and keep a cow and a few chickens, producing vegetables, milk, and eggs for home use, but sometimes also for sale. Between 1920 and 1925 the census recorded an increase of 35 percent in farms of 3 to 10 acres in size and of 16 percent in farms of 10 to 20 acres, whereas the number of farms in all the larger size groups decreased. Between 1925 and 1930 the farms in the middle-size groups decreased, while the number of large farms increased. The prospect at present is for an increase of this movement of city workers to suburban places and small part-time farms. Although this is likely to raise the birth rate among these people and is a most salutary trend, it will doubtless diminish rather than increase the quantity of farm products purchased. Since it is likely that urban industries in the next decade will not expand their need for labor as rapidly as in the past decade, it is probable that the safest assumption with reference to farm population is that it will remain about stationary, perhaps decline slightly. But it will almost certainly continue to constitute a decreasing proportion of the national population.

Let us consider, therefore, the fundamental forces affecting the birth rate, both urban and rural. Why should the ratio of children to women of child-bearing age be nearly twice as high among the farming people as among the people living in large cities? And why should the trend everywhere in the Occident, not only in the United States but in Europe also, be downward? Clearly the decline is associated with industrial development and city life, and probably the major cause is the cost of raising children, particularly in the cities, and the competition of other desires. A recent investigation made by the Metropolitan Life Insurance Co. indicates that it costs in the cities about $9,000 to raise a child to the age of 18 for a family having an income of $2,500 a year. Since it requires about three children per family to maintain even a stationary population, it appears that for a typical urban American family to raise three children will cost $25,000 to $30,000. This necessarily reduces the standard of living, and fewer parents, evidently, are willing to make the sacrifice.

Quite often, too, urban conditions of living are not favorable to family life. In the modern urban industrial system there is little place for the child and almost no place for the aged, while the wife tends to become either a factory or an office worker, and the home is more and more in an apartment house or a hotel. In many, perhaps most, cases the individual, not the family, is the economic unit. On the farm, not only can the child be raised more cheaply than in the city, but also in most cases he is an economic asset from 10 years of age onward, while the wife is an economic necessity and a coworker,

and even the aged find plenty that they can do. Moreover, the farm is the home and the factory, and the family is both the economic and social unit. However, the cost of raising children is felt on the farms as well as in the cities, and there is increasing rural imitation of the fashions and standards of urban life.

Whether the suburban movement will decentralize the city population, and partially restore the former family ideals, only the future can reveal; but as yet the influence is inappreciable. The farmers of the United States can count on only a slow increase in population, and, as will be shown later, in the domestic demand for farm products, with a more or less stationary consumption only a few decades in the future.

All this assumes, of course, that the restrictions on immigration will not be relaxed. If such an immigration as occurred in 1923, for example, should be maintained while the birth rate declined, the entire picture would be altered. One hundred thousand more immigrants next year, 200,000 more the year after, followed by accretions of 100,000 a year until the 700,000 of 1923 is reached, would result in a rate of population increase during the next decade probably as large as that at present or, roughly, 1,000,000 a year. For the population of the Nation to increase nearly 2,000,000 a year, however, as it was increasing a decade ago, would require a larger immigration than has ever occurred in our national history. Whether such an increase in immigration will develop is a matter also which only the future can reveal. At present it appears no more likely than that the trend of the birth rate will be reversed.

This prospect for population growth in the United States as a whole has been considered at such length because Washington and the entire West, for that matter, is a surlpus producing area for most farm products, and the price of these farm products in Washington, or in the West, will depend upon and tend to be lower than the average price for the Nation.[36]

The prospect for population in the West.—The following table (II) shows that the increase of population in Washington, also in Washington, Oregon, and Idaho taken as a whole, from 1920 to 1930 averaged 15.2 percent, and in the 11 Western States over 33 percent as compared with 16 percent for the United States as a whole. But if California be excluded, the gain in these 10 Western States was only 13.6 percent. In the preceding decade (1910–20) the rate of population increase was 18.8 in Washington, 20.2 percent in Washington, Oregon, and Idaho as a whole, and 30 percent in the 11 Western States, as compared with about 15 percent for the United States as a whole. Excluding California the gain in the 10 Western States was 23 percent. The increase of population in the West, therefore, excluding California, also in the three States of Idaho, Oregon, and Washington taken as a whole, and in Washington alone, was smaller during the decade 1920–30 than in the United States as a whole, also the rate of increase diminished, as compared with the preceding decade.

[36] It is probable that the per-capita consumption of farm products in Washington is not far from the average for the United States. Washington in 1930 had 1.3 percent of the population of the United States and produced during the preceding 5 years 5.2 percent of the Nation's wheat, 25 percent of the apples, and 2 percent of the hay, which is fed mostly to meat and milk animals. The animal products of Washington constituted 1.23 percent of the Nation's production in the 5-year period 1924–28 (beef and veal 0.9 percent, milk 1.73 percent, poultry and eggs 2 percent, and wool 1.73 percent). Totaling all agricultural products, including animal products (and excluding feed consumed by farm animals), it appears that Washington produced over 1.6 percent of the Nation's net agricultural production, which may be compared with 1.3 percent of the Nation's population.

TABLE II.—*Rate of increase of population, Western States, by decades, 1870–1930*

State	Percent of increase					
	1920–30	1910–20	1900–10	1890–1900	1880–90	1870–80
United States	16.1	14.9	21.0	20.7	25.5	30.1
Montana	−2.1	46.0	54.5	70.3	265.0	90.1
Wyoming	16.0	33.2	57.7	47.9	200.9	128.0
Colorado	10.2	17.6	48.0	30.6	112.7	387.5
New Mexico	17.5	10.1	67.6	21.9	34.1	30.1
Arizona	30.3	63.5	66.2	39.3	118.2	318.7
Utah	13.0	20.4	34.9	31.3	46.4	65.9
Nevada	17.6	−5.5	93.4	−10.6	−23.9	46.5
Idaho	3.0	32.6	101.3	82.7	171.5	117.4
Washington	15.2	18.8	120.4	45.0	375.6	213.6
Oregon	21.8	16.4	62.7	30.2	81.8	92.2
California	65.7	44.1	60.1	22.4	40.3	54.3
11 Western States	33.6	30.4	66.8	31.9	75.5	78.5
10 Western States (California excluded)	13.6	23.1	70.7	38.0	109.2	109.9
Washington, Oregon, and Idaho	15.2	20.2	95.7	43.2	170.3	117.5

These trends in population suggest that the consumption of farm products in Washington, or in Washington, Oregon, and Idaho taken as a whole, or in the West, excluding California, will not increase as rapidly as in the United States as a whole. In California, however, the trend of population is rapidly upward, and that State is importing meat and dairy products. Central Washington, however, in supplying the California market would be in competition with all the other Western States, where there are hundreds of millions of acres of grazing land and where the value of irrigated land has been pretty thoroughly deflated.

CHANGES IN PER CAPITA CONSUMPTION OF FARM PRODUCTS

But changes in diet, particularly from cereals toward more meat and milk, might increase the per capita consumption of farm products in the United States. Such changes have occurred since the World War, and are of greater extent than any since the beginning of the century, at least. But the increased consumption of milk and pork has been largely counterbalanced by decreased consumption of beef, and the decreased consumption of the cereals by increased consumption of sugar and vegetables. (See fig. 2.[31]) The net result has been a total per capita consumption of farm products in the maximum years (1926 and 1928, when urban prosperity was at its height), only 6 percent above the average of the base period (1897–1901), or above the pre-war period 1909–13. The minimum per capita consumption was in 1917 and 1918, when it fell 4 percent below the 1897–1901 average. For over 30 years [37] the total per capita consumption of farm products has not varied more than 10 percent, and it has now (1931) fallen slightly below the average of 30 years ago. The domestic demand for farm products for at least several decades to come seems very likely, therefore, to vary almost directly with the Nation's population.

Nor is per capita consumption in the State of Washington or the West likely to diverge much from its present relation to the national average. Regional advances in income, with consequent improve-

[31] Not printed.
[37] Previous to 1897 the data were not adequate to construct indices of production and consumption.

ment in standards of living, attact people of appropriate training or experience from other regions and the difference is soon equalized.

THE PROSPECT FOR EXPORTS

Several of the principal agricultural products of Washington—notably wheat, fruit, condensed and evaporated milk—are exported to foreign markets. It is worth while, therefore, to note the prospect for exports of these products.

With reference to wheat the farmers of Washington are in competition with all the world in supplying the deficit countries of western Europe and eastern Asia. In northwestern Europe the birth rates are trending downward even more rapidly than in the United States, except in France, where population has remained practically stationary for 60 years. (See fig. 3.)[31] In every country from Sweden to Scotland and Switzerland the number of births have fallen to that point where they are scarcely sufficient to maintain the present population; and in England and Germany only about 9 daughters are being born to replace 10 mothers of the present day.

Moreover, vigorous efforts are being made to stimulate food production within each European country, not only in order that the food supply may be assured in case of war, but also to avoid sending gold abroad in payment for foodstuffs. Practically prohibitive tariffs have been placed on wheat by Germany ($1.62 a bushel), France (86 cents), Italy (over $1), and now Great Britain seems likely to place a tariff duty on wheat.

American apples, likewise, are facing the prospect of tariff duties in Europe as well as sanitary regulations (affects only grades below "fancy" grade in England), and exports of practically all farm products, except cotton possibly, are likely to be seriously retarded by the fact that not only Europe but the entire world also is in debt, principally to the United States, and interest payments need to be met before consumption goods can be purchased. Luxury products, like apples, dairy products, meat (to many peoples), are likely to feel this situation even more keenly than wheat. This is as true of the Orient as of Europe.

The trend of exports of farm products has been downward for a decade. (See fig. 4.)[31] In the fiscal year 1930–31 it was lower than in any year during the twentieth century. The world situation affords little evidence of improvement in the near future. The distant future cannot be forecast except to note that the Orient, owing to the trend of its poplation, appears to afford more hope than Europe.

THE PROSPECTIVE DEMAND FOR CROP ACREAGE

Despite an increase in agricultural production since the World War of about 20 percent, total crop acreage has remained more or less stationary. (See fig. 5.)[31] It was lower in 1931 than in 1919. Moreover, crop yields per acre have not increased and were lower in 1929 and 1930, owing to the weather conditions than for many years. The great increase in agricultural production during the decade after the war was owing almost wholly to four factors of minor

[31] Not printed.

consequence before the war which suddenly became of major importance.

1. First in importance is the substitution of gasoline for horse and mule feed. The decline of about 8,400,000 horses and mules on farms, and of probably over a million more in cities, between 1918 and 1931 has released nearly 30,000,000 acres of crop land, which has been used mostly to feed meat and milk animals and to produce cotton. This is equivalent to an increase of fully 10 percent in the effective crop acreage of the Nation. As there are less than half enough colts on farms to replace the horses and mules that die or become disabled yearly, substitution of tractors and automobiles for horses and mules probably will continue for several years at least.

2. Almost as important as the mechanization of crop production has been the increasing production of meat and milk per unit of feed consumed. The increase in animal products (other than power) since the World War has been about 23 percent, whereas crop feed available has increased not more than 10 percent, while the feed from pasturage probably has declined slightly (fig. 6).[31] This increased production of milk and meat per unit of feed consumed, assignable to culling of cows, slaughter of cattle, sheep, and swine at an earlier age (young animals make greater gains on the same amount of feed than older animals), reduction in death losses by better sanitation, particularly among hogs, a vast shift in pork production from the South to the Northwest, where the stock is better, and more efficient in transforming feed into pork and lard, the use of minerals in feeding, and many other causes have added the equivalent of 25,000,000 acres, probably, to the crop area.

Looking to the future, this factor undoubtedly will continue to be of great importance in the economizing of farm land, for culling of dairy cows and reduction of losses of pigs through sanitation and better feeding, can and probably will continue for many years. However, gains through slaughter at an earlier age and through shifts in production from south to north will be less important, undoubtedly, than during the past decade, because such shifts are probably nearly completed.

3. Less important, yet a significant factor, particularly from the standpoint of crop-land requirements of the Nation, has been the shift from the less productive crops per acre to the more productive; notably, from corn toward cotton in the South, a crop which is worth much more per acre, from wheat toward corn in the North, and from grain and hay toward fruit and vegetables in several areas, notably in California. Looking to the future, there is no assurance that these shifts from less productive to more productive crops will continue.

4. Likewise, there has been a shift from beef cattle toward dairy cattle, hogs, and chickens, which produce much more food than beef cattle per unit of feed consumed (fig. 7).[31] During the next decade this factor may sink into insignificance or disappear, owing to the probable upward trend of the beef-cattle cycle; but later, when the number of beef cattle decline, this factor is again likely to become of some importance.

Nearly all the increase in agricultural production per acre since the war, therefore, can be assigned to the decline in horses and mules and improvements in animal husbandry. These two factors alone have

[31] Not printed.

added the equivalent of, roughly, 55,000,000 acres to the effective crop area since the World War, which is an increase of about 18 percent. It is these two new factors, principally, which have enabled the total crop acreage to remain almost stationary while agricultural production increased about 20 percent.

SUMMARY OF PROSPECTIVE NEED FOR CROP LAND

Since the World War, therefore, the population of the Nation has increased over 20 percent, and agricultural production also is about 20 percent greater, while total crop acreage has remained stationary. The maximum population of the Nation, which will occur about 30 years hence, perhaps sooner, will be less than 20 percent greater than the population today, unless the trend of the birth rate is reversed or restrictions on immigration are relaxed. It is probable that the factors just described which have held crop acreage stationary while production increased may diminish somewhat in influence in the future, but the cheap price of fertilizers and the universal testimony of agronomic experiments and cost of production studies, as to the profitability of their greater use, suggests that crop yields per acre may increase notably during the next few decades. That all these factors which tend to increase production per acre will continue to hold crop acreage stationary appears probable, in view of the rapid decline in the annual increase of the Nation's population.

The future need for any expansion in the crop area appears dependent primarily upon the export demand for farm products, which at the present requires only about 10 percent of the total crop acreage. The outlook for any great increase in exports is not bright.

It may be noted, in this connection that, according to the census, about 32,000,000 acres which were in crops in 1919 were used for pasture, lay idle, or had reverted to brush or forest in 1929. A decrease in crop acreage was revealed in about two thirds of the counties of the Nation. This decrease occurred in irrigated land in the West as well as humid land in the East. But in nearly one third of the counties of the Nation, located mostly in the subhumid to semiarid Great Plains region, an increase in crop area of about 33,000,000 acres occurred. This increase was the result largely of advances in the mechanization of agriculture and in agronomic technique. These advances were facilitated by the large size of the farms in the Great Plains region, and seem likely to extend gradually into more humid areas, particularly where the farms are large and the soil fertile. They are likely to lower the cost of production, and make competition increasingly difficult in the production of grain, hay, and livestock in areas where the farms are small, as is the case in most irrigated districts.

LAND AVAILABLE FOR CROP PRODUCTION

In 1930 about half (51.9 percent) of the total land area of the United States (1,903,216,640 acres) was in farms and only slightly more than one fifth (21.7 percent) of all land was classed as crop land.[38]

The large area of land not being used for crops is further emphasized by noting that crop land represents less than half (41.9 percent)

[38] U.S. census, 1930 (preliminary figures).

of the land area in farms. Figure 8 [31] shows the percentage distribution of all farms land according to use and also pictures the percentage relation of land in farms and land not in farms. It will be noted that crop land plus plowable pasture land represent only 27.6 percent of our land surface. Of the remaining 72.4 percent of our land surface (1,377,594,000 acres) it has been variously estimated that 600,000,000 acres are physically capable of producing crops, but are not now so employed.

Although physical characteristics of unoccupied lands are unfavorable for the agricultural use of a larger acreage than is capable of being used for crops, it is evident that there is no lack of acreage for the prospective farmer who wishes to acquire undeveloped land. Such land is available in every part of the United States.

CLASSES OF UNDEVELOPED LAND

For purposes of distinguishing between the general type of reclamation necessary to bring land under cultivation, undeveloped land is divided into four more or less overlapping classes: Forest and cut-over land, drainable land, irrigable land, and dry-farming and grazing lands.

FOREST AND CUT-OVER LAND

In 1923 it was estimated that there were approximately 170,000,000 acres [39] of forest and cut-over land physically capable of being used for crop production after clearing and draining where necessary. Changes which have taken place in these acreages since 1923 have not been estimated. The approximate location of forest, cut-over land, and woodland in farms is pictured in figure 9.[31]

Although there are scattered areas of forest and cut-over lands in the United States, it will be noted that the lands are concentrated in three general regions. One large region lies in the northern parts of Michigan, Wisconsin, and Minnesota, and is known as the Great Lakes region; another extends south and west from Virginia into eastern Texas and Oklahoma, and is known as the Southern Pine region; and the third lies in central and northwestern California, western Oregon, western and northern Washington, northern Idaho and western Montana, and is known as the Pacific Northwest.

Large areas of cut-over land, particularly in the southern region, must be artificially drained, as well as cleared, before crops can be produced. To determine whether or not it is economically sound to bring such land, or in fact any other raw land, under cultivation calls for a careful analysis of the productive capacity of the land after reclamation, the cost of reclaiming the land, the demand for crops best adapted to the region in question, and the comparative advantages of producing such crops in different undeveloped areas.

DRAINABLE LAND

Of the approximate total area of land in the United States that is too wet for cultivation (113,537,000 acres), it has been estimated that 91,543,000 acres, which amount to 22.1 percent of the area of the present crop acreage, will be suitable for crops after reclamation. Most of the undrained land lies east of the one hundredth meridian

[31] Not printed.
[39] Yearbook of the U.S. Department of Agriculture, 1923, p. 427.

(fig. 10).[31] The largest areas will be found in the cut-over regions of Michigan, Wisconsin, and Minnesota, and along the Atlantic coast and Gulf of Mexico from Virginia to south Texas and up the Mississippi River to southeast Missouri.

The area may be roughly classified as tidal flats located along the sea and Gulf coasts; river flood plains located principally in the valley bottoms of the rivers flowing across the Atlantic Coastal Plain and along the Mississippi and its tributaries; the Everglades in Florida; and the glacial marshes, muck and peat bogs in the Great Lake States. With the exception of the Florida Everglades, the wet prairie lands of southern Louisiana, and the lands along the Gulf Coast in Texas, nearly all of the large tracts of unsettled, unreclaimed lands needing drainage are timbered lands. Clearing land of stumps, brush, down logs and other debris is an expensive operation which often costs more than the cost of engineering works to drain the land. The fact that the costs of these two operations generally aggregate more than the value of the land after it has been reclaimed accounts in large part for the large areas of undeveloped land within organized drainage districts. Of the total area of land in drainage enterprises in 1929,[39] 81 percent (68,263,831 acres) was in occupied farms and 35 percent (29,490,275 acres) was unimproved (table III).

TABLE III.—*Area in occupied farms, area planted and total area in drainage enterprises in 1929, by States*

[1930 Census]

State	Total area in drainage enterprises, acres		Area in occupied farms, 1930		Area planted, 1929	
	1930	1920	Acres	Percent	Acres	Percent
Arizona	318,931	39,640	304,802	95.6	278,066	87.2
Arkansas	4,631,155	3,479,591	2,940,035	63.5	2,425,632	52.4
California [1]	2,288,479	1,108,319	2,078,720	90.8	1,851,061	80.9
Colorado	366,719	171,656	305,966	83.4	274,922	75.0
Florida [1]	5,961,470	1,637,073	443,230	7.4	217,136	3.6
Georgia	84,255	65,452	63,865	75.8	37,097	44.0
Idaho	375,464	64,642	362,303	96.5	334,546	89.1
Illinois [1]	5,034,122	3,909,049	5,002,880	99.4	4,265,524	84.7
Indiana [1]	10,210,604	9,087,183	10,095,944	98.9	8,528,179	83.5
Iowa [1]	6,248,189	5,224,478	6,195,281	99.2	5,684,899	91.0
Kansas	257,169	93,856	253,845	98.7	219,736	85.4
Kentucky	585,625	358,480	515,101	88.0	320,084	54.7
Louisiana [1]	3,568,443	2,266,328	2,502,397	70.1	1,917,185	53.7
Michigan [1]	9,119,668	9,729,171	8,655,636	94.9	6,475,839	71.0
Minnesota [1]	11,357,883	9,232,709	8,560,555	75.4	5,788,537	51.0
Mississippi [1]	2,967,838	1,601,444	2,198,283	74.1	1,782,174	60.0
Missouri	3,150,022	2,596,204	2,427,599	77.1	2,067,727	65.6
Montana	167,629	168,682	150,844	90.0	114,266	68.2
Nebraska [1]	863,559	607,730	848,329	98.2	734,618	85.1
Nevada	162,980	15,940	155,491	95.4	111,512	68.4
New Mexico	176,292	140,219	151,516	85.9	137,570	78.0
North Carolina [1]	686,486	542,828	331,481	48.3	269,074	39.2
North Dakota	1,094,142	1,240,328	1,094,114	100.0	908,979	83.1
Ohio [1]	8,147,508	8,107,204	7,992,228	98.1	6,748,152	82.8
Oklahoma	170,158	12,150	163,936	96.3	135,956	79.9
Oregon	211,182	4,000	146,576	69.4	116,987	55.4
South Carolina	208,249	140,031	94,744	45.5	61,606	29.6
South Dakota	697,758	222,062	684,746	98.1	567,285	81.3
Tennessee	593,560	363,671	413,791	69.7	212,690	35.8
Texas [1]	2,886,356	2,166,128	1,899,254	65.8	1,272,762	44.1
Utah	156,052	113,823	109,518	70.2	90,368	57.9
Virginia	15,042		5,704	37.9	4,748	31.6
Washington	367,242	94,924	351,898	95.8	309,818	84.4
Wisconsin	892,713	794,569	574,892	64.4	350,522	39.3
Wyoming	245,703	95,474	188,327	76.6	163,015	66.3
Total	84,268,547	65,495,038	68,263,831	81.0	54,778,272	65.0

[1] Preliminary.
[31] Not printed.
[39] Figures given for 1929 were obtained from the 1930 United States Census (preliminary).

A large area of land assessed for drainage benefits which is not improved and is not yet yeilding an income for other purposes in any drainage district or other improvement districts creates problems which are more than likely to result in financially embarrassed and defunct enterprises. In a study of drainage districts in the South [40] it was found that an average of 40 years would be required to bring under cultivation all undeveloped land in organized districts on the basis of the rate of development which took place between the years 1920 and 1926. Many of these districts were found to be in financial difficulties, and the results of the study led to the concludion that an agriculture more profitable than obtains at present is necessary to enable these districts to maintain their existing capitalization. Evidence presented by drainage experts representing various parts of the country before the House Committee on Irrigation and Reclamation point out emphatically that these conditions still prevail in a large number of districts in the United States.[41] The mere evidence that large areas of land in organized districts have not been in demand for agricultural purposes suggests the need for a careful planning of the agricultural possibilities of undeveloped and developed lands in organized districts and proposed districts in the light of the probable demand for land for agricultural purposes. In order to insure as much as is possible the sound development of land in districts only partly developed and the rehabilitation of financially embarrassed and defunct districts which have agricultural possibilities, it is necessary to determine the capacity of the land to meet obligation and to adjust existing bonded indebtedness accordingly. Until such procedure has been consummated, the establishment of profitable farms will be seriously handicapped.

IRRIGABLE LAND

Generally speaking, the land lying west of about the one hundredth meridian, which passes through the west central portions of the Dakotas, Nebraska, Kansas, Oklahoma, and Texas, receives a rainfall too light for ordinary production of crops. Although the major portion of this area is mountainous and desert waste in so far as intensive crop production is concerned, there are many broad and fertile river valleys, level plateaus among the mountains, lake beds or lake margins, and other places that are or can be irrigated. Of the 30,599,470 irrigable acres in irrigation enterprises in 1930, only 19,547,544 acres, or 63.9 percent, were irrigated, although engineering works were capable of providing water for 26,101,890 acres or 84.7 percent of the total.[42] In other words, in addition to 4,578,993 acres for which engineering works were not ready to supply water in 1930, there were 6,554,346 nonirrigated acres which engineering works were prepared to irrigate but which were not demanded for irrigatied farming purposes. The distribution of these acreages among the different States is presented in table IV.

[40] Marsden, Roger D. and Teele, R. P., "Economic Status of Drainage Districts in the South", U.S. Dept. of Agriculture, Technical Bulletin No. 194, October 1926, p. 48.
[41] "Loans for Relief of Drainage Districts", hearings before the Committee on Irrigation and Reclamation, House of Representatives, 71st Cong., 2d and 3d sess. on H.R. 11718 and S. 4123, April, May, and December 1930.
[42] 1930 Census.

TABLE IV.—*Number of enterprises and irrigable and irrigated land in these enterprises by States for 1920 and 1930*

[1930 census]

State	Area[1] in enterprises				Area enterprises were capable of supplying water				Area irrigated						Number of enterprises	
	1930	1920	Increase or decrease		1930	1920	Increase or decrease		1929	1919	Increase or decrease		Proportion of area, 1929	Proportion of area capable of supplying water, 1929	1930	1920
			Acres	Per-cent			Acres	Per-cent			Acres	Per-cent				
Arizona	1,085,627	813,153	272,474	33.5	824,152	627,303	196,849	31.4	575,590	467,565	108,025	23.1	53.0	69.8	1,270	1,388
Arkansas	225,992	246,480	−20,488	−8.3	209,942	179,013	30,929	17.3	151,787	143,946	7,841	5.4	67.2	72.3	1,043	944
California	8,075,895	7,805,207	270,688	3.5	6,815,250	5,894,466	920,784	15.6	4,746,632	4,219,040	527,592	12.5	58.8	69.6	38,117	24,115
Colorado	4,528,251	5,220,588	−692,337	−13.3	4,078,712	3,855,348	223,364	5.8	3,393,619	3,348,385	45,234	1.4	74.9	83.2	6,509	6,634
Idaho	2,814,048	3,780,048	−966,000	−25.6	2,617,021	3,092,810	−475,789	−15.4	2,181,250	2,488,806	−307,556	−12.4	77.5	83.3	3,222	3,629
Kansas	95,719	102,562	−6,843	−6.7	83,583	67,853	15,730	23.2	71,290	47,312	23,978	50.7	74.5	85.3	300	209
Louisiana	850,401	851,211	−810	−.1	795,165	728,742	66,423	9.1	450,901	454,882	−3,981	−.9	53.0	56.7	2,352	1,373
Montana	2,622,423	4,329,148	−1,706,725	−39.4	2,276,000	2,753,498	−477,498	−17.3	1,594,912	1,681,729	−86,817	−5.2	60.8	70.1	4,461	6,035
Nebraska	763,039	766,768	−3,729	−.5	703,641	562,468	141,173	25.1	532,617	442,690	89,927	20.3	69.8	75.7	721	470
Nevada	983,717	1,382,036	−398,319	−28.8	736,249	704,708	31,541	4.5	486,648	561,447	−74,799	−13.3	49.5	66.1	1,245	1,015
New Mexico	741,245	961,879	−220,634	−22.9	656,669	696,119	−39,450	−5.7	527,033	538,377	−11,344	−2.1	71.1	80.3	1,965	2,391
North Dakota	24,860	57,476	−32,616	−56.7	24,006	34,235	−10,229	−29.9	9,392	12,072	−2,680	−22.2	37.8	39.1	23	30
Oklahoma	7,344	11,742	−4,398	−37.5	7,331	9,672	−2,341	−24.2	1,573	2,969	−1,396	−47.0	21.4	21.5	77	33
Oregon	1,478,128	1,925,987	−447,859	−23.3	1,158,210	1,344,046	−185,836	−13.8	898,713	986,162	−87,449	−8.9	60.8	77.6	4,066	4,710
South Dakota	122,510	188,382	−65,872	−35.0	109,550	150,914	−41,364	−27.4	67,107	100,682	−33,575	−33.3	54.8	61.3	121	292
Texas	1,566,876	1,687,447	−120,571	−7.1	1,177,415	1,150,542	26,873	2.3	798,917	586,120	212,797	36.3	51.0	67.9	1,728	1,371
Utah	1,739,869	2,359,244	−619,375	−26.3	1,542,475	1,700,550	−158,075	−9.3	1,324,125	1,371,651	−47,526	−3.5	76.1	85.8	2,714	2,403
Washington	915,379	836,795	78,584	9.4	631,511	637,151	−5,640	−.9	499,283	529,899	−30,616	−5.8	54.5	79.1	2,986	2,692
Wyoming	1,958,147	2,564,668	−606,521	−23.6	1,655,008	1,831,039	−176,031	−9.6	1,236,155	1,207,982	28,173	2.3	63.1	74.7	2,631	3,564
Total	30,599,470	35,890,821	−5,291,351	−14.7	26,101,890	26,020,477	81,413	.3	19,547,544	19,191,716	355,828	1.9	63.9	74.9	[2]75,551	63,298
Total for Idaho, Washington, and Oregon	5,207,555	6,542,830	−1,335,275	−20.4	4,406,742	5,074,007	−667,265	−13.2	3,579,246	4,004,867	−425,621	−10.6	68.7	81.2	10,274	11,031
Total for Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming	26,942,729	31,978,753	−5,036,024	−15.7	22,991,257	23,137,038	−145,781	−.6	17,463,960	17,401,043	62,917	.4	64.8	76.0	69,186	58,576

[1] Irrigable area, 1930; total area, 1920.

[2] Net, when duplications are taken into account is 75,517.

It will be noted that of the 915,379 acres in enterprises in the State of Washington only slightly more than half (54.5 percent or 499,283 acres) were irrigated in 1929. Of the 416,096 acres in the enterprises which were not irrigated, water was available for 132,228 acres. With the exception of the States of Washington, California, and Arizona, there were decreases between 1920–30 ranging as high as 39.4 percent of the area in irrigation enterprises in each of the remaining 16 States in which lands were irrigated. In Oregon and Idaho the decrease was 23.2 and 25.6 percent, respectively.

Even when one considers Federal irrigation enterprises, it is difficult to avoid the conclusion that there is far more land in organized districts than will be economically demanded for crop production for many years to come.

According to the Annual Report of the Commissioner of Reclamation for the year ended June 30, 1931, the Bureau was prepared to supply water to 1,993,393 acres on projects proper, but almost a fourth (24.5 percent or 488,580 acres) of this acreage was not irrigated in 1929. By adding to these totals the land in the so-called Warren Act projects, the Bureau was prepared to supply water to 3,634,112 acres in 1930, but more than a fifth (23.2 percent or 843,256 acres) of this acreage was not irrigated.

The prospective irrigation farmer is confronted with problems somewhat similar to those described for drainage districts. Financially embarrassed and defunct irrigation districts are not uncommon. The organization of many districts was promoted before they were justified on the basis of demand for crops to be grown. The inclusion of unproductive land in addition to more land than could be adequately irrigated with available water, poor engineering works, excessive costs, and many less important factors contribute toward the failure of enterprises. Recapitalization of the enterprise on the basis of a conservative estimate of the earning capacity of productive land is essential on many projects to insure the establishment of profitable farming enterprises. Officials in several States have taken steps to facilitate refinancing programs and the discouragement of the organization of new districts or the extension of existing districts. With respect to Federal projects, Congress passed a series of relief Acts, particularly during the past decade, and among them the "Omnibus Reclamation Act" (act of May 25, 1926) is the most important. Among other feature of this act the period of repayment of construction charges was, at the discretion of the Secretary of the Interior, increased to 40 years. Rapidly mounting delinquent payments due on construction charges were in this way reduced or wiped out. The following quotation from the act (subsection k) provides for relief to irrigation farmers in still another way:

> That on any existing project where, in the opinion of the Secretary, it appears that on account of lack of fertility in the soil, an inadequate water supply, or other physical causes settlers are unable to pay construction costs, or wherever it appears that the cost of any reclamation project, by reason of error or mistake or for any cause, has been apportioned or charged upon a smaller area of land than the total area of land under said project, the Secretary is authorized to undertake a survey and make recommendations to Congress.

Up to June 30, 1930, a total of $15,578,855.60 [43] was charged off or accounted for as loss. These charge-offs were found necessary in spite of the fact that no interest was required in cost of construction. In general, the policy of charging off or writing down construction charges is commendable. In fact, until the overcapitalization in each project is eliminated by some method or other, the projects will not be sound financially. Prospective irrigation farmers cannot afford to purchase land in any irrigation enterprise that is not economically sound. This is particularly true on those projects where farmers are jointly responsible for meeting the construction and other costs without regard to default in payment of charges against any individual farm unit or tract of irrigable land.

The climate, crop possibilities, and cost of irrigating land are important factors which are often discounted. The dramatic appeal of turning desert or other barren waste land into a garden spot often overshadows the economic advisability of doing so. In one extreme represented by the Southwest, there are hot, dry valleys with a semitropical temperature the entire year, and in the other extreme represented by the high mountain valleys and plateaus of the Northwest the winters are cold and dry, and frosts occur even in summer. The soil is usually very fertile. A fertile soil, the application of water to growing crops at just the right time and in the quantity needed, and the preponderance of clear days and even temperature are a combination of factors which usually results in higher yields per acre than yields from fields depending upon rainfall.

The vision of high yields without regard to cost, however, has led to misfortune for many prospective irrigation farmers. Cost of construction of reservoirs and main canals per acre of land range as high as $176 and more on the proposed Columbia River Basin project. In addition to this cost, there is the cost of clearing and leveling the land, constructing lateral ditches, preparing the land for irrigated crop culture, erecting farm buildings, and food, clothing, and other living expenses. Economic surveys of reclamation projects made by a committee which included "practical irrigators, economic experts from agricultural colleges, and representatives of the Bureau of Reclamation" led to the conclusion that from $5,000 to $10,000 must be spent to provide the permanent improvements and equipment necessary for an 80-acre farm.[44]

DRY-FARMING AND GRAZING LAND

Irrigation farming, dry farming, and grazing are intermingled in the western half of the United States, beginning at about the one hundredth meridian. In a large part of this area river valleys are or can be irrigated, the higher benches and terraces are usable for dry-farming purposes, and the remainder of the land suitable for any agricultural purpose is usable for grazing purposes.

No inventory of the existing and potential dry-farming area has been made. Although the Federal and State governments own large

[43] Report of Commissioner of Reclamation for fiscal year ending June 30, 1930, p. 57.
[44] Extract from speech by Dr. Elwood Mead before the American Society of Civil Engineers in May 1929, p. 1208, Proceedings American Society of Civil Engineers.

areas of these lands, no Federal or State policy based on an understanding of the economic potentialities of these land resources has been formulated.

Other things being equal, the grazing value of this territory depends upon the supply of drinking water for the stock, the carrying capacity of the range, the length of the grazing season, and the possibility of growing hay and forage.

CROPS TO BE GROWN ON PROPOSED COLUMBIA RIVER BASIN PROJECT

Before any proposed reclamation project can be considered to be economically feasible and socially justified, particularly when the Federal Government is to be responsible for forwarding funds for the development of the project, it is essential, among other things, to prove conclusively; first, that crops to be grown can be grown more economically on the land to be reclaimed than on available land suitable for growing the same crops in existing organized projects and communities in other parts of the United States; second, that markets will absorb the crops to be grown at a profit to the producers; and, third, that the Federal Government will not be promoting and (or) subsidizing the production of crops in one section of the country when such crops enter into competition with the same or substitute crops produced in other sections of the country.

The Department of Agriculture has not had an opportunity to study and determine the economic feasibility of the agricultural aspects of the proposed Columbia River Basin project. Consequently no attempt has been made in the following statement to present more than a few of the many aspects of the questions involved which should not be overlooked or discounted.

NET FARM PRODUCTION

The average annual value of net farm production per capita [45] is much higher in every State in which farm crops are produced under irrigation than the average for the United States (table V). In fact, for the three States immediately concerned with the proposed Columbia River Basin project Idaho, Oregon, and Washington, the percentages above the average for the United States are 206.3, 40.5, and 28.6, respectively. For the 11 Mountain and Pacific States combined the average per capita production above the average per capita production for the United States as a whole is 42.4 percent. These figures do not suggest, as many proponents of the development of the project in question seem to believe, that the West is a deficit area for farm products, or that the development of the Western States has been stagnant.

[45] Crops consumed on the farm plus crops sold plus crops held for sale plus livestock products corrected for crops fed to livestock.

TABLE V.—*Average annual value net farm production* [1] *for several selected States, 1924–28, based on average farm prices over a 10-year period, 1917–26*

	Net farm production			
	Total	Per capita production	Amount per capita + or − U.S. average	Percent + or − U.S. average
	Dollars	*Dollars*	*Dollars*	*Percent*
United States	12, 687, 142, 404	108. 9	0. 0	0. 0
North Dakota	335, 091, 689	501. 3	+392. 4	+360. 3
South Dakota	276, 549, 044	411. 4	+302. 5	+277. 8
Nebraska	487, 662, 589	361. 7	+252. 8	+232. 1
Kansas	533, 770, 637	290. 1	+181. 2	+166. 4
Oklahoma	438, 880, 452	194. 1	+85. 2	+78. 2
Texas	999, 154, 543	185. 0	+76. 1	+69. 9
Montana	178, 209, 330	329. 0	+220. 1	+202. 1
Idaho	146, 851, 902	333. 6	+224. 7	+206. 3
Wyoming	62, 572, 913	292. 2	+183. 3	+168. 3
Colorado	182, 198, 650	182. 1	+73. 2	+67. 2
New Mexico	61, 297, 689	153. 1	+44. 2	+40. 6
Arizona	53, 299, 097	133. 8	+24. 9	+22. 9
Utah	72, 598, 045	149. 2	+40. 3	+37. 0
Nevada	21, 293, 102	247. 4	+138. 5	+127. 2
Washington	208, 282, 859	140. 0	+31. 1	+28. 6
Oregon	136, 367, 913	153. 0	+44. 1	+40. 5
California	551, 936, 208	113. 7	+4. 8	+4. 4
11 Mountain and Pacific States	1, 674, 907, 708	155. 1	+46. 2	+42. 4

[1] Crops consumed on the farm plus crops sold plus crops held for sale plus livestock products corrected for crops fed to livestock.

CONSUMPTION OF FARM CROPS

The average annual per capita consumption of farm crops in the United States for the 5-year period 1924–28, expressed in terms of average prices for farm crops over a 10-year period (1917–26), was $94.55 (table VI). If we assume that the per capita consumption of farm crops in the Mountain and Pacific States was the same as the average for the United States, these 11 States combined produce 64 percent more farm products than they consume. On this basis Idaho, Oregon, and Washington produce 252.8, 61.7, and 48.0 percent, respectively, more than they consume. Even assuming that the average per capita consumption in these States is a third more than the average for the United States, a large percentage of the farm crops they produce must be disposed of on markets in other parts of the country.

TABLE VI.—*Average annual per capita consumption of farm crops* [1] *compared with average annual per capita net farm production* [2] *1924–28, for all States and selected States* [3]

States	Average per capita net farm production, dollars	Average per capita consumption		
		Total, dollars	Increase or decrease of production over consumption	
			Dollars	Percent
United States	108.9	94.55	+14.3	+15.1
North Dakota	501.3	(4)	+406.7	+430.1
South Dakota	411.4	(4)	+316.8	+335.0
Nebraska	361.7	(4)	+267.1	+282.5
Kansas	290.1	(4)	+195.5	+206.8
Oklahoma	194.1	(4)	+99.5	+105.2
Texas	185.0	(4)	+90.4	+95.6
Montana	320.0	(4)	+234.4	+247.9
Idaho	333.6	(4)	+239.0	+252.8
Wyoming	292.2	(4)	+197.6	+209.0
Colorado	182.1	(4)	+87.5	+92.5
New Mexico	153.1	(4)	+58.5	+61.9
Arizona	133.8	(4)	+39.2	+41.5
Utah	149.2	(4)	+54.6	+57.7
Nevada	247.4	(4)	+152.8	+161.6
Washington	140.0	(4)	+45.4	+48.0
Oregon	153.0	(4)	+58.4	+61.7
California	113.7	(4)	+19.1	+20.2
11 Mountain and Pacific States	155.1	(4)	+60.5	+64.0

[1] Plant foodstuffs, industrial crops, and animal products.
[2] Crops consumed on the farm plus crops sold plus crops held for sale plus livestock products corrected for crops fed to livestock.
[3] Based on average prices for farms crops over the 10-year period, 1917–26.
[4] Assumed to be approximately same as United States average.

Without giving adequate weight to the relationships between existing production and consumption schedules for farm crops in the determination of the economic feasibility of the proposed development of new farm land, the determination of marketability of crops to be grown is bound to result in misleading conclusions. With a possible, but not probable, exception of certain specialty crops which might be grown, crops grown on land in new developments come in direct competition with the same or substitute crops produced on other lands which are sold on the same or competing markets. In deficit areas for particular crops or groups of crops this competitive element may be largely local. To argue, however, that production of additional crops does not adversely affect, either directly or indirectly, the market for the same crops produced by other farmers amounts to saying that supply has nothing to do with price in an open market.

Even if the contention were true that all products of Federal reclamation projects are consumed in the State which produced them, surely the farmers of the numerous non-Federal reclamation projects which have been in distress, as well as those of existing Federal projects

that have had to have special financial relief from time to time during the past decade, would find their market affected adversely by the reclamation of additional acreage.

The results of a careful analysis of elasticity of demand for and supply of the crops which would de produced on the proposed Columbia River Basin project is essential to support any statement that the crops which would be grown on the project will be marketable at a profit to the producer and without a depressing effect on prices which existing producers of the same crops receive. Unless a careful analysis of this kind proves market conditions to be otherwise, it is difficult to avoid the conclusions that the areas in question are already surplus and not deficit areas, and that any additional crops thrown on the market will depress prices for the same and/or substitute crops grown by established farmers. Furthermore, without carefully weighing these factors, any estimates as to prices which might be received for crops to be grown are more than likely to be seriously inflated.

PRODUCTION OF FARM CROPS

A brief consideration of the production of a few of the main crops which would be produced on the proposed Columbia River Basin project in the light of total population in the same areas emphasizes certain competitive aspects of the proposed project which seem to have been overlooked by the proponents of the project.

The population of the 11 Mountain and Pacific States combined represented only 9.3 percent of the total population of the United States between 1924 and 1928. Attention is directed to the fact that this 9.3 percent of the total United States population produced a much higher proportion of the total United States production of certain crops, many of which would also be grown on the proposed Columbia River Basin project. These 11 States produced between 1924 and 1928:

51.3 percent of the total alfalfa crop.
22.2 percent of the total hay crop.
22.8 percent of the total wheat crop.
4.5 percent of the total oats crop.
2.0 percent of the total cotton crop.
43.3 percent of the total apple crop.
90.0 percent of the total grape crop.
100.0 percent of the total lemon crop.
70.1 percent of the total orange crop.
8.3 percent of the total grapefruit crop.

A distribution of the production of these crops, by States, is presented in table VII.

Average annual production and percent of total production in the United States of several selected farm crops between 1924–28 in the 11 Mountain and Pacific States

State	Average annual U.S. population between 1924–28, percent	Alfalfa		Total hay		Wheat		Barley		Oats	
		1,000 tons	Percent	1,000 tons	Percent	1,000 bushels	Percent	1,000 bushels	Percent	1,000 bushels	Percent
United States	100.0	28,752	100.0	107,109	100.0	833,165	100.0	240,742	100.0	1,371,786	100.0
Montana	0.5	1,414	4.9	2,904	2.7	57,954	7.0	4,348	1.9	18,113	1.3
Idaho	.4	2,216	7.7	2,982	2.8	25,580	3.1	5,025	2.1	6,366	.5
Wyoming	.2	834	2.9	1,640	1.5	3,332	.4	1,580	.7	4,158	.3
Colorado	.9	2,029	7.1	3,519	3.3	18,328	2.2	8,676	3.6	5,544	.4
New Mexico	.3	317	1.1	441	.4	2,364	.3	151	.1	946	.1
Arizona	.3	569	2.0	635	.6	1,015	.1	704	.3	462	.03
Utah	.4	1,393	4.8	1,611	1.5	5,490	.7	1,010	.4	2,280	.2
Nevada	.1	422	1.5	680	.6	424	.1	338	.1	73	.01
Washington	1.3	828	2.9	2,103	2.0	42,922	5.2	2,248	.9	9,272	.7
Oregon	.8	714	2.5	2,073	1.9	20,478	2.5	2,751	1.1	9,740	.7
California	4.2	4,013	14.0	5,223	4.9	11,830	1.4	28,176	11.7	4,276	.3
11 Mountain and Pacific States	9.3	14,749	51.3	23,811	22.2	189,717	22.8	55,007	22.8	61,230	4.5

State	Apples (commercial)		Grapes		Lemons		Oranges		Grapefruit	
	1,000 bushels	Percent	1,000 tons	Percent	1,000 boxes	Percent	1,000 boxes	Percent	1,000 boxes	Percent
United States	97,119	100.0	2,338,907	100.0	6,811	100.0	37,785	100.0	9,472	100.0
Montana	233	0.2								
Idaho	4,021	4.1	282	0.01						
Colorado	2,626	2.7	306	.01						
New Mexico	563	.6	517	.02						
Arizona	28	.03	1,071	.05			75	0.2	124	1.3
Utah	552	.6	1,228	.05						
Nevada			235	.01						
Washington	24,617	25.3	2,966	.1						
Oregon	4,333	4.5	1,737	.1						
California	5,084	5.2	[1] 2,097,200	89.7	6,811	100.0	26,435	70.0	666	7.0
11 Mountain and Pacific States	42,057	43.3	2,105,542	90.0	6,811	100.0	26,510	70.1	790	8.3

[1] Includes 15,000 tons not harvested in 1926, 142,000 tons not harvested in 1927, and 153,000 tons not harvested in 1928.

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