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# *Land Problems and Policies*



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## *Preface*

**I**N THE INTEREST OF STIMULATING STUDY AND PROMOTING discussions of important land problems facing the Nation, states, and rural communities, the Iowa State College held the Land Economics Institute during the summer of 1949. The central core of the Institute was the Land Problems and Policies Seminar consisting of an integrated series of lectures prepared and given by outstanding students of land problems and policies. The lectures at this Seminar, in revised form, are made available through this book for the use of all those interested in land problems and policies.

In addition to the Seminar lectures are Chapters 9, 10 and 11 which were originally given in the Land Problems Lecture series of the United States Department of Agriculture Graduate School at Washington, D.C. in 1949. These three chapters round out the scope of the book by including problems and policies of forest, recreational, and wildlife uses of land.

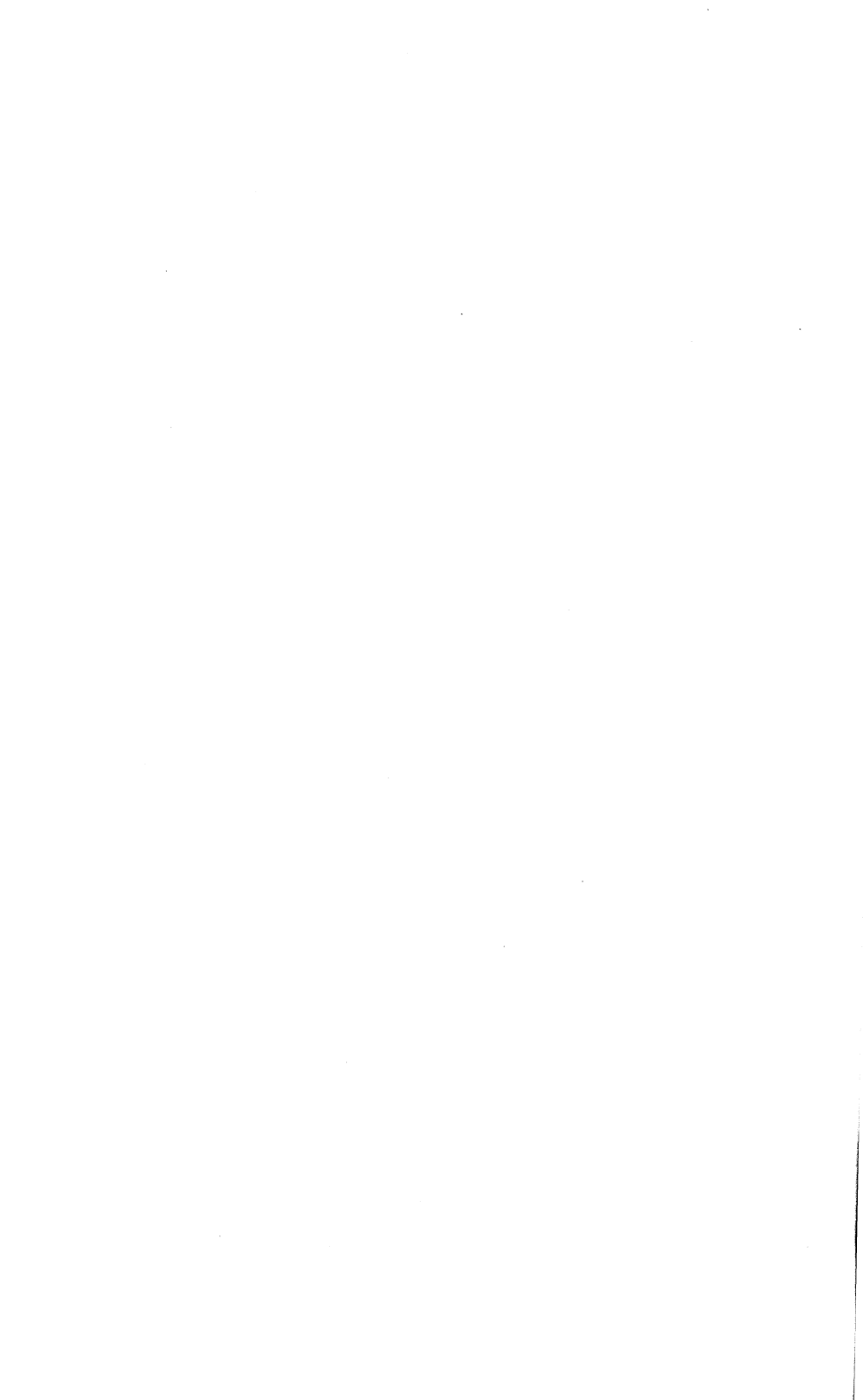
We are deeply indebted to the authors of the various chapters for preparing the lectures and revising them for publication. We gratefully acknowledge the permission of the United State Department of Agriculture Graduate School to include the three chapters mentioned above in this volume. Also, we acknowledge the assistance of Charles L. Stewart of the University of Illinois, who, as visiting professor at the Institute, made helpful suggestions.

Special acknowledgement is hereby made to the Farm Foundation, Chicago, Illinois, for their grant of funds making possible the publication of this volume.

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# *Land Problems and Policies*



# 1.

## *Introduction*

**T**HE UNITED STATES HAS BEEN GENEROUSLY ENDOWED with a rich and varied supply of land resources. These resources and the manner in which they are used constitute an important basis for our wealth, continuing prosperity and well-being of the Nation. This importance of land resources, together with the increasing scope of public control and influence over land utilization, invites careful study and appraisal of land problems and the policies being used to lessen or remedy them. This appraisal should consider additional alternatives leading to an improved pattern of land utilization.

Prior to any appraisal of land problems, policies and future alternatives of action, the objectives to be achieved must be considered. These objectives have the triple role of helping:

(1) delimit land problems. Unless land policy objectives are delimited it becomes difficult, if not impossible, to determine major land problems—for problems arise within the gap between land use conditions being experienced and the objectives desired.

(2) appraise land policies. Unless objectives are outlined, it is difficult, if not impossible, to appraise land policies, since policies must be evaluated in terms of objectives to be achieved.

(3) develop alternatives of future action. Unless land policy objectives are determined, it becomes difficult, if not impossible, to work out consistent and reliable alternatives of action for improving utilization of land resources.

In line with this reasoning, the next chapter is devoted to an

analysis of the objectives of land policies. Even though the task of establishing objectives to evaluate land problems and policies is extremely difficult, chapter two should stimulate further thinking into this important phase of land problems and policies research, education and action. The difficulty of the task is additional proof of the need for attempting to refine the direction in which land policies should be moving.

From an economic viewpoint land resources become important only when viewed in terms of satisfying the demands on them by people. Thus, chapter three on population trends, policies and problems is intended to stimulate studying of the factors and trends in population growth and distribution in an effort to help guide resource utilization in terms of people and their wants.

Chapter four turns attention to the farm land resources of the United States. Chapter five discusses the principles of land utilization—the guiding rules for using land for the satisfaction of human wants.

Since the supply of land as well as the demands on land and the application of land use principles vary with respect to kinds of use, the next six chapters discuss various kinds of land uses and the problems and policies peculiar to each. Farm lands, range lands, water resources, forest lands, recreational lands and use of land for wild life are discussed in these six chapters.

Inasmuch as land policies have been geared largely to family farms as the units of use of farm lands, special consideration is given to family farm problems and policies in chapter twelve.

Considerable proportions of lands used for wild life, recreation, forestry and grazing are in public ownership. The remaining portions of lands in these uses, plus practically all farm lands, are in private ownership. The public interest and private interests in using these lands often conflict. Hence, means must be provided for working out public land programs within the general framework of private property. This presents one of the most difficult problems in land use programs and policies. Chapter thirteen on public interests in the use of private lands discusses this problem and indicates some alternatives of action. Chapter fourteen includes a discussion of the process of planning the use of land resources and chapter fifteen discusses land programs in a policy framework. Finally, chapter sixteen summarizes the ideas presented in the preceeding chapters and makes certain suggestions for building a land policy.

The viewpoints of more than a dozen students of land problems and policies are given in this volume. Frequently, these viewpoints are not in agreement. These apparent disagreements and various points of view expressed should help stimulate thinking on land



problems and policies by other students. A selected list of references following each chapter was prepared by the various authors for those students desiring further information on each topic.

The editors feel that the information and viewpoints presented in this book will contribute materially to a critical study of land problems and policies. From such study should come a better understanding and appreciation of our major land problems and policies. Also, from such study should come further ideas and suggestions for clarifying our land problems and for working out the needed solutions.



## 2.

### *Objectives of Land Policy*

RAINER SCHICKELE

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**L**AND POLICIES ARE SOCIAL CONTROL MEASURES designed to improve the use of land resources and the conditions of property rights under which people work and live on the land. The main problems to which land policy is addressed, therefore, lie in the fields of (1) land use, conservation and development, and (2) land tenure.

The formulation of land policy takes place in the general framework of public action. It is a part of the "law of the land," and evolves within the socio-economic and political processes of society. The objectives of land policy are governed by what people desire, and what the functions of government are conceived to be in bringing about better land use and tenure.

But changes in land use and tenure are desired only when people do not like existing conditions or when people visualize better use and tenure of land. The need for public action arises whenever people feel that they, as individuals, cannot bring about the desired

adjustments. Hence, as policy is made, people have in mind some norm or goal which constitutes the image of an ideal situation toward which they strive. These "norms" represent the goals of policy toward which specific programs are directed.

In technical language, these goals, or notions commonly held as to how things ought to be, are called "value judgments." They are objectively observable facts and as important as are amount of money in circulation or bushels of wheat produced. Certain beliefs regarding economic and social situations must be introduced as essential facts into research methods and analytical procedures employed by social scientists. There can be no escape from this necessity.

The term "goal" as used here is not conceived as an individual value judgment that we may have dreamed up, but rather as a group consensus on a value judgment. As a belief held by a sufficiently large number of people to exert a "normative" influence upon attitudes, behavior and actions of people. The researcher's own value judgment should not enter into the formulation of goals. He may or may not share any of the beliefs introduced as facts into the analysis. The course as well as the findings of his analysis should in no way be affected by whether he does or does not accept these goals toward which policy is directed.

A task of social science is to spell out these goals of public policy in terms which render them amenable to analytical treatment. Just what is it that people want? Are the goals attainable? Are they compatible with other goals? Do they fit into the socio-economic and political framework within which society operates? In appraising specific objectives of certain land programs, we must project them against the background of the superior goals of general economic policy.

#### **MASTER-GOALS OF ECONOMIC POLICY**

Objectives of specific public policies and programs should be subservient to the broad goals toward which society as a whole is striving; all goals should converge toward one end—the improvement of general economic and social welfare. In formulating such ultimate economic ends, we can establish guiding principles of policy for evaluating any specific program.

Let us posit two master goals of economic policy: (1) the maximization of the social product over time, and (2) the optimization of income distribution among people. The first is concerned with problems of misuse of human and physical resources in the production process and has constituted the center of economic science since its inception. The second is concerned with problems of inequities in the distribution of real income among families; it has

until recently been neglected by economists, but has always been keenly recognized by people everywhere.

How can we spell out these master goals of economic policy in objective scientific terms? We have to establish norms with which concrete situations can be compared, and deviations from which can be measured, at least in proximate orders of magnitude.<sup>1</sup>

**MAXIMUM SOCIAL PRODUCT.** Marginal productivity analysis provides the main set of tools for determining the degree of efficiency in the pattern of resource allocation. The norm, that is, the conditions for maximum social product, can be briefly defined this way:

The factors should be allocated among all various lines of production so that their marginal social net product values are equal throughout the economy.

This ideal pattern of resource allocation we shall call the "productive norm." If in any concrete situation the marginal net product of a given resource is smaller in some and larger in other lines of production, the situation is considered "maladjusted" with reference to the productive norm, and the use of resources should be shifted from the low to the high marginal product fields.

In terms of static equilibrium analysis of a firm, or even of an industry, this concept of the productive norm is quite simple.<sup>2</sup> The real difficulties arise in empirical measurement and in introducing time preference and technological change. Furthermore, the analytical structure, the nature of constants and the functional relations between variables regarding the firm are quite different from those regarding aggregates of the economy as a whole. While the size of

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<sup>1</sup> The following cannot be more than a highly simplified outline of an intricate analytical procedure. Three important things should be kept in mind: (1) there are other than economic goals of public policy; (2) the optimum resource allocation (productive norm, see below) varies with the pattern of income distribution, due to differences in propensities to consume and demand elasticities of various goods with respect to income between different income groups; and (3) the goal of a given policy is usually achieved in terms of a higher or lower degree of accomplishment rather than in terms of all or nothing. Often, an actual public program pursues various ends simultaneously. If some of these ends are in conflict, they should be ranked in relative priority, pressing one toward a higher degree of attainment at the expense of a lower degree in the other. For instance, the Soil Conservation and Domestic Allotment Act of 1936 pursued the two purposes of conservation and farm income support (through production controls). In some areas, conservation practices increased yields and offset acreage reductions. Largely because of the partially conflicting nature of these goals and a confounding of various means-end relationships, the means employed did not achieve a high degree of effectiveness. (See John F. Timmons, "Land Tenure Policy Goals," *Journal of Land and Public Utility Economics*, Vol. 19, No. 2, p. 178, May, 1943.)

<sup>2</sup> For a succinct formulation of the productive conditions of welfare, see A. P. Lerner, *Economics of Control*, pp. 75-77, Macmillan, New York.

the labor force is a variable for the firm, it is a constant for the economy; the time preference for the individual is much higher than for society; and there are many items of social costs (e.g., soil erosion, oil and timber wastes, loss of products due to unemployment) and returns (e.g., roads, education, many public services) which do not appear in the ledgers of the individual firm.

Nevertheless, the body of marginal theory is sufficiently developed to be of real practical help in evaluating public policy.

The objectives of any specific land program should be tested for their compatability with the productive norm: do they tend to make for a more efficient allocation of resources and hence for a larger social net product? We shall see later that this test is particularly appropriate for land use, conservation and development policies.

OPTIMUM INCOME DISTRIBUTION. Whatever the size of the social product, people have certain ideas as to how it ought to be distributed. Wide-spread poverty existing side by side with affluence is revolting to the sense of decency and justice in a democratic humanitarian society. Extreme poverty and economic insecurity reduce the individual's opportunities to the despondent choice between starving or begging for charity (including government hand-outs), and leaves liberty empty of meaning. Extreme wealth widens the opportunities of a few, often to the point of exercising power over many others, permitting liberty to degenerate into license and domination. People are keenly aware of the characteristic features of income distribution, as the extremes of poverty and wealth impinge upon their daily lives through direct observations and experiences.<sup>3</sup>

In a highly articulate democratic society, maldistribution of income is more strongly resented than malallocation of resources. In fact, in modern industrialized nations, public policy is much more often and directly concerned with improving income distribution than with increasing the social product. I need only mention progressive taxation, minimum wage and other labor legislation, education and health programs—all these policies have as their goals not product maximization, but income redistribution in a direction which more nearly satisfies some distributive norm, however vaguely conceived.

Let us attempt to spell out this goal of optimum income distribution in terms sufficiently concrete to be useful in appraising policy objectives.

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<sup>3</sup> An elaboration of the arguments in this section can be found in an article by the author, "Optimum Income Distribution as a Goal of Public Policy," *American Journal of Economics and Sociology*, pp. 453-78, April, 1944.

The dominant ideas with reference to which income distribution is to be optimized are equality of opportunity and individual liberty. The first of these concepts is equalitarian in character, the second differential. But their interrelation is conceived as complementary rather than antagonistic. That is: the best income distribution is one which equalizes opportunities among all individuals of society, and at the same time gives each individual the liberty to seize upon his opportunities according to his peculiar skills, talents and aspirations—which of necessity makes for unequal real incomes.

Translated into practical economic terms, this means that income should be so distributed that:

- (1) Everyone should grow up and live in an environment of at least minimum adequate standards of health, nutrition, clothing, shelter and education. There is ample evidence that children raised under conditions of below minimum standards in these essentials of life find their opportunities severely restricted. The quantitative contents of these minimum standards vary with cultural patterns, the state of the arts, and the size of the social product relative to population. This criterion of optimum income distribution we shall call the "subsistence norm."<sup>4</sup>
- (2) Everyone should have the opportunity of personality differentiation, of developing his individual talents and satisfying a great variety of wants according to his own selection. An individual with high wants is expected to spend commensurate efforts, thereby contributing to the social product correspondingly. The individual's urgency of wants of increasing scope and differentiation is the prime incentive for working hard and well, if by so doing he can satisfy these wants. Hence, one's income should be in proportion to his personal contributions in effort and skills to the social product. This criterion of optimum income distribution we shall call the "contributive norm."

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<sup>4</sup> If the marginal product value of a worker is lower than the value of his subsistence, three reasons may account for it: (1) His labor is inefficiently combined with other factors; if he is an employee, the employer is to blame; minimum wage laws tend to lead to more efficient labor use. (2) The worker is partially or totally disabled, by injury or old age; our moral code does not deprive him of a subsistence claim on that account. (3) The worker is lazy and negligent; the community can exert various kinds of pressures to utilize whatever productive capacity he might have (e.g., through eligibility rules for certain subsistence grants). Society would probably lose more by depriving him of his subsistence claim than by granting it, because below-subsistence levels of living create crime and social unrest, and cause undeserved hardships to his dependents. Society's interest in his children's future capacities and attitudes alone should justify his support at minimum adequate level.

Concretely, then, the maladjustment of a given pattern of income distribution can be measured in terms of the percentage of families falling below minimum adequate standards of subsistence, and the degree by which the individual's income falls short of (or exceeds) the marginal productivity of his labor (including management and all the skills which are the attributes of the individual and which he exercises in the production process).<sup>5</sup>

The objectives of any specific land program should be tested for their compatibility with the subsistence and contributive norms of optimum income distribution. This test is particularly relevant to tenure policies.

#### **FORMULATION OF POLICY GOALS IN THE USE, CONSERVATION AND DEVELOPMENT OF LAND**

In the field of land use, land policy objectives are directed primarily toward the goal of maximizing the social product—although any re-allocation of resources usually involves some shifts in income distribution. The focus, however, is upon the productive norm.

To simplify the exposition of the argument, let us skip the problem of improving the broad pattern of land use, i.e., of shifting land from one major use category such as arable farming to another, say forestry or extensive grazing. It is my impression that the degree of maladjustments in the land use pattern of the United States is relatively small and rather localized. The bulk of the land now in timber finds its highest use in timber production; the bulk of the land now in arable farming finds its highest use and should remain there. There are, of course, exceptions, but I believe that our major land use problems probably fall within each of these broad use categories of farming, grazing and forestry, and are concerned chiefly with conservation.

People have watched gullies eating deeper and deeper into once fertile fields until they had to be abandoned. Virgin forests have been cut over without orderly reforestation being provided for. Native ranges have been overstocked until only deserts were left. Along with soil erosion and the destruction of the protective cover of trees and range grasses came swelling floods and siltation of

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<sup>5</sup> "Property" in this context is not considered a personal "attribute of the individual," since it can be acquired in so many ways that are largely unrelated to "individual effort expended." Moreover, the growth of corporate and public property and of a highly differentiated labor-division economy should work in the direction of reducing the effect of property upon the pattern of personal income distribution. However, where a wide diffusion of property is feasible without disturbing the efficiency of the production process, such diffusion is desirable in the interest of distributive welfare.



navigable streams and reservoirs. Such misuses of land violate the productive norm and call for land conservation policies.

Obviously, the pursuit of competitive self-interest of individual producers is in conflict with society's interest in maximizing the social product over time. There is a fundamental difference in the time-preference for land income on the part of individuals and society. The short-run private profit motive to exploit resources must be confined by the long-run social welfare motive to conserve and develop them.<sup>6</sup> Individuals maximize their immediate profits by incurring social costs which are borne by someone else—by farmers and city people who get flooded out in the lower parts of the watershed, and by future generations who inherit impaired resources.

A basic goal of land conservation policy is to induce a degree of use intensity and a system of use practices which will maximize the long-run social product value derived from land resources.

But the nature of various land resources varies greatly. So general a formulation of a policy goal is useful only for designating guiding principles, from which more specific objectives of specific land programs can be derived. It is this step from the general to the specific that encounters innumerable difficulties. We can outline only a few of them.

**ARABLE FARM LAND.** Here, conservation policy deals with a complex land resource. The plant nutrients are a combination of renewable fund and flow resources; the topsoil is for practical purposes a non-renewable fund resource. Society's long-time interest is concerned primarily with the topsoil; as long as it is kept in place, the management of the restorable plant nutrients might well be left to a rather wide range of individual discretion.

A conservation program in arable farming, therefore, should recognize this distinction. Its major objective should be to control soil erosion—and never mind about fertility as such.<sup>7</sup> The rate of fertilizer application should be governed primarily by the short-run

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<sup>6</sup> There are cases where private profit interests coincide, at least in principle, with the welfare interests: monopolistic output restrictions in extractive industries. It would be unwise, however, to interpret such coincidence as a genuine identity of private and social interest. The objectives of monopolistic output restrictions are very different from those of conservation, and hence the quantitative application of output reduction as to timing and types of resources might not correspond with the requirements for conservation objectives. For example: general agricultural production control cannot be justified primarily on grounds of conservation, as is done so often.

<sup>7</sup> To the extent that fertility maintenance is necessary to hold the top-soil in place, it becomes an erosion control measure and falls within the provision of public conservation policy.

relations between fertilizer (and related) costs and crop prices, in the interest of the productive norm.

This may sound trite. But let us look at the consequences of this proposition. It means that not a cent of public money should be spent for conservation in all the areas where erosion, either from water or wind, is no problem. It means that a very substantial part of the public services and conservation payments made to Corn Belt, New England and Mississippi Delta farmers were misspent with respect to the basic objective of the conservation program. There is no justification, on grounds of public interest in conservation, for use of public funds on level land not subject to serious erosion, or on rolling land already under permanent grass or tree cover. Yet, millions of dollars have been spent under various conservation programs on just such lands. If all these funds had been concentrated on the land really subject to erosion, public welfare would have been served much more effectively.

In the mid-thirties, some land economists had proposed just such a conservation program, in which the establishment of conservation districts and disbursements of conservation payments were to be limited only to areas subject to erosion.<sup>8</sup> But the conservation program under the "Soil Conservation and Domestic Allotment Act of 1936" was rapidly developing into an income-support and production control program, in which many objectives were confounded into a conglomeration of purposes that made a clear-cut conservation policy difficult to apply.

Although we are not dealing here with methods for implementing land policy objectives, in formulating such objectives the cost of the program and the degree of achievement through economically and politically feasible means must be appraised.\*The basic objective is not to stop erosion at all cost and by any means, but rather to reduce erosion at public costs people at large are willing to stand, and by regulatory means farmers are willing to accept.

This means that policy objectives should be drawn up with the view of economizing public funds and regulatory devices. And this implies the establishment of critical limits which should determine the application of various conservation objectives and methods, according to specific land classes or type-situations.

For instance: critical limits for specific land classes or type-situations and their respective conservation objectives might be designated as follows:

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\*See Rainer Schickele, "Methodology in Soil Conservation . . .," Iowa Agricultural Experiment Station Res. Bull. 209, p. 373, March, 1937, and A. C. Bunce, *The Economics of Soil Conservation*, pp. 14-16, and 76-78. Iowa State College Press, Ames, 1942.

- (1) Land so dissected by gullies that its reclamation costs are prohibitive should be stabilized by the least expensive method of protective covering—the critical limit of restorability;
- (2) Land so susceptible to erosion that it should be shifted from cultivation to permanent pasture or timber—the critical limit of arability;
- (3) Land that should remain in cultivation, but requires current soil conserving practices, such as longer rotations, contour and strip cropping, etc.—the critical limit of current conservation practices;
- (4) Land that is so little subject to erosion that it does not warrant public concern—the critical limit of eligibility for conservation aid;
- (5) Public conservation aid (in kind or cash) should be allocated in such a way that farmers are compensated for conservation expenditures not recoverable within a reasonable time period—the critical limit of compensating individual sacrifice;
- (6) Mandatory regulation should be used where lack of conservation damages adjacent property (e.g., mandatory land use regulation under soil conservation districts), or where major blocks of land should be permanently withdrawn from farming (e.g., rural zoning ordinances and government purchase of submarginal land), or where conservation measures are urgently needed and can be applied individually without sacrifice in income—the critical limit of mandatory regulation.

In the context of a practical farm conservation program, the first four points lay out the direction and emphasis with which the conservation objective applies to particular classes of land, point five establishes principles of allocation of public aid to producers so as to achieve maximum conservation results for a given amount of public funds, and point six designates the limits within which the use of statutory land use regulation might be justified.

Our present soil conservation programs need overhauling, with respect to clarification of detailed objectives and principles for allocating public aid somewhat along the lines presented here. Income-support and production control objectives should be clearly segregated from those of conservation, even though they may, under certain circumstances and within narrow limits, be complementary to each other. The public is entitled to a clear-cut accounting of the costs and accomplishments of the various policies, and this cannot be done by jumbling up many heterogeneous objectives into a single mammoth program.

This is not to deny, however, that one program should be used,

wherever possible, to reinforce or supplement another. An income support or credit program might well require cooperators to meet certain minimum conservation standards. There are many obstacles to practicing conservation that individual farmers often find hard to overcome. Since all farm programs should converge toward the over-all goals of public policy, their complementariness should be enhanced, and their conflicts be minimized. This can be done without obscuring the accountability of each program for its direct costs and accomplishments.

**FOREST LAND.** Conservation objectives in forestry can be stated more simply—although the socio-political factors are offering formidable obstacles to their implementation.

On the whole, the present land in forests finds its highest economic use in timber production. The objective of a forest conservation program is primarily one of establishing management practices and regulations designed to maximize the long-run social net product derived from forest lands.

Following a similar procedure of analysis as was done with farm land, critical limits for various classes of forest lands should be established that would indicate the direction and emphasis of conservation objectives to be applied. In 1933, the U. S. Forest Service, in response to a Senate Resolution and under the leadership of Earle H. Clapp, prepared a well-conceived "National Plan For American Forestry," in which three levels of intensity of forest management were established.<sup>9</sup> Fire control, selective logging and reforestation practices should be geared to soil and climatic conditions so as to yield sustained or increased timber output depending upon various cost levels and locations to market.

It is quite likely that current and prospective relevant cost-price ratios are such that it is economically justified: (1) to reforest now denuded slopes in strategic positions—the critical limit of erosion and flood control; (2) to prevent any present forest land from deteriorating any further—the critical limit of sustained potential productivity; (3) substantially to expand and improve fire and pest control in accordance with systematic estimates of fire and pest hazards; (4) to adopt a long-time program for a systematic expansion of land under sustained yield management, beginning with the most productive and favorably located areas and gradually covering lower grades and more remote locations.

In drawing up specific objectives along these lines, we should keep in mind that public expenditures for forest conservation are

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<sup>9</sup> See U. S. Forest Service, *Major Problems and the Next Big Step in American Forestry*. Senate Document No. 12—separate No. 1, p. 43, Washington, D.C., 1933.

well adaptable to the needs of functional fiscal policy—stepping up expenditures during periods of general business recession, contracting them during peak periods of business activity.

**OTHER LAND RESOURCES.** We have treated in some detail the major issues involved in formulating land policy goals with respect to land use and conservation objectives for two major types of resources, farm and forest lands. A similar procedure might well apply to other land resources.

For range lands, the objectives can be stated in terms quite similar to those outlined for arable farm lands. Most of the conservation problems on range land arise in semi-arid or arid plains and mountain zones subject to wide weather fluctuations. Livestock enterprises have a much longer production period than most crop enterprises. Therefore, range conservation needs to give special emphasis to flexibility in stocking rates and provisions for adequate supplemental feed reserves. Conservation does not mean non-use, but optimum use of resources. It would be foolish indeed to use the carrying capacity of ranges during the drought years of the thirties as a standard for formulating specific range conservation objectives; yet the carrying capacity under conservation of a given range area is often cut to one-half or one-fourth in one year, and doubled or quadrupled in the next. There are limits beyond which the individual rancher cannot go in providing for feed reserves, or for a quick expansion of his herds. Public policy can go a long way in supplementing his efforts at equalizing the aggregate feed supply over seasons and over years, and by so doing a substantial part of over-stocking in dry years and under-stocking in wet years could very likely be avoided.

Perhaps the most urgent need for a new and forceful conservation program is in oil and natural gas resources. Here, we deal with a non-renewable fund resource of extremely strategic economic importance. There is excessive waste in the exploitation of our oil and gas resources, and even in their consumption. Time is rapidly ripening for a comprehensive federal oil conservation program. The major objectives should be reduction of waste, encouraging a shift to engines using heavier oils or having lower consumption rates, and increasing control over rates of output in the long-time interest of the economy.<sup>10</sup>

**QUANTITATIVE ASPECTS OF CONSERVATION OBJECTIVES.** The problem of determining the rate of exploitation of non-renewable fund resources in the best long-time interest of society is vexing. Quite apart from

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<sup>10</sup> The price effects of possible future output restrictions should not be allowed to produce windfall profits to private companies.

the question of society's time preference—which can only be answered a priori and must fall somewhere between the current interest rate on individual savings and zero—the crucial unknowns about which “reasonable” assumptions must be made are (1) the physical quantity of the resource worth exploiting under the most advanced techniques, and (2) the character and rate of potential substitution of that resource by one or more others in more ample potential supply. We should realize that whatever the quantitative aspects of our conservation objectives may be, whatever the degree of conservation or the rate of exploitation we may aim to establish, an assumption as to these two crucial unknowns is implied.

An illustration may help explain. Some alarmists want to drastically curtail current output and consumption of oil so that we have more of it left 100 years from now.<sup>11</sup> Their antagonist is the consuming public who wants increasing supplies of gasoline at the cheapest possible price now. The economist should tell the alarmist that almost every week new oil deposits are being discovered, here and abroad, and a brand new source of energy, the fissionable atom, is just around the corner. He should tell the consuming public that oil resources are exhaustible, that the unit cost of production is increasing as lower-grade and more remote resources are being tapped, and that there is no certainty as to the time when it will be economically feasible to substitute atomic energy for oil.

The same basic issue arises with the use and exploitation of other land resources which have exhaustible components, such as agricultural land, forest and range lands, fisheries, etc. It requires statesmanship and intimate knowledge of economics and technology to determine the most desirable conservation objectives in quantitative terms. This field of inquiry should rank very high in usefulness to policy formulation.

Related to this issue is the clamor of conservationists for substituting flow resources such as hydro-electric, solar and wind energy for fund resources. The limits of such substitutions should be determined primarily by competent economic analysis rather than by visionary fears or the recklessness of competitive enterprise.

A corollary to the determination of the optimum degree of conservation is, of course, the appraisal of the costs, both private and social, involved in bringing it about. The fiscal cost, i.e., the public funds required effectively to administer a conservation program, is only a part of the cost picture. Often, the same objective can be achieved by various methods, some of which may require large public expenditures (like incentive payments to producers or construction

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<sup>11</sup> See William Vogt, *Road to Survival*, p. 68, William Sloane Assoc., New York, 1948.

at public cost), others may require no funds at all (like mandatory regulations), still others may produce government revenues (like severance taxes or other tax devices). Theoretically, the ultimate quantitative test of the appropriateness of a given conservation objective must proceed within the macro-economic framework of marginal analysis and the productive welfare norm.<sup>12</sup>

**LAND DEVELOPMENT AND RECLAMATION.** The goal of land policy with respect to the development of land resources also should be directed toward implementing the productive norm of economic welfare. Conservation objectives deal primarily with the problem of keeping unimpaired the production capacity of resources now in use; land development objectives deal with the problem of bringing hitherto unused resources into production.

In a settled and fairly mature economy like ours, new land development projects require amounts of capital so large and time periods of amortization so long that small-scale enterprisers cannot shoulder the financial burden. Any major land developments must come from corporations or from government agencies; in either case, society is vitally concerned with the character, cost and use-disposition of such land development projects.

The most far-reaching modern land developments in this country are the river basin projects such as those of the Tennessee, Columbia, and Missouri rivers and the Central Valley of California. All of these are multiple-purpose projects, in which the various widely divergent purposes are combined in widely varying proportions, but are all closely linked together through the nature of the land itself. This basic fact alone points to the necessity for integrated planning of the various development phases which can be accomplished effectively only under government auspices.

The objectives in qualitative terms are obvious enough: irrigation, flood control, hydro-electric power, navigation, recreation. But the economic problem in quantifying these objectives is: how much of each and at what cost?

Let us be practical about this and introduce formal economic analysis first where it will help people most in improving decisions: on the local or area level, and on working up to regional and national levels.

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<sup>12</sup> If a given objective has been so tested and found inappropriate, but people democratically elect to go ahead with it anyway, the economist has no ground for objecting. As often as not, the future might exonerate the people's judgment. Try to visualize the state of this country now, had the conservationists controlled the settlement and industrial development during the 19th century. Yet, many serious mistakes could have been avoided had their influence been stronger.

These developments require large public appropriations. How should they be determined? Here is roughly the process (disregarding the time sequence of these stages):

- (1) Congress, somehow, arrives at a decision as to what funds shall be appropriated for such land developments in relation to other purposes such as national defense, foreign aid, farm price supports, social security, education, public health, etc. At this stage, it is doubtful whether formal economic analysis will carry much weight in congressional deliberations.
- (2) At whatever general order of magnitude public investment in these land developments has been determined, the appropriations must be broken down by the regions of various river basins. At this stage, economic analysis could make a significant contribution, especially concerning the ranking of the various regions as to prospective aggregate benefits for each 100 million dollars of public funds invested. However, a cursory glance at the Congressional Record does not reveal such comparative economic analysis as a decisive factor in the regional allocation of funds.
- (3) Accepting whatever total appropriations are forthcoming for a given area, the requirements for the various construction units submitted by the engineers should be appraised, usually scaled down a bit here and there, and ranked according to priorities. It is at this stage where economic analysis could be most immediately useful and practical in allocating funds among the various phases within the region or basin. This, however, presupposes a central planning authority, with sufficient jurisdiction to effectuate such allocations within an integrated general plan of development. So far, the Tennessee Valley Authority has been the only example where this was done in some systematic fashion. In all the other regions, this economic appraisal and integration of the various development phases is extremely weak, and the allocation decisions tend to reflect the relative strength and persuasiveness of public operating agencies, private pressure groups and individual congressmen rather than the result of economic analysis of alternative development plans. We have traditionally been short on research and long on log-rolling in determining the quantitative objectives in such land development programs.

In a tentative way we might sum up the basic issues thus:

- (1) From a national viewpoint, our capital stock and current and potential rate of capital formation justifies substantial public investments in land development programs along the TVA lines. From a world viewpoint, such investments would yield much larger marginal returns in undeveloped areas abroad than in the United States, but institutional conditions greatly limit the choice of public investments in land resources.



- (2) The criticism that land development programs in face of threatening farm surpluses are not justified is spurious. Farm surpluses, except for a few special commodities during certain periods, are the result of demand rather than supply maladjustments and hence should be tackled primarily from the demand side. Moreover, erosion continues to sap the productive capacity of agricultural land while the population increases.
- (3) Land development in major river basins taps hitherto unused resources yielding products of which we are short, such as electric power, and reduces losses such as erosion, flood damages and silting of streams, the aggregate private and social costs of which we tend to greatly underestimate. The spurt of human activities which is engendered within the region by such development programs releases energies and opportunities which would otherwise remain dormant.
- (4) The rate of repayment of irrigation development costs by farmers should be geared to what they are able to pay, under average management and prevailing prices, after operating expenses and family living requirements have been met. Any residual cost not covered by such repayment schedules should be borne by society as a whole. Any other repayment policy is self-defeating and economically unsound. Similar principles should be established for determining repayment rates for other development costs like those for electric power and navigation.
- (5) There lies a great challenge to people and their statesmen in bringing to bear upon the allocation of funds more economic analysis and rational judgment, especially in the clarification of quantitative aspects of the various objectives, and in the determination of amortization charges.

#### **FORMULATION OF LAND TENURE POLICY GOALS**

Tenure problems are concerned primarily with the distributive welfare norms. Although the effects of certain tenure conditions upon land use and conservation, and upon the productive process in general, are unmistakable, it is property rights and responsibilities that characterize tenure relationships. The second major field of land policy, therefore, deals with the conditions under which people should own, work and live on the land. Whatever a given pattern and intensity of land use may be, the tenure arrangements govern the way in which land income is distributed among the people.

**THE GOAL OF FAMILY FARM POLICY.** The most outspoken basic goal of American land tenure policy has been the family-type farm. From the days of Jefferson to the present, the ideal of our farm lands

being owned and operated by independent prosperous farm families has dominated people's thinking and found expression in a rather consistent series of land settlement and tenure programs. This ideal has persisted without losing its vigor, despite the criticism it has received from industrialists, bankers, landlords and economists.

It seems to be a rather sturdy plant, this system of family farms, and its performance has been quite impressive. Its doom has been announced ever since the beginning of the century, and when Mr. Thomas Campbell organized his wheat factory in the mid-twenties, Mr. Brookings was sure the factory system would sweep the family farms off the Great Plains. So far, a quarter century later, Mr. Campbell is still the lonely wheat king, surrounded by a handful of minor vassals. The Plains wheat economy has remained in the hands of family farmers as firmly as ever. Since neither the great depression nor the war bonanza defeated the family farm as a producer of the most readily mechanizable enterprise of all, one finds it hard to think of any foreseeable event that would.

The explanation of the persistence of the family farm throughout the major agricultural regions of this country is simple: Farmers have succeeded in adopting modern technology within the framework of their family farms. True, they have grown larger; and cooperative marketing, customwork with large-scale machinery and managerial skills supplied by the Extension Service, farm organizations and co-ops have yielded economies of scale which only the industrial form of organization was thought capable of yielding. Still, the fact remains that outside the Plantation South and the fruit and vegetable West, over 95 per cent of the American farms are of the nonindustrial family type.

Many claims have been made for the family farm. Some of them are severely criticized by A. Whitney Griswold in his recent book *Farming and Democracy*. The upshot of Mr. Griswold's analysis, it seems, is that democracy can thrive without a preponderance of family farms in the economy as a whole; but that whatever the size of the agrarian sector may be, the social and economic structure of family farms is more conducive to democratic processes than that of large estates. This latter point is sufficient to justify a family farm policy on socio-political grounds; the first has long ceased to be relevant to the problem in the United States, since the working population engaged in agriculture has steadily declined to less than one-fifth of the total, obviously without impairing the vigor of our democratic processes.<sup>13</sup>

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<sup>13</sup> If in any modern industrial nation a single group could claim to form the bulwark of democracy, it probably would be industrial workers, as Mr. Griswold's study suggests. I believe, however, that such exclusive claims by any single group

We might put it this way: Democracy requires that centralization of power be minimized, and that the exercise of power be held accountable to the people over whom it is wielded. Under a system of family farms, property in land and income from land are widely diffused and power derived therefrom is decentralized. Under a system of industrial large-scale farming, land property and income, and hence power, become concentrated in few hands, and the issue of effective accountability of such power to the people affected must be faced and successfully resolved. This means that the hired farm laborers would have to be unionized and granted all the rights of collective bargaining and social security now available to industrial workers. Also, both farm labor unions and agricultural employers would have to be held responsible to the government for the conduct of their affairs to the extent that public welfare is involved—a considerable extent indeed. These conditions, essential for democracy, could not be brought about without a long period of bitter conflict and even violence, as our own experience in the industrial farming areas in the Pacific states have shown.

Another aspect: the industrial form of organization makes labor a variable cost. When a business recession depresses the demand for farm products, agricultural employers would do what their manufacturing peers do: dismiss some workers and contract the total output. No vivid imagination is needed to see the implication of such perfectly normal business behavior to the nation's welfare. If during the 1930's agriculture had reduced output by 30 or 40 per cent as industry did, no appeal for faith in the American system of free enterprise could have staved off a full-fledged revolution. Government would have had to subsidize agricultural employers into maintaining a normal level of output—at a public cost which of necessity would have run much higher than the subsidies paid to induce farm families not to produce in excess of a "normal" supply.

These considerations are crucial to the issue of whether a family farm policy is justifiable on social and political grounds. Yet they rarely enter the discussion. Could it be that most people still are not aware of them?

The over-all goal for our family farm policy can be defined in terms of the following norm:

American agriculture should be mostly characterized by family farms, each large enough to support a farm family at a decent

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for being the "bulwark" of a democratic order should not be taken too seriously. There is too much setting up a straw man and taking delight in knocking him down in this otherwise highly informative book. (Harcourt, Brace and Co., New York, 1948.)

standard of living, and small enough to be managed and operated by the farmer as an independent business enterpriser relying primarily upon the labor of himself and his family.

**WELFARE NORMS.** Is this goal compatible with the distributive welfare norms? Three basic objectives must be formulated and tested to supply the answer.

*Adequate Subsistence.* Is a family farm capable of providing sufficient income to meet adequate minimum subsistence requirements for the family? Potentially the answer must be yes, since many family farms actually meet such requirements. But a cursory glance at statistics reveals that many family farms actually do not meet them. Ellickson and Brewster estimated that nearly 60 per cent of all bona fide farms in 1945 had incomes well below adequate subsistence needs.<sup>14</sup> Excluding the South with its share croppers, that proportion of inadequate family farms was around 45 per cent for the rest of the country.

One of the basic objectives of family farm policy, therefore, should be to reduce the proportion of farms too small to provide an adequate family living, by helping some of these farmers to obtain more resources and greater skills, and others to move into non-farm occupations where their opportunities would be better.

*Managerial Scope and Reward.* The second test: Is a family farm capable of providing sufficient opportunities and incentives for an individual to develop and employ his skills and energies and reap appropriate rewards for his efforts? Again, potentially the answer is yes, since there are wide variations in the incomes of family farmers which can be attributed to personal differences in skill and effort. But there are also many farms where these opportunities for personal development, self-expression and higher rewards for increased effort are severely restricted. Share-croppers often carry on no gardening or livestock raising. Many tenants engage in little long-time planning and investment. On the land they rent from others they have only indirect influence upon the shaping of the permanent improvements on the land, which may sometimes turn out to be an important infringement on managerial freedom. Furthermore, lack of access to credit or sporadic price declines and crop failures have severely restricted the scope of operations for many a competent and energetic farmer.

<sup>14</sup> See J. C. Ellickson and J. M. Brewster, "Technological Advances and the Structure of American Agriculture," *Journal of Farm Economics*, p. 837, November, 1947.

Hence, a second basic objective of family farm policy should be to increase the managerial scope and responsibility of farmers, help them to obtain commensurate returns and protect their legitimate claims for the full reward of their efforts. This objective requires far-reaching changes in the share-cropper system, in customary landlord-tenant relations and in farm credit arrangements.

*Size Limitation.* In the thought of some people a third basic objective derives from the over-all goal of a family farm policy: to discourage the accumulation of land much beyond the work capacity of the family's labor force. This means that when a farm family expands its operating unit to a certain size beyond which it depends more and more upon outside hired labor, provisions should be made to render it more difficult to expand the acreage further. Instead, such a farmer should be encouraged to invest his savings into more intensive land uses, into loans to other farmers or into non-land assets. Such an objective would conform to the socio-political goal of keeping ownership of land and land income diffused and the power over farm land and farm people decentralized.

This objective, at first glance, appears to conflict with the productive welfare norm. In quantifying such an objective, this danger should be recognized and avoided as effectively as possible. Many economists have overestimated that danger, while they have underestimated the extent to which peculiar institutional arrangements of the corporate system and of the capital market have led to poor resource allocations.

The more wealth one has, the easier it is to get more, and the less urgent it becomes for the owner to put it to its most productive use. The marginal returns from an increment of capital added to an enterprise already amply equipped are bound to be smaller than if the increment were added to an enterprise undersupplied with capital. This "self-generating power of wealth" is demonstrated both within and outside of agriculture. Beyond a certain point, depending upon the nature of the production process, this cumulative principle tends to conflict with the marginal productivity principle of resource allocation.

For instance, compare two farmers of equal managerial ability. One owns a well-improved, fully-equipped farm of a size that utilizes his labor force near the point of optimum efficiency; the other rents a small, run-down farm on which his labor force is greatly underemployed. The first farmer gets all the credit he wants thrown at him at bargain terms, and he finds no difficulty in buying additional land and equipment whose marginal productivity must of necessity be very much lower than that of the same amount of capital if it were added to the enterprise of the second farmer. The second

farmer, however, usually cannot get sufficient credit at reasonable terms and must struggle along without it—to the detriment of his productive effectiveness. Here is a typical illustration of how present institutional credit arrangements can lead to resource misallocation. This “self-generating power of wealth” tends to impede the equalization of marginal productivity of capital throughout the economy, perhaps even more so in industry than in agriculture, due to the greater concentration of wealth and the peculiarities of the corporate structure.<sup>15</sup>

The land policy objective of discouraging the expansion of farm size beyond certain limits has some points to support it. If the quantitative aspects of this objective are properly formulated, it would not depress the productive efficiency of resource use, but might actually improve it. This “if,” of course, represents a delicate problem of policy determination. The 160-acre limitation under the first Homestead Act worked reasonably well east of the Missouri, but was found painfully inappropriate in the Great Plains. We should guard against making similar mistakes of too severe restrictions on farm size in the settlement policies of new irrigation areas, in the application of a graduated land tax, in the tenant-purchase program of the Farmers’ Home Administration and in various other areas of land policy.

Let us face the problems in determining the upper limits beyond which family farm policy might discourage expansion of scale of the individual farm unit.

The over-all policy goal points to a family farm “small enough to be managed and operated” primarily by the family’s labor force. Although this upper size limit may be adequate to meet the productive as well as the distributive welfare norms in the major types of farming, there are production conditions in certain areas and enterprises where this limit is too low.<sup>16</sup> A well designed family farm

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<sup>15</sup> This issue is, of course, very complex; it involves various quantitative rules of credit allocation which are often called “capital rationing,” and of which the requirement of unencumbered assets as collateral for loans is probably the most important in farming. It involves differences in liquidity preference at various levels of wealth and size of operation, and in ability to bear risk. It involves the use of undistributed profits instead of equity or credit financing of corporate ventures, and many other things. All of these point in the direction of the hypothesis that mere size, beyond the requirement for technical efficiency, can lead to misallocation of resources with relative impunity. See also A. G. Hart, “Assesses, Liquidity and Investments,” *American Economic Review*, Vol. 39, No. 3, p. 172, May, 1949.

<sup>16</sup> For instance, if the term “primarily” is defined as 50 per cent or more of the farm’s total labor requirements to come from family members, there are types of farming where seasonal labor requirements are very high, and where a farm size meeting the conditions of the productive norm may need such a large complement of seasonal workers that they contribute well above 50 per cent of the annual labor-months. This might be the case in certain specialized fruits and vegetable

program should have sufficient flexibility to avoid serious conflicts with over-all economic welfare goals.

**GUIDING PRINCIPLES FOR TENURE POLICY OBJECTIVES.** These three basic objectives of subsistence, managerial scope and size limitation, should serve as guiding principles in formulating specific objectives of land tenure programs. They challenge policy-makers and their economic advisers to courageous thinking and acting. Really significant improvements in land tenure require major operations on some of our deeply entrenched institutions.

Increasing the size of inadequate family farms involves helping present competent farmers on such units to acquire more land, capital, equipment and supplies. Existing private credit facilities are not adapted to that purpose. The scope of the Farmers' Home Administration is much too small to accomplish a significant improvement in the farm size pattern. In principle, credit must be made available according to productive need rather than collateral security; this means credit arrangements based upon borrower-lender cooperation in determining credit needs and in budgeting debt payments ahead over appropriate time periods depending upon farm income and family requirements. At present only public credit agencies can furnish such credit facilities; but there is no reason why private lenders could not furnish them if they were sufficiently interested in making the necessary changes in their lending practices and regulations.

Increasing the size of inadequate farms does not in all cases involve the displacement of another farm family, but it often will do just that. Such a program, therefore, should provide for assisting farm families to shift out of agriculture whenever the family is so inclined and has a reasonable chance of improving its scale of living by doing so. This means vocational training, consultation and employment service facilities, and often some credit to make the shift financially possible for the family. The need for such a program is greatest in the Old Cotton South—which, of course, involves dismantling the plantation-share-cropper system.

New farming units established in irrigation projects should be adequate in size. They might often be used to resettle some of the competent families who are being displaced by the consolidation process.

Expanding the scope of managerial freedom and responsibility and the commensurate reward in income for the farm family involves

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areas, in extensive grazing areas of the western plains and mountains, and perhaps even on the arid fringe of the wheat belt.

again the dissolution of share-cropper arrangements. It also involves a decisive change in landlord-tenant relations in the direction of shifting all managerial functions, including those concerning permanent improvements, to the tenant. Whether such a shift should come about through a tenant's rights program of compensation for unexhausted improvements and for "disturbance," or through a tenant purchase program, should be decided according to which of these means appears more appropriate at a particular time and place. Both approaches should be used simultaneously with different emphasis and speed depending upon local circumstances.

Again, adjustments in credit arrangements are required in the direction of safeguarding the borrower's equity and possession in case he defaults on debt payments due to external causes beyond his control, such as price depressions and crop failures. Forced sale of collaterals in satisfaction of delinquent debts should be restricted to cases where delinquency is due to the borrower's ill-will, negligence or incompetence. The present system makes no such distinction, and thereby greatly limits the farmer-borrower's scope of managerial effort and frequently deprives him of his just rewards. Such a change in credit arrangements would involve amendments in existing bankruptcy and foreclosure laws and other statutory regulations. Perhaps minor adjustments in interest rates and service charges and a more general or even universal mortgage insurance program for farm real estate loans might be found helpful.

Another important policy objective for expanding the family farmer's scope of management is to promote cooperative and public service methods for bringing into his reach various economies of scale in production, farm organization and marketing. For instance, custom and cooperative use of large-scale equipment and of sires, specialized technical advice in farm management and marketing through cooperatives and extension services would greatly strengthen the family farms, especially those on the lower end of the size scale. Such cooperative and public services should be expanded hundredfold and as quickly as possible as a major phase of a family farm policy.

Discouraging concentration of land into larger than family farm units would very likely be the indirect result of a vigorous application of the policy objectives outlined so far. Many of these program phases would tend to counteract the "self-generating power" of wealth, the strongest force leading to concentration of ownership and control beyond the needs of production efficiency. But certain specific limitations might well be necessary. For instance, public-sponsored credit facilities should be available only to bona fide family farmers; in certain areas, a carefully gauged, graduated land tax might be a good thing; making all agricultural employers of more than 4 or 5



workers subject to all social security and labor legislation is already long overdue; limitation of price and income supports to a reasonable volume of output might also help to discourage large-scale farming without sacrifice to the welfare goals; and the settlement policies in new irrigation areas certainly should be so devised as to effectively restrict land speculation, concentration and reversion to tenancy.

There are, in broad outlines, the guiding principles and objectives of a long-range comprehensive land tenure program for a national family farm policy.

### **LAND POLICY IN WORLD PERSPECTIVE**

In closing, we should orient our land policy with respect to the land and population problems of the world. The more conscious we grow of the world's indivisibility, the broader the scope of our land policy will become.

Our government's promotion of oil resource development in the Near East is as truly a part of our land policy as is the British land development program in East Africa. But these are both examples of a colonial type of national land policy. These quasi-imperialist policies of individual nations bear the grave danger of tearing the world apart rather than welding it into a peaceful society of nations. They are out-of-date and should be redirected or replaced by a genuine system of world land policies under United Nations auspices. We, as a member nation, should contribute to the making of world land policies, just as the congressmen from our home state contribute to the making of our national land policy.

As long as there is no world government, the purpose of formulating world land policies can be no more than helping individual nations to think their land problems through in a more systematic and world-wide framework. Through moral suasion and conditional development loans and grants-in-aid it might even be possible to induce a nation here and there to enact land policies more nearly in line with global needs than would be the case otherwise. There, as in many other fields, the United States has come into position for the exercise of constructive or destructive leadership. We may well pray for enlightenment to make this leadership constructive. The possible consequences of failure are horrible to contemplate.

Perhaps the basic principles and objectives just outlined are amenable, with some modifications, to world-wide application; the specific objectives, and the various methods of their implementation, of course, are not. They must be closely adapted to the institutions and economic conditions of each country.

Let us briefly survey some of the pressing land problems.

Point Four of the Atlantic Charter proclaims that all states, great or small, should enjoy "access, on equal terms, to the trade and to the raw materials of the world which are needed for their economic prosperity."<sup>17</sup> The emphasis is on need rather than ability to pay. The development of land resources for the production of such needed raw materials requires much capital not now available in the countries where these resources are located. It makes good economic sense for the industrialized nations with a high rate of capital formation to furnish it, on loan, to the undeveloped countries—but under the conditions outlined in the Atlantic Charter. To guarantee adherence to these conditions, it should be logical to place the surveillance of such land development projects in one of the United Nations agencies. Let the United States furnish the capital and Standard Oil do the drilling for oil in the Near East, but the UN Trusteeship Council and International Bank should supervise the projects and see to it that access be assured on equal terms to all states, great and small, according to their needs.

The charter of the FAO directs it to function in the fields, among others, of agricultural conservation, credit, population and farm labor, development of agricultural resources, and land tenure. All these fall within the purview of land policy. We should push the formulation of policy objectives and programs in these fields, within the framework of the FAO. We should urge the member nations to adapt them to their respective conditions and submit a specified list of capital and skill requirements needed from outside to implement these policies.

In allocating, through the FAO and the International Bank, capital and technicians to various countries for land conservation and development, the same basic criteria of economic welfare norms can be applied that have been discussed with respect to the United States. No doubt, some profound changes in the institutional arrangements, particularly concerning land tenure, will be involved in many of the industrially undeveloped countries before such policies can bear fruit. We should, through the FAO and in cooperation with other members, develop criteria of eligibility for assistance which will encourage desirable reforms.

Finally, a comment on the Malthusian nightmare that is recently being revived: The thesis that any help to India and China in developing her resources and increasing her food production is a waste of effort as long as people there insist on propagating is fallacious. Worse, it is dangerous as it succors the reactionary instincts of nationalist isolation. This thesis puts the cart before the horse. It

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<sup>17</sup> The Atlantic Charter was signed by 31 nations on Jan. 1, 1942, Russia being one of them.

would be more correct to say that any efforts to reduce the birthrate in those countries are wasted as long as their people live under constant threat of starvation. The "luxury check" of population growth seems to have amazingly universal application. As long as parents see half of their children die before they come of age, they instinctively will produce as many as possible to assure the preservation of their race.

This statement is, of course, almost as lopsided as the Malthusian thesis. But after all, western civilization during the last two centuries has proven Malthus wrong; it might just be that eastern civilization, if it succeeds in adapting science and technology to its culture, will prove the Neo-Malthusians equally wrong.

Humility of the scientist should make us confess that we cannot possibly predict how an industrial revolution will affect population growth in India and China. Compassion of the humanitarian should make us determined to render these peoples any possible assistance in developing their land resources and raising their living standards. Wisdom of the statesman should convince us that our nation cannot flourish unless we help build a society of nations in which people will share the fruits of the land in peace and prosperity.

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# 3.

## *World Population Trends, Problems, and Policies*



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**I**T IS QUITE GENERALLY REALIZED TODAY THAT THE world's population has been increasing more rapidly since about 1800 than in any similar period in human history. (See Table 1.) The population of the world in 1800 is believed to have been about 900 million of which about 200 million, or a little over 22 per cent, were Europeans or settlers from Europe. By 1913 it had increased to 1,700 or 1,800 million, almost double the 1800 population. Just before World War I Europeans and their descendants probably numbered 600-625 million or three times as many as in 1800 and had become about 35 per cent of the total. By 1940 the total population of the world had grown to about 2,100 million and Europeans constituted about one-third, a slightly smaller proportion than in 1913. At the present time, the total population of the world is 2,300

to 2,400 million and the proportion of people of European descent is now falling. Because the changes in the proportions of the world's population living in its different parts are important from a number of standpoints, they will be summarized briefly.

During the nineteenth century and the first decade of the twentieth, Western Europe and North America grew in numbers far faster than most of the rest of the world. However, about the middle of the nineteenth century or a little later a differential in growth developed within Europe. Southern and Eastern Europe, which had hitherto grown more slowly than Northern and Western Europe, began to grow faster than in the past. In 1850 slightly over one-half of the total population of Europe lived in Northern and Western Europe, but by 1913 its population had fallen to about 43 per cent of the total. Only if the populations in North America, Australia, South Africa, and certain parts of South America are added to those of Western Europe can it be said that up to World War I people of Western European stock continued to grow more rapidly than those of Eastern European stock. It should also be noted that during the latter part of the nineteenth century certain portions of Asia's population, notably Japan, the Philippines, and Java, began to grow more rapidly than in the past, but on the whole the Asiatics have grown much less rapidly and less regularly than the peoples of the West. As a result of these differences and changes in growth the proportion of the Asiatics in the world declined from perhaps 65 per cent in 1800 to about 55 per cent in 1900 and continued to decline, although much more slowly, up to World War II when it was probably about 53 per cent. Today, the people of Asia are supposed to be increasing proportionally. They now constitute about the same proportion of the total as in 1913 (55 per cent) and seem likely to grow proportionally in the near future.

What brought about this rather sudden growth of population, especially in Europe and America, during the 150 years preceding World War I and, during the last few decades, among many other peoples? In my judgment the most general statement that can be made on this point is that modern science has been the chief factor in bringing about this vast growth of the world's population since about 1750-1800. Since 1800 the growth of population has probably exceeded by half or more the total growth of mankind in the many millenia prior to that time. Although such long-sustained growth has been very unusual in human history and has probably never occurred in any large population, it is necessary to bear in mind the fact that even the growth since 1800 falls far short of man's reproductive capacity. When human reproduction approaches the maximum, i.e., when births are 45 or more per 1,000 and when deaths

TABLE 3.1  
ESTIMATED POPULATION OF THE WORLD AND ITS DISTRIBUTION  
BY CONTINENTS, 1800-1948\*

Continent	Population (in millions)					
	1800	1850	1900	1913	1937	1948
World.....	919	1,091	1,527	1,723	2,089	2,351
Asia.....	600	664	839	923	1,105	1,248
Europe.....	188	266	390	468	383	389
Africa.....	100	100	141	135	157	193
North and Central America..	15	39	110	134	177	211
South America..	14	20	41	56	86	105
Oceania.....	2	2	6	8	11	12
USSR†.....					170	193
	Percentage Distribution					
	1800	1850	1900	1913	1937	1948
World.....	100.0	100.0	100.0	100.0	100.0	100.0
Asia.....	65.3	60.9	54.9	53.6	52.9	53.1
Europe.....	20.5	24.4	25.5	27.2	18.3	16.5
Africa.....	10.9	9.2	9.2	7.8	7.5	8.2
North and Central America..	1.6	3.6	7.2	7.8	8.5	9.0
South America..	1.5	1.8	2.7	3.2	4.1	4.5
Oceania.....	0.2	0.2	0.4	0.5	0.5	0.5
USSR†.....					8.1	8.2

\* Data for 1800 and 1850 are from Walter F. Willcox, *Studies in American Demography*, Ithaca, Cornell University Press, 1940, p. 45. The data for 1900 and 1913 are compiled from a number of official and semiofficial yearbooks. Those for 1937 and 1948 are taken from *Demographic Yearbook* (1948) and *Population and Vital Statistics Reports* (1949) of the United Nations. The 1937 figure for Africa has been increased by 10 million for Ethiopia for which no 1937 figures are given although a 1948 population of 15 million was assigned to Ethiopia. The 1937 population of China was given as 452 million and the 1948 population as 463 million. With considerable parts of the world's population still uncounted (China, Ethiopia, and other parts of Asia and Africa and some parts of South America) the total figures may well be in error by some millions. However, there is no reason to doubt that the general trends shown are essentially correct.

† No attempt was made to divide the population of the U.S.S.R. between Europe and Asia in 1937 and 1948.

are at a moderate level, perhaps 20 or less, as they have been in much of the West for a century or more, man's numbers can double in 25 years or less, that is to say, in about a generation. (Such a rate of growth actually prevailed in the United States for a number of decades prior to 1860.) Throughout the period of human life on the earth the chief obstacle to such multiplication—in many cases the only obstacle—has been man's inability to control his death rate. This in turn has been due largely to his inability to increase the pro-

duction of the necessities of life fast enough to care for the increase in numbers.

A simple arithmetic calculation will help in understanding the nature of population growth. A population of 100,000 persons with a natural increase of 25 per thousand per year would grow to 900 million—the estimated population of the world in 1800—in 369 years and would grow to 2,300–2,400 million—the population of the world today—in about 410 years. Obviously, such a rate of growth has not persisted in any large proportion of the world's population for any considerable period of time. The tremendous growth in man's numbers since 1800 represents, therefore, the unusual in human history rather than the usual. In seeking to understand how it came about, we must take account first of the peculiar conditions which led to the decline of the death rate. These may be summed up briefly in the phrase "the development and application of modern science to the problems of resource utilization and to the improvement of health."

It is impossible to give details of the effects of the application of science on production and health. But most of us today are well aware of the fact that agricultural and industrial revolutions have been going on in the West for two centuries or more. The net result of these revolutions has been to increase almost beyond belief the productivity of labor in all lines of economic activity. All types of workers produce many times as much in a day's work as they did in 1800. It was also this increase in production which made possible more intensive scientific research, some of which has contributed directly to still more efficient production and some of which has contributed directly to the reduction of the death rate by adding to our knowledge of sanitation and medicine. But I would like to make it clear that up to the present, man owes most of his lower death rate to the increase in agricultural and industrial production which by increasing the goods at his disposal made life easier. From now on, in the West at least, further reduction in the death rate will owe more and more to the development of scientific medicine.

Beginning about 1800, therefore, we can say that much of the Western World entered upon a new era of population growth, largely because of the improvements in health made possible by increased production aided after a time by the advances in sanitary and medical science. But these benefits in improved production and health did not reach all peoples at the same time. This fact largely explains the changing proportions of the world's population in different regions to which attention has been called. As a consequence of the differences in time of the application of science to agriculture, industry, and health, there are today very large differences in birth rates and death rates in the several major parts of the world.



## WORLD POPULATION GROUPS

For convenience in understanding world population growth today, the differences just referred to will be summed up by classifying the people of the world in three large groups. The boundaries between these classes are, of course, not precise, but such a classification is a useful device in helping us to see what is happening in population growth throughout the world and in trying to foresee probable population developments in the world during the next few decades.

*Class I countries.* Class I consists of those countries which we generally designate as Western; namely, Western Europe, North America, Australia, New Zealand and a few other small areas. Demographically, Class I countries are characterized by very low death rates and birth rates, compared with the rest of the world. As a consequence, most of them have a relatively small excess of births over deaths now. Some of them have no excess when due allowance is made for the fact that they still have relatively young populations because of recent, fairly rapid growth. In these countries as a group, population will grow slowly during the next few decades. In some of them it will probably begin to decline after a decade or two. In 1800 this class had a population of about 115 million, or between 12 and 13 per cent of the estimated population of the world. There were, of course, no Class I countries at that time. By the end of 1913 this Class contained about 358 million people, or more than three times as many as in 1800, and constituted about 21 to 22 per cent of the world's total population. These same countries had an increase of about 77 million by 1940 making their total population about 435 million in that year and they still had about 21 per cent of the world's total. This later growth was due in considerable measure to the relatively large growth of the United States and Canada. These Class I countries now exercise a large measure of control over both birth rates and death rates and their growth in the future will almost certainly be much slower than in the past.

*Class II countries.* Class II is composed chiefly of countries in Southern and Eastern Europe (Italy has been placed in Class I) to which are added Japan, some countries in North Africa, and some in South America. They are characterized by medium death rates which have been brought under a certain measure of control, at least temporarily. This control is much less secure than in Class I countries. Their birth rates are still quite high because contraception is not yet widely practiced, albeit, there is clear evidence in most of them that it is spreading in almost direct proportion to the increase in industry and urban living. As a consequence, they have high rates

of growth similar to those which prevailed in most Class I countries for a number of decades before World War I. As a class they will almost certainly continue to grow quite rapidly for at least three or four decades yet. However, some of them may pass into Class I in the meantime while others will continue to grow rapidly for a longer period. These countries as a class contained almost as large a population in 1940 (432 million) as the Class I countries and had almost 21 per cent of the world's total population. They had been growing much faster than the latter for several decades as shown by the fact that in 1900 they had only about 238 million people and only 15 to 16 per cent of the world's population. It is quite probable that for the next few decades they will grow at a more rapid rate than any other class. In absolute numbers they may even grow more than Class III countries.

*Class III countries.* The remainder of the world will be placed in Class III: This group is, in general, characterized by high death rates and high birth rates. Such control over vital processes as does exist is confined almost wholly to the death rate and is extremely precarious. Class III countries contain almost 60 per cent of the world's population. All but about 10 to 12 per cent is found in South and East Asia and the neighboring islands.

Some of these Class III countries—India, Java, the Philippines, and a few others—have been growing fairly rapidly in recent decades. The reason they are placed in Class III rather than in Class II is that neither their birth rates nor their death rates are under reasonably secure control. Death rates in particular are likely to fluctuate widely from time to time and thus render growth highly uncertain. Whenever subsistence is increased in such countries population grows because the death rate is reduced. There is no assurance, however, that subsistence can be increased steadily enough in most of them to maintain a lowered death rate for any great length of time and thus insure such steady growth as took place in the West from 1800 to World War I. Likewise, there is small assurance that their rather embryonic health services can be maintained even at their present low levels of effectiveness. Indeed, with the disruption of the colonial system as represented in the establishment of Hindustan and Pakistan, in the setting up of the Indonesian Republic, in the revolts in Burma and French Indo-China, and with the chaos accompanying the current Chinese civil war, it may not be possible even to maintain civil order in many of these countries. Under these conditions it is altogether possible that their populations will not only cease to grow but will even decline because of a rise in their death rates. Civil order is a prerequisite for all improvements in living conditions.

The potentialities of growth in these Class III countries are enormous as witnessed by the growth of India and Java during the past few decades. In China the potentiality is as great as in India, possibly even greater, but we do not know what has actually happened there since the Chinese "censuses" are both incomplete and unreliable. But we do know that China has enjoyed none of the conditions favoring population growth which have prevailed in India during the past 6 or 7 decades. She has not had a strong central government capable of maintaining civil order, of building railways and irrigation works, of spreading the knowledge about and the practice of improved agriculture and of establishing even a mildly effective health service. Moreover, the movement for industrialization has been weak and intermittent and has accomplished far less there than in India. Altogether, considering the conditions which have encouraged population growth in other lands having a similar economy, it appears highly doubtful whether China has had any appreciable population growth for several decades, aside from the growth in Manchuria arising from the large migration into that area since about 1900.

When the birth rate of any country is in the neighborhood of 45 per 1,000, as is probably the case in China, even if the death rate is 35, over three times our present rate, the increase would be at least 4 million a year. Such an increase cannot be cared for even at present low levels of living unless new land becomes available, unless industry is expanding at a tremendous pace and unless there is a very rapid improvement in agricultural techniques. In other words, total production must increase greatly in a country like China or India if population is to increase even at a moderate rate. Since there is comparatively little chance of such favorable conditions prevailing in any of the Class III countries for more than a few years, what will probably happen is that their populations will grow but slowly and intermittently and that even this slow growth in numbers will take place at the expense of any significant rise in the level of living. If health services are strengthened sufficiently to reduce the death rate significantly for a time, the level of living may even deteriorate to the point where absolute need will more than offset health work and the level of living will be substantially lowered. Under these conditions the death rate will probably rise.

Furthermore, it should be noted that our experience in the West leads the demographer to doubt whether there will be any substantial reduction in the birth rate in these countries until industrialization is well under way and until there has been a period of several decades during which the level of living of an important fraction of the population has been rising. A rather prolonged period of fairly comfortable living seems to be the economic prerequisite of a decline

in the birth rate. It is possible, of course, that an active governmental policy encouraging smaller families would speed up the reduction in the birth rate. With modern means of communication, the knowledge on which a rational decision regarding the need for birth control can be based, can be spread much more rapidly than in the past. In addition, the means to make birth control effective can also be made known to the masses of the people in a relatively short time. These conditions make it not unreasonable to assume that the practice of birth control can spread more rapidly even in backward industrial areas than was possible during the nineteenth century in the West. Whether it will do so remains to be seen.

### POPULATION PROBLEMS AND POLICIES

It is now possible to state in broad terms some of the more important problems and policies the world as a whole will face in dealing with possible future population growth. The more important statement of national problems and policies is, however, a different matter because it must be spelled out in detail for each country and this cannot be done here. It is essential to realize that each nation has its own peculiar problems and that its policies must be adapted to the solution of its own problems. Moreover, different countries and peoples have different standards by which they will define their problems, and in the light of which they will propose policies even when they recognize population control as a matter regarding which a public policy should be adopted.

ADJUSTING POPULATION TO RESOURCES. In the most general terms the population problem of the world is that of adjusting man's numbers to his resources in the light of his ability to use these resources efficiently at a given time and place. Such a generalized statement dodges the really important problems and is, therefore, of little practical interest. All this brief discussion can do, however, is to call attention to a few of the implications of such a statement for different peoples and to suggest some of the differences in the policies which are likely to flow from efforts to make such adjustments. To do this we must make one important assumption which many people may not be willing to grant at this time—that the time has come when a *laissez faire* policy as regards population growth cannot safely be followed much longer by any country. Soon we must begin to consider with care how the growth and the distribution of populations are affecting, or are likely to affect, our social, economic, and political welfare, and to formulate policies which seem likely to contribute to this end.

On the basis of this assumption most, but not all, Class I countries do not have very serious problems arising out of increasing numbers. Exceptions are Italy and Holland, and perhaps one or two others which still have populations growing so rapidly that it is doubtful whether they can long maintain their present levels of living with the resources available to them. Also, the United Kingdom, Germany, and some other countries with slowly growing populations are perforce much concerned with overpopulation because of changes in the economy of the world and in its political organization. These changes increase the difficulties of expanding the foreign trade upon which some of the highly industrialized countries are dependent for the maintenance of present levels of living, to say nothing of improving them. Thus, while problems of overpopulation can by no means be ignored in several of the Class I countries, the more urgent problems in most of them are those arising from differential fertility—the distribution of the people within the country and, in some countries, even with maintaining numbers. For example, in France there is much concern over the probability of serious decline in numbers in the not distant future and over the depopulation of certain regions.

In Class II countries where, for the most part, there is a fairly rapid increase in numbers, the problem of numbers is of much more concern than in Class I countries. How important the problem of numbers is to any particular country will depend upon the volume and the quality of the natural resources they possess and the outlook for their rapid and efficient use. In some of the Balkan countries and Japan the amount of unused land suitable for agriculture and the quantity of mineral resources are so small that the present and prospective increase of population must be regarded with considerable concern even though births are coming under a measure of control. Besides, a number of these Class II countries have entirely inadequate amounts of capital to utilize their natural resources efficiently and also lack the experienced engineers and workers upon whom any rapid increase in production in agriculture and industry depend. There is a real likelihood that a steady improvement in the level of living in these countries will be seriously interfered with by the too rapid growth in numbers. Hence, in the judgment of the writer the most urgent population problems in many of these Class II countries are those arising out of the too rapid growth of numbers. But since the voluntary control of the birth rate has clearly begun in most of these lands there is some reason to believe that it will continue to spread with increasing rapidity. However, those which already have rather dense populations in relation to resources will probably feel increasing population pressure for several decades.

Other Class II countries, of which the Soviet Union is perhaps the best example, seem to have sufficient resources to support a large

increase in numbers, not only at present levels of living, but even at improving levels. If, however, even the Soviet Union continues to grow rapidly, it is reasonably certain that the rise in the level of living will be retarded by this increase. If, as now appears to be the case, the Soviet Government is more interested in the enhancement of the political and military power, which is commonly believed to accompany increase in population, than in raising the level of living of the masses, it will continue to encourage the increase in numbers at the expense of better living. Generally speaking, in Class II countries a *laissez faire* policy in respect to restraint of population growth is apt to be followed for the next few decades, but there is also a chance that the policy adopted will be one of expansionism in which political aims take the place of welfare aims.

**THE PROBLEM OF OVERPOPULATION.** In most Class III countries (high birth rates and high death rates, largely uncontrolled) the urgent population problems are those of overpopulation. The levels of living are very low in such countries and the deaths have been and still are determined largely by the amount of subsistence available. At first, this might lead one to assume that the only important problem in such countries is the increase of the food supply. Many people take this position. But just because the increase of subsistence in Class III countries acts so directly to increase population, it must not be forgotten that the real problem of improving the level of living is not only one of increasing subsistence for the present population but also for rapidly growing population and that this relatively rapid rate of subsistence increase must be continued for several decades—until the birth rate has begun to fall faster than the death rate. It is the per capita production which in the end determines the level of living and the level of living which in turn determines the death rate—a fact often overlooked by people who give only casual attention to these problems.

**POPULATION PROBLEMS OF PARTICULAR COUNTRIES.** Although there are certain general differences in the population problems of the countries belonging in the three classes distinguished above, it is clear that since these classes themselves are not neatly and precisely distinguished from one another at any given time, their population problems and the policies needed to deal with them cannot be classified with precision. It may be helpful, therefore, to be a little more specific regarding the population problems of certain countries.

In the United States where our natural resources are still very large and where we have the scientific organization, the capital, the

experienced management, and the skilled personnel to use our resources with considerable efficiency, the problems of production can be handled rather quickly and easily. Furthermore, the fact that for the last 90 years at least our population has been growing at a decelerating rate with only occasional upswings means that much of our increase in production in recent decades has been used to improve the level of living rather than merely to support larger numbers. If our population had continued to increase after 1860 as it had been increasing up to that time, we would now have about 468 million citizens. With such a population our level of living would be far below what it now is. With a population of about 150 million, with our great resources, with our abundant capital, and with well-trained workers in every field, our population problem is only secondarily one of numbers and their pressure on subsistence. Our problems are rather those arising from the distribution of population, from differential birth rates, and from the desire for improving the quality of our living especially in the lower economic groups. Whether or not we have the means of producing the largest possible economic return per capita even for our present population, we can produce enough for a very good living for all of our present and probable future numbers. The reason we can feel assured of a good living as compared with the peoples in the more densely settled lands of Europe and Asia is found in the low ratio of population to resources and in our relatively slow growth in numbers in recent decades. As a consequence of relatively large resources, our population problems are not those of mere existence in a bitter struggle for survival, but of so organizing our life that we can live more comfortably and more richly.

On the other hand, Japan, even though placed in Class II demographically, already has such a large population in relation to the resources available for its support and to the capital and techniques which can be applied to her resources, that the outlook for the attainment of even a very modestly comfortable level of living is far from bright. In order to become self-supporting, Japan must produce food for 5 people or more on every acre of tillable land and for almost 4 (because of double-cropped land) on every acre of crops harvested. The United States harvests about  $2\frac{1}{2}$  acres per person or 10 acres for 4 persons. Therefore, Japan's population problem is now one of adjusting her population to her resources, using the term resources in its broadest sense. For almost 50 years she made an adjustment of resources to a fairly rapidly growing population by expanding her resources through the enlargement of her empire and the increasing application of science to production. The continued effort to expand her resources was an important factor in

bringing about World War II. It may be a factor in another war at some future time if the adjustment between population and resources takes the form of trying to provide resources to a steadily growing population rather than of trying to adjust numbers to the resources which are available.

The only way that Japan can, in the long run, insure a moderately decent living to her people is to reduce her birth rate—reduce it to a level which will result in a population which she can support with her present resources plus those goods which she can reasonably hope to secure through the channels of trade. If all the densely populated Class II and Class III countries were to neglect population control and were to devote all their efforts to providing the goods necessary to reduce death rates, there would indeed be standing room only in most countries a century hence. Furthermore, hunger, disease and war would again become the primary determiners of the death rate.

POPULATION PRESSURES AND WAR. We can be reasonably sure, however, that when the pressure of population is felt more and more in countries like India and China, they too, no less than Japan prior to World War II, will want larger resources in terms of land area and will be disposed to fight for them. No nation, once its people become literate and are allowed to know what is going on in the world, can be expected to accept calmly the increasing hardship its people will feel as they become more and more crowded and live, what seems to them, a more and more uncertain and precarious existence. Under these conditions outbreaks of war may initiate cycles of destruction which will raise the death rate until there is little or no increase of population.

At this point it should be noted that a country does not particularly endanger the peace of the world just because its people are crowded and live miserably. When a country accepts such an existence as inevitable and has no means to make war on the better armed and organized peoples who have larger resources, it is not very likely to undertake the conquest of new resources. But such conditions are not and cannot be permanent in a world where science shows how to use natural resources more efficiently, where people are learning about the existing differentials in resources, and where the military power of the backward peoples is increasing, albeit, slowly. The world in which people accept mere existence passively is rapidly vanishing with the improvement of communication and the increased amount of travel by all peoples over the earth.

What is happening in India today will help us to understand better the actual problems many countries face as indicated in general



terms above. In 1921 India had a population of about 306 million. Twenty years later it had 389 million (including Pakistan). The rates of increase in these two decades were not large by comparison with those of the United States before 1910, nor were they any higher than those of several European countries during a considerable part of the nineteenth century. (The average increase was about 12.6 per cent per decade.) The birth rate which prevailed averaged somewhere in the neighborhood of 45 per 1,000 and the death rate averaged around 30-33. A continuation of even this modest rate of increase until the end of the present century would give India a population of over 790 million. The same growth could develop in China and in other parts of South and East Asia, an area which now contains over 1,000 million people. It is because of the sheer impossibility of keeping production ahead of growth in such a vast population that the chief problem in these Class III countries becomes that of adjusting population to resources. It seems probable that the people in these countries can learn to control numbers more easily than they can increase production to provide for an uncontrolled increase in numbers. Though fully aware of the many great advances being made in agriculture and the scientific possibilities of increasing production in nonagricultural industries, it is hard to see how we are to avoid poverty and hardship and war which will involve the whole of mankind if there is no success in the control of population in these Class II and III countries. The West was able to avoid these evils to a considerable extent during the nineteenth century because of conditions which do not exist today. The most important differences between the situation in the West during the 1800's and the world situation from 1950 on are to be found in the relatively small population of Western Europe and North America in 1800 and the large amount of natural resources open to exploitation by this small population. Where are the people of China and India and Japan and other Asiatic lands to find other Americas and Australias and South Africas?

As we have seen to our sorrow we cannot ignore the problems of Japan and remain untouched by the efforts Japan may make to solve her urgent population problems. We must perforce become interested in world population trends and problems and participate in the formation of policies directed to the solution of these problems. Willy-nilly we are involved in the population problems of all countries, especially must we concern ourselves with the problems of overpopulation. We face the increasingly felt pressure of numbers on resources in those parts of the world which are passing from a status of tradition in their modes of living and producing to a stage of more active effort to provide a better living for their poverty-stricken populations. They now favor the application of science to

their agriculture, industry and health, but they have not yet realized that they must also apply science to the control of their numbers if their last estate is not to be worse than their first.

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# 4.

## *Farm Land Resources of the United States*

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**T**HE NEEDS OF THE UNITED STATES FOR ARABLE LAND can be analyzed in terms of anticipated population, income and consumer preferences of this population, and expected volume of agricultural exports. In these broad terms, ample areas of land exist for taking care of the needs of the United States in the foreseeable future—more than ample. And the land is of such quality that, under conditions of reasonably high levels of employment in non-agricultural sectors, farmers can have good incomes for their labor. In fact, our land resources in this country, under modern systems of soil, crop, and livestock management, are abundant enough to permit several alternative policies for their development and use. That is,

unlike many crowded countries where every potential acre must be used, we have many choices. Generally, of course, we should aim to use those lands for crops and livestock that will give the greatest economic return on a sustained basis, taking account of competing uses for forestry, recreation, and the like, and especially of the advantages to be had from locally balanced economies with the various resources for agriculture, forestry, mining, and industry fitted together.

Besides this general view, and more important to realizing the full advantage of all our resources and of the labor and genius of our people, is the need to appraise our resources regionally and locally. The farms furnish not only goods to the general market, but also employment and a way of life to people—a way of life that can be good or poor. In some sections of the country new opportunities are urgently needed; other sections are fairly well in balance now. We have the choice of developing lands within areas where people need new land or within other areas to which such people may migrate. Then, too, we are becoming increasingly aware of the advantages of a mixed economy of agriculture and industry in the same region.

#### RESOURCE NEEDS OF OUR POPULATION

First, let us look at the general needs of the country as a whole. According to recent estimates,<sup>1</sup> the existing crop and pasture land is more than enough to support our present population with a moderate-cost adequate diet. It would not support all the population with a high-cost adequate diet—a diet that would reflect the tastes of high-income families for the more expensive foods.

On the basis of crop yields for the period 1941–1945, and 355 million acres in crops plus 140 million acres of crop-land equivalent of feed from pasture, 167 million people could be supported with a moderate-cost adequate diet. Under the same assumptions, 203 million could have a low-cost adequate diet and 137 million a high-cost adequate diet. This high-cost diet assumes 44 per cent of the food energy from livestock products and the low-cost diet only 30 per cent. Based upon previous experience with the acres used in the United States, the high-cost diet would require 3.15 acres of crop-land equivalent per person and the low-cost diet 2.12 acres, excluding acres for non-food and non-feed crops and for horse and mule feed.

It would seem clear from these calculations that many more than

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<sup>1</sup> For this discussion, we have drawn heavily on the data presented by Raymond P. Christensen in his *Efficient Use of Food Resources in the United States*, U.S.D.A. Tech. Bull. No. 963, 1948.

our present population could be supported with an adequate diet without employing any more land resources and with no greater production from the use of our land resources. In doing this, however, there would need to be some shifts away from products now preferred by American consumers, especially meat. But even with the 1943-45 civilian diet, a population of around 161 million could be supported.

**TECHNOLOGICAL IMPROVEMENTS.** There is every reason to believe, however, that technological improvements in agricultural efficiency will continue to take place. In fact, the rate of application of these improvements is accelerating. Such improvements will likely increase production from the existing crop and pasture land, although many of them, as in the past, will be directed primarily toward reducing costs. This is an important distinction to make. For a great many years farmers have been adopting improved production techniques in the United States. This has had a remarkable effect upon efficiency, but only in very recent years have the average yields of the principal crops increased. This was because American farm managers were concerned with cutting costs, especially labor, as much as they were with increasing yields. Many good practices were adopted because they increased efficiency, even though they might actually reduce slightly the net harvest.<sup>2</sup>

Now yields are increasing. Between the period just before World War II and 1946, farm production increased about 3 per cent per year, with little increase in the land used for crops. It would be conservative to predict a further increase of 10 per cent by 1955. A study made by agriculturists in the Land-Grant Colleges and in the Department during the early part of World War II showed that it would be entirely practicable for farmers to increase production on a sustained basis by at least 20 per cent, and by 30 per cent on several items without increasing acreage used. It should be emphasized that in this study full account was taken of farming systems to maintain soil productivity without depletion through erosion or other processes. A good deal has happened since then to make even those figures look conservative. Of course, we all know that what farmers do in this direction depends a great deal upon the kind of agricultural programs that are adopted and especially upon the general level of employment and economic activity in the country. A very serious agricultural depression might change the present trends.

But looking again at a 10 per cent increase in production per

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<sup>2</sup> See also "The Soils Men Live By," Charles E. Kellogg, Lecture for the Graduate School, U.S.D.A., November, 1948. (Mimeographed).

acre, we see that 184,000,000 people could be supported with a moderate-cost diet, or 150,000,000 with a high-cost diet on the present farm land. The most recent estimates of the Bureau of the Census forecast a population in the United States of 155,500,000 by 1955.<sup>3</sup>

**NEED FOR MORE LAND.** In general terms we may say that our need for more land in farms depends upon (1) whether our population will increase faster than is now expected, (2) whether our consumers are able to purchase a high-cost adequate diet, (3) whether exports will continue at present levels or even increase, or (4) some combination of these circumstances.

Since we are only laymen in the fields of inquiry within which these questions lie, we can only give a layman's comment. It seems reasonable to accept the population estimates and to assume no drastic changes in immigration policy. Nor can we see anything now to suggest an increased volume of agricultural export, except possibly to meet short-time emergency situations. There is every reason to hope that a high level of agricultural exports will continue as a part of a high level of international trade in all sorts of goods. As European recovery proceeds, however, a real prospect exists for even some decline in agricultural exports.

What consumers in this country use of agricultural products can vary a good deal. A falling off of employment and business activity could lead to a decline in the domestic market, and especially to a decline in the so-called high-cost items like meat, milk, and fruits. Not as a program primarily to support agriculture, but as a program to improve the health and efficiency of all our people, a series of important steps might be taken to encourage better nutrition. These include the furnishing of school lunches. Something may be done for children of pre-school age. We have all heard a good deal of discussion about plans for helping low-income families obtain an adequate diet. Considerable prospect exists that programs of this sort may be adopted. If so, the consumption pattern will be in the direction of the "protective" foods like livestock products, fruits, and vegetables.

Considering the general situation, in our view, there appears to be no immediate need to develop any substantial acreage of new land in crops and pasture to meet the probable consumption requirements. We might go even further and suggest that to develop a large acreage in advance of actual need might run the risk of creating surpluses. Attempts to meet such risks, or threatened risks, might lead

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<sup>3</sup> Current Population Reports: Population Estimates. Bureau of the Census. February 14, 1949.

to inefficient production in several ways. For example, through strict farm quotas on some sort of historical base, high import restrictions on specialty crops or through other subsidies.

At the same time there is an urgent need for farm families on poor soil to find better economic opportunities, either on better land or in other occupations. It may be entirely justifiable and reasonable to help farm families on poor lands to find new opportunities in farming through land development, even though these general requirements do not suggest the need of a greatly increased acreage.

#### LAND AVAILABLE

When national requirements should demand an increased acreage of crop land, how much do we have available and where is it? This question cannot be answered precisely for two reasons: (1) We do not have accurate soil maps for much more than one-half of the arable land; although, of course, there is no land in the United States about which we do not have some information, even though it is sketchy in places. (2) More important is the fact that any estimate of land area available depends upon economic conditions, including a scale of prices and costs either consciously or unconsciously assumed, and also upon an assumption as to the state of the agricultural arts. In making such estimates, one usually relies on history. But in fact, the land will be used in a new economic environment and with a new set of tools rather than in the old economic environment with the old tools.

If we were really pressed for land, as people are in many of the crowded countries, we could increase our farm land enormously. In the humid parts of the United States for example, practically all the soil that does not have steep slopes, that is not thin over rock, that is not simply loose, deep sand, or that is not undrainable, could be used to produce crops or pasture. That is, should our need for farm products demand it, we could use a great deal of land which, under foreseeable economic conditions and the foreseeable state of the agricultural arts, it would be clearly unwise to use for farming.

In the arid parts of the United States, fairly deep non-stony soils with gentle slopes that can be freed or kept free of salts, and that can be irrigated from available water supplies, could also be used for crops. Here again, there is no prospect that we shall need to use all of this. We should pick out the best of it for use as needed, giving full recognition to the other competing uses of land and especially of the water supplies.

Although by no means entirely satisfactory, perhaps the best estimates we have of the amounts of land suitable for cultivation are those published in the 1938 Yearbook of Agriculture, *Soils and Men*

TABLE 4.1\*

Geographic division (1)	Land now in cultivation (1935 census) (2)	Land suitable for cultivation under present practices							
		In cultivation		In plowable pasture	In brush or timber	In need of drainage	In need of irrigation	Total	
		(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	<i>Acres</i>	<i>Acres</i>	(%)†	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	(%)†
New England.....	4,303,401	1,736,646	40.4	103,143	.....	.....	.....	1,839,789	42.7
Middle Atlantic.....	17,158,442	2,894,823	16.9	369,129	22,843	1,984	.....	3,288,779	19.1
East North Central..	64,758,999	38,009,771	57.8	6,568,996	3,127,172	678,496	.....	48,384,435	74.7
West North Central..	148,751,973	59,935,039	40.2	7,094,306	285,923	1,191,600	138,100	68,644,968	46.1
South Atlantic.....	35,099,820	9,943,499	28.3	1,015,910	4,003,802	1,873,609	600	16,837,420	47.9
East South Central..	30,588,628	9,803,944	32.1	1,502,272	3,790,762	222,021	.....	15,318,999	50.1
West South Central..	65,222,331	21,828,643	33.5	3,347,079	8,238,937	1,994,323	790,706	36,199,688	55.5
Mountain.....	30,419,715	11,537,538	37.9	1,192,945	112,200	262,532	1,754,094	14,859,309	48.8
Pacific.....	19,031,622	5,258,800	27.6	417,900	274,600	205,000	236,000	6,392,300	33.6
Total.....	415,334,931	160,948,703	39.1	21,611,680	19,856,239	6,429,565	2,919,500	211,765,687	51.0

Land suitable for cultivation under best soil-conservation practices

Geographic division (1)	In cultivation			In plowable pasture	In brush or timber	In need of drainage	In need of irrigation	Total		
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
	<i>Acres</i>	(%)†	(%)†	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	(%)†	(%)†
New England.....	3,579,142	83.2	206.1	336,127	.....	.....	.....	3,915,269	91.0	225.4
Middle Atlantic.....	12,910,992	75.2	446.0	1,620,920	73,276	1,984	.....	14,607,172	85.1	504.6
East North Central..	57,346,837	88.5	150.8	12,313,011	5,878,757	690,611	.....	76,229,216	117.7	200.5
West North Central..	128,410,635	86.3	214.2	20,248,118	599,393	1,213,900	349,800	150,821,846	101.4	251.6
South Atlantic.....	28,209,286	80.3	283.7	3,419,817	11,552,831	2,977,376	600	46,159,910	131.5	464.2
East South Central..	19,727,870	64.5	201.2	5,138,369	7,203,114	222,021	.....	32,291,374	105.6	329.4
West South Central..	51,886,792	79.6	237.7	5,986,678	15,704,103	2,025,803	872,671	76,476,047	117.2	350.3
Mountain.....	21,658,006	71.2	187.7	2,497,136	181,670	292,426	2,538,658	27,167,896	89.3	235.5
Pacific.....	15,349,922	80.7	291.9	1,162,500	958,400	239,700	2,087,000	19,797,522	104.0	376.5
Total.....	339,079,482	81.6	208.5	52,722,676	42,151,544	7,663,821	5,848,729	447,466,252	107.7	278.0

\* The estimates cover land suitable for cultivation under prevailing price levels during the period from 1921 to 1936 and not subject to erosion injury under present methods of farming and, second, the amount of land in the United States, assuming the same price levels, that would be suitable for cultivation without erosion injury if the best farming practices and erosion control methods were put into effect.

† Of column (2).

† Of column (3).



(Table 4.1). Those estimates were made in the light of economic conditions of about 1921–1936,<sup>4</sup> and thus do not at all represent the extreme limits of what could be cultivated with a much greater population. We have no doubt that new estimates would result in a somewhat different series of figures, probably somewhat higher ones generally, partly because of great improvements in the agricultural arts and partly because of a higher level of economic activity. These estimates show some 55 million acres of land suitable for cultivation (under the best practices for the control of erosion) that were not then used for cultivation or for plowable pasture. Undoubtedly this is a conservative figure. Interestingly, 40 million of the 55 million acres are in the 16 states<sup>5</sup> of the southeastern part of the country.

A part of this 40 million acres in these 16 states is in the Mississippi Delta, part of it is in the low-lying flat woods and coastal plain along the Atlantic Ocean and the Gulf of Mexico, and a large part is on the uplands inland from the sea. Most of it is forested and quite a bit of it is poorly drained. Except for those of the Mississippi Delta, the soils are generally not fertile under natural conditions or when first plowed, but they are very responsive to fertilization and other good management practices. Much of this land has soils essentially similar to a great deal of the land now supporting intensive farming in this southeastern region. It has not been used heretofore, partly for institutional reasons—absentee ownership, large holdings by people not interested in farming, and the like—but primarily because the market requirements for those products for which the region possessed competitive advantage have not demanded its use. This situation is changing, however, with improved technology and increasing regional population. Within the past generation, greatly improved methods of fertilization and liming have been developed, along with much improved varieties of cereal grains and forage crops. Then too, there has been an increase in population in this region, especially urban population, which tends, along with the improved technology, to raise these lands above the margin for livestock and dairy production.

Several modern soil surveys have recently been completed in various parts of this area. In some of these, the use of the various soils was determined. Analysis of these findings supports the general figures given in the 1938 table. If anything, we should now suspect that these earlier figures were low.

Estimates from a soil survey in Mecklenburg County, Virginia,

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<sup>4</sup>*Soils and Men*, Yearbook of Agriculture 1938, page 95, U.S.D.A., U. S. Govt. Print. Off., Washington, D.C., 1938.

<sup>5</sup>These include: Del., Md., Va., W. Va., N.C., S.C., Ga., Fla., Ky., Tenn., Ala., Miss., Ark., La., Okla., and Tex.

and from a physical land conditions survey of Greene County, Georgia, are given in Table 2. In each of these counties the acres of land suitable for tilled crops that are not cultivated exceeds the acreage that is cultivated. On the whole, the same types of soil are included in the cultivated and uncultivated acres, although the uncultivated acres may require somewhat more intensive practices for sustained production than those already cultivated.

We should not want to overemphasize these acre figures. In these and similar tables, acres of different soil types are thrown together. But we must recall that an acre is not a fixed standard of agricultural productivity—not at all. Soils—even soils suitable for crops—vary enormously from one another in characteristics, and consequently in their responses to management. Even on the same kind of soil, optimum management practices and yields vary with prices at the farm, farm labor supply, the farm buildings inherited from the previous generation, and the like. New technology affects the various kinds of soil unevenly, changes their relative economic advantage. Thus, accurate figures must get down to individual soil types.

TABLE 4.2  
VARIOUS USES OF LAND SUITABLE FOR CULTIVATED CROPS  
IN TWO SOUTHERN COUNTIES

	Mecklenburg, Va. * 1944	Greene, Ga. † 1940
	(acres)	(acres)
Total Area . . . . .	425,000	266,000
Area suitable for tilled crops . . . . .	308,000	144,000
That were in woods or brush . . . . .	149,000	64,000
That were idle . . . . .	26,000	16,000
That were in crop land . . . . .	123,000	48,000
That were in pasture . . . . .	5,000	16,000
Crop land on land unsuited to tilled crops . .	13,000	6,000

\* From unpublished manuscript of the Soil Survey of Mecklenburg County, Virginia.

† From "Physical Land Conditions in Greene County, Georgia." Physical Land Survey No. 23, Soil Conservation Service, Washington, D.C., 1941.

Generally speaking, modern technology, including new varieties of crops and grasses, fertilizer practices, erosion-control methods, live-stock care, forestry practices, and rural electrification, have placed the soils of the humid East, and especially those of the Southeast, in a more favorable position than they had formerly. True, there is still a great lag in the general adoption by farmers of the new practices in proper combination for high levels of sustained production; but the potentiality clearly exists. Thus, we must be careful in thinking about "ratios of acres to people" or "average" acres. Few, if any,

farmers use "average" acres. A farmer uses one or more specific types of soil, most of which are rather far from the average. It is important that we continually re-examine our concepts of land that are based upon average yields, average responses and the like. Otherwise, we shall be basing land policy upon the experience of a previous generation, rather than upon the potentiality of the next with a whole set of new and more effective tools.

**OPPORTUNITIES IN THE SOUTHEAST.** In the popular mind, most of the soils in the Southeast are thought to be unfertile. In a sense this is true. They were developed under forests in a humid climate with little freezing. Except for the young soils of the river flood plains, most of them have been strongly leached. Farm crops are quite different from the native vegetation. Most of the crops and grasses have been introduced. They have had to be reworked by the plant breeder for yield, quality, drought tolerance and disease resistance. A great deal of progress has been made. Still these crops developed by the plant breeder have quite different soil requirements from those of the native vegetation. Thus, the farmer needs to make an arable soil from the natural soil. This is what the good farmers have done and are doing now.

Perhaps the rough sketch shown in Figure 1 illustrates an important difference between the majority of the soils in the Southeast and the majority of the soils in the Prairie part of the Middle West. In the best soils of the Prairie soil region, maximum productivity is to be had at first. It is almost bound to fall off considerably if the land is cultivated and exposed to the sun for any considerable length of time. In other words, the practical level of soil productivity for economic sustained production is somewhat lower than the initial one. Put another way, for the first few years there is an area under the curve of productivity that might be regarded as "God's free gift to the homesteader." Approximately the reverse situation exists with most of the soils of the Southeast. The initial productivity, or at best after the first 3 or 4 years after clearing and burning, is well below the practical level for economic sustained production. Thus, during the first few years the farmer must add lime and fertilizers and introduce legume hays into his rotations in order to build up his soil.

These relationships are still imperfectly understood by farmers, but are far more generally appreciated now than they were 15 years ago. Great opportunities exist now for using these soils effectively, and not only these, but the hillier ones not suitable for crops, under a protective cover that is also highly productive.

The size of farm has also been, and is now, a handicap in this region and has held back advancement. But farm businesses can be

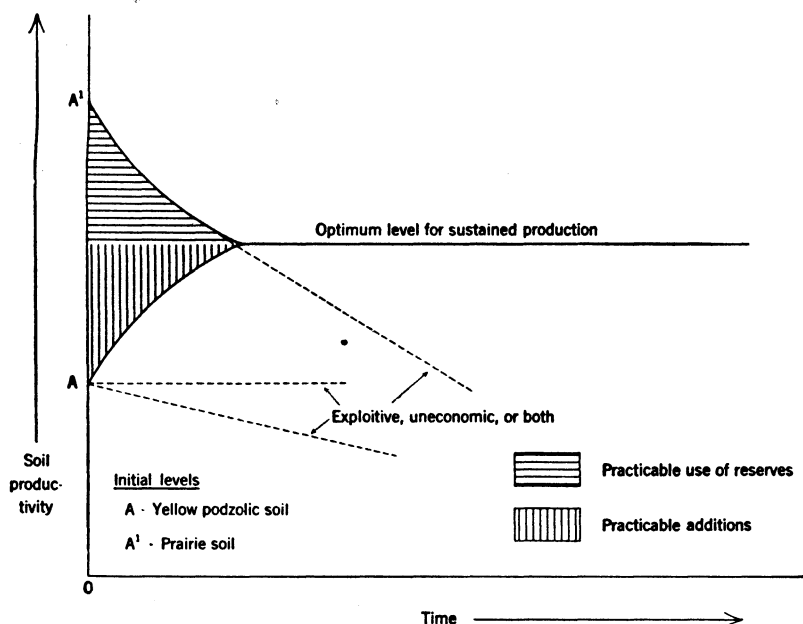


FIG. 4.1.—Highly idealized sketch illustrating the sharp contrast between using reserves in a Prairie soil (of the Midwest Cornbelt) and adding reserves to a Yellow Podzolic soil (of the Southeastern States) in order to reach the optimum level for economic sustained production. (Actual levels and time rates vary greatly with individual local soil types.)

expanded through the better use of unplowable soils on the farm for pasture and for forestry. Many opportunities also exist for enlarging farms through expansion of the total acreage and through local movement. Fortunately, a great deal of good land not now used is scattered throughout the area, although, of course, not uniformly.

#### REGIONAL ASPECTS OF NEEDS AND RESOURCES

The general factors affecting land use have unequal effects from place to place. For example, improved income and purchasing power in any particular city have a more pronounced influence on the local markets for fluid milk, fruits, and vegetables than on the general demand for these products. Thus, the establishment of industry in an existing agricultural area offers new kinds of jobs for people now on farms. It also offers better economic opportunities for those who remain on farms when an increased local market demand and, consequently, the increased local need for land develops. The establishment of more industries in the southern states, for example, can have

the effect of relieving the crowding on the land. At the same time, it increased the demand for the very products adapted to improved farming systems with better combinations of practices for both production and conservation.

Reclamation through irrigation has broadened the economic base of many western communities. Good agriculture has been added to mining, ranching, forestry, or some combination of these. In many agricultural areas of the West, the development of hydroelectric power is a critical need and has both a direct and indirect bearing upon the use of the land. Low-cost electricity for use on existing farms and for use by new industries may be fully as important as more irrigation—often more so, if the advantages of a balanced economy, with both agriculture and industry together, are to be realized.

The direction of new public investments in the Great Plains, and especially in the Missouri Valley, may have enormous effects on the use of the land. For example, a determination to irrigate large, continuous tracts would require a high priority for the use of water impounded in reservoirs—whether of the multiple-use type or not—for irrigation and for the development of intensive, specialized farms. On the other hand, the investment could seek high yields of electric power with more of the irrigation developed on individual farms, or in small projects where water might be pumped from the ground-water supplies or from small impoundments. In this second alternative, emphasis could be given to increasing the stability of existing ranches and dry farms. Compared to farms farther east, these farms in the Great Plains have been unstable because of the fluctuating climatic conditions and because of the relatively narrow base of the agriculture—mostly wheat and cattle. If the first alternative is followed, the existing farmers will either need to change to specialized farming or be subject to the severe hazards of drought as they were formerly.<sup>6</sup>

Although it may appear paradoxical, it is in the southeastern states where the amount of uncultivated, potentially arable land is greatest that the greatest need exists for farm people to find additional livelihood opportunities. Except for the southeastern states, and for parts of Utah and New Mexico, farm families in the United States are rearing only a few more than enough sons and daughters to take over the operation of existing farms. Therefore, development of new land elsewhere than in these crowded areas, on an extensive scale, will require migration. In contrast, the development of new land in

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<sup>6</sup>See "Hearings Before a Subcommittee of the Committee on Irrigation and Reclamation" on a bill to establish a Missouri Valley Authority, Document 555, 79th Congress, First Session, 1945.

the South will find ready at hand farm people needing the opportunity. This has already been demonstrated by the large movement of families from the hills into the Mississippi Delta in recent years.

### BASIC POLICY QUESTIONS

In conclusion, we should like to suggest some policy questions. Because of the relatively abundant soil resources in the United States, it is possible to choose among several alternatives for our further development. We do not need to cultivate every acre of plowable upland, drain every swamp, and use every available drop of water for irrigation. With the present prospects of increase in population and continued technological development, we shall not need to draft all these resources into high use in the foreseeable future. We have many alternative opportunities for maximizing the use of our resources in a way to give rural people a higher standard of living than they have had.

To what extent should migration of farm people be encouraged? Since we have so much available land, certainly every effort should be made to encourage the movement off poor soil—soil too unresponsive with our present agricultural arts to give economic sustained production. Many of these soils are eroded and a protective cover of trees is the most productive one. But those occupying these poor soils need a better economic opportunity elsewhere.

We have currently thought of such shifts in terms of long distances. Historically, there has been a great deal of shifting of farm population within the United States. At first, of course, settlement spread to the West, following the colonization along the East Coast, and, to a much less extent, into our present Southwest from Mexico. Big shifts took place immediately after the Civil War to the Middle West, the Great Plains, and the Far West, from New England and from the so-called "worn-out soils of the East."<sup>7</sup>

In the North, this migration went on along with a rapid growth of industry. For a long time now, farming in the Middle West has developed alongside industry. Farm boys and girls have had many opportunities. Also, there has been a decline in the size of farm families in the North along with the improved incomes.

Relatively, there was less movement from farms in the southern states, partly, perhaps, because of the homesteading advantages of the Union veterans over the Confederate veterans. After the Civil

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<sup>7</sup> Of course, most of these soils were not "worn-out." They were not and had never been so responsive to the current agricultural arts as the soils of the Middle West. A great deal—certainly the larger part—of the abandoned land of the East was as good when abandoned as it ever had been, except possibly for the first 2 to 5 years of cropping after clearing and burning.

War, many of the large plantations were split into small tenant farms. Anyway, since the Civil War, there has been a high proportion of small farms in the South. A good many of the families on these have been large and have had low incomes relative to farm families in the Middle West. Thus, in the South the farms have remained smaller with more people per 100 acres of crop land.

Actually, there is less "hopeless" land being farmed than is commonly supposed. Some of the soil that looks bad and is not supporting the farm family has good potentialities if it were properly managed. Moving a family from such soil to another kind of soil may not help at all. Instead, it may be far better to help such a family learn how to manage the land it already has. In a great many instances, a relatively small investment toward this end will accomplish as much as an expensive move. Especially in the southern and middle atlantic states, many farm businesses are too small for a family to succeed, even with good management. These businesses can be increased through better use of the non-crop land—pasture land and forest land—and through aid in purchasing more land, either adjoining the existing farm or nearby in the same community.

Group settlement versus infiltration has been argued for years. Now, of course, there are many potential areas in the world where settlement can only succeed on a group basis. This is true in many parts of the tropics. It is true in the Far North. It is true in the development of desert land for irrigation. But settlement by infiltration, where possible, has many advantages. A large part of the land available for settlement in the Southeast is in relatively small holdings. A large portion of the needed community services—roads, schools, shopping centers, and the like—already exist.

All we are really saying is that investments in land development should be appraised broadly, considering all the many opportunities that exist in this country. We need to ascertain, for example, the costs and benefits from public investments in the Southeast in demonstration farms; in payments under something like the Agricultural Conservation Program for land clearing, terraces, lime, phosphate, and the like; and in loans for enlarging farms—and these we need to compare with the costs and benefits from public investment in large-scale irrigation schemes. It may well turn out that we shall find the best program involves some of both.

Finally, and most important now, consideration needs to be given the local and regional balance among industry, forestry, mining, and agriculture. Some areas have such an overwhelming agricultural advantage that their development for agriculture alone is justified, even though all the costs for roads, schools, hospitals, shopping centers, and so on, need to be carried by the farm land. Ordinarily, however,

this is not so, and it is becoming less so. In many areas of only moderate productivity, farming alone will not provide a sufficient economic base to support the services we should like to see Americans have. There is so great an advantage to both industry and agriculture in their development together that potentialities for their complementary development should be given first priority. Even in the Missouri Valley, one wonders whether more industry is not more urgently needed than more farming.

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# 5.

## *Principles of Land Utilization*

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**T**HIS CHAPTER IS CONCERNED PRIMARILY WITH UTILIZATION of land for agricultural purposes. Other uses are discussed only incidentally, or as they are involved in shifting uses of land.

As a field of economic research, agricultural land utilization has been defined as "the study of the land resources of a nation or other geographic unit with a view to determining for what and how they may be most economically employed."<sup>1</sup> The term "other geographic unit" implies that the area of study could be the entire world, or at the other extreme, an individual farm. Economic studies of agricultural land utilization, however, usually deal with areas of land larger than individual farms, which are delimited from surrounding areas by their similarity of use opportunities or use problems. Some of the broader aspects of land utilization indeed may encompass the entire world. Studies concerned with the adequacy of land resources to meet the food needs of increasing world population are in this

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<sup>1</sup>"Research in Agricultural Land Utilization," Social Science Research Council Bulletin No. 2, June 1931.

category. And we should bear in mind that land utilization is not solely an economic problem. A physical and biological foundation is necessary for adequate analysis of the economic phases; and in addition, there are important social and political aspects.

Land is utilized for the benefit of the people who share a common resource base. Within that general framework, the economic aspects of land utilization involve one over-all objective—that of maximizing the net value product when land is used in combination with other resources. As both present and future benefits must be considered, it is necessary to strike the kind of balance between present and future uses that will maximize the net value product when both are considered.

Efficient utilization of land is guided by several principles governing the economic productivity of land. Diminishing returns and the principles of specialization, location, and comparative advantage are perhaps the most important. These principles are discussed in most general texts on economics, and their special applications to land utilization are elaborated in the textbooks on land economics and farm management.<sup>2</sup> This chapter deals more with the application of these principles than with a discussion of them in abstract terms.

It might be profitable, however, to mention certain of the special properties of land as compared with other capital goods because these unique features of land require different approaches to efficient utilization. Land is a natural resource in the sense that land as such cannot be reproduced. Certain types of use may result in permanent damage to a given land base. Land is distributed over space and is almost completely immobile. It has to be utilized where it is found. The immobility and spatial features give special significance to location factors in the use of land.

The value of land derives from its economic productivity, that is, from the current and expected value of its marginal product. The basis for this economic productivity is partly physical and partly location and situation with respect to a given economic environment. Land of high natural fertility, and physically suitable for a number of crops, may be located in an area relatively isolated from the market for the products that can be grown on it. Lack of profitable market outlets for other products might mean, for example, that its most profitable use was from grazing. Although highly productive in a physical sense, its economic productivity per acre still would be low. On the other hand, land that is naturally quite infertile may be located close to a population center. Farmers might find it very profitable to fertilize such land heavily in order to grow fresh fruits

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<sup>2</sup> See especially, "Land Economics," chap. 5 by Roland R. Renne, and "Farm Management," chaps. 16–18 by John D. Black *et al.*

and vegetables to be sold in the local market. The economic productivity of such land, therefore, would be quite high.

But we need to note that this land must have certain minimum physical characteristics that enable users to apply fertilizer and other resources to it in order to achieve a profitable production combination. In other words, it must have capacity to use other resources in an efficient combination for that particular market situation. An example of land that does not have such capacity is the area surrounding the mining towns of Butte and Anaconda in Montana. These towns are located on a high mountain plateau; and the surrounding land has a high altitude, low rainfall, and is rough and stony. As a consequence, fresh fruits, vegetables, and milk are shipped in from the irrigated valleys farther west. If the adjoining land were suitable for cultivation it would have location advantage over the more fertile lands which now supply this market.

Within a given area, the economic productivity of land varies directly with its natural fertility and its physical suitability for producing those commodities yielding the highest net return over non-land costs. In other words, differences in physical productivity explain most of the variations in economic productivity within the same locality or general market area. But factors of location and economic situation may be of overriding importance in determining economic productivity of land in different locations.

### **BALANCING PRESENT AND FUTURE BENEFITS**

Conservation is the land utilization problem that is currently in the spotlight. The economic aspects of this problem involve the over-all economic objective of maximizing the net value product when land is used in combination with other resources and more especially the balancing of net products from present and future uses. This raises the question of how to predict future events as a basis for deriving estimates of demand for the products of land comparable with estimates of our future capacity to produce farm products.

In this country our land resources seem ample for the markets that we are now supplying and for those that are likely to be available to us over the next few years. But what about the long-term future? Our population is growing and it is possible that demands on our food production resources from other countries will become greater as the years go by. Is it likely that a short-term surplus will be followed by a long-term shortage?

One view of our ability to supply long-term future needs for the products of agricultural land is that increasing population and gradual soil deterioration may eventually result in heavy pressure of population on food supplies, even in this country. Another view is

that research, invention, and discovery will continue to increase the output from our land resources, and that population increase will tend to slow down.

Other chapters in this book deal more in detail with the factors supporting each of these two points of view. In this chapter we are more concerned with how to strike a balance between present benefits and those accruing in the future in order to maximize the net value product when both the present and the future are considered. This problem has its beginning in the concept of efficient use of land at any point in time.

Efficient utilization of agricultural land involves a combination of land with labor and other resources that will yield as high returns from additional units of labor and capital as they would earn if utilized in other lines of production. If the returns in agriculture are lower than in other lines it would be desirable to use less labor and capital in agriculture and relatively more in other lines—in other words, to use the land less intensively. Conversely, if the return for additional labor and capital is higher in agricultural production than in other lines, this calls for more intensive use of land, and perhaps for the development of new land.

The economic aspects of conservation center on the problem of maintaining this concept of efficient utilization of land over a period of time. When efficient utilization of land is considered both currently and over a period of time, the use of labor and capital resources must be allocated in such a way that marginal returns are equalized among the following major alternatives:

1. Current production in agriculture
2. Current production in other lines
3. Future production in agriculture
4. Future production in other lines

If the returns from additional units of labor and capital invested in current agricultural production are lower than if they were invested in current production in other lines; or lower than if they were invested in future production, either in agriculture or other lines; it is obvious that labor and capital should be shifted to the most remunerative investment alternative.

Under certain conditions investment in conservation for future agricultural production becomes the most profitable alternative. From an economic standpoint investment of labor and capital should be shifted toward the most profitable alternatives until returns on additional units of investment are equalized between agriculture and other lines, both currently and over a period of time.

This reasoning recognizes that labor and capital resources are potentially productive, and that our society is interested in employing them in their most productive uses. For example, if cotton supplies

were pressing on available markets, part of the resources used for cotton production should be shifted into other uses. Cropland now used for cotton might be shifted into hay and pasture for meat and milk production, and if this involved larger farms and less intensive use of land, a part of the labor supply might be more productively employed in nonfarm work. If the most profitable alternative use of some of the land is in forestry, tree planting would illustrate an investment alternative on which returns can be obtained only in future years, and land used for hay, pasture, and trees would promote conservation of soil resources.

The returns that can be expected from investments in future agricultural production will depend largely upon the following factors:

A. On the supply side

1. Land depreciation or land improvement
2. Land development
3. Technological advances (including new sources of food)
4. Trade policy

B. On the demand side

1. Population growth
2. Per capita income and its distribution
3. Changes in food habits and new developments in nutrition
4. International trade, and size of trading area drawing on given food production resources.

If we estimate the future demands for food and fiber, we can compare this estimate with expected supplies over the same period and arrive at some conclusion concerning relative farm prices and costs.<sup>3</sup>

If such analyses point toward increasing prices for farm products, we have an indication that investments in future productivity sufficient to meet the increased demand would be likely to pay. We must bear in mind, however, that the investment could be made currently or later, when the higher demand develops. If investment in fertility maintenance or improvement today results in a large immediate increase in output which cannot be absorbed profitably in the present market, such investment may be postponed profitably until the market demand has increased. The only type of investment which probably cannot be postponed economically is that which is necessary to avoid permanent damage.

The possibility of postponing certain investments in conservation brings out the important point that there are alternative ways of

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<sup>3</sup> For one attempt at estimating future prices under specified conditions, see a "Study of Selected Trends and Factors Relating to the Long-Range Prospect for American Agriculture," H. R. 80th Congress, 2nd Session.

achieving conservation. Economists should help to determine the ones that are most in accord with efficient land utilization, both currently and over a period of time.

Looked at in this way, striking a balance between the present and the future involves maintaining efficient utilization of resources through time. This means more or less investment for fertility maintenance or improvement today that results in higher production tomorrow, depending upon prospective demand for farm products—and more or less intensive use of land in other ways. It also means that investments which yield returns only in future years are likely to be the most profitable alternatives in periods of recession, when returns on investment for current production are low, or nonexistent. Because of these counter-cyclical effects on the general economy, investment in conservation might well be increased when the economy is experiencing a recession. But increases under those conditions probably would have to be made as public investments, or with some form of public insurance of future returns.

The central point to bear in mind, however, is that capital investment is potentially productive—either now or in the future. The net value returns on investments yielding an income only in future years must be high enough at some stage in the production cycle to equalize returns between current and future production, if they are to be equal to returns on investments that yield current income.

One way of comparing investments that yield a current income with those that provide income only in future years is to convert the future net product to present worth at an appropriate discount rate, such as that prevailing for long-term government bonds. A private discount rate would be too high because it reflects many risks that are not incurred in public investments, and we are concerned here with maximizing the net product to the entire social group. Suggestions have been made that no discount rate should be used for investments where public interest is involved.<sup>4</sup> But unless it is discounted, an investment made today that will yield its first return 100 years from now would be just as valuable as one maturing next year, and returns from the latter investment could be reinvested in productive enterprises again and again over the entire period. If public funds were to be invested with no discount on future maturity, there would be no economic protection against shifting too large a proportion of present income into long-term public investments. A relatively riskless rate provides a basis for establishing priority ratings for investments that mature at different future dates.

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<sup>4</sup>“Watershed Flood Control: Performance and Possibilities,” by Bernard Frank and E. N. Munns, *Journal of Forestry*, Vol. 43, No. 4, April 1945.

The above analysis is dependent on an estimate of the most probable future situation. We all know that future events cannot be predicted with certainty. The very uncertainty of future needs for food gives emphasis to protection against permanent damage of soil resources, even though technical advances may overcome part of the effects of such damage. Because our objective is that of maximizing the net product, we must take account of land depreciation. In other words, if the physical productivity of land is permitted to deteriorate in the production process, that is one of the costs to be subtracted before arriving at the net product used in comparing returns on investment from present versus future production.

When it comes to placing a value on land depreciation, however, we encounter many difficulties, both practical and theoretical. In the first place, we need to distinguish between fertility depletion and permanent damage to soil resources. Depletion of fertility can be restored at a cost. From a depreciation standpoint it is analogous to the wearing out of a building. Sometimes the cost of restoration is high. And if we trace the materials back to their source, some irreplaceable resources may be involved. But if restoration is possible, depreciation can be calculated by comparing the cost of restoration at a given time with the cost of maintaining the physical productivity year by year. The cost of restoration becomes the upper limit on expenditures for fertility maintenance.

The problem is quite different if land depreciation involves permanent damage to soil resources. By definition, such damage cannot be restored. Our physical plant consisting of productive land now in agricultural uses therefore is made permanently smaller than it was before the damage took place. If such permanent damage were extensive and the long-term future should bring increasing demands for food and fiber, we might indeed have pressure of population on food supplies. But this outcome must be tempered by the possibility of land reclamation, by allowance for the possibility of substituting other resources for land, and for changes in population growth. Technological advances in products and processes that substitute for land resources may proceed at an even faster rate than in the past. But we should not count too heavily on their offsetting permanent damage to soil resources. The potential losses to society from permanent damage should be carefully evaluated.

If we could foresee a future food shortage created by permanent damage to soil resources we also would be able to predict an upward trend in relative prices of farm products. The upward turn of prices under those conditions would reflect a social loss of part of our food production base. Investment in land conservation to insure future productivity in order to prevent such a loss would then show rela-

tively high returns even when discounted to present worth. But we must guard against assuming that this constitutes adequate protection against such damage. Investment in conservation, even under those conditions, is frequently retarded by conflicts in public versus private interests, and by other factors. Conflicts between individual and public interests may arise out of particular tenure arrangements because individuals can avoid bearing the full cost of exploitation. Also, and perhaps more important, because the social group can and should give more attention to future needs and noneconomic considerations than it is possible or profitable for individuals to do. And public investments for conservation usually are not made solely on the basis of economic criteria.

We also need to guard against reaching the conclusion that if food prices rise in the future as a result of permanent land damage this would result in higher incomes to farm operators. Although some farmers might benefit for a short time from rising prices of farm products and of land, production expenses would increase and the higher incomes on farms not adversely affected would soon become capitalized into land values. In this way returns to farmers would tend to be equalized with other groups. But society as a whole would be worse off because of less productive resources, and we are interested in maximizing the net product not only to particular groups of individuals but to the entire social group.

As already indicated, a part of the necessary protection against permanent damage may show relatively high returns when a balance is struck between investments for current versus future production. But even the part on which probable returns cannot be calculated with any degree of accuracy probably should have relatively high priority on funds for public investment. The continued existence and progress of our society must be protected. This calls for a contingency reserve of soil resources which could be drawn upon should unforeseen food emergencies develop. We learned during the recent war how quickly the food supply situation could change from one of burdensome surpluses to relative scarcity. The contingency reserve, however, should be over and above protection of the needs which can be estimated.<sup>5</sup>

We might summarize our attempt to balance present and future returns from agricultural land in this way: (1) Efficient land utilization requires achievement of equal returns on additional investments of labor and capital in agriculture and other economic

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<sup>5</sup> For further development of the concept of a contingency reserve, see "Farming Systems in Relation to Soil Conservation," a paper prepared by the author for the United Nations Scientific Conference on the Conservation and Utilization of Resources, Lake Success, 1949.



activity—currently and over a period of time. (2) Efficient utilization over a period of time involves an estimate of future food needs and of our ability to supply it. (3) Protection against permanent damage to soil resources should have high priority for investments in conservation and should be distinguished from fertility depletion that can be restored at a reasonable cost. (4) Investment in fertility maintenance or improvement that increases current production above the quantities that can be absorbed profitably in the present market may be quite uneconomic, because the resources invested could be more profitably used in supplying more urgent current needs for other products, or future needs for farm or other products. (5) Land resources can be maintained in very extensive uses—hay, pasture, and forest. These may be the most economic uses in the absence of more profitable markets for other products. This gives special point to evaluating the alternative ways of conserving soil resources. (6) Because of the uncertainty of future events, it is in the public interest to develop and maintain a contingency reserve of soil resources over and above that necessary to meet the needs which can be estimated with some degree of accuracy.

#### SHIFTING MARGINS OF MAJOR USE

Conservation programs frequently involve changes in major uses of land. Most of such changes, however, are made in response to changing needs for the products of land as reflected in market demands. Shifts in major uses will affect the output of farm products over a period of years. They can be made intelligently only on the basis of estimates of future demands for food and fiber in relation to our ability to supply those demands. Therefore, some of the same background information is needed for this problem as for the solution of conservation problems.

Too little attention has been given to the problems involved in the shifting margins of both major and minor uses of land. Frequently the response to the changing outlook for farm products is too slow to keep up with a new source of demand. And then once the shift is started it may go too far. This leads to maladjustments in the use of land because after major changes have been made the process is not readily reversible.

These problems are well illustrated by the changes in wheat acreage in the great plains states. In that region much of the change in the acreage seeded to wheat involves a shifting of grassland to wheat or vice versa. Shifting between use of the land for crop production and for grazing usually is regarded as changing the major use of land.

Table 1 shows the seeded wheat acreage in these states: for 1919,

after the increase drive of World War I; for 1937, the high point in the 1930's; for 1942, after the acreage had been reduced by drought, low prices, and adjustment programs; and for 1949, after the expansion brought on by World War II. The seeded acreage in the Great Plains increased over 23 million acres from 1942 to 1949, or by 62 per cent. The acreage in Colorado increased 157 per cent.

TABLE 5.1

ACREAGE OF WHEAT SEEDED IN GREAT PLAINS STATES, AND THE UNITED STATES, 1919, 1937, 1942 AND 1949

State and Region	1919	1937	1942	1949	Percentage Increase from 1942 to 1949
	( <i>Thousand acres</i> )	( <i>Thousand acres</i> )	( <i>Thousand acres</i> )	( <i>Thousand acres</i> )	( <i>Percentage</i> )
North Dakota . . . . .	10,222	9,583	7,478	10,643	42.3
South Dakota . . . . .	4,322	3,648	2,730	4,312	57.9
Nebraska . . . . .	4,438	5,104	3,024	4,587	51.7
Kansas . . . . .	11,671	17,110	10,861	15,805	45.5
Oklahoma . . . . .	4,723	5,784	4,086	7,552	84.8
Texas . . . . .	2,490	5,315	3,935	7,630	93.9
Montana . . . . .	3,281	4,678	3,373	5,579	65.4
Wyoming . . . . .	202	278	244	390	59.8
Colorado . . . . .	1,405	1,620	1,374	3,526	156.6
New Mexico . . . . .	140	430	388	554	42.8
All Great Plains States . . . . .	42,894	53,550	37,493	60,578	61.6
United States . . . . .	77,440	80,814	53,000	83,173	56.9

The appraisals that are now being made of our prospective markets for wheat indicate that, unless we have another food emergency, much of the recent increase in wheat acreage may need to go back into other uses—mainly hay and pasture. Such uses, by the way, would constitute a contingency reserve of food production resources. But once the sod lands have been plowed, the shift is not readily reversible—at least not from the farmers' point of view. It is difficult to re-establish a grass cover. In most areas the net income per acre obtainable from grass and livestock would be lower than from wheat. This would mean a writing down of investment in land and equipment. It probably also would require larger farms and fewer farmers.

Land use adjustments of this type are desirable from the standpoint of the national interest, but how to make them profitable to farmers and in that way promote the needed changes still constitutes

one of our major land use problems. The cost of transferring the use of these resources becomes the source of conflict between public and private interests in land use. In some instances this conflict might be resolved by public investment in the cost of transferring the land resources to the new uses.

In considering some of the underlying factors in shifting the uses of land, we might begin by listing the major uses in their usual order of competition for land, and then try to analyze the factors determining the margins of each use under given conditions. The "order of uses" that most frequently seems to prevail is the following:

1. Urban
2. Suburban
3. Part-time and residential in rural areas
4. Full-time farming (arable land)
5. Forestry
6. Grazing

In addition, we have service uses, such as roads, and the following special uses that sometimes compete with those listed above:

1. Mining
2. Watershed protection
3. Recreation
4. Fish and wild life

The various urban uses compete with and supplement each other in somewhat the same way as the different agricultural uses. But the urban users of land have little difficulty in outbidding other users. Why? The basic explanation goes back to the factors which have determined the location of cities and towns. The larger ones owe their size chiefly to location on commercial trade routes or especially easy access to raw materials and power for manufacturing industries.<sup>6</sup> But trading centers are necessary parts of the community structure in all areas where land is used for any purpose. Even small trading centers will take some land away from agricultural uses. To the point of saturation of the economic need for such sites they represent a more intensive use. More labor and capital are combined with a given area of land, which increases the economic productivity of that land.

The higher economic productivity of the land in urban uses is attributable primarily to its location or site value for those purposes. Just as on individual farms the economic limit to the production of one farm product is the greater profitableness of another, so also in the competition among major uses of land the margins are determined by the relative profitableness of competing uses.

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<sup>6</sup> Edgar M. Hoover, Jr., *Location Theory and Shoe and Leather Industries*, chap. 17. Harvard University Press, Cambridge, 1937.

Suburban uses of land can be thought of merely as less intensive urban uses. Frequently, however, difficult land use problems arise in suburban areas because this is the margin of transference between urban and rural uses. Some land is held by speculators for possible urban uses that for some time to come might be utilized best for agricultural purposes. But the income expectancy for suburban development is too high to permit farm uses. Frequently, also, overly enthusiastic real estate promotion results in suburban developments that are not as well located with respect to their urban centers as other areas that remain in agricultural use. This, of course, is a problem in urban land planning.

We also have a great deal of strictly rural land now utilized for residential and part-time farming purposes. These uses of land are primarily residential and represent a more intensive use than full-time farming. They, therefore, usually compete successfully with strictly agricultural uses even in the more productive farming areas. The lands suitable for part-time farming and rural residences usually possess certain location advantages, such as proximity to an urban area or at least to a place of nonfarm employment, hard surfaced roads and other public facilities. The location features of land for these uses usually are more important than the productivity of the land for agricultural use. Although a part-time farm can be operated more successfully on physically productive land than on poorer land, the disadvantage of poor land may be offset by greater access to nonfarm employment, and also by the availability of schools, churches, and other home-site advantages. We find, therefore, a great deal more part-time farming in the eastern forested areas when they are located adjacent to urban centers and other resources of nonfarm employment than in the fertile plains of the Midwest. Frequently, the less productive farming areas have some advantages for rural living in the way of good scenery and recreational opportunities that partly offset the poorer land.

It is in the less productive farming areas, that are also suitable for timber production, where farming and forestry uses impinge on each other. Similarly, in other areas arable farming and grazing are competing uses. Land that is unsuited for arable farming is not always suited for either forestry or grazing, however. Too often the assumption is made that land which is unprofitable for arable farming necessarily is good forest land, or good pasture land. It may be very poorly suited to either of these uses, and if they do furnish the best alternative use it may be on a very extensive basis. These uses also may be supplementary in certain areas.

The special uses of land that were listed above sometimes conflict with other major uses, but frequently they are supplementary. For

example, mining is sometimes carried on in areas that are also used for farming with little conflict between the two operations. But where mining does conflict with other uses, the returns from mine operations usually are sufficiently greater to compete successfully with the conflicting uses. Watershed protection often is accomplished with good forestry management or with a combination of forestry and grazing uses. But exploitive cutting of timber or overgrazing seriously conflict with watershed protection. Individual and public interests are likely to be in conflict on the question of watershed protection because the losses that would be incurred without protection would not impinge directly on those who profit from overgrazing or from cutting the timber on a watershed area.

Recreational uses also frequently are supplementary to other forms of land utilization. But where areas are set aside solely for recreational use they are likely to possess unique scenery, other natural features, or uniqueness with respect to a given location. Yellowstone National Park is an area possessing such unique natural features. If it were not for the geysers, hot springs and the magnificent scenery the land probably would be used as a forest reserve and also would furnish grazing for cattle and sheep. In fact, western stockmen have criticized the Jackson Hole acquisition because cattle and sheep grazing was prohibited when it was set aside for recreational use.

Uniqueness with respect to a given location is illustrated by the Lake Michigan waterfront in the cities of Chicago and Milwaukee. Several hundred miles of Lake Michigan shoreline probably are as well suited physically for recreational use as that part now devoted to parks in those two cities. But location with respect to the number of potential users is unique to the cities of Chicago and Milwaukee. Recreational use of this type, of course, competes with other urban uses, but once established it also enhances the value of other uses. When recreational areas are provided at public expense, it is difficult to compare values of land for this use with competing uses. But government bodies have to determine their value on the basis of need for recreational facilities from the standpoint of health and morale, and the potential enjoyment derived from such facilities. Their decisions to outbid other potential users for the property necessarily are based on nonmonetary consideration.

Perhaps the use of land for fish and wild life conflicts less frequently with major uses than any other special use. Even in this field, however, we find a certain amount of competition. In the western states, big game utilize grazing that otherwise would be available for cattle and sheep. Ponds may be used for ducks and geese that if drained would make good farm land. Even fish ponds now are established on land that could be used for farming.

It is apparent from the above discussion that we have an array of major uses that do compete with each other on their respective margins. And, as previously indicated, the limit of one major use frequently is determined by the relative profitableness, or the net value product, of a competing use. But there are many obstacles to rapid shifting of the major uses of land. The deterring effect of transfer costs has been mentioned, i. e., the possible writing off of old investment and the necessity for additional investment before the land is suitable for the new use. Since we cannot predict the long-term market prospects for the products of land with a high degree of accuracy, the hesitation shown by private investors in changing the major uses of land is quite understandable. But often, as in the wheat illustration, such hesitation gives rise to conflicts between the public and private interests in the use of land. We need to discover ways of overcoming such conflicts in order to prevent serious maladjustments in land use.

One of the more difficult and unresolved questions in land use relates to lands that are suitable for multiple uses. This is especially true of the western public lands where often watershed protection is of major importance. Timber, grazing, big game, and recreation are possible multiple uses and, while they supplement each other for the most part, they may also to a certain extent compete and conflict with each other on the same area of land. The problem then is one of determining the most effective combination of uses when both private and public interests are considered.

#### **LAND CLASSIFICATION AS A GUIDE TO IMPROVED UTILIZATION**

From this brief review of the application of some of the principles of land utilization, it is apparent that economic use of land is founded on the common body of principles used in general economic analysis. But special problems arise in their application to land utilization research. And as previously indicated, the social and political aspects of certain land use problems sometimes are more important than the purely economic considerations. The following four broad objectives seem to characterize economic studies of land utilization:

1. Description of present situation
2. Development of criteria for establishing optimum use
3. Determining the extent of maladjustment in use
4. Developing suggested measures for achieving optimum use

This section deals with efforts to classify land for the purpose of guiding improvements in land use. Some land classification activities have attempted to serve all four of the objectives mentioned above. Most classification studies, however, have been confined to the first three.

Economic land classification work received a great deal of emphasis during the drought and depression years of the 1930's. The work subsided during the war but interest in this field now appears to be reviving. There is a tendency at this time to examine critically the methods used in prewar years as a basis for improvement of the work to be undertaken.<sup>7</sup> The discussion that follows is an attempt to further the critical examination of purposes and procedures in land classification work.

Many attempts have been made to classify lands in accordance with their suitability for different uses. The National Resources Planning Board report on Land Classification in the United States lists the following five major types of land classification that were under way at the time this report was published:<sup>8</sup>

Type I. Land Classification in Terms of Inherent Characteristics

Type II. Land Classification in Terms of Present Use

Type III. Land Classification in Terms of Use Capabilities

Type IV. Land Classification in Terms of Recommended Use

Type V. Land Classification in Terms of Program Effectuation

The first three of these types are largely physical classifications in terms of inherent characteristics, present uses, or physical use capabilities. The last two involve economic considerations, primarily in terms of the first three of the broad objectives in land utilization studies. Some of these land classification studies are designed to guide the shifting of major uses of land, and others point toward improvement of minor uses, e.g., more efficient use for farming.

Let us consider, first of all, the land classification objectives aimed toward guiding the shifts in major uses of land. Obviously, this is an attempt to determine the combination of uses in which a given area of land will contribute the greatest economic and social product. We already have discussed the hierarchy of major uses and how competition among these uses frequently works out. But suppose we want to classify a specific area of land to determine whether it should be used for farming, part-time farming, or forestry. How do we determine this? On the basis of relative incomes from farming versus part-time farming versus forestry? Obviously, we cannot determine the margin of economic use between part-time farming and full-time farming on the basis of relative incomes from farming uses alone. Consideration needs to be given to the residential value of such land for persons who are employed outside of agriculture a part of the time.

<sup>7</sup> Howard E. Conklin and Sherwood O. Berg, "A Preliminary Report on Developments in Land Classification Methods," Mimeo. report A.E. 688, Dept. of Agr. Econ., Cornell University, December 1948.

<sup>8</sup> "Land Classification in the United States," Report of the Land Committee to the National Resources Planning Board, March 1941.

We have not developed adequate techniques for measuring the economic contribution of a given area of land in these two competing uses. Use of land for rural homes and part-time farming involves primarily the direct consumption or home uses, whereas land devoted to full-time farming is utilized primarily for the production of farm products for sale. Residential uses of land in rural areas should be evaluated in the same manner as they are in urban areas. In other words, we need to consider locations with respect to nonfarm employment, the likelihood of growth of nonfarm employment opportunities, availability of public services such as all-weather roads, schools, and public utilities; also other community facilities. When rural land is appraised for its part-time farming potential, the evaluation process is necessarily that of evaluating direct consumption goods. Appraisal of the same land to determine its potential value in full-time farming, on the other hand, involves largely the determination of its capacity to produce income in agricultural production. The competitive margin between these two uses probably works itself out in such a way that smaller tracts of land will be used for rural homes and for part-time farming in the more productive farming areas. On the other hand, larger tracts of land, that were formerly used as full-time farming units, are likely to be occupied as part-time farms or rural homes in the less productive farming areas. Objective methods for determining the lands best suited to part-time farming are still to be developed.

Let us turn now to the problem of determining whether land should be used for full-time farming or for forestry or grazing. More adequate measures have been developed for this determination. On the farming side, we can determine by farm budget analysis the income expectancy from different types and sizes of farms that might be adapted to the area. Such analysis, however, depends for its accuracy on reliable input-output data and on a good physical classification of land suitability. The way in which these materials should be used in land classification work is discussed later under economic productivity classifications for farm lands.

Often there is a considerable gap in income between farming and forestry or grazing uses. And whether land can be used for farming depends upon a test of submarginality in that use. This means that we need to determine the areas where farm income is normally too low or too unstable to pay operating expenses, maintain the farm plant, and yield a return to farm families which they consider necessary for a living, including the support of public and private community institutions and services. The return that farm families consider necessary will, of course, depend upon their other employment opportunities. Theoretically, their net earnings in agriculture should be equal to their potential earnings in other lines, but it will



be necessary to establish an approximate standard for the analysis of an area. The test of submarginality then can be made with farm budget analyses to ascertain whether any type and size of farm can be organized in the area on a self-supporting basis. Some areas, of course, are physically unadapted to cultivation. The margin between farming and other major uses is then based entirely on physical considerations. In still other areas the question of unsuitability for farming is fairly obvious and no detailed analysis is necessary.

Some workers have approached the problem of testing submarginality for farming uses by developing indicators of distress, such as tax delinquency, condition of buildings, relief payments, etc. Others have depended primarily on records of past farm income experience in the area. Both of these types of data certainly furnish useful evidence for the decision. They should be utilized whenever they are available. The direct farm budget approach, however, has the following advantages:

1. Income expectancy is analyzed directly instead of depending upon indirect measures of distress that may have their roots in other causes. The budget analysis is oriented to future income expectancy rather than to past conditions.
2. It permits analysis of other farming alternatives than those which have prevailed in the area. For example, the legumes and grasses which have been developed in recent years and the new methods of fertilization may permit development of profitable farming systems in areas that were formerly submarginal for farming.

In areas where the prevailing sizes and types of farms are the most profitable ones that can be established, the same results would be obtained by using records of income experience as by the farm budget methods, provided farm records are sorted to reveal the most profitable of existing sizes and types. If historical data are available, net returns series can be constructed for different sizes and types of farms that run back over a period of years.<sup>9</sup> These series also could be projected forward to include results of new developments.

Suppose our analyses of income expectancy in farming uses indicate that successful farms as previously defined cannot be organized in the area. Should measures then be developed to aid in shifting the land to a more extensive use, e.g., forestry or grazing? One further test is needed before drawing a conclusion. Would public investment in area-wide improvement programs make farming profitable? By

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<sup>9</sup> For his approach see Wylie D. Goodsell, Ronald W. Jones and Russell W. Bierman, "Typical Family-Operated Farms, 1930-45, Adjustments, Costs and Returns," U.S.D.A. BAE processed 1946.

these means present investments in the entire community structure might be protected. This possibility is discussed in the next chapter.

Some land classification studies are designed to develop a ranking or grading of the economic productivity of land that is best suited for farming. (Similar grading is required for land in forestry or grazing uses, but we are concerned here with farming land.) This approach has been called an "economic opportunity classification" of farm land.<sup>10</sup> The purpose to be served may be to provide a more equitable basis for taxation, to furnish background information for farm appraisal work or to guide potential users and purchasers of land.

In specialized farming areas with few alternative uses a physical productivity rating based on relative yields of the special commodity, assuming a given set of practices and inputs, can be interpreted rather easily in economic terms. For example, the Montana approach to classification of wheatland has been in terms of probable yield of wheat per acre when summer fallow is practiced.<sup>11</sup>

Determination of the relative economic productivity of land having a number of alternative crop and livestock uses is a much more complex job. In approaching this problem we need to consider: (1) the form in which land classification materials need to be prepared, and (2) the way that such analyses can be used to establish productivity ratings for farm lands with alternative uses. With respect to the form in which land classification materials are made available, we should recognize first of all the need for separating the physical and economic relationships that are involved. The economic analyses will need to be reworked from time to time. But the physical relationships are much more stable. If the two sets of data are presented separately, it will be easy to rebuild the economic structure on the foundation of a physical land suitability classification.

The chief reason why the physical and economic materials need to be kept separate is that most farming land does not have a single unique use or capability. The economic margin of use for different products changes with changing economic conditions and other external factors. Even land that is continued in the same crop rotation will be farmed more or less intensively in accordance with economic conditions. Those who recognize the need for changing both the major and the minor uses of land, and especially intensity of use, in accordance with economic conditions have some difficulty in accept-

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<sup>10</sup> Conklin and Berg, Mimeo. report A.E. 68, Dept. Agri. Econ., Cornell University, December 1948.

<sup>11</sup> "Land Classification in the U.S." Rpt. of Land Com. to the Natl. Res. Planning Board, Fig. 43, p. 135.

ing an objective such as the following: "To provide permanently for using the nation's land in accordance with its capabilities and the treating of it in accordance with its needs."<sup>12</sup> The wording here implies one set of uses for agricultural lands, based on inherent physical capabilities, and that the same intensity should prevail regardless of economic conditions. It is primarily because most farming land has alternative uses, and changes in intensity are needed from time to time that we should separate the physical and economic relationships.

The natural science data needed for an economic classification of land in a specific area includes a physical inventory of the land, which contains information on soil type, slope and erosion hazards, and which indicates the part of the area which is physically suitable for cultivation. Within the margin of physical suitability one can then determine income expectancy under specified conditions by the use of farm budget analysis. In order to do that successfully, however, the physical yield expectancy of the different crops that can be grown in the area must be known, together with the rotation practices and the treatments that are needed to maintain the soil in the alternative uses that are being compared. In other words, a physical classification of land according to the types that will respond approximately in the same way to give rotation practices and treatments is needed. In addition, we need a quantitative measure of yields to be expected from each crop with given practices. The data on yield expectancy for various crops and pasture uses, and practices and treatments needed to maintain the land in these uses, should be furnished by workers in soils and crops. It is part of the physical job of classification.

With this information available, economists can analyze income possibilities of different sizes of farms on each land type. This should be done by determining the highest net income alternatives, with given levels of managerial ability.<sup>13</sup> It is necessary also to develop price and cost data that constitute longer term expectancy. Economic analyses of this type, based on a solid foundation of physical and biological data, would permit a rating of land types in accordance with net income expectancy. Some land types would be found sub-marginal for farming uses in accordance with previous discussion.<sup>14</sup>

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<sup>12</sup> H.R. 4417, 80th Congress, 1st Session, under declaration of policy.

<sup>13</sup> Frequently improved systems of farming require a higher level of managerial ability than now prevails in an area. The question then arises as to whether the requisite managerial skills can be developed by the rank and file of farmers in the area. If the required skills are not attainable the proposal is not a feasible alternative.

On land types that are economically suited for farming, returns may be compared and used as a basis for grading the economic productivity of different areas of land. Comparison should be made for the sizes and types of farms best adapted for each land type.<sup>15</sup> Proper allowances have to be made for varying inputs of capital and labor under different systems of farming, but with careful work a valid index of economic productivity can be constructed. It must be realized such an index rating or grading of economic productivity will change if some of the economic forces that affect returns from the types of farming under comparison are altered. For example, new crops, higher yielding varieties of old crops, new methods of fertilization, or other technological changes may alter the rating of economic productivity.

A rating of this kind will reflect economic productivity differences when the land is used for full-time farming. It will also serve as a guide to more equitable taxation and as background for farm appraisal work. It should be understood that the rating is not one of income experience with the sizes and types of farms that have prevailed in the area, but rather a rating of the most profitable types and sizes of farms that could be developed for the area and that could be operated by farmers with a given level of managerial ability. This means that in what now are considered "poor land" areas, characterized by small farms and low incomes, an attempt would be made to analyze the income possibilities for systems of farming that are better suited to the physical and economic conditions of the area and which would take advantage of recent developments in technology. In other words, the possibilities of achieving a better balance between labor, land, and other capital resources would be explored.

There has been much discussion of the need for an economic classification of land by local areas because the land market does not fully reflect differences in economic productivity.<sup>16</sup> The less productive land, and usually the smaller farms, sell at relatively higher

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<sup>15</sup>With the previous qualification that public investments in area-wide improvement may change the income expectancy. Also if it is not possible to maintain certain soils, we may decide to mine them and to continue their use in farming. There is the further possibility that no better alternatives are available for the people who are now farming this type of land.

<sup>16</sup>See notes on "Poor Land" and "Submarginal Land" by John D. Black in *Journal of Farm Economics*, Vol. 27, No. 2, 1945, for the suggestion that if sizes and types of farms are adapted to the productivity of the land the income *per man* might tend toward equality on different grades. But Black also states that a rating of productivity *per acre* is useful for taxation and related purposes.

<sup>16</sup>See table of lending experience by land classes in "Research Work in Minimum Financial Requirements and Related Considerations for Beginning Farming," by W. L. Cavert, in *Journal of Farm Economics*, Vol. 28, No. 1, 1946.

prices in proportion to their income expectancy than the larger farms that have more productive soil and that can be operated more efficiently. That the land market does not fully reflect income differences on different grades of land is not questioned. But other factors are involved that may be even more important explanations of the tendency for land of low economic productivity to be valued relatively higher than more productive land. Perhaps the first and foremost reason for this in areas where low income farms are concentrated is the lack of mobility of farm people. If farm families had knowledge of other income opportunities, and if such opportunities actually were accessible to them, it is possible that enough farm families would shift out of the poorer areas to permit less intensive farming of the land. If this hypothesis is correct, the most effective land use adjustment measures in areas of this type would be those that open up the avenues of escape.

Another factor that we need to consider, of course, is the home value of small farms, which already has been mentioned in connection with part-time farming. Also more families are in the market for that kind of a place because it is as large a farm as they can afford to buy, and frequently a farm family occupying a place of this size can make an acceptable living on it if they have no indebtedness. In other words, they can use both the income from the land and from their labor for living expenses. It also is probable that there is some selectivity in grades of managerial ability of present operators on the small farms of lower productivity that are located in the same area as the larger and more productive farms. There is no guarantee, therefore, that if operators of the small farms were to shift to larger farms they would increase their income expectancy proportionately to the incomes that are now being obtained. This is only one of the reasons for the desirability of a complete array of sizes and types of farms to fit the capacities and efficiencies of individual operators and their special personal situations.

By now it probably is apparent that land classification designed to grade the economic productivity of farming lands is not a beginning reconnaissance job that serves as a foundation for other economic research in an area. It is more the end result of area studies in production adjustment and efficient land utilization. Moreover, the economic ranking may change with improvements in technology and changes in economic conditions. Economic classifications, therefore, cannot be thought of as a fixed frame of reference for other research. Classifications based on physical characteristics are much more stable. However, if economic classification studies were made as outlined above they would be sufficiently stable to help guide individual farmers in the use of land and provide a basis for equitable taxation and for farm appraisal work.

### AREA LAND IMPROVEMENT PROGRAMS

In the previous section very little was said about the area and inter-area effects of possible changes in land use that might be based on land classification studies. Any change in the use of land will have repercussions on other segments of the economy of the area, and on other areas as well. However, the assumption is frequently made in land classification studies that if the change results in higher net incomes to farmers within the area the effects are generally favorable. More funds will be available for support of both the public and private community institutions. But the potential area effects of such changes need to be analyzed systematically. Some unfavorable effects are possible, especially on competing areas. And where we are dealing with large areas the potential inter-area effects should be considered.

Sometimes area-wide improvement programs can be undertaken which result in more profitable farming within the area. They involve developments which cannot be undertaken by individual farmers. Such programs for irrigation, drainage and flood control have a long history in this country. The soil conservation districts, organized under state laws, and the large federal multipurpose regional projects represent more recent developments. The Missouri Valley Development Program probably is the most ambitious of these regional improvement programs. Obviously, detailed discussion of such programs is outside the scope of this chapter, but a few general remarks are in order. Research and planning for area-wide improvement programs would come under the fourth of the broad objectives listed in the last section. Namely, developing suggested measures for achieving optimum use of land. The obstacles encountered in shifting the major uses of land in response to changing conditions have been mentioned. Development of area improvement programs involves ascertaining the specific impediments to optimum adjustment in the area, and determining the types of measures that are needed to achieve more efficient utilization of land resources, including shifts in the major uses of land.

Programs of this type usually involve both public and private investment. Since returns on such investments accrue over a period of years the discussion under "Balancing Present and Future Benefits" is applicable to this problem. In fact, conservation measures usually are a part of an integrated area improvement program. It is especially pertinent to emphasize that an improvement which results in an immediate increase in output, which cannot be profitably absorbed in the present market, probably should be postponed until the market demand has increased. The wisdom of such a decision may rest on the present situation within the area in relation to other areas. Increased production may be incidental to prevention of permanent damage

to resources. There might be acute need for improving the income position of those now living in the area. Perhaps this can be accomplished with only minor repercussions on the market, and thus with little effect on other areas. For example, opportunities may exist for developing irrigation of valley lands that will greatly increase and stabilize the productivity of the surrounding range and dry-farming lands. Such benefits cannot be assumed without analysis of both the benefits and the offsetting costs. The potential effects of a suggested program need to be analyzed in terms of the probable impacts on farmers within the area, the total economy of the area, and the possible repercussions on other areas, both favorable and unfavorable. The potential returns on public investments necessary for area improvement programs should be judged in comparison with alternative uses for public funds.

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## 6.

### *Use and Conservation of Our Farm Lands*

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A LARGE SHARE OF THE ESSENTIALS OF OUR CIVILIZATION come from the land—that thin layer of productive soil which covers part of the earth's surface. Most of what people eat comes from this surface layer of soil as do most of the clothes they wear and all of the wood from which man builds his dwellings and manufactures thousands of useful articles. From this soil also come various other raw products of industry including tobacco, linseed oil, cellulose, turpentine, and quinine.

This productive land—from which everybody lives, city and country people alike—is the nation's most important resource. It is the world's most important resource. The nation cannot survive as a people or as individuals without it.

For these reasons, every person in the entire nation—bankers and farmers, industrialists and laborers, professional people, educators and

students—has a vital stake in the permanent welfare of the country's productive land. It is not just the farmers' problem; it is everybody's problem.

Today, a great many people of the world are rightfully concerned about their supply of productive land—whether or not there is enough to go round and what can be done to make what is left produce more. Not enough people are doing all they can to solve the problem, but the number of those who are trying is increasing.

Day by day, more people around the world are recognizing the fact that food comes very largely from the soil. They are learning that productive land is the base of all things—the foundation of the world's economy. Here in the United States people are beginning to see that every plant grown, all that is shared in the way of food and fiber with other people, even what we amount to as a great industrial nation begins with and rests on the sustained productivity of our agricultural land. The nation may have—in all probability will have, from time to time—difficulties with such temporary things as too little production or over-production. But there will remain the unalterable mathematical fact of a limited supply of land in the face of a continually increasing population.

#### **LAND IS HEIR TO MANY ILLS**

Land is not a permanent resource. Under many conditions land is extremely unstable, insecure, and impermanent. When wind or water moves across bare earth, some of the fragile soil is picked up and carried away. It may be moved hundreds of miles or only a short distance, but eventually large amounts are stripped off the land unless it is tied down with effective soil-conserving measures. Soil thus removed by erosion leaves the land poorer than it was. Often erosion leaves it unplowable or useless for further practical crop production. And people in this country do not haul erosion-displaced soil back to where it comes from. It is not commonly done anywhere. Many people do, however, haul topsoil off the land and sell it for use on lawns and in small gardens. (This wasteful process could be avoided in some degree by getting soil from stream bottoms, where it often is productive and deep, rather than from sloping uplands where it is shallow and often unproductive.)

If the land is flat and occupies low situations, it will accumulate harmful quantities of water and sometimes toxic salts, unless drainage outlets are provided and kept open and effective. This condition also reduces the productivity of the land or makes it useless for the growing of crops.

And land is heir to still other ills. But most or all of them can be cured, prevented, or improved with modern land use measures, if treatment is not postponed too long.

## **LATE STARTING**

The nation would be much better off with respect to our supply of good land if interest in conservation on the part of Americans had become active a hundred years ago. When the United States was first broken up into farms, the average depth of the topsoil over the country was about 9 inches. Today, it is only about 6 inches. Thus, in a comparatively short time as the life of a nation goes, around a third of our productive topsoil has washed out of our fields in the direction of the sea. Moreover, much land has been slashed into an uncultivable condition by millions of gullies. As a result, about 50 million acres of once good cropland have been ruined for further practical cultivation and another 50 million acres of cropland is in about as bad condition. Also, more than half of the topsoil has been stripped from approximately another 100 million acres of cropland, and on still 100 million acres more the process of erosion is actively under way.

## **WHAT IS LEFT**

People in the United States are not in danger of starving or even going hungry any time soon. They are very likely to hear of surplus production of some crops, before people cry out for food, as in the early 1930's. The stubborn mathematical fact remains, however—as already noted—that there are not unlimited supplies of productive land capable of producing indefinitely, as some uninformed people would have us believe. Since the nation has allowed almost half of its original supply of productive land to be severely damaged by soil erosion, waterlogging, and the like—millions of acres of it so severely damaged as to be incapable of further economic cultivation—there are now only about 460 million acres left that are suitable for use as good, plowable cropland. About 70 million acres of this 460 million acres must be cleared, drained, irrigated or otherwise improved before it can be tilled and planted to intertilled crops or small grains. All of it except about 80 to 100 million acres is subject to severe erosion if left unattended. Worse yet, the nation continues to let at least 500,000 acres of its farmland be ruined by excessive and unnecessary erosion every year, despite the great strides that have been made in soil conservation during the last 15 years. This means that this much, adding together the scattered damaged area, is being so damaged every year the average farmer cannot plow it any longer. And a great deal more is damaged in some degree every year by unnecessary erosion. Before this New Era of Agriculture based on soil conservation got into swing, the annual damage was even larger. Now, fortunately, the rate of damage is gradually being reduced.

This toll out of the country's limited and decreasing supply of productive land has brought us to the point where there is no more good land to waste. This becomes even more evident when our rate of population growth is considered, and the fact that around 70 million acres of the present cultivated area is too steep, too erodible, or otherwise too unfavorable for further cultivation. Too, it must not be overlooked that once good soil is swept off the land into the oceans, it cannot be recovered. The part that is left behind—subsoil—is vastly less productive and usually is more difficult to plow or is more erodible, even though some of it can be improved or made to produce quite well with good farming, including addition of available plant nutrients. But subsoil farming too often is the equivalent of bankrupt farming on bankrupt land. Even under the most favorable circumstances good farming on topsoil is more profitable than on erosion-exposed subsoil.

If the soil removal process is allowed to continue long enough, the land is finally unable to support good growths of grass or trees. As long as it is not stripped down to bedrock or subsoil of sterile sand or stubborn clay, however, a certain limited amount of production of useful plants and animals is possible. Some erosion-stripped land can be made to produce fair to good crops if enough fertilizer is applied, if soil-improving rotations are used, and if the producer is willing to take unusual care in the management of the land and crops. These efforts, however, must be paid for in one form or another. No person and no nation can discount soil erosion for very long by relying solely on fertilizers or machinery or soil-improving rotations, although they are all essential. The point of diminishing returns can arrive too soon and lead too quickly to insufficiency, especially where erosion is permitted to continue and rainfall allowed to run to waste.

In very recent years soil has frequently been listed as a "renewable" resource. The implication, apparently, is that eroded land can be "renewed" and restored in a practical way to its former productive condition. While this is partly true, too often the assertion succeeds only in deluding people who should not be misguided. Deeply eroded land cannot be "renewed" or restored to anything like its original productive condition within a few years. At excessive cost and under laboratory or research plot conditions it is possible, of course, to add fertilizers or manure and grow soil-improving plants in such a way as to stimulate growth and increase yield. This does not mean, however, that the original soil, now displaced, is being renewed in the sense of replacement. Moreover, man has not found it practical to bring back to his fields and pastures rich soil scattered over the floor of the oceans through the process of erosion.

Recently, the Department of Agriculture published the results of corn produced at the Northwest Appalachian Conservation Experiment Station at Zanesville, Ohio. The plot on which the corn was grown started out with topsoil and wound up at the end of 10 years with erosion-exposed subsoil. The range in yield of corn produced over the 10-year period 1933 to 1942, inclusive, was approximately 60 bushels the first year on topsoil, with a rainfall of 42.7 inches, to less than 2 bushels per acre the last year, on erosion-exposed subsoil, with a rainfall of 38.6 inches. The treatment was the same over the whole period; no fertilizer was used at any stage. The significant point is that by 1942, erosion had removed approximately 6 inches of productive topsoil, down to the level of exceedingly poor subsoil.

The Ohio Agricultural Experiment Station initiated an experiment in 1936 near Wooster to determine the relative crop production on topsoil and subsoil. Measurements were made of the yields of corn, oats, wheat, and hay on virgin topsoil and on subsoil under different systems of cropping and management. Results from the first 9 years (1937-1945) show the average per-acre yield for corn in a rotation of 2 years of corn followed by 1 year each of wheat and hay, for virgin topsoil without treatment, was 59.1 bushels per acre. This compared with an average yield of only 19.7 bushels per acre for similarly used subsoil. Where the best treatment, including lime, commercial fertilizer, and manure, was used in a 4-year rotation of corn, oats, wheat, and hay, the average corn yield for the topsoil was 91.3 bushels, compared with only 52.4 bushels for the subsoil.

Thus it is seen that on this exposed subsoil, which had a favorable structure but was lacking in organic matter and other available essentials for best crop growth, the yields of corn, oats, wheat, and hay remained substantially lower, irrespective of treatment. This, perhaps, is sufficient evidence to show that topsoil is one thing and subsoil another.

Soil that has lost some of its fertility as a result of prolonged or intensive cropping, or as a result of leaching, is renewable in the sense that (a) its fertility levels can be restored by applications of fertilizers and manure and the use of crop rotations and (b) its texture remains unchanged.

Land eroded down to unfavorable subsoil, however, is not renewable in any exact sense, except over periods of a great many years, even centuries. Too often it is not renewable in the practical sense.

Where gullyng has set in, one can frequently appraise it as the beginning of the death stage of land unless quick action is taken to remedy the situation. Stated differently, the deadly gullyng process usually sets in at that stage of erosion marking the completion of stripping off the topsoil.

Soil conservation surveyors have tried to find additional land to add to the 460 million acres of good plowable area. Thus far they have not been too successful, even though some tidal areas have been reclaimed by dyking and pumping and by setting automatic trapdoors for keeping out sea water.

More and more it looks as if the 460 million estimate is very close to the sum total of our stock of good land. That is a great deal of land—if it is carefully safeguarded from now on. It's good land, not mediocre; and it can be kept good with modern soil conservation. Unfortunately, with imprudent use, it can go from good to not-so-good, or even on to the condition of very poor or uncultivable land.

### THE SERIOUSNESS OF SHEET EROSION

Last year in the state of Washington, various parts of the state were subjected to exceedingly serious erosion, in addition to the destructive floods. In the Palouse country, one of the most productive wheat-producing areas on earth, it was found by field measurements that on many farms a ton of rich wheat soil was lost for every bushel of wheat produced during a single season of severe erosion (1948). You can find, I think, during years of heavy rains in various parts of the country that it often costs, on unprotected land, 20 bushels of soil to grow one bushel of corn. Twenty-five bushels of rich soil to produce one bushel of wheat or 20 bushels to produce a bushel of corn is a very high price to pay for our daily bread, in view of the limited area of the irreplaceable resource necessary to produce bread—that is, productive land. Our rapidly increasing population adds to the seriousness of the problem.

It is not easy to put an immediate dollar value on such a soil loss. Still we can't get away from the basic fact that we are rapidly losing the material out of which future farm dollars would be derived—if the soil were kept in the fields and out of the rivers and oceans.

Probably all of you have noticed that runoff of rainfall from unprotected, cultivated slopes is always muddy—muddy because the water is laden with rich soil swept off the land. You doubtless have seen, also, clear or nearly clear water trickling from woods and meadows, and from fields well protected against erosion. So, you really do understand what erosion is, although you may not have thought much about it or tied in muddy water in its exact relation to soil wastage by erosion. Some of us have not bothered to understand the relationship—that is, that muddy water is nothing but clear water discolored with soil washed out of unprotected fields by

every heavy rain. Too many have neither clearly understood nor appreciated the nature and dangers of sheet erosion.

Just what sheet erosion is and how it was damaging land was first shown in a survey of Louisa County, Virginia, in 1905. It operates something like compound interest working backwards: Taking off more and more from what's left instead of adding on more and more in a steady process of gain. A farmer thus gets poorer and poorer along with the land, as the rains obstinately dig deeper and deeper into the thinning layer of the good soil of the fields—that is, if anybody is willing to sit by and allow the process to go unheeded and unattended.

### MODERN SOIL CONSERVATION

The science of soil conservation embraces the whole field of wise treatment and prudent use of farmland.

Modern soil conservation is based on sound land use and the treatment of land with all the appropriate measures that are needed to keep it permanently productive while in use. It means terracing land that needs terracing. It means contouring, strip cropping, and stubble-mulching the land as needed, along with supporting practices of crop rotations, cover crops, etc. It means gully control, stabilizing water outlets, building farm ponds. Locating farm roads and fences on the contour, planning steep, erodible land to grass or trees, development of good pastures and good management of them after they have been developed. Modern soil conservation, moreover, consists of doing these and still other necessary things. Where land is too wet, it calls for drainage; if it is too dry it calls for irrigation; if it is subject to wind erosion, it calls for stubble-mulch farming, wind-stripping, and windbreaks. If plant nutrients and organic matter have been depleted, it calls for fertilization and addition of organic matter; if water-soluble salts have accumulated in toxic quantities, it calls for drainage or leaching out the salts by flooding. Modern soil conservation calls also for the use of the best of the most adaptable varieties of crops as well as the most efficient tools available to farmers.

An indispensable part of modern soil conservation is a supporting program of research, such as will provide at all times all the advantages that progressive science can contribute. Moreover, modern soil conservation calls for the continuing maintenance of all effective work put on the land.

Modern soil conservation is based on the fundamental principle that every acre must be treated according to its capabilities and need. Parcels of land differ in their characteristics and in their ability to produce, often within a single field and sometimes within the limits

of an acre. There are no blanket, short-cut measures that we can substitute for complete, acre-by-acre soil conservation treatment of a farm. That is why the Soil Conservation Service divides the land into eight simple capability classes, according to slope, soil, erosion, drainage, and other factors of land character and condition. These capability classes are based on soil conservation surveys.

After the capabilities have been determined, a conservation plan or blueprint is made for each farm, based on the determined capabilities of the land. This is worked out by the farmer and technician working together—out in the fields and pastures and woodlots, not in an office around a table. This plan shows, field by field, the needed conservation practices on that particular farm for the present and for years to come, such as terracing, contouring, strip cropping, crop rotations, etc. It is a complete, scientifically balanced plan for which there can be no effective substitute. The physical condition of the land itself decides that point, except that the plan must agree as nearly as possible with the farmer's economic capacity or facilities to carry it out. And this method of scientific farm blueprinting is still another development of modern soil conservation. This is the basic plan of operation the Soil Conservation Service started out with on the day of its birth, September 19, 1933, and the plan that guides its program today.

It is a complex plan that must be made by trained technicians who know the land by virtue of their scientific training and experience.

Next comes the application of the practices called for in the farm plan—practices and combinations of practices needed for safeguarding and wisely using every acre of the farm. Here again the soil conservationist lends a hand, by giving technical assistance or supervision in the application of the practices to the land—right out on the land and never by issuance of written directions from the office.

The district, for its part, may be able to make available such special equipment as ditchers, heavy tractors, or other machinery that an individual farmer cannot afford to have himself, because of his limited need for such equipment individually. Such equipment, whether purchased by pooled funds of the district or obtained otherwise, usually is made available to district farmers at a reasonable daily or hourly charge to take care of its operation and maintenance. Often the district supervisors negotiate with private contractors to do conservation work according to plans made by technicians. Thus, for example, throughout the country during the fiscal year 1948, more than 14,000 private contractors were engaged in this kind of work in the districts, operating some 32,000 pieces of major equip-



ment of nine principal types (Table 6.1). These contractors own a large share of all heavy equipment used last year in 1,864 actively cooperating soil conservation districts, and this is being done in accordance with farm plans made for district operations by the technicians of the Soil Conservation Service. (This equipment has a new replacement value estimated at more than \$220,000,000.)

#### SOIL CONSERVATION DISTRICTS

The various steps which are being taken to apply sound conservation measures to the land have been sketched above. This program of proved soundness is moving forward, as pointed out, with gratifying progress through the soil conservation districts of the nation. The districts are, for the most part, local units of state government and are proving to be the most effective device ever conceived for carrying out scientifically applied conservation treatment of the land in a practical, effective, and wholly democratic fashion. There are in the Soil Conservation Service, also, the first and by far the largest corps of trained, experienced soil conservation technicians in the world. And, what is also important, a constantly growing understanding of the importance of positive soil conservation is developing among the leaders and thinking people of virtually every part of our society—educational and religious, agricultural, business, and professional.

As of May 1, 1949, farmers and ranchers of the 48 states, Puerto Rico, Hawaii, Alaska, and the Virgin Islands had formed 2,100 soil conservation districts, all organized since August 4, 1937. (Fig. 6.1 and 6.2.) They cover 1,152 million acres. In Iowa, for example, there were, as of May 1, 1949, 92 districts, including approximately 32 million acres or 90 per cent of the area of the state.

These districts, as is generally known, are voted into existence by the local people under state enabling legislation. They are managed by local farmers, locally elected for their nonpaying jobs. Between 10 thousand and 12 thousand of these district governing officials, usually called district supervisors or directors, give unselfishly of their time and energies in the furtherance of soil conservation throughout the country. They are on nobody's payroll, and are obligated to no group, to no state, federal, or other outside authority. They draw on the support and facilities of everybody who can contribute something to district progress—state, county, federal, and private agencies, including business establishments, civic organizations, schools, banks, railroads, and others.

It is this kind of voluntary cooperation, initiated and carried on by the landowners themselves that is getting the soil conservation job done. And they are getting the job done right—by treating each acre of farmland according to its capability and need in a way that

TABLE 6.1  
PRIVATE CONTRACTORS AND SOIL CONSERVATION DISTRICT EQUIPMENT JUNE 30, 1948 \*

SCS Region	Number of Districts	Number of Contractors	Wheeled Tractors	Crawler Tractors	Road Patrols	Draglines	Power Shovels	Ditching Machines	Well-Drillers	Bull-dozers	Pick-up Scrapers
1	Contractor owned		35	70	134	86	240	55	13	718	40
	District owned		11	9	9	9	0	2	0	59	5
	SCS loaned		2	8	6	14	0	2	0	51	18
			—	—	—	—	—	—	—	—	—
Total	156	914	48	87	149	109	240	59	13	828	63
2	Contractor owned		2,915	1,296	202	521	75	46	338	2,169	717
	District owned		70	16	4	7	0	8	1	13	9
	SCS loaned		4	15	13	21	0	2	0	27	4
			—	—	—	—	—	—	—	—	—
Total	353	3,948	2,989	1,327	219	549	75	56	339	2,209	730
3	Contractor owned		215	1,615	319	628	182	655	179	1,459	482
	District owned		1	3	2	4	0	2	0	6	23
	SCS loaned		6	52	0	23	1	3	0	44	19
			—	—	—	—	—	—	—	—	—
Total	379	2,494	222	1,670	321	655	183	660	179	1,509	524
4	Contractor owned		1,116	1,132	627	347	23	5	351	1,606	529
	District owned		52	19	4	5	0	0	2	14	13
	SCS loaned		29	14	3	9	0	0	0	15	3
			—	—	—	—	—	—	—	—	—
Total	280	2,961	1,197	1,165	634	361	23	5	353	1,635	545

5	Contractor owned		344	1,825	308	194	55	33	305	1,357	1,186
	District owned		48	28	3	1	0	0	0	28	44
	SCS loaned		27	139	4	11	2	0	0	91	104
Total	356	2,033	419	1,992	315	206	57	33	305	1,476	1,334
6	Contractor owned		221	1,016	106	114	53	44	324	686	778
	District owned		17	74	1	3	0	0	1	40	67
	SCS loaned		34	80	6	7	0	0	0	46	80
Total	208	1,127	272	1,170	113	124	53	44	325	772	925
7	Contractor owned		137	511	80	133	70	41	203	470	332
	District owned		3	11	0	1	0	1	2	12	10
	SCS loaned		0	23	0	16	2	0	2	39	23
Total	132	741	140	545	80	150	72	42	207	521	365
National Totals	Contractor owned		4,983	7,465	1,776	2,023	698	879	1,713	8,465	4,064
	District owned		202	160	23	30	0	13	6	172	171
	SCS loaned		102	331	32	101	5	7	2	313	251
GRAND TOTAL	1,864	14,218	5,287	7,956	1,831	2,154	703	899	1,721	8,950	4,486

\* Prepared by Soil Conservation Service October 15, 1948

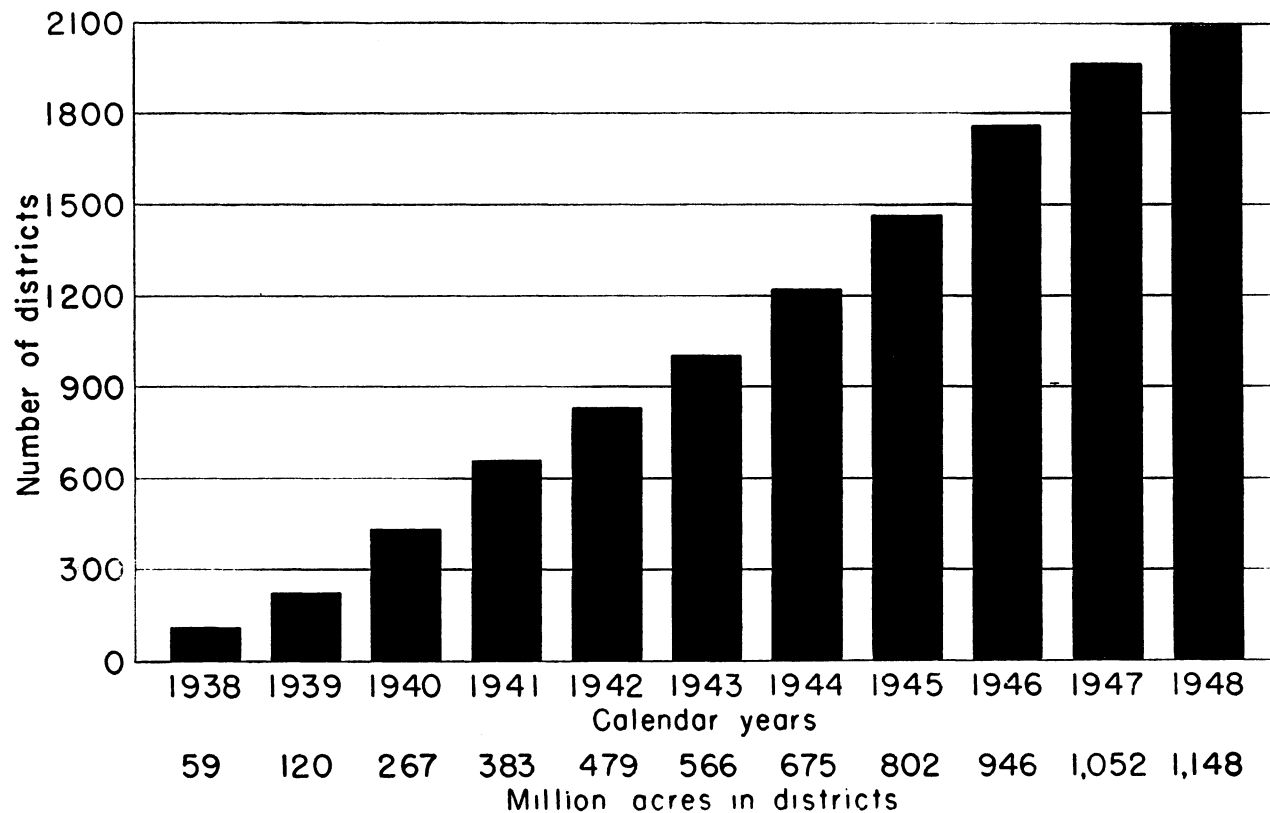


FIG. 61.—Number of conservation districts organized, 1938–48. (Cumulative by calendar years.) (Soil Conservation Service, USDA.)

makes it possible, through maintenance, to keep the land safeguarded permanently.

### ERA OF SOIL CONSERVATION FARMING

Up to the first of 1949, farmers and technicians working together out on the land, in soil conservation districts, had prepared some 683,000 complete conservation farm plans, covering nearly 187 million acres, with 93 million acres treated with needed conservation measures. (Fig. 6.3.) The practices applied have included such items as:

- 17 million acres of contour farming;
- 4½ million acres of strip cropping;
- 25 million acres of stubble-mulching;
- 500,000 miles of terraces;
- 45 million acres of range and pasture improvement, with continuing proper management provided for;
- 3 million acres of wet farmland drained;
- 2½ million acres of dry land leveled or otherwise conditioned for irrigation;
- 125,000 farm ponds constructed in proper locations and with adequate watersheds adjusted to climatic conditions;
- 293 million acres covered by conservation surveys in detail; and
- 250 million acres covered on a reconnaissance basis.

These figures on accomplishments do not include the additional millions of acres which have been surveyed, planned, and treated through programs other than the soil conservation districts program. All together, they mean highly encouraging progress and they reflect a new era in American agriculture: The era of soil conservation farming.

Such progress could not possibly have been made but for the fact that farmers in soil conservation districts are working together in a highly effective manner; pooling their resources of labor and equipment, planning together, and helping one another in many ways.

### SOIL CONSERVATION PAYS ITS WAY

Nothing has to be sacrificed in order to keep the land safe, healthy and productive. On the contrary, our experience on hundreds of thousands of farms proves that soil conservation actually pays a handsome immediate and long-time profit. Soil conservation is an investment. It increases per-acre yields and income, benefits business, and safeguards health. It pays back more than it costs to the farmer, to business and professional people in town where he trades, and

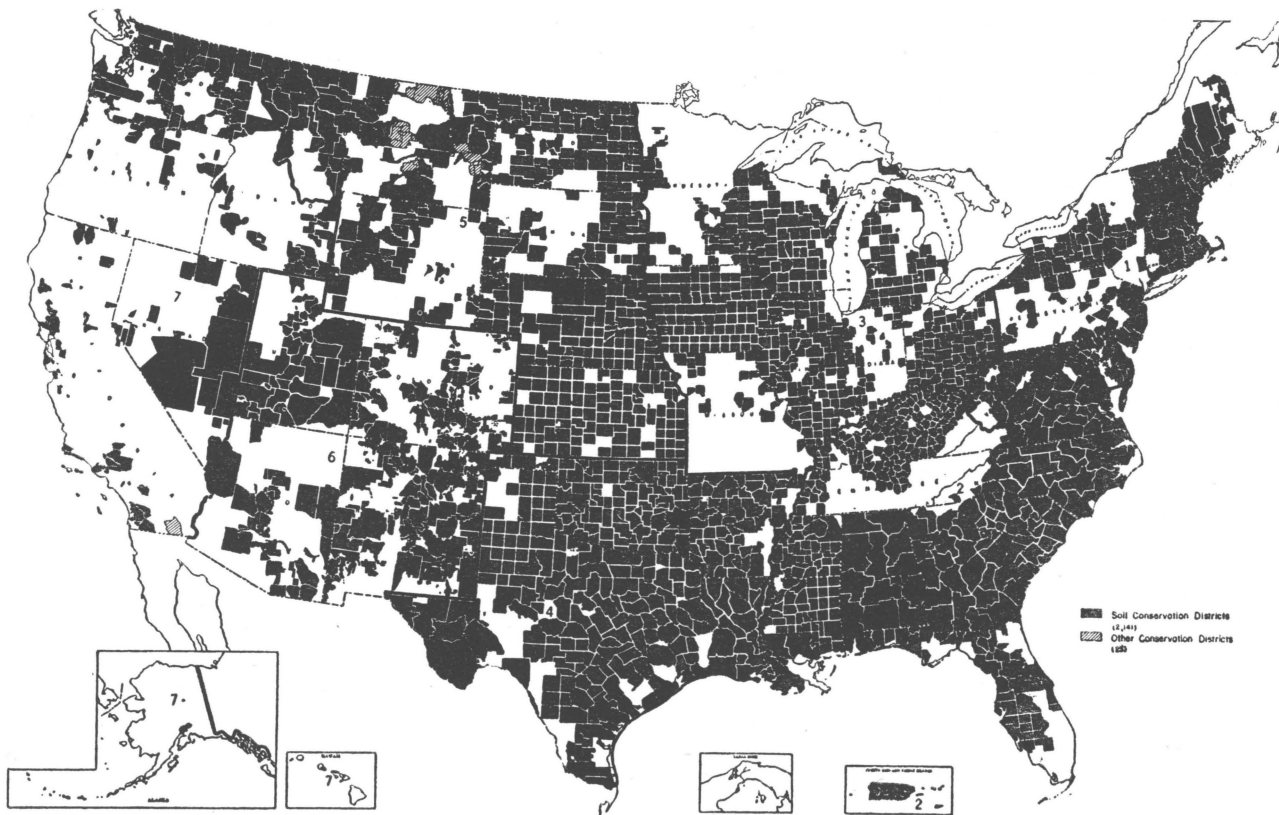


FIG. 6.2.—Soil conservation districts established as of July 1, 1949, and other conservation districts being assisted by the Soil Conservation Service. (Soil Conservation Service, USDA.)

to local, state, and federal governments which derive their revenues from taxes on production and earnings. It is a chain of increased wealth which stems, as does most wealth, from the land.

The recorded income for the 1945 crop year in representative areas from conservation-treated farms as compared to similar farms on which about half as much conservation work had been done, has supplied evidence of the profitableness of properly coordinated, complete soil conservation work. This report from farmers who keep books showed that the increased income from conservation farming on 984 farms averaged \$4.90 an acre better than 888 comparable farms with relatively little conservation.

Previously, 9,300 representative farmers in all parts of the United States had reported that conservation farming for two years or longer had increased their per-acre yields, covering all major crops grown in the country, by 36 per cent on the average. These farmers had kept books on their operations, and the years reported on were not the peak price years.

There are a number of reasons why soil conservation increases income. The principal reason is that rainwater stored in the soil and the soil with its content of organic matter and other elements of fertility put into the land by nature and man are all retained in the fields to increase per-acre yields. Per-acre yields generally are largely responsible for farm profits—that is, good yields per acre are almost invariably more remunerative than low yields per acre.

#### **SOIL CONSERVATION BENEFITS THE PUBLIC**

It is not surprising, then, that both federal and state governments have found it to be in the public interest to appropriate funds for furthering soil conservation work. Soil conservation districts do not have the power to levy taxes or assessments. The farmers themselves pay for the materials, labor, and equipment used in putting their district conservation plans into effect. Practically all of the states have granted some funds for their soil conservation district programs. Funds are provided through federal appropriations for the technical services that the Soil Conservation Service extends to districts. For the fiscal year 1948, the cost of this technical assistance, plus limited amounts of equipment, planting materials, and the like, averaged \$1.47 an acre.

#### **SOIL CONSERVATION IS AN INVESTMENT**

It has been estimated by the Soil Conservation Service that in 1948, for instance, the federal government retrieved the entire amount spent by the Soil Conservation Service on its soil conservation work.

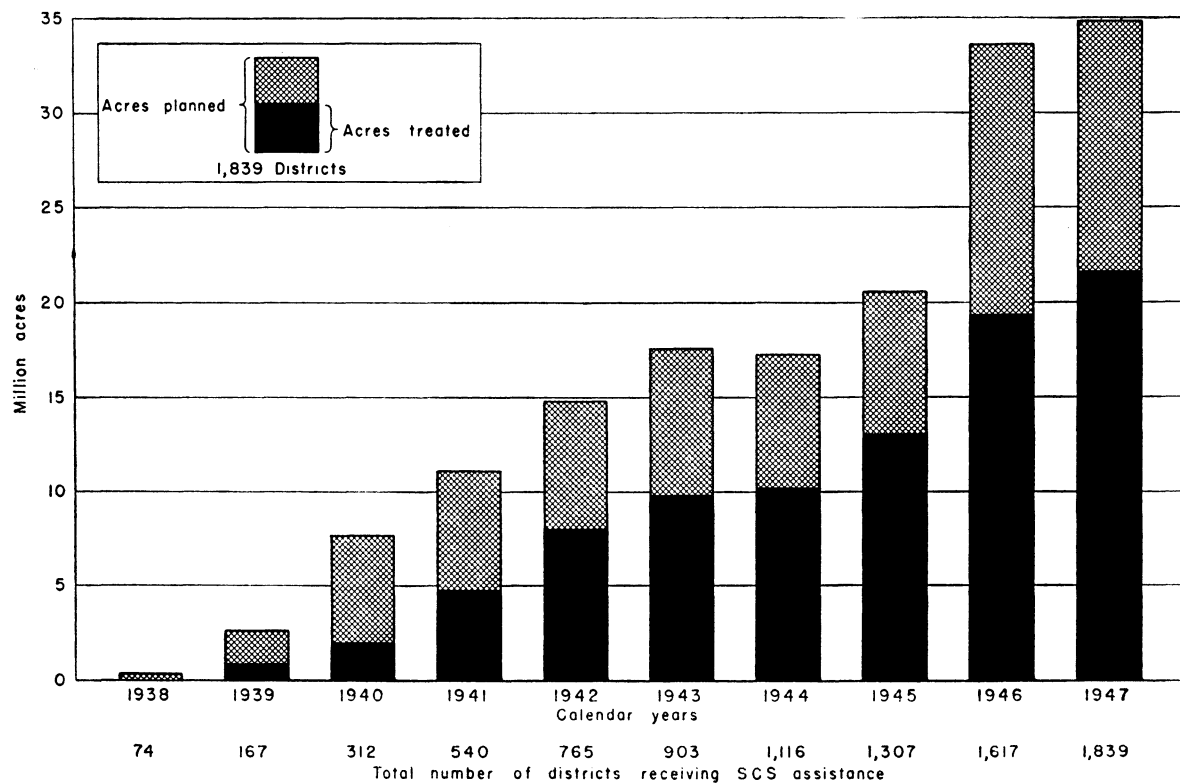


FIG. 6.3.—Acres planned and acres treated in soil conservation districts. (Soil Conservation Service, USDA.)



In addition, the government made a 77 per cent profit in increased income taxes paid on increased returns—a result of farmers applying effective soil conservation measures on their lands. Based on reports from district farmers and ranchers, that included 35½ million dollars in increased revenue tax from the use of soil conservation measures that the equivalent of 344,827 treated farms of 290 acres each—approximately 100 million acres treated—produced. Then, too, the extra income tax paid by retailers, processors, and distributors, who profited by the conservation farmers' extra production and spending—out of their approximately 245 million dollars increased income—brought the estimated total return to the federal treasury up to 69 million dollars. The 39 million dollars originally appropriated, plus some 30 million dollars more—profit on the investment.

In other words, the kind of soil conservation work under discussion is a good investment. It is a good investment for the farmer; it is a good investment for the public. It is a good investment, plus the accomplishment of an utterly essential conservation job.

### **MISUNDERSTANDINGS**

How the United States should go ahead with carrying out its soil conservation job has been discussed quite freely in the last few years. Some have insisted that the way the Soil Conservation Service goes at the job is all right but is moving too slowly, or that soil conservation costs too much.

The answer to the last assertion has been given. To the former it can be said that the Soil Conservation Service working through soil conservation districts is now treating around 21 million acres of farm land each year. Or, to speak more nearly accurately, the equivalent of 31 million acres, counting the survey and planning work done each year. Twenty-one million acres of land efficiently treated—treated both scientifically and practically to the very best of man's accumulated knowledge and ability—is a lot of land.

Still, the job admittedly is not going fast enough. Go back a few years and it will be found that we were not putting any completely coordinated work of this effective kind on any land anywhere. Even those who have complained loudest have done nothing to help; either they did not understand what was needed or did not understand what was going on.

The soil conservation research program began in 1929 and the application work in 1933. When the action program was finally started, it was learned that much education was necessary. The work moved slowly at first. What is most encouraging at present is that the program is moving progressively faster from year to year. In the fiscal year 1941, 1.1 per cent of the total remaining soil conservation

job of surveying, planning, and application was completed. Last fiscal year (1948) the rate of progress had trebled—it was 3.3 per cent of the remaining job. Of the total job 15 per cent had been completed. With more facilities the work could go faster, and it should go faster. The job on the farmlands of the country could be finished up to the stage of maintenance by 1970. That should be done because of the large area of land that continues to be severely damaged each year.

#### **EFFECT OF SOIL CONSERVATION ON FARM YOUTH AND BUSINESS**

The Sylvania community of Lonoke County, Arkansas, formerly produced cotton as its main crop; but in the 1930's conservation farming was taken up by the community. A Soil Conservation Service CCC camp, located at nearby Jacksonville, began work in the Sylvania community in 1936. A year later a soil conservation district was organized. It included this community and all of Lonoke and Pulaski Counties. Since that time, conservation farming—mainly dairy farming in this instance—has expanded rapidly.

At first, only a few farmers started dairying, and only in a small way, but as the acreage of hay and pasture crops expanded under the new conservation-farming program, more and more farmers went into the business. Today, dairying is the major enterprise on about 100 farms of the Sylvania community. It has grown into a million-dollar farm industry. The farmers are cooperators with the Lonoke-Pulaski Soil Conservation District.

A recent study of an average group of ten families, who were among the first to start soil conservation in the Sylvania community, shows that their farms are now paying from six to ten times more taxes of all kinds than they paid ten year ago. The study also reveals other outstanding farm advancements.

One of the most interesting of the findings relates to the children of the community. Of twenty-six children in ten families practicing soil conservation, nine have become partners with their parents in the dairy farming business; and eleven more have married and become dairy farmers themselves in the community. Three are still living with their parents attending high school. Only three of the twenty-six children have left the community.

A comparative study was made of an average group of ten families in another community, only five miles from Sylvania, who were still depending largely on cotton for their income. They were farming the same general kind of land; but few of them had even started conservation farming. Only eight of the thirty-three children in this group had married and settled in the community. Two minors were still in school; and twenty-three had left the community to seek

their livelihood elsewhere. And there were no father-and-son partnerships.

Most of the homes in the Sylvania community are painted and have modern conveniences; electricity, gas, hot and cold water, refrigeration, and sewage facilities. In contrast, few of the homes of the nonconservation farmers are painted or have any modern conveniences except electricity.

Undoubtedly, the better income from soil conservation, the better standard of living, and the brighter future were the chief inducements in keeping more of the young people on the farm.

The Louisiana Bankers Association gives a vivid description of what soil conservation has done for the Sylvania community. This association of bankers visited the community in July, 1947, and had this to say:

"The community (Sylvania) was going broke 10 years ago. Soil erosion was cracking the land wide open and soil depletion had relentlessly cut down production until it took 4 or 5 acres to make a bale of cotton. The school district was in debt—teachers made as little as \$40 a month. Most of the farmers owed money; it was hard for many operators to pay the interest on their loans, and some didn't.

"But since that time has come a complete shift in the use Sylvania folks made of their land. They used to farm. Now they dairy. Their soil conservation district is responsible for the change. As a dairying community, Sylvania found it necessary to develop improved pasture. Here and there over the grass-covered landscape lie those pastures—7,000 acres of them. That acreage represents a 1,000 per cent increase in pasture during the past seven years. Soil Conservation Service technicians working in the soil conservation district have labored long hours the past decade helping farmers prepare land, seed proper mixtures of pasture grass and clover, and then manage the grass so it would produce its best.

"With the improved pastures to give their dairy cattle long-season grazing, the Sylvania dairymen send \$3,500 of milk daily to the Terry, Mayflower, Singley, and Kraft dairy companies. The milk brings around 100,000 a month to the producers."

During the last year, farmers in one part of the Sylvania community graveled many miles of road, at their own expense, when informed that the state and county could not do the job properly. They needed all-weather roads for the trucks that took their milk to market. The bankers and merchants in the nearby town of Cabot are strong supporters of soil conservation, largely because of the results they have observed at Sylvania. Banks report that deposits from farmers of this community have risen more than 300 per cent and that farm income has increased more than 500 per cent. And the

merchants of Cabot report that everyone in town has benefited from the soil conservation and dairy farming program in the Sylvania community.

The Sylvania community is an outstanding example showing how conservation farming increases farm income, raises the standard of living, assures security for farm people, and keeps young people on the farm to insure a lasting and progressive agriculture and a more stable society. But the Sylvania community is not the only example of this; there are numerous other communities and hundreds of thousands of individual farmers scattered throughout the nation who have had similar results from their soil conservation operations.

These highly successful community and farmer group accomplishments are the best kind of proof that the soil conservation job can be successfully done on time, under our system of government. It is doubtful that the job could be done in a lasting way under any system of government where farmer initiative, spirit, cooperativeness, love for the land, and rewarding returns are stifled by dictated action.

#### **HELPING OTHER COUNTRIES TO HELP THEMSELVES**

The record of progress and accomplishment in the field of soil conservation in the United States during the last 15 years is quite sufficient to show what can be done by sound agricultural planning and application. Apparently a lot of other people around the world agree, because, during the last few years, 80 other countries have sent 475 agricultural representatives and "trainees" to the United States to study our soil and water conservation program in the field. Some of them working with Service technicians for as much as a year. These visitors have included agriculturists and scientists from nearly every part of the globe—from South America, Africa, Europe, India, China, Australia, Asia. Several countries already have national soil conservation programs under way, patterned after our own.

#### **RUSSIA STARTS SOIL CONSERVATION**

Recently, Russia—actually and potentially a major agricultural producing nation—announced (Moscow press dispatches, October 24, 1948) a 15-year conservation plan to protect its big wheat belt from damaging drought winds. The United States faced something of a similar problem, of course, in its wheat-producing Great Plains area during the 1930's and dealt with it with a high measure of success. In this, as in all the effective soil conservation work in which this country has pioneered, that success was due to the fact that: (1) the program was started on the right basis and continued on that basis (treating the land according to kind and need) and (2) democratic

methods of voluntary action which distinguish all such undertakings of public welfare in America, guided the program.

The news reports referred to described the newly announced Russian plan for its vast steppes area as calling for such items as three thousand miles of tree belts, 45 thousand reservoirs and farm ponds, and 80 thousand farms to be put under improved grass and crop rotations, with the program to be completed by 1965. In a land-short world beset by a rapidly mounting population, any bona fide undertaking for developing and preserving any food-producing land resource of a substantial area certainly is a move in the right direction. At the same time, it might be pointed out that such figures serve by contrast to emphasize some of the things we already have done in the United States in the field of soil and water conservation, chiefly in considerably less than 15 years.

For example, as of December 31, 1948, we had already planted 25,249 miles of windbreaks (shelterbelts), had built 126,192 farm ponds, and had applied conservation treatment of various kinds on 683 thousand planned farms in soil conservation districts alone.

Land already treated included at that time such items as 25,197,000 acres of stubble-mulching; 566,000 miles of terracing; 53,500,000 acres of pasture and range improvements; 17,000,000 acres of contouring; and 1,880,000 acres of improved irrigation.

As previously indicated, 1970 is our goal for completing the soil conservation job for the nation.

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# 7.

## *Range Land Problems and Policies*

R. R. RENNE

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**L**AND IN THE WESTERN TWO-FIFTHS OF THE UNITED States is devoted largely to the production of livestock through grazing of the natural vegetation. About 5 per cent of the more than three-fourths billion acres in the eleven western states is utilized by tilling or raising crops. Formerly ranchers raised no products, not even tame hay for livestock feed. They depended entirely on grazing of the natural vegetation to support their livestock enterprises. Even today in many areas in the western arid regions where ranching is the major type of land use, the ranchers raise no crops of any kind, but cut wild hay or native hay or grasses and feed this to livestock during the winter when the range cannot be grazed.

Failure to produce supplemental feeds or hay for winter use in the early days was one of the most important factors contributing to sweeping failures of many ranches during severe winters. A continually increasing proportion of ranchers in our arid areas are putting up a considerable amount of native or tame hay for winter feed

to stabilize their operations, and to protect themselves against disastrous winters. Wherever irrigation water is available in ranching areas, it is being used largely to produce hay for livestock feeding.

### CHARACTERISTICS OF RANCHING

Ranching, as a type of agricultural land utilization, differs significantly from dry farming, irrigated farming, or typical agricultural operations in more humid climates. The peculiarities of ranching give rise to important economic problems which are significant in determining the land use pattern and the policies which must be developed to solve range land use problems satisfactorily.

**SIZE OF RANCH UNITS.** Probably the most significant characteristic peculiar to ranching is the very large size of operating units. In Montana, for example, it requires at least four thousand acres, with average grazing land, to carry enough livestock to provide a ranch family sufficient income to support a reasonable standard of living, judged by modern American standards.<sup>1</sup>

The average size of farm unit in the United States is approximately 195 acres. The average size of operating unit in range land states such as Wyoming and Arizona is 2,533 acres and 2,881 acres respectively, or many times the average size of the farm unit of the country as a whole. This indicates the importance of the spatial element in ranching and the resulting very sparse population pattern. Thus, ranching may be characterized as a rather extensive form of

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<sup>1</sup> Grazing lands in Montana are grouped into five grades on the basis of the number of acres required per one thousand pound steer or one animal unit for a ten-month grazing period. Eighteen acres of first grade grazing land are required to graze one animal unit for a ten-month period, nineteen to twenty-seven of second grade land, twenty-eight to thirty-seven of third grade land, thirty-eight to fifty-five of fourth grade land, and fifty-six acres and over of fifth grade land. A minimum of one hundred animal units is necessary to provide a typical ranch family with sufficient income to support a reasonable standard of living judged by modern American standards. One hundred and twenty-five animal units is considered more nearly adequate. For purposes of determining animal units, five sheep are considered the equivalent of one cow. According to Saunderson, a "minimum comfort" standard of living would appear to require a ranch having about one hundred twenty-five to one hundred fifty units of cattle, or a band of one thousand to twelve hundred sheep. This is assuming that such stock ranches have few if any other sources of income and have the "average ranch family" of four to five people. (See M. H. Saunderson, "Readjusting Montana's Agriculture," V, Economic Changes in Montana's Livestock Production, Montana Agricultural Experiment Station, Bulletin No. 311, page 18, February, 1936.)



land use with comparatively low absorption per acre of capital investment. The sparse population contributes to social and economic problems, such as the high per capita cost of providing schools, roads, communications, and related services.

**RANCHING CHARACTERIZED BY RELATIVELY SLOW TURNOVER.** In some of the more humid and warmer sections of the country, especially in vegetable production, a farmer may get two or three crops or even more from his land in one year. But in the case of ranching, turnover is much slower. For example, in the case of beef cattle, it takes from two to three years to grow a steer to marketable size. In the case of sheep only one lamb crop can be produced annually, and only one wool crop. Many cattle ranchers do not run a cow-calf combination, but purchase yearling steers and graze them for a season before marketing them. Even when the cattle rancher sells his calf crop annually, he gets only one crop a year.

It requires from twelve to twenty years to get a good stand of native grass established in the western states, particularly in the plains region, so that the ability to shift from farming to ranching, for example, is strictly limited and requires many years. A farmer's decision to expand his cattle numbers and reduce his farming operations would have to be made not a month in advance, but years in advance of his plans to market his product.

**HIGH FIXED CHARGES IN RANCHING.** Heavy fixed charges are pronounced in ranching, primarily because real estate (land and buildings), especially land, comprises a much larger percentage of the total capital investment than in many other lines of endeavor. Since property taxes are relied upon to provide the main source of revenue for schools and local governmental operating expenses, property taxes are relatively high and rigid. The fact that they do not vary promptly with price changes as do income, sales, or similar taxes, places a heavy fixed charge upon agricultural enterprises such as ranching which use large areas of land.

**RANCHING A HIGHLY COMMERCIALIZED ENTERPRISE.** Agriculture, generally, is much less commercialized than most industries, and consequently reacts differently to price and income changes. However, in the case of ranching, operations are very highly commercialized. On most ranches only one enterprise is operated, namely cattle or sheep. More units than formerly are now operating both cattle and sheep,

but ranches are still highly specialized and tend to emphasize either cattle or sheep, but not both. Ranching is therefore a highly specialized business.

Evidence that ranch units are highly commercialized can be seen from the fact that less than 4 per cent of the total value of products produced on the ranch is used by the operator's family in the case of stock ranches, compared with more than four times this amount (over 16 per cent) in the case of general farms, and nearly 66 per cent in the case of self-sufficing farms.<sup>2</sup> This high degree of commercialization means that ranchers are especially vulnerable to price fluctuations accompanying vicissitudes of the business cycle, and weather variations characteristic of the semi-arid west, which determine the carrying capacity of grazing lands.

**ELASTICITY OF DEMAND FOR RANCH PRODUCTS.** Consumer demand for most agricultural products is relatively inelastic compared with the demand for many nonagricultural products. However, there is considerable elasticity in the wants of consumers for different types of food. Thus, the total importance of farm products is very great, but their marginal importance is modest. The demand for meat (beef and lamb) from American ranches fluctuates closely with the purchasing power of the public and the index of general employment.

When a large amount of unemployment exists and labor income is low, meat prices slump badly. On the other hand, when business activity is at a high level and wage earnings are high, meat prices soar. Thus, the cattle rancher is dependent to a large extent, and more so than some other types of agricultural operators, upon the general level of business activity and the vicissitudes of the business cycle.

The above characteristics of ranching as an industry point out some of the conditions which ranchers must face in their operations, and some of the problems which determine the land use policies that must be followed if ranching is to operate satisfactorily in our modern economy.

#### **RANGE LAND TENURE AND TENANCY**

The most significant land use problems associated with ranching are those involving tenure of range lands. Valuation, credit, taxation,

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<sup>2</sup> These data are for Montana farm and ranch units and are taken from R. R. Renne and H. H. Lord, "Montana Farm Price Variations," Montana Agricultural Extension Service Circular No. 93, page 5, June, 1938.

and conservation problems are also significant, but the most controversial and significant problems at the present time involve ownership and leasing arrangements of our western ranges.

**OWNERSHIP AND USE OF THE WESTERN RANGE.** Less than half of the nearly three-fourths of a billion acres of range land in the eleven western states is privately owned. The federal government owns 54 per cent, or 406 million acres, of the total land area of these western states where livestock production is the basic industry in the two hundred counties of the area. The Forest Service and the Bureau of Land Management administer more than three-fourths of this acreage, and the Indian Service an additional tenth.

Federal lands are poorer than average range lands, and their physical contribution to livestock production is not proportional to their acreage. In spite of this, federal range lands constitute the major acreage of the western states and they furnish some very strategic and fundamental resources, particularly as watershed areas, recreational spots, summer grazing, etc. Consequently, they are of great importance to the West.

Much of the publicly owned range land in our western states is leased by ranch operators for grazing purposes. Therefore, the number of livestock carried by the average operating unit is considerably larger than the privately owned land within the ranch unit alone could support. The landlord-tenant relationships growing out of this arrangement have given rise to serious controversies in recent years. During the past two years, in particular, heated controversy has arisen over the relative merits of public compared with private ownership of these western range lands.

The combined sheep and cattle using public grazing land have declined approximately one-tenth in animal unit months in the last three years, due in part to reduction in permitted grazing in National Forests. The number of sheep grazing on federal lands in the western states has declined more than one-fourth in the past five years, the decline on National Forests and on grazing districts (administered by the Bureau of Land Management) being approximately equal, 28.5 per cent and 27.2 per cent respectively. During these same years sheep numbers in the western states have declined more than one-third (34.1 per cent). Thus, there is very little difference between National Forests and grazing districts in percentage decrease in sheep numbers. In both cases the amount of the drop is less than the decrease in total sheep in the eleven western states.



Cattle grazing on public lands increased 7.6 per cent from 1942 to 1947 while cattle numbers in the eleven western states increased 4.3 per cent. The numbers on grazing district lands increased 14.8 per cent while those on National Forests declined 4.1 per cent.<sup>3</sup> Therefore, reduction in the total animal units of grazing on western public range lands in the last few years is due largely to reduction in number of cattle permitted to graze on National Forests. Incidentally, about twice as many cattle and about two and one-third times as many sheep graze on grazing district land as on National Forest lands.

The wild-life population (antelope, deer, and elk) on western grazing lands, particularly the National Forest areas, has increased significantly during recent years, from 161 thousand animal units in 1921 to 310 thousand animal units in 1931, 514 thousand in 1941, and 540 thousand in 1946.<sup>4</sup> This is an increase in the five-year period of almost 5 per cent, more than 70 per cent for the fifteen-year period, and some 235 per cent for the twenty-five year period. Total livestock animal units grazed on National Forests in the eleven western states decreased 53.2 per cent during the thirty-year period 1918 to 1947.

Heated controversy over the management of western range lands has resulted from the above developments. Extensive hearings have been held during the past two years by the Committee on Public Lands regarding further proposed cuts in numbers of livestock to be permitted to graze on National Forests. Many argue that the carrying capacity of the range has not deteriorated and cite continued large livestock production as evidence. However, the increased use of crop feeds and the use of more efficient animals obscure, in part, the deterioration in range resources. Also, for some types of range the livestock grazing use and the weights of the animals marketed may be maintained for some years although adverse changes in the soil-holding range plants may be occurring. In the Rocky Mountain Region, many of the perennial bunch grasses have diminished from overuse, according to range ecologists, but livestock production has been fairly well maintained on the browse feed and the annual grasses and weeds that are not good soil protectors. In

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<sup>3</sup> See Report of the hearings before the Committee on Public Lands and the Subcommittee on Public Lands, House of Representatives, on Forest Service Policy and Public Lands Policy; 80th Congress, 2nd Session; House of Representatives Report No. 2456, page 5.

<sup>4</sup> *Ibid.*, page 15.

such cases, soil erosion can reach an advanced stage before livestock production is significantly reduced. This condition jeopardizes the watershed lands of much of the Rocky Mountain Region which contains the headwaters of the main streams of the West.

The two major federal agencies acting as landlords for the western range lands are the National Forest Service and the Bureau of Land Management in the Department of Interior. The national forests of the western states (see Fig. 7.1) include some 136 million acres, of which about 80 million are usable for grazing. The Bureau of Land Management administers 169 million acres of public domain land, which includes 132 million acres of grazing land within grazing districts and 36 million acres outside of grazing districts (see Fig. 7.2).<sup>5</sup> The number of livestock permitted to graze on Taylor grazing district lands has been substantially maintained in recent years, so the controversy concerning our public range lands has centered on the Forest Service and its policies.

Lands at highest altitudes are the key watershed areas in our western states. They are located at the headwaters of our major rivers. These lands ordinarily receive the most precipitation, as much as forty or fifty inches yearly, compared with as low as fifteen to twenty inches of rainfall in the valley and foothill areas. Two-thirds of all the land of the southwestern, intermountain, and western plains receive less than fifteen inches of rain annually, which is not enough for crop production without supplemental water. The high country, or so-called mountain watersheds, must therefore furnish the life blood, or water, for the West.

The high country in the West is largely forest and range land. Because of the great watershed values of these lands, they must be handled with full acknowledgment of these watershed values. These values in the aggregate exceed that of all the cash products the lands may yield, because water is such a limiting or strategic factor in many areas that it is the very basis of life itself. In addition it produces hydro-electric energy and in some cases is used for transportation purposes.

Taylor grazing district lands are considerably below average in quality. In general they are the poorest of the western grazing lands. For years they were grazed excessively by all who could run their cattle or sheep on them. In 1934, when the Taylor Grazing Act was passed, these lands were in a serious state of deterioration.

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<sup>5</sup> *Ibid.*, page 2.

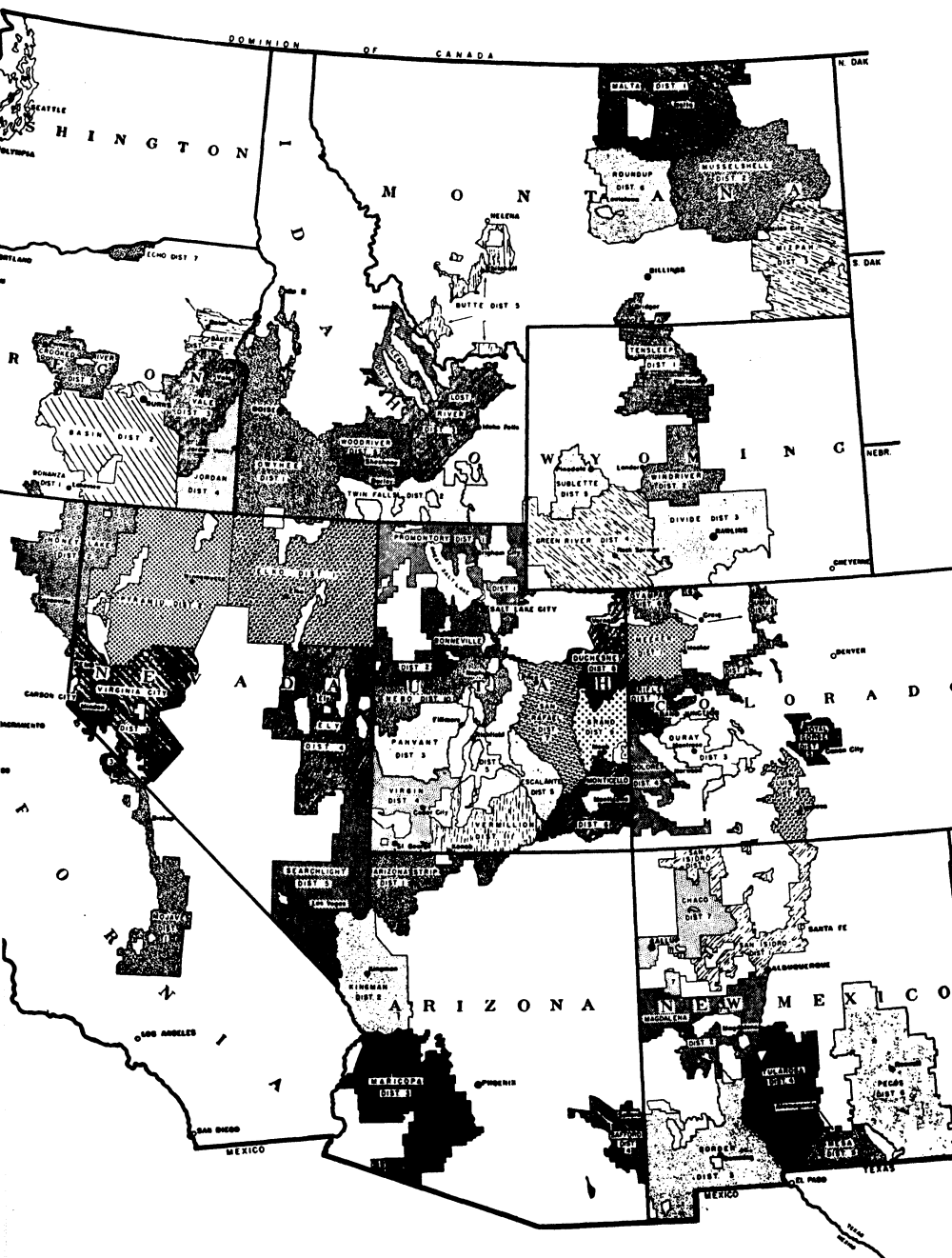


FIG. 7.2.—Map of the western states showing grazing districts under Taylor Grazing Act.

Much has been done through controlled grazing to improve these lands, but there is still much to be done, including more adequate stock water supplies, reseeding, control or reduction of aggressive and poisonous range weeds, rodents, etc.

**MULTIPLE AND CONFLICTING USES OF THE WESTERN RANGE.** Range lands in the western states have a wide variety of uses. Besides providing grass for domestic livestock, they are used for recreation (winter and summer camp sites, hunting, primitive areas, scenic areas, etc.), for municipal water and power sources, for water production for irrigation purposes, for watershed protection to prevent floods and silting of reservoirs, for lumber and wood products, for mining and prospecting for mineral wealth, for Indian welfare purposes, and for other uses. The multiplicity of uses and services of range land in our national economy is one of the main sources of conflict between users of range land and the supervising or administering agency.

The United States Forest Service administers the national forests under a system of "multiple use," which is management for coordinated maintenance and use of the forest resources and values. Under "multiple use" management, all the various uses must be coordinated and conflicts adjusted in the entire over-all management of the area so that the area taken as a whole can be devoted to those most productive uses for the permanent good of the whole people, and not for the temporary benefit of a few individuals or groups.

**PUBLIC VERSUS PRIVATE OWNERSHIP.** The argument has been advanced that federal range lands in the western states should be returned to private ownership as soon as possible, and that under private ownership use would be more efficient. The United States has followed a policy of private ownership of agricultural lands throughout the years. Where there is good evidence to show that private ownership makes most efficient use of land resources, such ownership, in keeping with our established national policy, should be permitted and encouraged.

In some areas of the West, average carrying capacity approximates a point where the net capital value falls to about zero. Under existing tax assessment procedures and institutional arrangements many stockmen prefer public ownership and leasing from the federal government to paying excessive taxes on such lands. As will be pointed out under the section "Assessment and Taxation," until



there is decided improvement in our local land assessment procedures so that lands are assessed more in keeping with their carrying capacity, and until there is assurance that assessments will be closely related to carrying capacity over a period of years, most stockmen will find it more satisfactory to lease rather than to own much of the federal range lands.

The multiplicity of uses of western range lands is often given as a reason for federal ownership as against private ownership. Many lands in the midwest and eastern part of the nation, however, have multiple purpose functions and are privately owned. The characteristic of multiple uses alone, therefore, does not apply solely to the western range lands.

Undoubtedly, much of the opposition to permitting western federally owned range lands to go into private ownership is based upon the conviction that much of our agricultural lands, through private ownership, have been exploited, and that western range lands would be similarly exploited if privately owned and controlled. The dust storms of the thirties, the extensive and serious soil erosion which occurred in many sections of our land, and related problems have led many to believe that a move to put any considerable portion of the existing federally owned range lands into private ownership would be a backward step, and should be vigorously resisted. One of the major arguments for this point of view is the fact that under private control, the competition of uses for land results in shifts to more intensive uses in high price or high profit prospect periods, with resulting serious long run economic and social consequences. For example, much land whose highest and best use is for grazing, will be put into wheat or in another crop in high price and favorable weather periods. It is extremely difficult to get these lands back to the less intensive grazing use readily. Ordinarily the transfer back occurs only when a series of natural forces such as adverse weather or heavy insect pest ravages, coupled with unfavorable prices push the land into the less intensive use. As a rule it requires several years and good management to reestablish or approach the former productivity of the land in terms of livestock carrying capacity.

Much of the acreage of the western public range lands is not suitable for division into units for single operator control. Consequently, competitive allocation of leasing rights is practically impossible. In the first place, the acreage is not blocked out into economic operating range units, or if such acreages do occur, there are other limitations such as inadequate water supplies, absence

of hay lands, grazing adapted to only one season of the year, or some other shortcoming which makes them inadequate as operating range units in themselves. Thus, these lands can be used only in conjunction with other lands already privately owned or with other lands controlled by other federal agencies for other purposes such as watershed protection, or with other lands owned by another public agency such as the state or county government.

The only competition that occurs for these federal grazing lands is that which occurs between owners or leasees, or controllers of other adjacent land. It cannot be between these adjacent operators and the public at large. In many cases there is no competition, even with adjacent property holders, because frequently the federal grazing lands are so located relative to other lands that only one operator is in a position to make effective use of them. The system of competitive allocation of leases through competitive bidding would keep the pattern of operations in an impossible state of instability and insecurity.

Still another factor which complicates the matter of private ownership of existing federally owned range lands is the fact that privately owned range lands already carry investment and assessed values that include to a large extent the forage value supplied free or at a nominal cost by associated federal lands. In other words, if the federally owned range lands were opened up to private ownership, the individual operator who owns some land but leases federally owned range lands now would be faced with the need for buying these formerly free or nominal-cost forage resources, the value of which he has already incorporated into his overhead and of which he is already paying part or most of the cost. Obviously, if the federally owned lands go into private ownership, they would go on the tax rolls, and since the land already owned by the private users would not be reduced in taxable value, anything that the owners had to pay for the lands beyond a nominal price would result in investment and tax costs that are already being carried on the present privately owned lands. It is true that this situation can be corrected by legislation, regulation, or administration, but institutional reforms come slowly, and in the meantime those who purchase the lands would be penalized to the economic competitive advantage of those who do not. Thus, there are some of the federally owned range lands that could justifiably be offered for private ownership, but many of them would not be accepted even if they were offered without price.

One further characteristic of federally owned western range lands contributing to the difficulty of moving these lands into private

ownership should be mentioned. Many of the western federally owned range lands, even though they are used for grazing and for nothing else, are not amenable to use and ownership by one rancher alone. Much of the winter sheep range, for example, is of such a type that sheep bands must herd over it in large circles, or must be free to move considerable distances as weather conditions, particularly winter storms or drought, dictate. Open range herding over common areas with other bands is a long established pattern, and single range allotments are not customary or practicable.<sup>6</sup> Private ownership could, of course, be worked out for such areas on a collective basis grouping together several private enterprisers, but this is a new departure in terms of ownership procedures.

In view of the above facts, the conclusion seems logical that private ownership of all or certainly most of the western range lands is not feasible or desirable. As a matter of fact, it seems clear that if all of the federally owned range lands were opened up for private appropriation, a great deal of them would remain publicly owned. On the other hand, it is just as unrealistic to insist that all of the federally owned range lands of the West must remain in federal or public ownership. There are some pieces of land that need not be retained in either federal or public ownership, but these parcels are not numerous and the total acreage involved would not approach a major portion of the present federally owned range lands. These parcels would have to be free from the shortcomings mentioned, or have some special qualities that would make them particularly useful and important to a particular ranch or operator so that he could afford and would be willing to pay the taxes that would be assessed against these lands under private ownership.

Solution to western range land tenure and tenancy problems is not private ownership, except in a few limited instances. The record of public land management by states and counties of the West does not provide encouragement for proponents of state ownership. Many reasons can be advanced to show that of all public agencies involved the federal government is in a position to do the most effective job of public range land management.

**IMPROVING LANDLORD-TENANT RELATIONSHIPS.** The main problem in western public range land management is landlord-tenant relationships. The problem is seriously complicated by the fact that in the case of these lands the landlord is the government. Livestock oper-

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<sup>6</sup> See M. M. Kelso, *Current Issues in Federal Land Management in the Western United States*, Journal of Farm Economics, November, 1947, page 1309.

ators (tenants) moreover, are a part of the government as are every other group of citizens in the country. In the case of our midwestern and eastern farm lands which are under private ownership, landlord-tenant relationships concern two or more private individuals, the government acting as an umpire or arbitrator. This relationship does not exist in the case of western range lands, because for a major portion of the acreage, the government is the landlord.

There is no question but that the recent controversy over Forest Service management policy on western range lands has arisen from the fact that the Forest Service limits the number of livestock that can be grazed on the range lands in the National Forests. The Forest Service Advisory Boards at the present time deal only with the conduct of grazing. Many ranchers want these boards to regulate the number of stock that can be grazed on these lands. Such action would almost certainly conflict with the interest of other users of the forests and with the public interest in sound watershed management.

There is a tendency to identify the interests of the administering agency with those being served and regulated in the case of land managed by the state land offices or by the Bureau of Land Management. Advisory boards for these agencies recommend carrying capacity of the range, issuance of permits or licenses, rules for land use allotments, seasonal use and improvements in the case of the Taylor grazing leases. Rentals charged have been extremely low, in view of recent high livestock prices, but in general the conflict of multiple uses has not been as definite or as involved in these grazing lands as in the case of National Forest lands. The Bureau of Land Management has made a sincere attempt to balance equitably the interests of the several users of western lands. But their problem has been a much less difficult or involved one than that of the Forest Service which has to reconcile not only the interests of various livestock men, but also the interests of lumbermen, irrigationists, recreationists, sportsmen, and others.

The tenant or user of western public range lands wants security of expectations, or what might be called stability of tenure, so that he can operate efficiently over a period of years. If difficulties arise between himself and the government (the landlord), he wants an impartial arbitration of such differences. He also wants reasonable payment of damages, by either party, and compensation for unexhausted improvements to be included in the leasing arrangements. The landlord, in turn, wants protection against damage to his

resources. Both the tenant and the landlord want a level of charges commensurate with productivity, and a policy which is satisfactory to both regarding who, among several possible beneficiaries, shall be given the right to use the land.

Some students of the problem recommend creation of a new kind of public body for administering western public lands. They suggest that on this new administering board should be represented both the user and the administering federal agency. For example, an administrative board of five members could be set up for a given area comprising one sheepman elected by sheepmen in the area, one cattleman elected by cattlemen in the area, two designated by the Secretary of the Interior or by the Forest Service, depending upon the agency which has jurisdiction of the grazing land in question, and one selected by a board of at least three of the four members. If this board were to meet regularly, say quarterly, and render prompt decisions that would be binding on both parties, a means would be provided, so these students argue, for more effective and fair administration of western public range lands.<sup>7</sup>

If any such administering boards are set up, certainly all interests involved in multiple use of the lands must be represented in such a way that these various interests or users will have an equitable part in the determination of management policies. This may be extremely difficult to do. Nevertheless, the principle involved is a significant one, namely that some means must be set up by which both users and the administering federal agency or landlord are represented effectively on the administrative body or board, otherwise misunderstandings, confusion and dissatisfaction are likely to be continuous. Short of this type of administering agency there must be a continued and effective public relations program consisting primarily of thorough information being made available to the public and to the users at all times as to the reasons for management policies that have been established by the administering federal agency, and the considerations involved in arriving at these decisions.

A national forest advisory board was recommended by the Committee on Public Lands to the Secretary of Agriculture in its preliminary report on Forest Service policy about two years ago. A National Forest Board of Review consisting of three individuals has been appointed by the Secretary of Agriculture to serve in an

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<sup>7</sup> For a more complete statement of this proposal see M. M. Kelso, "Current Issues in Federal Land Management in the Western United States," *Journal of Farm Economics*, November, 1947.

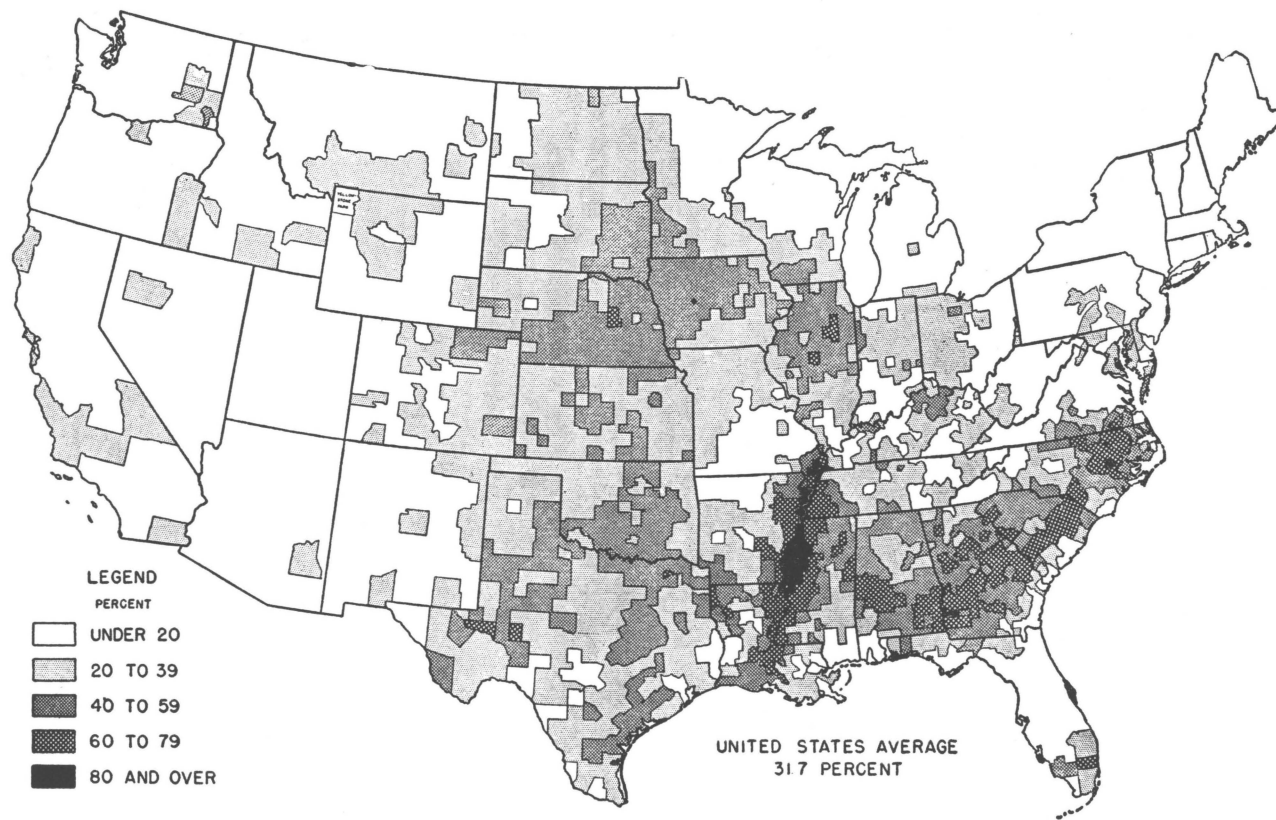


FIG. 7.3.—Percentage of all Farms Operated by Tenants, Jan. 1, 1945. "Graphic Summary of Farm Tenure in the U.S.," U.S. Department of Commerce and U.S. Department of Agriculture, Government Printing Office, Washington, D.C., 1948. page 10.

advisory capacity with him for the administration of Forest Service lands.<sup>8</sup> This step is a recognition of the desirability of working out some means of effectively articulating the interests of users and the public in general with that of the staff of the administering federal agency or landlord in the administration of western range lands.

According to the Committee on Public Lands, one significant source of dissatisfaction or misunderstanding among users, the public and the administering federal agency in the case of western range lands is the lack of an adequate plan of payments to the states by the federal government in lieu of taxes for federal lands. More than four-fifths of the total federal land holdings are in the western states, and it is estimated that some 200 million dollars yearly would probably be necessary for an adequate program of payments to the state by the federal government in lieu of taxes.<sup>9</sup>

TENANCY IN RANGE LAND AREAS. Although nearly a third of the nation's farms are operated by tenants and more than four-fifths in some counties in the southern states, only a seventh (14.5 per cent) are operated by tenants in the eleven western states. Only six of the 200 counties in the western states have as much as 40 per cent tenancy and the great majority have less than 20 per cent (see Fig. 7.3). Only one region of the nation, the Northeast, has a lower percentage of tenancy than the western states.

Livestock production as carried on under western range conditions, does not lend itself to a high percentage of tenancy comparable with that in wheat and cotton growing areas. These two crops are annual cash crops and tenants can move from farm to farm annually or every two or three years without serious economic disadvantage. Range livestock production, especially cattle production, ordinarily requires a period of years to complete one production cycle. Also successful management and husbandship require knowledge of and familiarity with the particular ranch and the livestock over a period much longer than a year.

Western range operators lease large acreages from the Forest Service and the Bureau of Land Management, as noted earlier, but these lands are not listed by the census as "land in farms" and do

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<sup>8</sup> Members of the Board are Dr. Jonathan Forman, Columbus, Ohio, Professor G. B. MacDonald, Ames, Iowa, and the author. They were appointed in the late summer of 1948. The first meeting of the Board was held in Washington, D. C., March 7-11, 1949.

<sup>9</sup> Report of the Hearings before the Committee on Public Lands and the Subcommittee on Public Lands, *op. cit.*, page 2.

not show up in census tenancy figures. A large proportion of our ranchers rent land, largely publicly owned, and many lease more acres than they own.

### RANGE LAND VALUATION AND CREDIT

A majority of ranchers have borrowed at one time or another in the operation of their ranch business. Ranchers generally have made rather heavy and widespread use of credit, and it has been an important and frequently deciding factor in the success or failure of the ranch operation. Credit has undoubtedly enabled many to weather trying times when their current income was insufficient to meet current expenditures. It has enabled many to reap relatively early the advantages of improved practices, devices, and services, which they would have had to postpone until they had saved up enough to purchase them with cash. At the same time it has also been a great burden to many through its excessive or improper use, and in the case of some ranchers it has proved their complete undoing.

**SOUND CREDIT PRACTICES FOR RANGE LANDS.** Climate and topography limit agriculture in more than nine-tenths of the area of our eleven western states to range livestock production—a highly commercialized, one-enterprise type of operation. This high degree of commercialization and specialization makes ranchers peculiarly affected by highly fluctuating price levels characteristic of our modern economy. With extreme fluctuations in carrying capacity and price the funds to meet overhead costs (including principal and interest payments on indebtedness) vary greatly. Debt service charges are one of the most important farm and ranch overhead items. Hence, farm credit policies should be those which result in bringing the amount lent into line with the long-time carrying capacity of the ranch, and the annual loan repayments should be flexible and adjusted to current income in terms of buying power rather than dollars.<sup>10</sup>

Too many loans are made on range lands with insufficient knowledge and appreciation of the long-time carrying capacity, or true

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<sup>10</sup> For a more detailed explanation of these recommendations and the arguments for their adoption in mortgage contracts see the author's treatment in "Montana Farm Bankruptcies," Montana Agricultural Experiment Station Bull. 360, June 1938; "Montana Farm Foreclosures," Montana Agricultural Experiment Station Bull. 368, February, 1939; and "Land Credit Practices and Successful Farm Operation," Journal of Land and Public Utility Economics, November, 1938, pages 442-451.



worth of the lands. A very large number of the disastrous loan experience cases have occurred because the amount loaned was too large in proportion to the true value of the land. Such loans are frequently made during boom periods or at times of high prices when an exaggerated opinion about current as well as ultimate value of the land prevails. A widespread lack of knowledge of carrying capacity or normal values of range areas on the part of many lenders, contributes to unsatisfactory loan experience in these areas.

Too frequently loans are made for too short a period so that the annual cost of paying off the loan is too heavy or the uncertainty of being able to renew or refinance the loan under satisfactory terms when it matures is a constant source of worry and tends to encourage short-sighted land use practices. In recent years much improvement has been made on this point in the case of range lands.

The method of repayment of the loan is an especially important factor determining satisfactory loan experience in the case of range lands. Much of our western range lands is located in the western part of the Great Plains area and the semiarid and arid southwest areas. In these areas, the climatic conditions are such that any variation in precipitation above or below normal is extremely important. Precipitation above average results in bumper grass and high carrying capacity, but precipitation below normal results in extremely low carrying capacity or complete inability to carry any livestock at all because of drying up of water holes and drying up of the range. In 1934 and 1936, for example, cattle and sheep in many sections of the West, particularly the Great Plains section, had to be moved out and many were slaughtered on the spot. Under these conditions, man's inventive mind must develop a workable substitute or replacement for the natural cushion or buffer of crop dependability which exists in the more humid areas.

Over a period of years sufficient to cover a complete business cycle and the usual range of weather conditions, the range lands of the West will return an average income under existing management practices which compares favorably with that of other agricultural areas of the nation. Hence, it is a matter of working out credit practices adapted to the variable weather conditions that may occur. Since debt service charges (principal and interest payments) are one of the most important ranch overhead items, the annual loan repayments (principal and interest) should be variable and adjusted to current income. The payments should not be a fixed amount annually characteristic of current amortized loans, but repayment provisions in mortgage contracts should be definitely related to, and vary with,

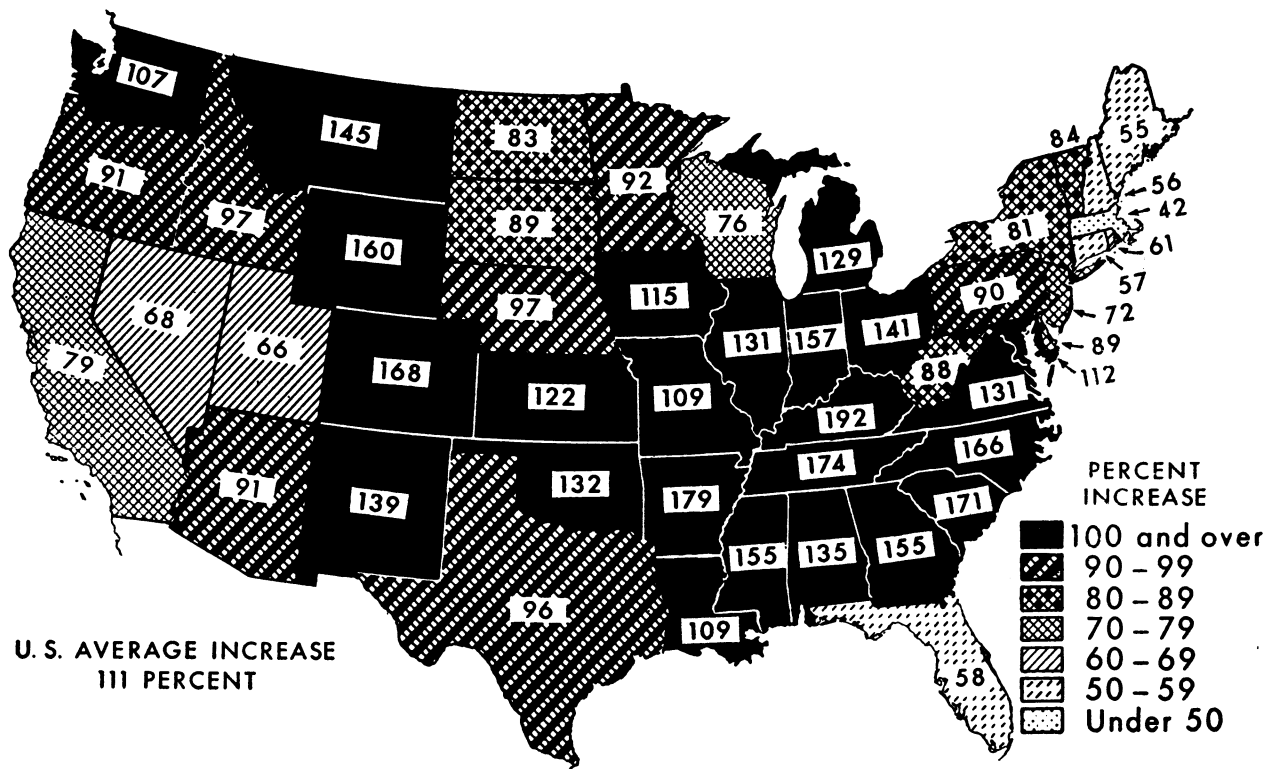


FIG. 7.4.—Percentage Change in Average Value Per Acre of Farm Real Estate from 1935-39, Average to March, 1949.

the income earned annually.<sup>11</sup> In addition to such "variable" or "flexible" repayment provisions which should include arrangements for forward payments in case of good years at the beginning of the loan period, a forbearance clause should be included providing that the lender wait, in the case of very bad years, until the carrying capacity recovers and the rancher has some income that can be applied to the loan. An intensive educational program will be necessary before such provisions become general in mortgage contracts on range lands.

**TRENDS IN RANGE LAND VALUES.** Agricultural land values for the country as a whole rose sharply during and immediately following World Wars I and II. Using 1912-14 = 100, agricultural land values in the United States rose from an index of 103 in 1915 to 170 in 1920, fell to 127 in 1925, and to 115 in 1930, to 79 in 1935, rose to 84 in 1940, to 114 in 1944, and continued to rise until in 1949 they reached an index of 175 or three-fourths above the 1912-14 level and approximately 3 per cent above the post-World War I peak of 1920. The largest increases in value per acre in recent years have occurred in the South Atlantic and South Central states. Large increases in value per acre of ranch real estate have also occurred in most of the eleven western states. (See Fig. 7.4.)

The first significant declines in land value since the late '30's occurred during the quarter ending March 1, 1949. At that time values were at or below their November 1948 level in all of the mountain and Pacific states. Largest percentage declines from November 1948 to March 1949, occurred in Montana and Oregon with 10 per cent and 9 per cent declines respectively. Every one of the western states showed declines of 3 per cent or more for this period, with the exception of New Mexico where there was no change in values. These declines in value compared with a decrease of 1 per cent for the United States as a whole for the same period. Declines in prices of livestock and the severe winter apparently were the major factors responsible for lower land values in the mountain states.<sup>12</sup>

Meat prices are particularly subject to wide swings associated with vicissitudes of the business cycle, and any major decline in business

<sup>11</sup> See the author's treatment in "Land Economics," Harpers, New York, 1947, page 549.

<sup>12</sup> See "Current Developments in the Farm Real Estate Market," USDA, Bureau of Agricultural Economics, page 2, Mimeographed release April 20, 1949.

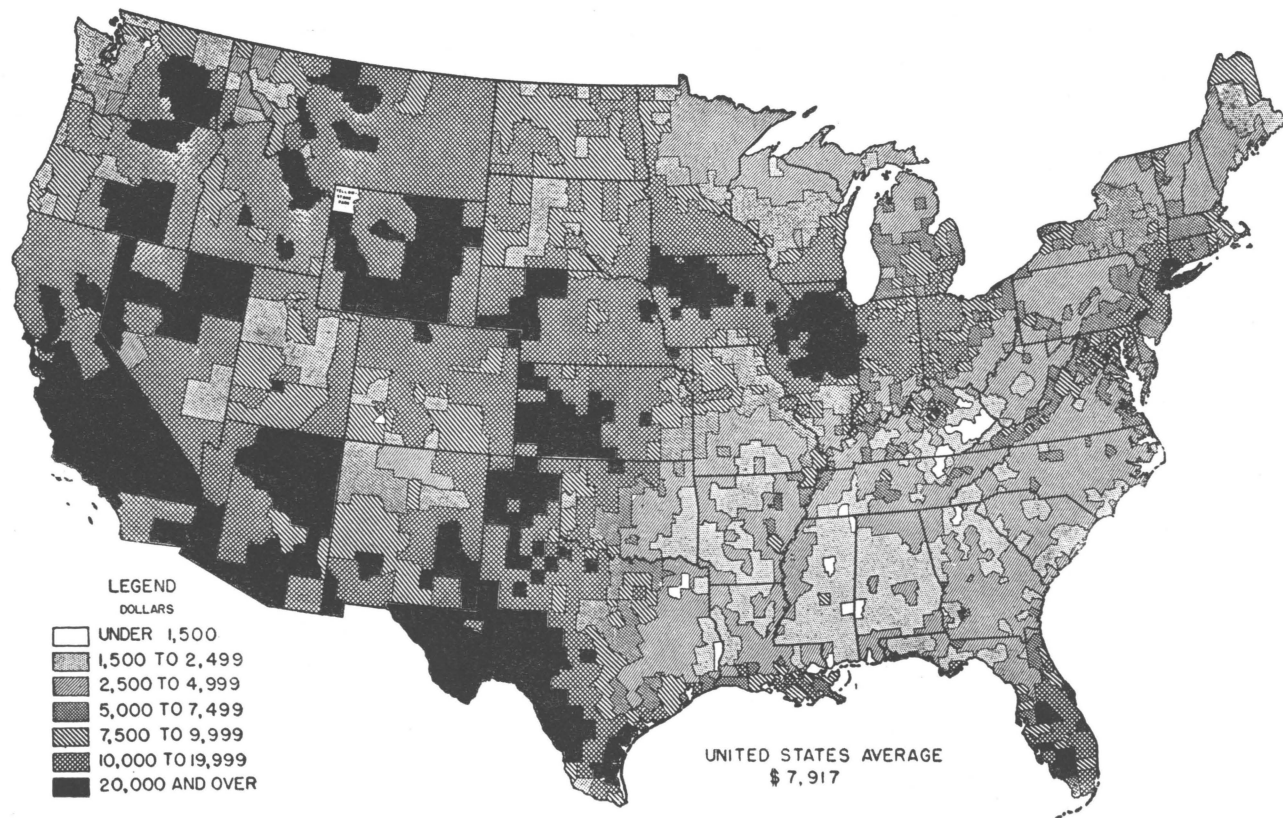


FIG. 7.5.—Average Value of Land and Buildings Per Farm, Jan. 1, 1945. (from "Graphic Summary of Farm Tenure in the U.S." page 30.)

activity will undoubtedly result in rather severe declines in livestock prices. Such declines would tend to drive range land values considerably below present relatively high levels. In the eight mountain states, for example, range land values were approximately two-thirds above their 1912-14 level at the end of the first quarter of 1949.<sup>13</sup>

Western ranchers are in comparatively good financial condition, and many have paid off much or all of their indebtedness in recent years. However, there have been new operators who have come into the business with the high livestock prices of recent years and have borrowed heavily to finance their investment in range land and livestock. Many of these operators are particularly vulnerable to any major decline in livestock prices. For the most part, however, the range livestock industry is on a sound financial footing, and unless business declines are severe, there should not be widespread range land foreclosures or bankruptcies. The fact that ranching requires a large investment in land means that any serious declines in agricultural income will be particularly disastrous to western ranch operators. Figure 5 shows the average value of land and buildings per farm on January 1, 1945. Note the particularly heavy investment in land and buildings, but especially land, in the western states where ranching predominates as the major enterprise in many of the counties.

#### RANGE LAND ASSESSMENT AND TAXATION

Range land taxes are one of the most rigid and inescapable out-of-pocket costs threatening the stability of western ranch operations. Land taxes are particularly significant in much of the range area of the West, because of (1) the wide fluctuations in annual ranch income resulting from variations in precipitation and livestock prices, (2) the tendency of governmental agencies and costs to expand during high income periods and to remain high or relatively fixed during the inevitable periods of low ranch income, and (3) the failure to distribute the taxes levied according to the ability to pay.

**TRENDS IN RANGE LAND TAXES.** Taxes on farm real estate in the eight mountain states are now more than twice their 1909-13 level and

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<sup>13</sup> The index of value per acre for farm real estate for the eight mountain states on March 1, 1949, was 163, using 1912-14 = 100. This is somewhat less than the national average which was 175 on March 1, 1949. *Ibid.*, page 7.

almost three and one-half times the pre-World War I level in the three Pacific Coast states. Moreover, increases have been significant in recent years, particularly since the close of World War II. In 1930, farm real estate taxes in the mountain states stood at 237 and for the Pacific Coast states at 290. The same figures for 1947 are 208 and 342 respectively.<sup>14</sup>

Farm real estate taxes generally increased greatly from the beginning of the first World War to the end of the '20's. During the '30's farm real estate taxes were maintained at approximately twice their prewar level. Decline in agricultural income after 1929, and the extremely severe drought and insect pest ravages in the western states in the early '30's made it impossible for many ranchers to meet tax assessments in the '30's. Continued widespread tax delinquencies during the '30's, increased transfers of ranches through tax deed foreclosure, and related distress in ranching areas have called attention to the need for fairer and more equitable range land taxation.

One of the principal causes of range land tax delinquencies is the failure of the rigid or inelastic real estate taxes based on general property tax levies to adjust promptly and completely to changes in ranch income. Adjustment of assessments more in line with capitalized income or productivity value would tend to encourage more stable operation of range lands. Lack of uniform assessment standards and the absence of assessed values based on true earning power or carrying capacity of the land (capitalized income value) has resulted in much overassessment particularly on the poorer, less productive grades of range lands. A system of land classification for tax assessment, based upon scientific evaluation of the grazing lands, is essential to reduce discrepancies in tax burdens resulting from present inadequate or unscientific classifications and assessments.

In a study made by the author in Montana, it was found that the best grades of grazing land were assessed about two and one-half times their capitalized productivity or carrying capacity value, while the average grades were overassessed about four times, and the poorest grades from five to eight times.<sup>15</sup>

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<sup>14</sup> See "Agricultural Finance Review," USDA, Bureau of Agricultural Economics, Washington, D.C., Volume 2, page 124, November, 1948.

<sup>15</sup> For first grade grazing land the ratio of assessment value to productivity value was 2.41, for second grade 2.36, for third grade 4.11, for fourth grade 5.12, and for fifth grade 7.80. See R. R. Renne, and H. H. Lord, "Assessment of Montana Farm Lands," Montana Agricultural Station Bulletin No. 348, page 32, October, 1937.

IMPROVING RANGE LAND TAX ASSESSMENTS. Instability in the control of range land contributes to destructive range management practices. Adjusting the tax assessments on low grade range lands into line with the carrying capacity of these lands would tend to encourage private ownership and better range land management practices. Any plan for improving assessment of western range lands should be designed to correct the two major evils which now exist, namely (1) the failure to assess range lands in accordance with their ability to pay (carrying capacity or productivity) particularly the tendency to over-assess the lower grades, and (2) the lack of any uniformity in assessment policies among counties or among various areas within a state. The first major step in the improvement of tax assessment on range lands is the making of a scientific soil classification and an economic evaluation of the land so that correct assessment values can be computed. Also needed in most of the states is a state agency with authority and funds to administer such an assessment system and enforce uniform compliance with established assessment standards over the entire state.<sup>16</sup>

If range land taxes are to be made variable or flexible to fluctuate in keeping with periodic variations in ranch income, other significant adjustments must be made in tax policies, particularly by local governmental units. It is neither feasible nor desirable to change the program of governmental services from year to year in keeping with variations in ranch income. Consequently, certain fundamental adjustments must necessarily be made in the financial plans and operations of local governmental units particularly. Governmental units are in a better position to carry cash reserves than is the average ranch operator. For this reason, in contrast to present practices, governmental units should carry cash reserves and plan their budget so that tax levies could be lowered in the lean years, thus enabling individual ranchers to survive the impacts of the inevitable low-income period. To do this a program of "forward" payments of taxes should be a part of the plan so that governmental reserves can be built up in good years. This problem is a very complicated one, and requires not only legislation changing present laws in many of the states, but a sound educational program so that the tendency to pork-barrel governmental surpluses will not occur in the good years and thus result in inadequate resources to take care of the lean years.

Complicated as the problem is, the possibilities are of such sig-

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<sup>16</sup> *Ibid.*, page 43.

nificance to stable range land operations that every effort should be made by research and educational agencies to bring about changes which will make it possible to adjust tax assessments on range lands in line with current carrying capacity or productivity.

#### CONSERVATION OF THE WESTERN RANGE

The prolonged severe drought of the early '30's, combined with excessive overgrazing, particularly of the remaining public domain lands that had not been taken up for settlement by private individuals, brought about serious deterioration of western ranges. Millions of acres are eroding, some severely and others less severely, and the carrying capacity in many areas has not been maintained. The Chief of the Forest Service in his annual report for 1947 states that on many of the western ranges one can see bunches of grass on which root crowns stand several inches above the ground surface, indicating that several inches of soil have washed or blown away during the lifetime of these individual grass plants. It has been estimated that about half of the national forest range allotments are in satisfactory condition. Others are improving gradually, but it will take a long period to put them into satisfactory condition. Where severe range deterioration is occurring, substantial reductions in livestock numbers are being made. These reductions are being made gradually to lessen hardships on permittees.

In some areas of the West where water is very scarce, some people have the notion that removal of vegetative cover on watersheds is desirable. A bare watershed would produce more water to fill up irrigation reservoirs, so some believe. Certainly, bare watersheds produce quicker water runoff, but there would be no protection of the soil against erosion, and mud as well as water would pour into the reservoirs. Flash floods would tend to damage improvements in the drainage area. Moreover, it should not be forgotten that the more water that runs off the surface, the less there is available for underground supplies, and the greater likelihood of wells going dry.

If watershed range lands are overgrazed or poorly managed, serious consequences result. Excessive cattle or sheep numbers allowed on the range trample to dust areas where they concentrate. Vegetation becomes sparse and erosion increases. Heavy grazing tends to kill out choice perennial grasses with large spread root systems, which are replaced with small root annual grasses and weeds. These are not only less effective in preventing erosion and soil runoff, but



they are low in forage value. Stock turned on the range too early in the spring when the soil is still wet from snow are particularly damaging.

**IMPROVEMENTS NEEDED ON WESTERN RANGE LANDS.** The condition of much of our public range land today is better than it was a decade or two ago. However, continued drought in some areas and earlier serious deterioration of others has resulted in a considerable portion of our western range lands being in an unsatisfactory condition. Improvements needed include additional stock reservoirs in many areas, fencing and related improvements, reseeding, and rodent and poisonous weed control. In some cases purchase and management of additional land by federal, state, or community agencies are becoming increasingly desirable for critical flood source areas and for upstream lands most important as water supply sources where individual owners cannot afford to take necessary measures for watershed protection. More intensive management on many national forest timberlands and ranges, particularly those that are most important forest watershed lands, is needed, but good management must also be applied on watershed lands in private ownership. This will require an extensive educational program and additional research.

The Forest Service estimates that from three to four million acres in national forests should be reseeded. About 200 thousand acres of range lands in national forests have been reseeded to date. On depleted range lands in private ownership, reseeding should be stepped up through conservation payments by federal action agencies, such as the Agricultural Adjustment Administration, to improve watershed conditions and restore wasted lands to maximum carrying capacity.

An educational program to acquaint ranchmen with means by which they can determine the condition of their own range land and the potentialities for improvement is needed. The ability to recognize some of the more important forage plants of the area, some skill in judging relative abundance, an approximate idea of the kind of vegetation the area once supported, a knowledge of which plants increase and which decrease under heavy and light grazing, and related information are essential if there is to be widespread adoption of conservation measures on range lands.

The employment of a range management specialist on the Extension Service staff in states with large acreages of range lands would undoubtedly help to get this educational job done. Federal and state action and development agencies concerned with range

lands can do much to assist this educational program by close cooperation with the Agricultural Extension Service and a joint discussion of development of programs and plans.

**SOIL CONSERVATION DISTRICTS.** Most of the states with the encouragement of the federal government through the Soil Conservation Service have passed soil conservation district laws. These laws permit farmers and ranchers to organize soil conservation districts which have the status of governmental subdivisions. Their major objective is to combat soil erosion and to prevent local misuse of land by cooperative land-use regulations. Soil conservation districts are now established extensively in most of the states as shown in Chapter 6.

The use of soil conservation districts to conserve soil is an application of the police power. Individual operators who refuse to employ conservation measures called for by the district's regulations are subject to the same legal procedures as any individual who violates a regularly established statute or ordinance of any other governmental unit.

Soil conservation districts cannot control land occupancy except indirectly through forcing agricultural operations to cease in extreme cases. However, there is nothing to prevent soil conservation districts from being given zoning powers through broadening their present scope of action by statutory amendment. At the present time they operate as specialized means of dealing with a specialized problem, namely erosion control.

**TAYLOR GRAZING DISTRICTS.** In recent years grazing districts to conserve range lands have been established in many western states under the federal Taylor Grazing District Act (refer to Fig. 7.2) and state grass conservation acts. The purpose of the Taylor Grazing Act, passed June 28, 1934, is "to stop injuries to public grazing lands by preventing overgrazing and soil deterioration, provide for orderly use, improvement, and development, to stabilize the livestock industry on the public range, and other purposes." The Secretary of the Department of Interior is authorized to create grazing districts from any part of the vacant and unappropriated public domain which is valuable chiefly for grazing and located in the eleven western states and North and South Dakota. Within districts, grazing is regulated on a permit system similar to that in use on national forests. Preference in regard to permits is given to those within or near a

district who are land owners engaged in the livestock business, bona fide occupants or owners of water or water rights, and persons acknowledged as enjoying use of the public range at the time the district is formed.

**STATE GRAZING DISTRICTS.** Many western states have passed legislation providing for the establishment of grazing districts which are non-profit cooperative associations of livestock operators to control and manage the use of range land within their boundaries.

In general, state grazing district laws empower cooperative associations of livestock operators to lease or purchase grazing lands, to develop and manage district controlled lands, and to allocate grazing privileges among members and nonmembers. Thus, grazing district legislation permits the establishment of collective tenure devices for securing and maintaining control over the right to use range land.

State grazing districts thrive most successfully where there is a checkerboard pattern of ownership (numerous small parcels, owned by a variety of absentee and local individual corporate owners), while Taylor grazing districts seem to be most useful in areas where federal lands comprise a large proportion of the total area and are of such low productivity that they have never been taken up by private individuals. In Montana, 37 state grazing districts have been established, largely in the eastern half of the state, and include between a sixth and a seventh of the state's area within their boundaries.

The development of soil conservation, Taylor grazing, and state grazing districts has done much to improve the control and use of western range lands. These agencies should be especially effective in the years ahead, and bring about continued improvement in the condition of our western range lands to assure best use and sound conservation of this important resource.

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## 8.

### *Use and Control of Water Resources*

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**L**AND AND WATER ARE INSEPARABLE IN THEIR USE. This is true from the driest desert areas to the wettest humid areas. This inseparability is true both with respect to water which falls on land in the form of precipitation and with respect to water which flows over, through or under the area. However, the interrelationships between land and water vary greatly in different parts of the United States and even more in different parts of the world. Both land and water are related closely to climate. It is customary to characterize climate in relation to both land and water in broad zones as arid, semiarid, subhumid, humid, and the like.

Water may be diffused on the surface of the land, or it may be in rather definite stream channels on top of the ground, or it may be found in surface lakes, or in underground channels and reservoirs. It may be found in a liquid, gaseous, or solid state in various areas and periods of time.

## USE OF WATER

Uses of water are many and varied. Water uses may be characterized as positive in the sense that they are helpful and valuable to human beings, or as negative in the sense that they are harmful and destructive. Uses of water are also characterized as consumptive and non-consumptive, depending upon whether the amount of the water is diminished by this particular use so that it is not available in equal quantity for some other use. In the final analysis, no use of water is consumptive since all water returns ultimately to the hydrologic cycle and is used over and over again. However, at a particular time and place water may be and frequently is consumed or used up for a particular purpose thus rendering its use for this particular purpose and area as competitive with other alternative uses.

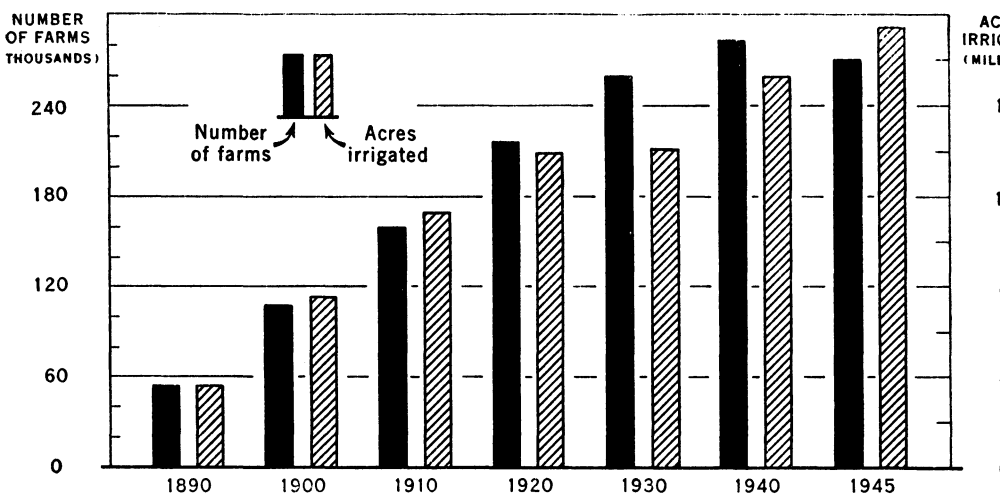
A complete enumeration of all the uses of water in a complex economy such as ours is too much for any one person to compile. It is impossible to measure all uses of water in the United States and impossible to put the various uses on a common basis of measurement. Following are some of the major uses of water, beginning with the more basic ones, and such statistics as are available.

**MAINTENANCE OF LIFE PROCESSES.** Water is essential to the maintenance of all forms of life, both beneficial and malign. The primary use of water then can be considered as the maintenance of the life cycle—human, animal, and vegetable. In the more arid areas, restrictions are placed on the use of water to meet essential needs. These needs are defined as the continuance of human life and sufficient animal and plant life to sustain human existence. High priorities in the use of water are granted in all climates to consumption by livestock, for the purpose of increasing both the human food supply and the supply of animal labor. Water which falls in the form of precipitation, of course, supports all types of plant life. One of the main reasons for man's management of water is to encourage some form of plant growth, either by increasing the supply of water at critical periods or by removing excess amounts of it. In arid and semiarid regions, water is used for irrigation of commercial crops and for flushing harmful salts out of the soil as a preliminary to such production. In some cities, a large part of the municipal water supply is used for lawns, trees, and other decorative plant growth, but the use of water for these purposes is first and frequently curtailed when the supply is in danger.

Irrigation is undertaken primarily to maintain life processes in farm crops. It is not the only use of water which falls in this category, but it is one for which statistics are most readily available. There are in the United States today approximately 300 thousand farms on which irrigation is practiced (Fig. 8.1). This is 5 per cent of the total number of farms in the United States. The acreage of the irrigated land is 21 million, although the total area within irrigated farms is more than 100 million acres. For these 21 million acres of irrigated land an estimated total water supply of 62 million acre feet is supplied. It has been estimated that the present irrigated area is roughly half of the potential irrigable area within the United States.

FOR SANITATION AND TO CARRY OFF WASTES OF VARIOUS KINDS. Our modern industrial civilization is based upon the disposal of direct human wastes and those wastes which grow out of our industrial life. The more common way of disposing of such wastes is to carry them off in solution or in suspension and to discharge them in some body of water, either a river, lake, or ocean. Such wastes then become oxidized or diluted so as to no longer be harmful or obnoxious. However, there is frequently an interim time period and an interim area in which such wastes are harmful to aquatic life and prevent or obstruct many other uses of the water. A major part of the water supply in urban areas is used to carry off wastes. Next to human consumption the use of water for this purpose is most important. Water is also essential to personal hygiene and has many other domestic uses.

Practically all municipalities of any size in the United States have a water system which may or which may not be supplemented by individual sources of water, particularly wells and cisterns. In a large proportion of the cases this central water supply is provided by the municipality itself. Of the total population of the United States, 56.5 per cent live in cities, towns, and villages of 2,500 persons or more. With respect to cities having a population of 25 thousand persons or more, their gross debt on account of municipal water supply enterprises exceeds one billion dollars. According to the United States Geological Survey, the total quantity used for municipal water purposes is about 12 billion gallons daily. These municipal purposes include not only direct human consumption but also the disposal of wastes, industrial use, consumption by animals and consumption by plants.



BASED ON DATA FROM CENSUSES OF AGRICULTURE—EXCEPT THAT DATA FOR AREAS IRRIGATED IN 1910 AND 1920 ARE INTERPOLATED FROM CENSUSES OF IRRIGATION FOR THOSE YEARS

FIG. 8.1.—Irrigated farms and acreage, 17 western states, 1890–1945. The acreage of irrigated land has increased rather steadily from one census period to another, and the number of irrigated farms likewise, at least up until 1940. Roughly 5 per cent of the farms in the United States are irrigated, and the area of irrigated land is roughly 5 per cent of the total crop land area of the United States. (BAE, USDA.)

FOR INDUSTRIAL CONSUMPTION. Many modern industrial processes use large quantities of water either directly or as a means of carrying out certain processes or for a wash, for heat transference, or air conditioning or for other purposes. Water may also be a source of certain raw materials, such as salts and various chemicals. Some of the water so used is consumed, subject to the reservations expressed earlier, and some of it is returned to the stream or other area from which it was originally taken.

Most of the foregoing uses are consumptive in character in the sense that they prevent the immediate re-use of the same water.

FOR GENERATION OF ENERGY—EITHER HYDRO-ELECTRIC OR DIRECT MECHANICAL POWER. One of the earliest forms of energy, other than human or livestock energy, was water power. The early industrial development of New England, for instance, was based largely upon the readily available water power. In more recent decades hydro-electric power has become increasingly important at least in total quantity. Hydro-electric energy is still only a small proportion of total energy and its proportion has not increased in recent years. The great expansion in hydro-electric facilities has been matched by



an equally large expansion of energy output of other sources, particularly in the use of petroleum. Generation of hydro-electric energy requires a gradient or fall in a stream, or the harnessing of the ocean tides. In any event the potential energy is dissipated or wasted if unused and the development of a hydro-electric plant merely harnesses for human use energy that is otherwise wasted. Generation of hydro-electric energy is in one sense a consumptive use of water since it does prevent the immediate re-use of this water for the same purpose. However, it generally does not prevent the use of this water for other purposes and often does not interfere with the use of water which would have occurred in the absence of hydro-electric developments. In connection with other sources of energy, water is used in the production of energy in the form of steam.

The use of water for the generation of hydro-electric power has increased greatly in the United States in the past twenty years. There is today a capacity of 16 million kilowatts for the generation of hydro-electric energy and these produce over 83 billion kilowatt hours of electricity annually. The present development of hydro-electric power in the United States probably does not exceed 20 per cent of the total potential.

FOR NAVIGATION. Oceans, lakes, and streams were once the major, indeed almost sole, channels of large scale commercial transportation in the world and in this country in our earlier period. While they have lost in relative importance due to the great increase in railroad, highway, and air transportation, water transportation is still extremely important in many parts of the world. It is less important within the United States than in perhaps any other major country because we have developed other means of transportation to such a great extent. However, even within the United States there is considerable water transportation and in recent years we have discovered that it has possibilities previously overlooked. The movement of freight from this country to most of the other countries is still predominately by water transportation. However, water often has a negative value for transportation, since it is often a barrier to other forms of transportation.

Although inland and coastal water transportation in the United States are not so important relative to total intercity transportation, there is still an appreciable quantity of freight that uses these means. In 1947, approximately 150 billion ton miles of freight moved over inland and coastal waters. This is about 20 per cent of the total ton

miles provided by the railroads of the United States, and about twice the total ton miles provided by the highways. Inland and coastal waters are less important for the transportation of persons than they are for transportation of freight.

**AS A HOME FOR FISH AND WILDLIFE.** Water whether fresh or salt is the habitat for fish and provides the major constituent of the habitat of many forms of wildlife. In addition to the commercial value of fish, both fish and wildlife are valuable for recreational and similar purposes.

**FOR RECREATION.** Lakes and streams are valuable for direct recreational purposes such as swimming, boating, and the like. Snow and ice also offer many opportunities for recreation.

**TO PREVENT THE INTRUSION OF SEA WATER.** One of the interesting but less important uses of fresh water is to prevent the intrusion of salt water into the delta of the streams entering into the ocean. Unless an adequate flow of fresh water is available, salt water enters channels and often does serious damage to the plant and animal life in delta areas.

**MAJOR NEGATIVE USES OF WATER—PREVENTION OF FLOODS.** A flood has frequently been defined as the overtopping of the normal banks of the stream including the erosion of the stream banks themselves. This definition assumes that normal amounts of water can be confined to the stream channel and that only abnormal amounts overtop the banks. When such overtopping occurs, damage follows.

It is very difficult to secure a reasonably reliable estimate of the damages resulting from floods in the United States. This is partly because the occurrence of floods is not regular and uniform but is highly variable from year to year. An estimate for the years 1924–1937 placed the average annual loss of property from floods at 102 million dollars. An average of 90 persons lost their lives annually because of floods during that period. For the fiscal year 1949, Congress appropriated more than 400 million dollars for flood control work by the Corps of Engineers. Expenditures for flood control are more likely to rise than to decline in the future. Even if dams and other structures reduce the flood hazard the fact that industry and urban development is occurring in areas subject to flood hazards is likely to increase the demand for additional flood protection.

**MAJOR NEGATIVE USES OF WATER—PREVENTION OR MINIMIZATION OF SOIL EROSION BY MOVING WATER.** Whenever water moves, in any volume and at any speed, it tends to move soil particles with it. Its power to move soil particles increases geometrically as the volume and speed of the water increases. One of the major water problems of the world is to get excess water off or into the land safely. Since conservation of farm lands is discussed in another chapter, this aspect of water use and management will not be considered further here.

**MAJOR NEGATIVE USE OF WATER—DRAINAGE OF AREAS WHICH NATURALLY HAVE EXCESSIVE WATER.** In many areas water stands on the surface of the land or the soil is saturated with water at or near the surface. Such a water-land relationship greatly limits plant growth, and precludes commercial crop production. Many such areas have been drained and converted successfully to farming. In other instances, drainage is less successful or is a failure. Drainage of a swampy area may completely change the land-water relationship sometimes with wholly unexpected results. For instance, the land may subside or sink when the water is drawn off, or, if the soil has peat in it, fires may break out. Large areas of the United States are in need of drainage and some of them could probably be drained successfully.

Drainage outlets have been provided and improved for more than 100 million acres, although not all of this can be considered as adequately drained. About 30 million acres of partly improved lands can be improved for crop use with proper drainage. About 20 million acres or more of unimproved lands can be drained at a reasonable cost and made suitable for farming.

**ADVERSE WEATHER, IN THE FORM OF SNOW, ICE, HAIL, AND RAIN, ALSO A NEGATIVE USE OF WATER.** The chief source of water is from storms of various kinds, and to that extent they are helpful. However, many types of storms bring some ill effects, and severe storms may bring serious damage in various ways. A consideration of all aspects of this relationship would get rather afield from a study of water.

### **MULTIPLE USES OF WATER**

The foregoing discussion has been in terms of single uses of water, with here and there a suggestion that much water can be and is used for two or more purposes, either simultaneously or in sequence. For instance, as a stream comes from a mountain range it may be used for generation of hydro-electric power and later diverted for

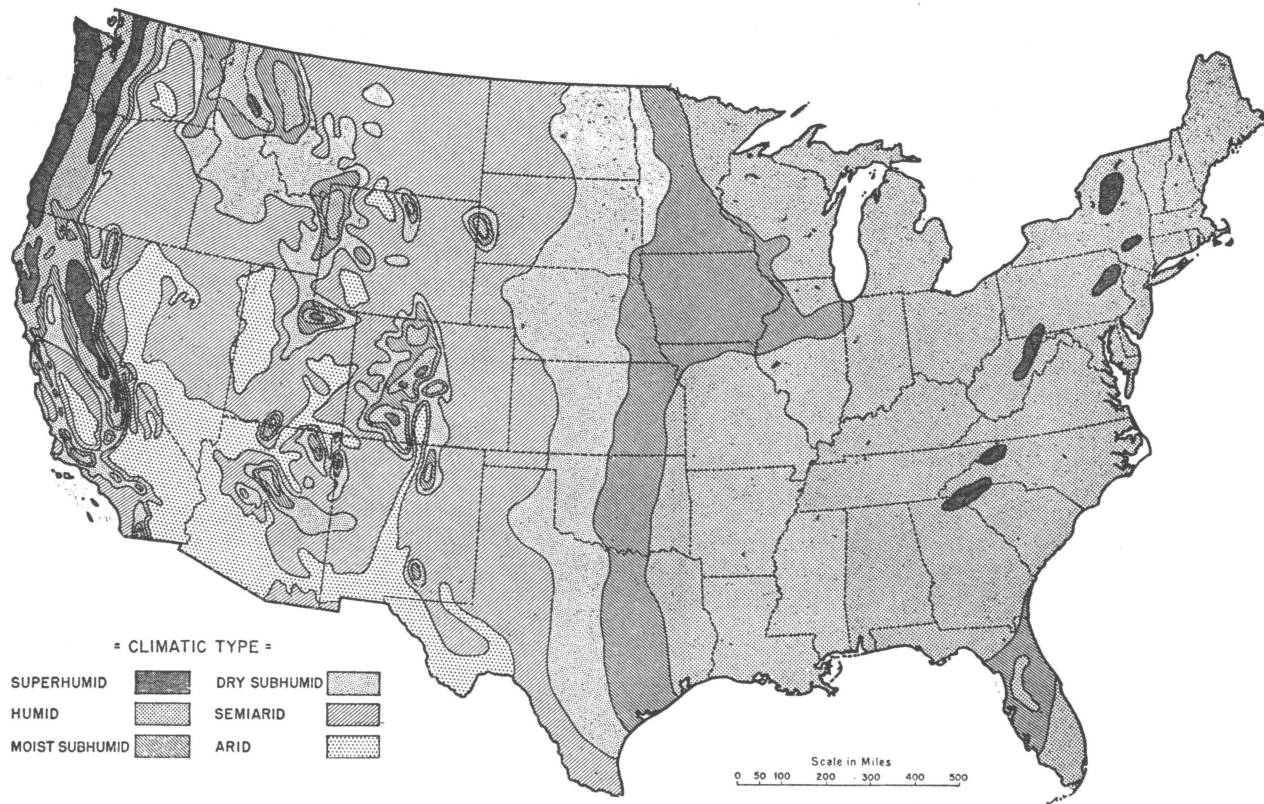


FIG. 8.2.—Distribution of rainfall. A classification of the United States into arid and semiarid, subhumid, and humid regions conceals many important but lesser differences in amount of precipitation. The nature of water use and of water problems varies considerably between such broad zones, however.

irrigation. This is an illustration of uses in sequence. On the other hand, a single dam may be the means of producing hydro-electric power and of diverting water for irrigation. This is a multiple purpose structure, although the uses of the water are actually in sequence. In other instances the same water may be used for recreational and power purposes at the same time or at least in the same place. Other examples of multiple use of water could be cited.

As the water supplies of the nation become more fully used the need for multiple uses becomes apparent. Oftentimes, a single purpose use of water needs only slight modification in order to produce substantial additional values. This is both good economics and good engineering. It also calls for the necessary institutional arrangements so that the full values from each use can be fully developed.

#### **CHARACTERISTICS OF WATER THAT GIVE IT VALUE**

Several factors influence the economic value or usefulness of water to humans. First, of course, is the amount of water. Up to a certain point additional quantities of water add value. The amount of the water can be measured either in terms of acre feet (the amount of water required to cover an acre of land to a depth of one foot), or the flow of water can be measured in terms of second feet (the number of cubic feet flowing past a given point in a second). A stream of water containing one cubic foot per second produces an acre foot of water in approximately 12 hours. In the drier parts of the United States more water is ordinarily more valuable than less water. To a considerable extent the same thing is true even in the humid areas, assuming that the supply is not increased too rapidly by sudden storms. However, there frequently comes a point in many climatic regions when additional quantities of water due to unusually heavy precipitation are less valuable than smaller amounts would be. Since the total amount of water is determined by annual precipitation in the area or in its watershed, very little can now be done to influence total supply (Fig. 8.2).

Experiments with artificial rainmaking in recent years open literally unforeseeable potentialities for modifying total water supply of an area. Perhaps in 100 years we can have exactly the amount of precipitation we want everywhere in the world. Water may sometimes be imported from other areas by means of extensive engineering works. Total stream runoff is subject to more influence by man, through watershed management. But even here, practical possibilities are often not large.

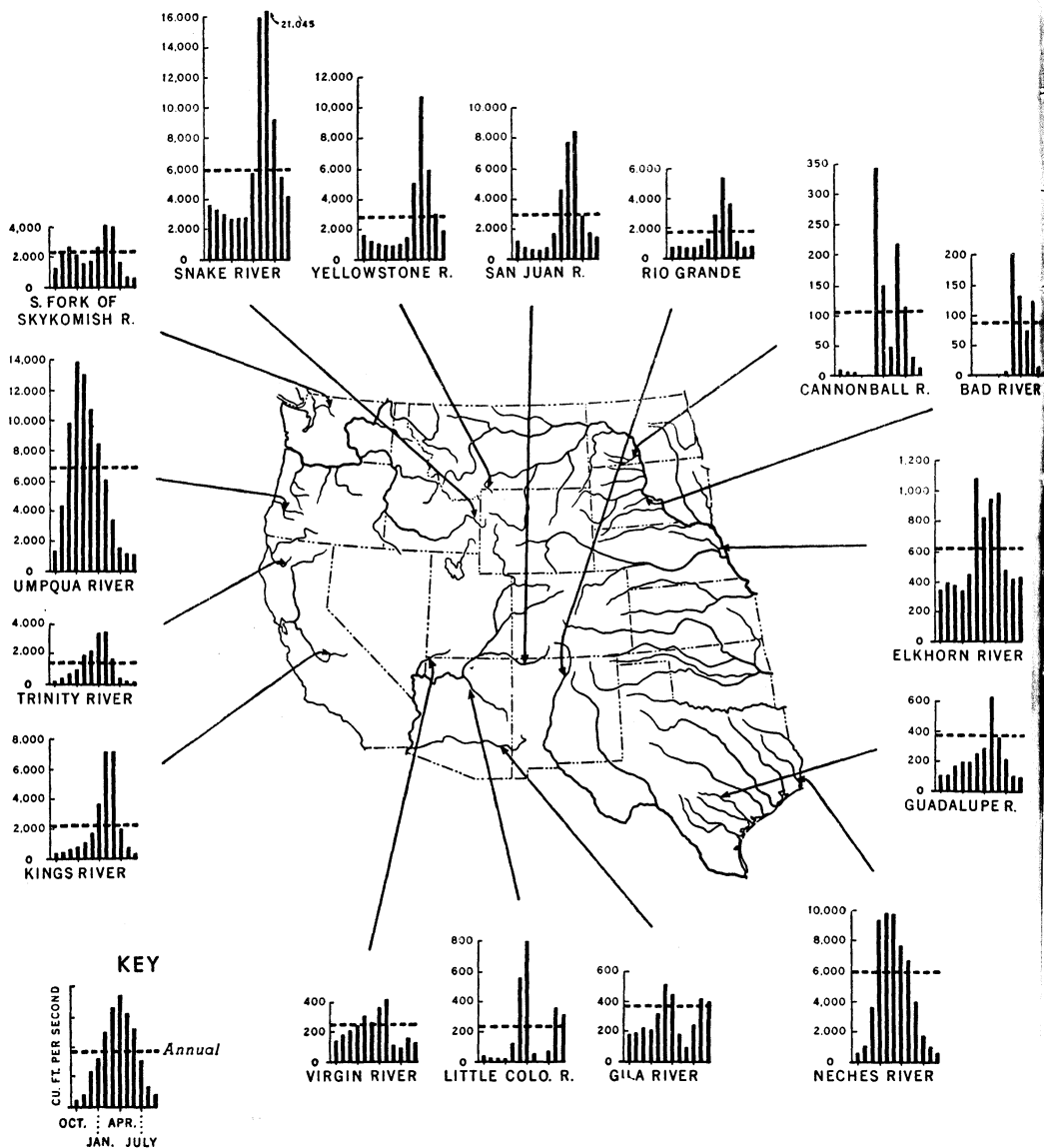


FIG. 8.3.—Normal seasonal flow of western streams. The season of maximum and minimum stream flow, and the difference between the maximum and minimum amounts differs considerably among western streams. In relatively few instances is the unregulated flow ideal for man's use.

Another factor which adds value to water is a gradient or a fall in the stream or movement of water. A gradient is necessary for the production of hydro-electric power and thus is valuable. On the other hand, a gradient in a stream or on the surface of the land is likely to lead to erosion and hence causes damage. The production of electricity is partly the result of the quantity or amount of water available and partly the result of the gradient of the stream. There is nothing that can be done practically to change the gradient of a stream for power production. Through terraces and otherwise, the gradient by which water leaves fields and other areas can be modified and thus erosion lessened.

The seasonality with which precipitation occurs or the seasonal changes in the flow of the stream also affect the value of water. For some purposes an even flow throughout the year is most valuable. This is true for navigation, for instance. The demand for electricity is not entirely constant throughout the year, but reasonably so, and thus a regular flow of water is most valuable for the generation of electrical energy. The need for water for irrigation or for urban use increases during the summer and hence a somewhat uneven distribution of water throughout the year, the greatest supply in the months of greatest need, would be more valuable than a more regular flow. Many streams have their season of peak flow of water at a time when such water is least valuable (Fig. 8.3). At the extreme, peak flow may produce a flood and cause damage rather than create value. Changes in seasonality of precipitation come in the same category as changes in total precipitation—a future possibility of enormous potentiality, but not practical now. Seasonality of stream flow can be modified within rather narrow limits by watershed management. Storage and regulating dams can alter stream flow below them, often by almost any degree to which it would be economic to construct the necessary dams.

Closely related to the matter of seasonality of water supply or water flow is the variability in supply. The total quantity of water available may vary greatly from one year to another (Fig. 8.4). Likewise, the flow or supply at one season such as summer may vary greatly from the available supply or flow at the same season in other years. Variability may even exist from day to day, particularly in some climatic and watershed conditions. Ordinarily, variability in supply or flow diminishes the value of a given quantity of water. Thus far, it has proven impossible materially to reduce variability in total water supply. The supply for certain uses or the flow at certain

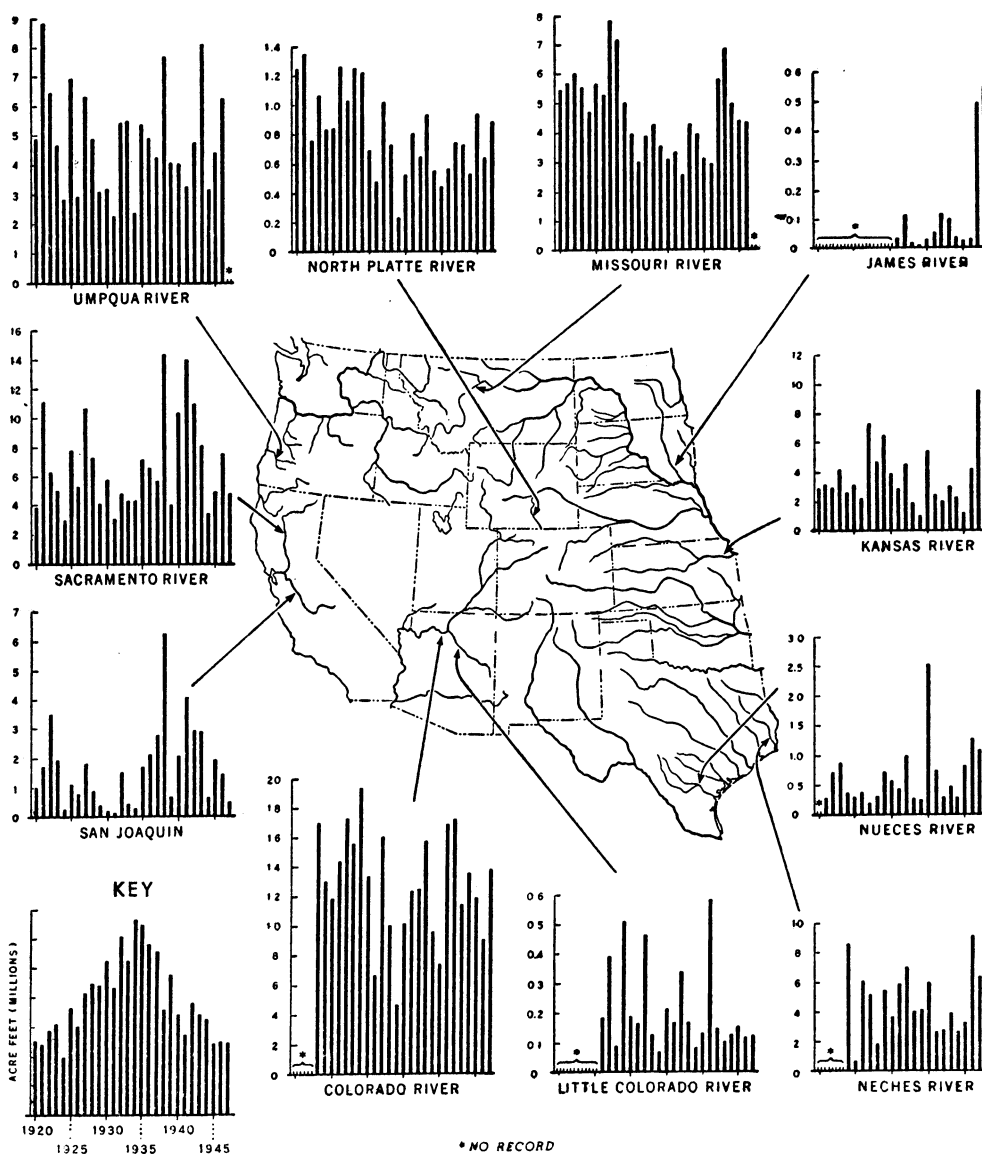


FIG. 8.4.—Annual variation in stream flow. Western streams differ greatly in the extent of their year to year variations in total stream flow. Generally, the more variable is stream flow from year to year, the less valuable it is. (BAE, USDA.)



points can be regularized by use of large storage dams, capable of holding water over from year to year, if adequate storage sites exist and if it is economic to do so. Thus, Hoover Dam can store more than 2 years normal runoff of the Colorado River at that point. By releasing this stored water as needed, the flow below the dam can be regularized under almost any climatic conditions.

Also, closely related to these two matters is the predictability of the supply or flow. A variable supply may be predictable at least under some conditions. For instance, a flood flow on the upper part of a stream will produce a large flow, possibly flood flow, at a lower point on the same stream at some later time. Both the amount and the time of this later peak may be predictable with very high accuracy. In areas where a large part of the stream flow comes from melting snows, snow surveys provide considerable information as to the probable future variation in total water supply and some information as to the timing of such future runoff. The supply of ground water can also be predicted with fair accuracy following a drought or a wet year. To the extent variability in stream flow or water supply can be predicted, the disadvantages of such variability in supply are less. It is then possible to make some provisions against either shortages or excessive supplies.

The purity of water also greatly influences its value. Practically no water in nature is completely pure, but instead it contains varying amounts of materials in solution or in suspension. By far the greatest part of the water in the world is in the oceans where it contains appreciable quantities of various salts. Thus far it has not been feasible to use sea water for many uses except navigation, fishing and recreation. However, serious attention is now being given to the possibility of purifying sea water for urban and agricultural use. Experiments of this nature thus far appear encouraging. Even so-called fresh water differs greatly in the amount of salts contained naturally in it. This in turn greatly influences their usability for some purposes, particularly for many industrial purposes. An unfortunately high percentage of the fresh water of this and other countries contains large amounts of impurities because of man's activities. Agricultural and other land uses may lead to erosion and to the presence of silt in streams. Industrial processes and the disposal of urban wastes have increased the impurities in streams of this country enormously. Man can purify water when it is to his interest to do so, but in practice he has been far more active in polluting than in purifying water.

## RIGHTS TO USE WATER IN THE UNITED STATES

There are two broad doctrines under which rights are acquired to the use of water in the United States. These are the Riparian Doctrine which applies generally in the humid areas, and the Appropriation Doctrine which applies generally to the arid areas.

**THE RIPARIAN DOCTRINE.** The Riparian Doctrine was imported from England, where it was part of the common law. Under it any land owner is entitled to use water flowing through or alongside of his land, or water bordering on his land, as long as his use does not diminish either the quantity or the quality of the water. Under this doctrine streams in England were used to produce water power, as well as for other purposes. This doctrine fitted the original colonies in the United States quite well, and the use of streams for water power took place under it. As strictly interpreted, this doctrine would prevent pollution of streams by the dumping of industrial or urban wastes. However, enforcement of this doctrine generally lay with the injured land owner whose riparian rights were destroyed or lessened by such dumping. Since so many cities have so generally dumped wastes into streams, by common consent the Riparian Doctrine is frequently tacitly modified as far as the preservation of the quality of the water is concerned.

**THE APPROPRIATION DOCTRINE.** The Appropriation Doctrine with regard to water was brought from Spain by way of Mexico. It originated in an arid area and permitted the actual appropriation of limited water supplies in order to permit their consumptive use. It has been applied rather generally in the arid western states where irrigation and other consumptive uses of water are larger. Under it a right to the use of water is obtained by application to the appropriate state official. "First in time, is first in right," is a common saying in the West to indicate that a priority of right is obtained by the date of the filing. "Beneficial use is the measure and basis of right," is another expression common in the West and indicates that rights cannot be obtained for more water than can be beneficially used.

Both the Riparian and Appropriation Doctrines can be applied not only to surface water supplies but to ground water supplies also. However, no doctrine has been applied consistently and beneficially to the use of a great deal of ground water resources of the United States. In most parts of the United States where ground water supplies

are used to a substantial degree, these supplies have been over-utilized with a consequent decline in the ground water level. In some Western States provision has been made in fairly recent years for the appropriation of ground water so as to limit its use to the average annual supply.

### **STREAM BASIN COORDINATION**

Closely related to the matter of multiple use of the water is the necessity for coordination of water uses within a single stream basin. Much of the early development of water was for single purposes and often entirely uncoordinated with other uses of water within the same basin. For instance, one municipality might take water from the stream for municipal purposes while another dumped its wastes into the same stream. Or, a hydro-electric power plant might be erected upon a stream without regard for the needs of irrigation from the same stream. Many other instances of single-purpose uncoordinated development could be cited. Such developments are bad enough as long as water resources are only partially utilized. However, as water resources come to be more and more fully utilized, it becomes increasingly necessary to take account of other uses of the same stream. Unless this is done conflicts and lawsuits are almost sure to arise. Less obvious but perhaps more important, the full values of the stream will not be realized.

There are many problems encountered in the coordination of water developments within a single stream basin. In the first place, there are the technical aspects of coordinating one use with another. Some reference has previously been made to these. The dams or other structures needed for one purpose may not be fully usable for other purposes, or the plan of operation of a structure may depend upon its use. Water used for one purpose may thereby be unavailable for other uses or may be less valuable for such other uses. The water needs of one area may conflict with those of another area either for the same or for different purposes. These and many other technical problems arise.

Such problems immediately lead into a consideration of the economic problems involved. Is it better to forego 10 per cent of the potential power production in order to obtain 25 per cent more irrigation water, for instance? Is it worthwhile to construct larger reservoirs in order to hold back more of the flood waters for productive use, or is it more profitable to allow more of the water to run to waste and to protect the area from flood by levees or dikes?

These are but a few of the many questions that may arise. Each of the technical questions of water use has an equally difficult economic problem. These problems are frequently further complicated by the fact that the costs and benefits from the different types of developments are forthcoming at different dates in the future and, hence, are not always directly comparable.

Estimation of costs and benefits have preceded private water developments, although the actual results have often fallen far short of the calculations or hopes. Calculations of cost benefit ratios, and restriction of development to those projects showing favorable ratios, have been required of federal agencies. This requirement has been ineffective in operation because costs are generally underestimated and benefits often grossly overestimated. Estimation of economic benefits from water developments is difficult enough at best, even when the estimator is not under pressure to come up with the answer the construction engineer wants. There has been a tendency on the part of economists to underestimate indirect benefits and to underestimate the rate of economic growth and its effect on value of water developments. On the other hand, engineers and promoters have overestimated these same items even more grossly.

Perhaps even more difficult than either the technical or economic problems are the political problems involved in the stream basin problems. If the stream basin is relatively small and lies entirely within the same political unit and within an area of generally similar interests and standards of value, then the problem may not be too difficult. However, most of our larger streams lie in two or more states and many more include areas with widely varied interests and viewpoints.

These political problems of coordinated river developments are well illustrated on the Missouri River. There is a basic conflict of interests between the upper watershed areas where the greatest interest is in irrigation and hydro-electric power, and the lower basin areas where there is great concern over navigation and flood control. In addition to this specific and perhaps extreme illustration there are a great many cases in which varied uses of water are attempted on a stream which flows in two or more states, and which soon come in conflict. There is a widespread tendency to regard the water which rises in a state as somehow the exclusive property of that state even though it may be physically impossible to hold it within the state and to use it there. Political problems are particularly acute when there is insufficient water available to serve all potential demands.

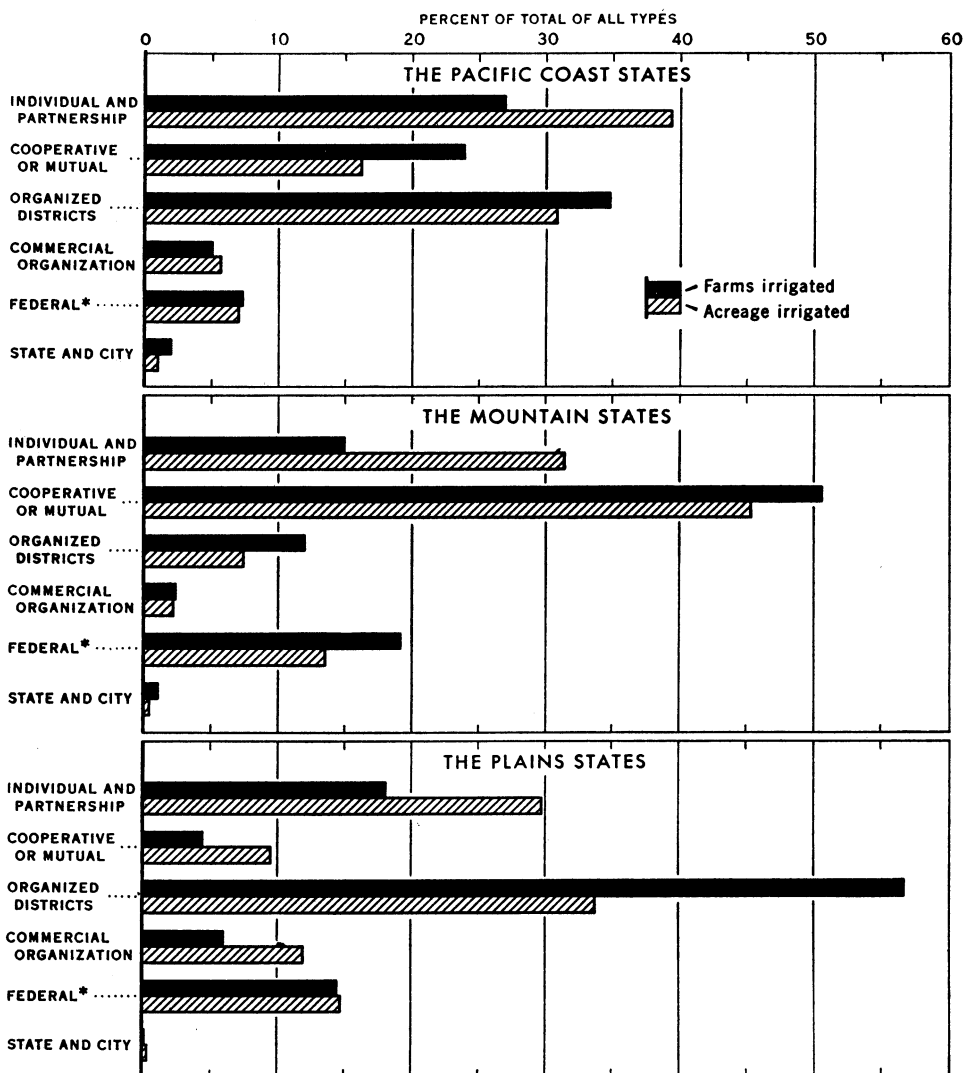
## FEDERAL WATER PROGRAMS

Although much of the use of water which has occurred in the United States to date has been made by individuals or corporations, or at the most by municipalities and states, there is reason to believe that most of the large scale water programs of the future will be federal in character. The federal government has already carried on extensive programs in irrigation, hydro-electric power, navigation, and flood control. The magnitude of these programs has increased greatly in the past 20 years. There is reason to believe that such federal programs will increase in relative importance in the future.

It is easier to consider federal water programs in terms of agencies rather than in terms of the specific kinds of programs since most federal water programs are multiple purpose in character.

The Bureau of Reclamation has provided a full project water supply for 2.5 million acres, and a full or supplemental water supply under special water service contracts for 2.7 million additional acres (Fig. 8.5). Most of the future irrigation of the West will be with water provided by federal reclamation projects. Large scale reclamation water developments are under way on the Columbia, Colorado, Rio Grande, and Missouri Rivers and their tributaries, and in the Central Valley of California. The Bureau of Reclamation has invested  $1\frac{1}{2}$  billion dollars in construction to date and has under way, or authority for, projects whose ultimate costs will exceed 3 billion dollars. It has been developing long range programs for the ultimate irrigation of something between 10 and 20 million acres of land. Until 1928 the Bureau of Reclamation was almost entirely concerned with irrigation. The approval of the Boulder Dam Project on the Colorado in that year brought a greatly increased emphasis to the production of electricity and this has become increasingly important on later projects (Fig. 8.6). With the passage of years emphasis has shifted from single to multiple purpose projects with increased attention to flood control, navigation, recreation, wildlife, and such other uses in addition to the primary ones of irrigation and hydro-electric power. An important phase of the federal program is its watershed investigations and soil and moisture operations (Fig. 8.7).

The Bureau of Reclamation has been permanently identified with two major policy uses. Under its basic law the acreage of land for which one person can get water on federal reclamation projects is limited to 160 acres. This acreage limitation is designed to promote family size farms, to spread widely the benefits of irrigation, and to



DATA FROM CENSUS OF IRRIGATION, 1940.

\*BUREAU OF RECLAMATION AND INDIAN SERVICE.

PACIFIC STATES INCLUDE WASHINGTON, OREGON, AND CALIFORNIA; MOUNTAIN STATES INCLUDE MONTANA, IDAHO, WYOMING, COLORADO, NEW MEXICO, ARIZONA, UTAH, AND NEVADA; PLAINS STATES INCLUDE NORTH DAKOTA, SOUTH DAKOTA, NEBRASKA, KANSAS, OKLAHOMA, AND TEXAS.

FIG. 8.5.—Irrigation by types of enterprises. Most irrigation development in the past has been by private capital, much of it in rather small enterprises. In the future, most irrigation development will be by federal agencies, largely because the remaining possibilities consist of large projects requiring large investment of capital. (BAE, USDA.)

prevent speculative gains on federal reclamation projects. This policy continues the homestead principle for public lands. Although it has been attacked several times since its adoption in 1902, it has been defended successfully every time so far. Under its legislation the Bureau of Reclamation is required to give preference in the sale of electrical power to public distribution agencies. Such a preference is not in terms of price at which electricity is sold, but rather is a preference for the available supply of electricity. Most of the benefits to the consumer from the public generation of electricity are lost unless the transmission lines and distribution facilities are also publicly owned, and unless the price policy passes on to the consumer the advantages of such public ownership. Accordingly, the Bureau of Reclamation has sought to encourage public distribution of electricity and a power price policy which will pass on to the consumer the benefits of such a policy. This policy has also been under heavy attack at times. The chief line of attack against this policy has been against appropriations for the necessary transmission lines. In some areas, privately owned companies have worked out cooperative arrangements with the Bureau of Reclamation and the public distributing agencies whereby federally generated electric energy is carried over privately owned power lines by payment of reasonable charges.

The Corps of Engineers, Department of the Army, has historically been concerned first with navigation and secondly with flood control. Up until the middle 30's, virtually the only devices used for flood control were levees and dikes. However, the disastrous floods of the Mississippi River in 1927 had demonstrated the limited usefulness of levees not supplemented by storage reservoirs. Under the Flood Control Act of 1936, and more recent acts, the Corps of Engineers has built a number of large dams which are capable of multiple purpose use and have been so used. These dams restrain flood waters which can be used at other seasons to improve navigation, to generate power, or for irrigation. Thus, beginning at the lower parts of major streams the Corps of Engineers has gradually worked upstream until it is now engaged in very similar activities to those of the Bureau of Reclamation which began at a different point on the streams.

The Corps of Engineers has not been engaged in controversies over policies similar to those of the Bureau of Reclamation. Theoretically, it does not provide irrigation water. Wherever it does improve the water supply, advantage is taken of this by private

# RECLAMATION POWER DEVELOPMENT

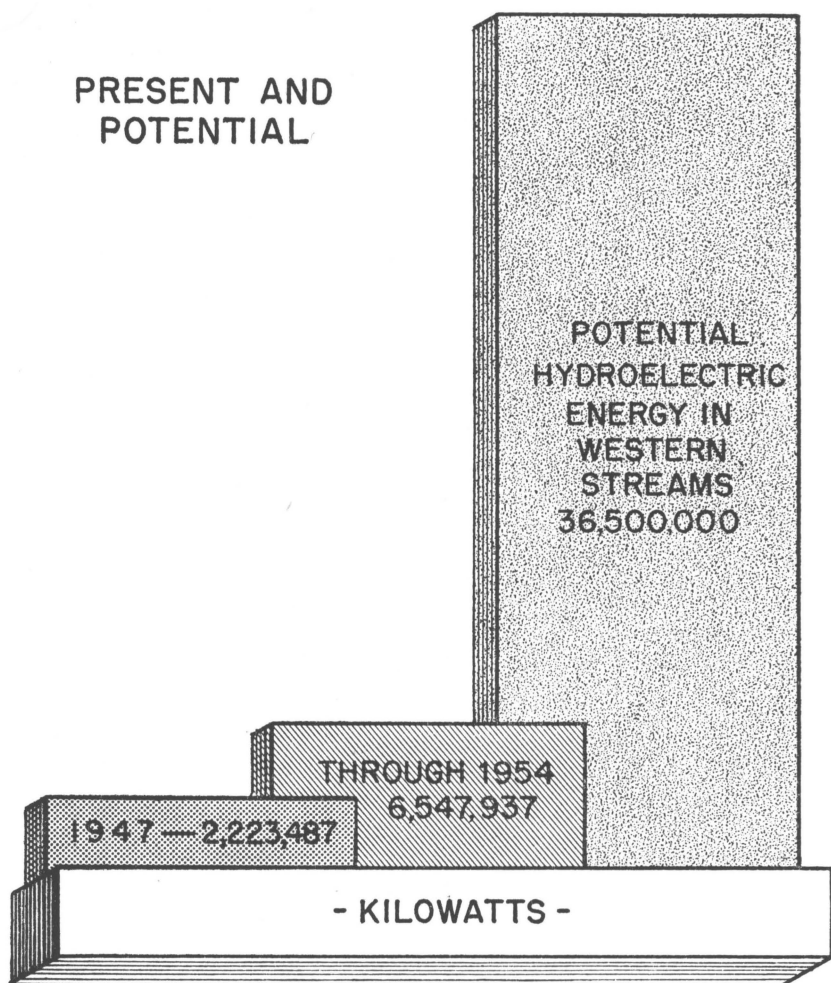


FIG. 8.6.—Reclamation power development. Development of hydroelectric energy by the Bureau of Reclamation is comparatively recent, having begun on a major scale since Hoover Dam was started in 1928. Construction under way and planned will nearly treble the amounts now produced, but even then will far from have exhausted the potentialities of western streams. (BAE, USDA.)



interests which construct necessary irrigation works. There is no acreage limitation provision in its legislation. The electricity generated at dams constructed by the Corps of Engineers is turned over to the Secretary of the Interior for his sale and disposal. The Corps has thus avoided controversy over public distribution of power generated at dams built by it. The private power companies have generally supported the Corps in its program.

The Bureau of Reclamation and the Corps of Engineers are each working in the same general field of water development. There has been widespread and bitter criticism of their rivalry in this field. The Hoover Commission gave particular attention to this problem. The report of the Task Force on Natural Resources, particularly pages 16-39 and 65-182, deals with this subject. The Task Force says, "The difficulty is that under existing policies and organization there is wholly inadequate assurance that projects undertaken are feasible, and that the objective of maximum benefits at the lowest cost is being attained." Former Governor Leslie A. Miller of Wyoming, chairman of the Task Force, has popularized his views, and presumably those of a majority of the Task Force, in an article in the *Saturday Evening Post* for May 14, 1949. His views are summarized in these brief quotations about the Army Engineers and the Bureau of Reclamation.

"The two agencies are so violently jealous of each other that an extravagant and wholly senseless competition has sprung up . . .

"In their indecent zeal to extend their empires, both agencies are guilty of underestimating—apparently deliberately—the cost of the projects they propose to build . . .

"Both agencies stoop to deception in furtherance of their efforts to stake out claims on projects . . .

"Both agencies are guilty of brazen and pernicious lobbying to achieve their ends."

It is inevitable that such rivalry should exist as long as there are two agencies both working in the same general field. To the extent that independent engineering studies are made on the same problems, there may be something gained by having two agencies working in this field. With this exception, there is certainly much lost by having two agencies. The difficulty comes in evolving and carrying out a coordinated program when two agencies are each working on a major scale on the same stream. Many water development projects have been criticized as being of the "pork barrel" type, that is, the cost to the federal government is greater than the cost to the local

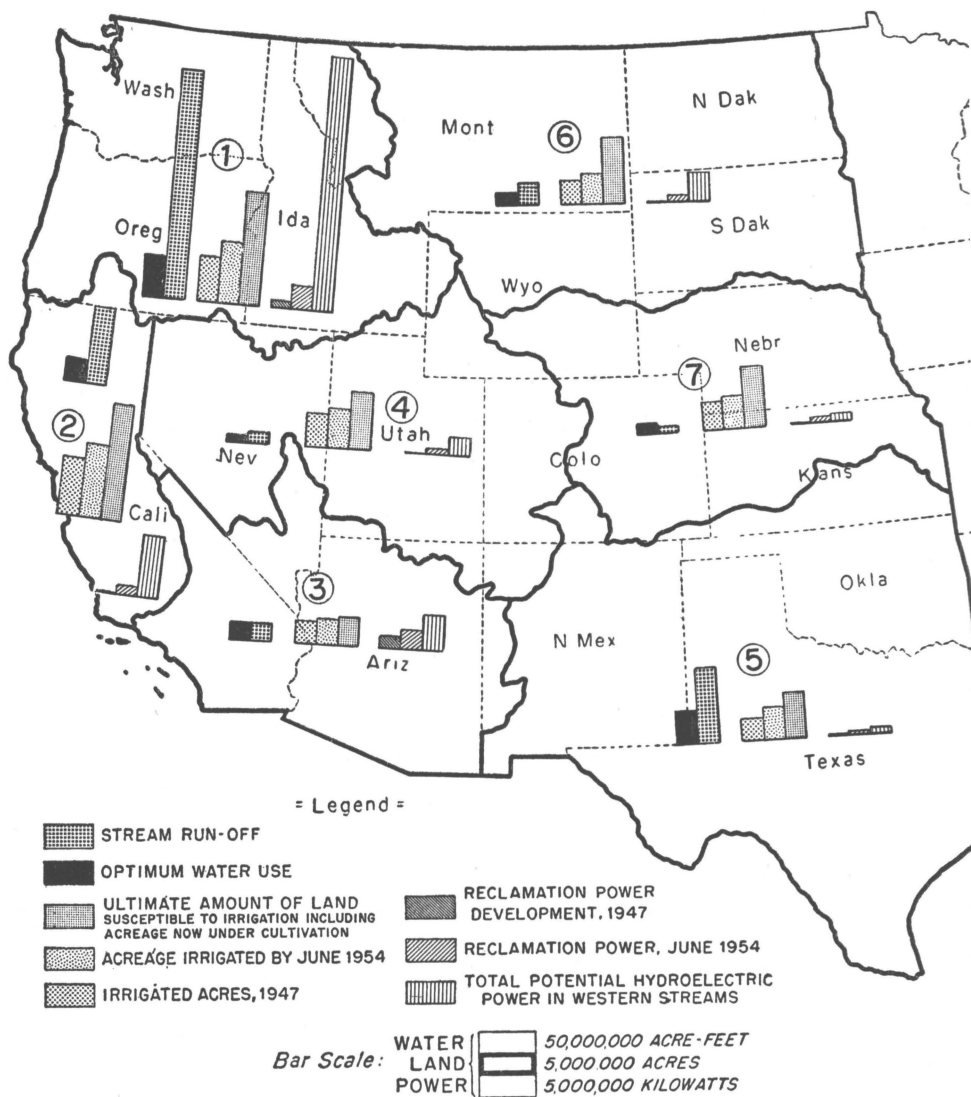


FIG. 8.7.—Western water resources and use. The various western river basins differ considerably in their potential water resources and in the degree to which these potentials have been realized. In most stream basins there is greater opportunity for expansion of hydro-electric power production than in expansion of irrigation.

community but the benefits are greater than the costs to the local community. Thus a local area benefits from the expenditure of federal funds for a water development project even though the nation as a whole does not. It is extremely difficult for any Congressman to vote against water developments in his district. It is almost axiomatic that a large flood control or navigation improvement program never fails of passage through Congress.

It is a mistake to assume this struggle is a purely bureaucratic one, although there is plenty of that in it too. Each program and agency has strong political support from groups which believe in its program or which benefit directly from its activities. Moreover, each agency continues to exist and to receive appropriations from a Congress that could bring order out of this rivalry if it chose.

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## 9.

### *Forestry in a Changing World*

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**T**HE OUTSTANDING CHARACTERISTIC OF THIS FIRST half of the 20th century is change. Change in the relatively stable social and economic ideas of the early 1900's. Change in our concept in international outlooks and relationships. Change in our appreciation of the significance of the renewable natural resources of the world and their relation to human welfare. Perhaps, in North America, no change is more noteworthy than the one that has taken place in the public attitude towards forests.

At the turn of the century people on this continent thought of the forests as limitless, if they thought of them at all. There were, indeed, farsighted men who understood that uncontrolled logging and the unchecked ravages of forest fires would lead inevitably to destruction of the forests and to shortages of forest products. But these men were few, and the majority took little heed of their warnings.

In the North America of today the situation is very different. Public interest in the welfare of the forests has been aroused and has expressed itself in an impressive volume of forestry legislation. In the United States a great system of national forests has been established, and in Canada logging operations on publicly-owned forest lands are being subjected to constantly increasing supervision. In both countries great strides are being made towards protection of publicly and privately owned forests from destruction by fire, insects, and tree diseases. An immense amount of research in forestry and forest products is being carried on. Public forestry administrations are being supported in their efforts by voluntary private associations. A strong corps of professional foresters has been built up and is constantly reinforced by graduates from many excellent forestry schools. Although much remains to be done, all this constitutes a very notable change from the attitude prevalent in the year 1900.

### FORESTRY

Mere exploitation is giving way to forestry. But what is forestry? In a word, it means the deliberate management of existing forests, and the establishment of new forests when necessary, to insure that the people shall receive in perpetuity the greatest possible benefit from all the forest lands at their disposal. Historically speaking, the practice of forestry does not commence until it becomes apparent that current methods of use or abuse are endangering the forest resources. You will recall Professor Toynbee's thesis to the effect that the continued existence of any civilization depends upon its successful response to a series of challenges. Adoption of proper forestry measures, in time to prevent dangerous forest devastation with all its incumbent evils, constitutes just such a response. The consequences of failure to meet this particular challenge are illustrated with awful clarity in the valleys of Jordan, Tigris and Euphrates.

There are records which show that some form of forestry existed in China long before the beginning of the Christian era. In Europe the practice of forestry on an empirical basis appears to date from about the 15th century, although the modern development of forestry as an applied science may be dated from the first quarter of the 19th century. Introduction of forestry into North America can be set, for practical purposes, at the beginning of the present century when such leaders as Fernow and Pinchot succeeded in laying foundations on which the American concept of forestry is still being built. To

the foresters of Europe, America owes a great debt, but progress on this side of the Atlantic has been rapid and, in some respects, useful ideas can already be sent back across the ocean.

### **FUNCTIONS OF FORESTS**

The functions of forests in a national economy are protective as well as productive, and no greater mistake could be made than that of assuming that the former are less important than the latter. In certain situations the exact opposite is true. Forests are essential to the protection of headwaters of the streams and rivers upon which agriculture, inland navigation and hydro-electric power must depend for their very existence. In mountainous country forest cover gives the best defense against avalanches and "flash" floods. Even within predominantly agricultural districts, a reasonable proportion of forest cover has been found necessary to give protection against wind and to help maintain underground water tables at satisfactory levels.

Forests also provide the habitat of many game birds and game and furbearing animals. Again, the forest provides ideal conditions for relaxation and rest from the tension and turmoil so characteristic of modern urban life.

### **FOREST PRODUCTS**

All these functions of the forest are important but this chapter will be devoted to discussing the forest as the source of forest products—products which have been in such short supply in so many parts of the world during the past few years.

It seems probable that wood was the first "raw material," other than food and skins, which our primitive ancestors put to use. Certainly, wood was commonly used for fuel and for building shelters tens of thousands of years before the commencement of recorded history. The important point for us is that the same material is serving the same purposes today. About one-half of all the wood cut each year is used for heating and cooking, and logs destined to be sawn into lumber still constitute the largest component of the other half. But not all the sawn lumber is now used in building and new uses for wood are constantly increasing in relative importance.

Looking backward, we can see that a turning point in the wood-using habits of the western world was reached at the beginning of the Industrial Revolution. The invention of the steam engine, the

mechanization of industry, and the scientific discoveries of the 18th and 19th centuries led inevitably to a whole series of new demands for wood and its derivatives.

The railroads of the world require many millions of cubic feet of wood annually in the form of crossties, and more millions for the construction of rolling stock. Each ton of coal mined entails the consumption of a certain volume of pitprops. During the last war years more lumber was used in the United States for making crates and boxes than for any other single purpose. Most important of all, the wood pulp industry—whose products were unknown less than a century ago—has become a major source of wood consumption, and provides raw materials for most of the world's paper and an increasingly large proportion of its textiles.

Furthermore, engineers are constantly finding new ways and improving old ways of using wood, and chemists are deriving entirely new products from this most adaptable of raw materials. It is true that many of these new products will never result in additional massive demands for wood; but it would be reckless to assume that some one of them may not create a new market comparable to that opened up by the invention of the pulping processes.

It is evident that the progress of civilization has increased rather than decreased the demand for wood, and that this tendency is likely to continue. But there are other forces at work in the same direction. One of them arises from the rapid increase of the world's population; another, from the urgent desire of people everywhere to attain improved standards of living. Evidences are multiplying that the vast populations of Asia are no longer content with the poverty and hardship which have been their lot.

It is not difficult to demonstrate that attainment of a better way of life for increasing numbers of people depends, to a considerable degree, on the provision of increased quantities of forest products—more fuelwood, more building timber, more railway ties and more paper for the dissemination of education and news.

#### **SHORTAGE OF FOREST PRODUCTS**

We arrive, then, at the conclusion that the future demand for products of the forest is likely to be larger—and very substantially larger—than it is today. But we reach this conclusion at a time when most of the world is suffering from more or less severe shortages of forest products. These shortages have delayed reconstruction in the war devastated regions of Europe and Asia, they have contributed



to the shortage and high cost of housing in the United States, and they are a direct cause of a great deal of human suffering in many other lands. It is very important, therefore, to determine whether existing shortages arise from a lack of forests and whether there is any possibility of meeting the increased demand which we foresee for the future. At first sight, it might seem that the mere fact that shortages exist now carries with it the implication that prospects for larger supplies in the future are poor. Further examination, however, may show a different picture.

Present or recent shortages may be divided into three principal classes. First, there have been relative shortages in the United States and Canada, which arise in large part from the extremely high level of general economic activity. Second, there are the shortages existing in Europe which, it is to be hoped, will be overcome when war damage has been repaired and the existing dislocation of normal trading channels corrected. Third, there are extreme shortages of long standing such as are characteristic of the Middle East and of large parts of Asia. These shortages are very severe, and but little prospect for early improvement is in sight. Perhaps we should also recognize a fourth category of purely local shortages, such as are found in some cities of Latin America because of excessive denudation of the forests in the immediate vicinity of these centers of population.

It will be convenient to discuss separately these different kinds of shortages and the prospects for overcoming them. First, however, it is necessary to define a few terms.

The first term is "productive forests." In a survey recently completed by the Food and Agriculture Organization of the United Nations, each country was asked to distinguish between "productive" and "other" forests. "Productive forests" include all forested lands capable of bearing recurrent crops of usable wood; in other words, lands where growing conditions are good enough to permit systematic forest management. "Other forests" include lands which bear trees but where site conditions are so difficult and the trees are of such poor form and slow growth that management would be impossible. Less than 8 per cent of the total forest area of the United States falls in the unproductive category; but, on a world basis, recognition of these two categories has proven to be extremely important, since more than one-third of the total forest area is found to be in the unproductive class.

When discussing the needs of a country for wood, we think of many different products—sawn lumber, fence posts, mining timber, paper, paperboard, veneers and plywood, and so forth. Quantities

of these different products are ordinarily described in different ways, such as thousands of board feet of lumber and tons of paper. Obviously, it is impossible to add together quantities expressed in different units of measurement in order to determine total wood requirements. The problem is solved by computing the average volume of roundwood needed for the production of each unit of volume or weight, and making the necessary substitutions. Then it becomes possible to calculate production or consumption totals.

**SHORTAGES IN THE UNITED STATES.** As has been said, such shortages of forest products as have existed in the United States have been relative rather than absolute, and they exist in spite of extremely high levels of production in practically all branches of forest industry. Should there be any slackening of the tempo of economic activity, they might quickly be replaced by temporary surpluses. The problem, then, is to estimate whether domestic forest resources, together with available imports, can continue to supply current rates or higher rates of consumption in perpetuity. The United States has been for many years a net importer, rather than an exporter of forest products.

A wealth of information is available in a series of booklets, issued by the Department of Agriculture, which contains analyses of the forestry situation as revealed by a reappraisal made by the United States Forest Service during the years 1945 and 1946. Drawing upon these and other sources, it is possible to summarize the position in this country with some confidence.

The chief forest product in the United States is sawn lumber. During and since the war it has been produced and used at an average rate of about 36 billion board feet annually, a figure which may be compared with the record production of 44½ billion board feet in 1909. It is estimated that potential annual requirements during the period 1950-55 will be about 42½ billion board feet, with a long-term future demand averaging about 39 billion board feet. The rate of lumber consumption per capita, ranging from 250 to nearly 300 board feet, is among the highest in the world. The short-term forecast envisages use of nearly 75 per cent of all lumber for construction purposes, including railways and mines. In terms of drain upon the forests, sawn lumber is expected to account for from 50 to 60 per cent of the total.

Short-term consumption of fuelwood, averaging about 63 million cords annually, will account for about 12½ per cent of total drain on the forest, since only 27 million cords will come from sound, living trees.

Production of pulpwood from domestic forests, currently running somewhere in the neighborhood of 15 million cords, is expected to rise to 20 million cords after 1950 and to 40 million 50 years hence. The short-term forecast indicates that pulpwood will account for about  $11\frac{1}{2}$  per cent of total drain. Allowance is made in the estimate of over-all consumption for continued imports of pulp and paper. All other forest products, excepting the three just mentioned, account for only 16 per cent of total commodity drain.

In 1944 drain on the forests of the United States amounted to 13.4 billion cubic feet, of which 9 per cent was caused by fire, insects and other natural enemies. Current growth, in terms of timber of all sizes, just about balanced current drain, although a deficit of 1.4 billion cubic feet of softwoods was offset by a surplus of hardwood growth. With respect to timber of sawlog size, however, the situation was not satisfactory, since growth was established at 35.3 billion board feet against a cut of 53.9 billion board feet, including an over-cut of 50 per cent.

The estimates of potential future demand require the provision for domestic consumption of 14.6 billion cubic feet annually, which would include 61 billion board feet of timber of sawlog size. In addition to this commodity drain, allowance must be made for natural losses.

To sum up, potential future requirements will demand a 20 per cent increase in total growth, but this will have to include an increase of 80 per cent in the growth of sawtimber.

The Forest Service estimates that these growth goals not only can be reached, but can be exceeded by a comfortable margin—25 per cent in the case of total growth, with a smaller margin of safety for sawtimber. This estimate implies an average annual growth rate of about 44 cubic feet per acre, as compared to a current rate of 29 cubic feet.

It is permissible to ask whether the estimate of possible future growth is realistic. Fortunately, there is now available a considerable amount of information respecting growth of forests in many countries where intensive forestry has long been practiced. For example, Switzerland and Germany show national averages of about 57 cubic feet per acre, and Denmark nearly 100. Other European countries show lower rates, but competent authorities believe that improved forestry can make possible a continental average of at least 43 cubic feet per acre, practically the same as the future rate assumed for the United States. But, when one considers that the United States possesses the finest forests of any country in the world, taking both

variety and extent into account; when one notes its favorable position in the southern part of the North Temperate Zone; and when one recalls general impressions of forest conditions in Europe and in this country, it passes all belief that this country cannot eventually reach average rates of growth and yield not only equal to, but considerably higher than, the possibilities which exist in Europe.

The goal, then, is definitely attainable. It is true that much time and effort must be devoted to its achievement because great improvements in forest management are needed; but Americans are fortunate in that the effort can be made with the confidence that they are not chasing a will-o'-the-wisp.

**SHORTAGES IN CANADA.** A similarly bright future for forestry exists in Canada. Already the world's largest exporter of forest products and largest producer of newsprint paper, her maximum potentialities have by no means been reached. Improved methods of forest management, now being gradually developed, and the opening up of forests as yet inaccessible, may eventually enable her to double her present output.

**SHORTAGES IN EUROPE.** We may now pass on to the current shortages existing in Europe, exclusive of the Soviet Union. Before the war, Europe, with a population nearly  $2\frac{1}{2}$  times that of North America, and with little more than one-third of the forest area, was nevertheless almost self-supporting in forest products. Net imports amounted to less than one-third of one per cent of total consumption. There were, however, great differences between conditions in different countries, with the result that international trade within the continent accounted for two-thirds of total world trade in forest products. The approximate balance between exports and imports depended on the offsetting of net imports of lumber, largely from the Soviet Union and North America, by net exports of pulp and paper to other continents. Furthermore, there were, even in 1937, evidences of approaching shortages.

After the war the situation had deteriorated seriously with respect to lumber, chiefly because of disturbance of former trade channels. Also the quantities of lumber formerly available to deficit countries from exporting countries have been reduced, partly because of reduced production and partly because of increased domestic consumption. The change in the position of the Soviet Union, from that

of a larger exporter to that of a net importer of lumber, has had particularly serious effects in western Europe.

With respect to pulpwood and pulp products, Europe is even today exporting more than she imports; but many European paper mills are idle, partly for want of pulp.

For pitprops, so essential to coal mining, Europe is practically self-sufficient, except for imports from Canada into the United Kingdom. The prospects for the future, however, are occasioning a good deal of concern.

Some countries of Europe already have surplus supplies of fuelwood, although others are short. This situation is difficult to correct, because fuelwood is the cheapest of forest products and cannot be transported profitably over long distances.

Europe's serious shortage of lumber comes at a time when the real need is exceptionally great, because of war damage to homes and factories. Prospects for increasing supplies from outside sources are slim. Arrangements have been made to increase temporarily the output from Europe's own forests, but this cannot be continued indefinitely under existing conditions. The long-term solution must lie, therefore, in improvement of the condition and output of Europe's own forests, and the prospects are that this can be done, given time. It will involve extensive reforestation, such as is being undertaken in the United Kingdom; conversion of coppice forest to coniferous high forest, now under way in France; and improvement of the degree of stocking in the forests of the northern countries. But there is little prospect that Europe can substantially increase the average per capita rate of consumption she enjoyed before the war from her own resources. If and when the Soviet Union resumes her former position as an exporter, the situation will be greatly improved.

Conditions in the Soviet Union are difficult to assess because of the lack of definite information. In brief, the reconstruction problem is still very great, and all domestic wood available, plus substantial imports, is likely to be needed within the country for a long time to come. Possibilities for the future, however, are very great because of the immense size of the forest resource, a large proportion of which is not yet accessible. Prewar consumption of wood per capita was estimated to be about 50 cubic feet annually, and is probably not much different today.

There is no question that current difficulties in North America and the USSR can be overcome eventually, and Europe can probably

re-establish relatively satisfactory supplies of forest products, perhaps with some help from outside.

**SHORTAGES IN THE FAR EAST.** The situation in the Far East is far more serious. There are extensive forest resources in such countries as Burma, Siam, and the Netherlands Indies; but in India and China, with more than 40 per cent of the world's population, the average quantities of forest products available per capita are very, very small. Even if the well-forested countries of Asia are included, average consumption per capita is only 10 cubic feet and in the two large countries the figure is much lower. Millions of people have virtually no wood at their disposal. Time does not permit outlining the consequences that follow, but they are serious indeed. In the areas of India and Pakistan formerly included in British India, there is hardly one-fourth of an acre of accessible productive forest per person; in China less than one-tenth of an acre, although inclusion of inaccessible productive forests brings the average up to about one-fourth of an acre.

For Asia as a whole, area of forest per person is nearly three-fourths of an acre, nearly the same as in Europe; but one-half of the total forest area of Asia is still inaccessible. How much can be done in the future by way of shipments of wood and its products from Asia's well-forested countries into India and China remains to be seen; in the meantime, large-scale planting projects within the two larger countries should be undertaken as soon as possible.

In the Near East and Middle East the stringency is even more severe. Prewar average consumption of wood was only 3 cubic feet per capita and most of that was imported. In Egypt there are no forests, in Saudi Arabia practically none, and in Iraq the forests that exist are remote from the dwellings of most of the people. Over much of this region soil degradation has progressed so far, and climatic conditions are so severe, that reforestation programs will be very difficult and very expensive.

Shortages of various kinds also exist in other regions but time does not permit examination of all of them.

#### **FUTURE OF WORLD FOREST RESOURCES**

We have reviewed present difficulties. Now we may examine future possibilities on the basis of the latest information respecting world forest resources.

In approaching this question from a world-wide point of view several facts must be borne in mind. First, there are great differences between the geographical distribution of forests and of populations. Second, wood in its natural state is a bulky material of relatively low value, and considerations of cost, as well as of supply, limit its transportation over great distances. For the more highly manufactured forest products the cost factor becomes of less importance. Third, differences in climate and in ways of living combine to ensure that an absolutely uniform distribution of available supplies will neither occur nor be needed.

In 1937 world consumption of forest products was estimated to be equivalent to 53 billion cubic feet of roundwood, and that figure is probably close to the rate of consumption today.

The problem is to determine whether productive forests now in existence could, if they were properly managed, provide that amount of wood, or an even larger amount, in perpetuity.

Total world forest area is estimated to be 9.9 billion acres, of which 6.4 billion acres are classed as productive. Of the productive forest, 2.3 billion acres are coniferous or softwood forests and 4.1 billion acres are broad-leaved or hardwoods.

After careful study it is estimated that, if the softwood forests now accessible were properly managed, they could yield more than 40 billion cubic feet annually. Forests as yet inaccessible should be able to produce an additional 20 billion cubic feet, giving a total of 60 billion cubic feet. Thus there appear to be possibilities for obtaining more wood annually, in perpetuity, from coniferous forests alone, than is now taken from all forests. This conclusion was not reached by assuming an over-all average rate of yield; but, when results are examined, it works out at an average of 31 cubic feet per acre. Many authorities would consider this average figure far from optimistic.

When we consider that the conclusion just outlined makes no allowance for the productive broad-leaved forests, which are nearly twice as extensive as the coniferous forests, it is evident that the forests of the world are potentially capable of a total production vastly greater than in the past. But it cannot be emphasized too much that this result depends on proper forest management. Unless such management is established, increased drain on the forests will merely result in their progressive devastation.

On the whole, prospects for the future are encouraging; but man's treatment of the forests up to the present, as seen from a world-wide

point of view, has been far from satisfactory. National forest policies are still lacking in many countries and are far from adequate in many more. For example, the United States and Canada have only progressed to a stage of transition from uncontrolled exploitation to forestry. Regional policies, particularly necessary where the forests and forest industries of different countries are naturally complementary to one another, have never been formulated.

Here again an encouraging change has become evident in the past few years in the adoption of an international approach to major forestry problems.

#### **DIVISION OF FORESTRY AND FOREST PRODUCTS, FAO**

In 1945 forty-two governments signed the constitution of the Food and Agriculture Organization of the United Nations and the number of adherents has now risen to 58. This organization is responsible, among other things, for promoting better use of forest resources and increased production and improved distribution of forest products. In order to carry out these functions, the organization includes a Division of Forestry and Forest Products, of which M. Marcel Leloup of France is director.

It is not possible, in the time at my disposal, to review all the activities of the division, but it will suffice to draw attention to some of the most important ones.

Working on the principle that a situation cannot be dealt with until the facts are known, studies of world forest resources were promptly undertaken and a world-wide program of annual statistics on forest products was established.

An international journal covering the fields of forestry and forest products, under the name "Unasylva," is being published. It serves as a medium for disseminating information and news throughout the world.

At an early stage it became evident that problems characteristic of different regions varied so greatly in kind and relative importance that a regional approach was essential.

Since Europe's post-war difficulties appeared most acute, first attention was directed there. FAO is now providing the secretariat and actively cooperating in the work of the Timber Committee of the Economic Commission for Europe. This committee is particularly concerned with finding solutions to urgent short-term problems regarding supplies of softwood lumber and pitprops. Good progress has been made. The committee has succeeded in ensuring the fairest



practicable distribution of available supplies, and steps which have been taken to secure additional forestry equipment for certain exporting countries are expected to result in increased supplies in the future.

A European Commission for Forestry and Forest Products has been created, under the aegis of FAO, where representatives of member governments can discuss their medium and long-term forestry problems, and seek means for their solution. This commission, and some subsidiary bodies, are served by the working group of the division established at Geneva.

The first Latin American Conference on Forestry and Forest Products, organized by FAO, was held in April, 1948, at Teresopolis on the invitation of the government of Brazil. This conference adopted a series of constructive recommendations which will be the foundation of future progress. A working group of the Forestry and Forest Products Division has since been established at Rio de Janeiro, and the Latin American Commission for Forestry and Forest Products held its first meetings this year.

A similar conference for Asia and the Far East was held at Mysore, India in the spring of 1949. A forestry representative of FAO is established in Bangkok, and organization of a commission is under way.

Further extension of the work to the Middle East and Africa is also planned.

The system adopted ensures that governments themselves will determine, through mutual discussion, the most urgent regional problems and the manner in which they should be tackled. At the same time, FAO is able to serve its members by acting as a coordinating agency. In the long run, the ideal of a world forest policy may emerge. The estimate of the ultimate possibilities of the world's forests points to the great advantages which might flow from such an outcome.

Meanwhile, FAO is endeavoring to bring technical information and advice within the reach of countries who need it, particularly the underdeveloped countries. Studies of means for reducing excessive wastage of wood are being pursued. Establishment of integrated forest industries, capable of using to best advantage all the products of the forests at their disposal, is being promoted. Not least in importance, FAO loses no opportunity to stress the fact that forestry and the utilization of forest products are one indivisible subject, and that the needs of the silviculturist and of the forest industrialist must be

considered jointly. To this fundamental concept too little attention has been given in the past.

To sum up the forestry situation, the world is now suffering from shortages of forest products, but the forests are inherently capable of producing far more wood annually than has ever been taken from them.

If the future possibilities are to be realized, all productive forests must be brought into use and haphazard exploitation must give way to orderly management.

Improved management of the forests of each country must be undertaken by that country, and great efforts will be required.

Finally, regional and world-wide cooperation between nations offers the means for faster progress.

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# 10.

## *Recreational Land Problems and Policies*

ERNEST S. GRIFFITH

*Director, Legislative Reference  
Service, Library of Congress*

**R**ECREATION IS "OFF THE JOB" LIVING, IN-SO-FAR AS it is designed to give pleasure, relaxation and satisfaction to the individual.

Horace Albright, the former Director of the National Park Service, tells the story of a conversation he once had with an engineer who was visiting Yosemite. The engineer waxed eloquent on the proposition that the national interest would best be served if those who valued the beauty and recreational opportunities of Yosemite would take thousands of photographs for preservation for posterity, and then allow the engineers to build a dam at the entrance of the valley so as to turn to economic ends the potential resources in power and irrigation which the valley contained. The suggestion was advanced in all seriousness and illustrates the gulf of misunder-

standing which those who believe in recreational values must somehow bridge in order to gain in certain quarters even a tolerance for their views. It is the age-long gulf between fact and value, between the tangible and the imponderable, between things material and things of the spirit.

It is not that a strong case cannot be made out that there are tangible economic values in recreational programs. This holds true for those under governmental agencies as well as for recreation which is privately sponsored. The exploitation of natural phenomena, for example, the Luray Caverns and the Natural Bridge of Virginia, has made more than one millionaire. Recreation as sheer industry, especially if the recreational aspects of other industries are included, counts its annual balance sheet in the billions. Though even an approximate measurement of the economic implications is difficult, the fact remains that under any method of calculation, states such as New Hampshire or Wyoming<sup>1</sup> must rate their recreational attractiveness as one of their top three or four economic assets.

The National Park Service has recently attempted the precise measurement of recreational facilities in monetary terms.<sup>2</sup> In general, the conclusion is that such measurement presents almost unsurmountable difficulties, but that to say there are difficulties in the way of measurement must never be allowed to obscure the fact that the economic and monetary values exist. The increased income of merchants and of hotel proprietors and concessioners, in or near recreational centers, is substantial and obvious. The substantial increase in land values and hence in taxable capacity in communities bordering our National Parks is likewise apparent, although the percentage of this increase attributable to recreational facilities may be the subject of controversy in particular cases. Moreover, one must never overlook the increase in productivity and earning capacity of millions and millions of Americans, both management and workers, as the result of the energizing influence of wholesome recreation.

All these statements would be generally accepted. Yet just because a firm monetary figure of the values concerned cannot be demonstrated, they are far too often overlooked. If, in what follows, reference to those values in monetary terms is not made, it must not be thought that this aspect is overlooked or its importance under-

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<sup>1</sup> The figure for Wyoming for 1949 is estimated over \$85,000,000. Cervi's *Rocky Mountain Journal*, p. 3, Nov. 17, 1949.

<sup>2</sup> This report entitled "The Economics of Public Recreation" is not yet complete. The portions thus far finished are yet only in preliminary form, and are not generally available.

rated. On economic grounds alone, the case for increased provision of wholesome recreational facilities, under both private and governmental auspices, is extremely strong.

### THE GROWING IMPORTANCE OF RECREATION

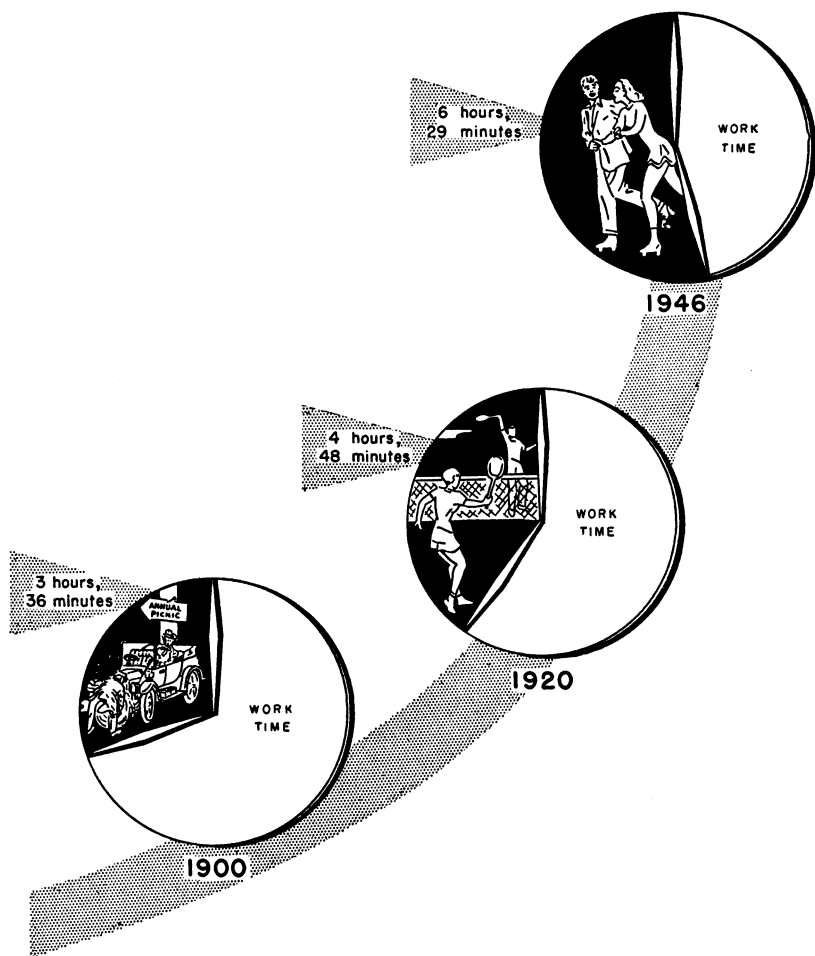
Yet, we must never lose sight of the fact that back of the economic order and its statistical and monetary expression lie those basic human needs for which the economic order itself exists. To the satisfaction of these needs, our natural resources should be ultimately dedicated, not only for those of us now living but even more for generations yet to come.

Consider, if you will, a few simple facts involving the relationships between these basic needs and our resources. For food and clothing we look to our soils, for shelter we look to our forests, for our national security, for our power, for our transportation, and for the heat of our houses we look to our minerals and water resources. This is not the end of the story, for man has other needs just as fundamental extending beyond his food, his clothing, his shelter, and even his security. Back of monetary income, back of income of goods and services lies man's psychic income, his ultimate enjoyment of his food, his clothing, his shelter, his security. This is ultimately the only real income of which we know. In this same psycho-physical sense that man needs food, man's nature calls for activity and self-expression. Man is born curious. Man's personality requires the esthetic expression of the beautiful.

To a very remarkable degree the satisfaction of these other needs belongs, not to the sphere of his economic activity, but to the use he makes of his leisure time. A satisfying expression of these other inner drives of man is largely dependent upon the use we make of our natural resources, more especially upon the program of recreation that rests upon these resources.

The extent and the consequent opportunity of leisure time is capable of statistical demonstration. In the Prewitt report are brought together some tremendously important data bearing on this point. It is recognized that under modern conditions as well as of old, about twelve hours of every twenty-four of a man's time are necessarily taken up by eating, sleeping, personal hygiene, dressing and other minor items for which the title "personal maintenance" will serve as an inclusive term. It is only the other fifty per cent of a man's time which in practice is distributable. In 1900, 70 per cent of the remaining twelve hours of his average day were taken up by

# GROWTH OF OUR LEISURE TIME\*



\* Chart based upon 12 hours. The remaining 12 hours of each day are taken up by eating, sleeping, personal hygiene, dressing, etc.

FIG. 10.1.—Growth of our leisure time. Chart is based upon 12 hours. The remaining 12 hours of each day are taken up by eating, sleeping, personal hygiene, dressing, etc.

man's work at earning a living. By 1920, this had fallen to 60 per cent; in 1946 it had dropped to 46 per cent. Expressed in reverse—in 1900, 30 per cent of man's time was available for leisure. In 1920, 40 per cent; in 1946, 54 per cent (Fig. 10.1). So great has been the shift in this apportionment of man's time between his work and his leisure that we are now in an era in which for the first time in history, the latter exceeds the former. If this were the only measurement of the need for growth in recreational facilities nationally, the case would be exceedingly strong. But this is by no means the whole picture. During the same period, our population has grown from 76 million to 141 million. Thus, even were the number of hours available for recreation in the average man's life the same as in 1900, we would still presumably need approximately double the recreational facilities. However, if we put together the increase in the number of hours available and the increase in the number of people and then assign the index number of 100 to the year 1900, the presumed need for recreation in 1946 is appropriately represented by an index number of 333. In other words, on the basis of even this superficial indication of social trends the recreational needs and opportunities have more than trebled so far this century (Fig. 10.1).

This is by no means the whole picture. Craftsmanship has always been regarded as a satisfying element, psychologically speaking, in a man's work. With the coming of mass production, craftsmanship is lessening, and the values associated with it must more and more be found in leisure time. Moreover, physical activity—if not excessive—has also been regarded as having its compensations, especially when associated with farm life. Here again, increasing urbanization and increasing specialization have forced man more and more to look for the opportunity for physical activity in his leisure time rather than in his work. Urban life itself multiplies tension and decreases relaxation; and we are paying the penalty in the increased population in our mental institutions, the increased instability in our homes, and the increased friction in life generally.

Yet the same power revolution that has produced the problem has increased the opportunity of making a wholesome and imaginative recreational program practicable. Per capita real income has more than doubled in this century. The five-day week, more vacations and longer vacations, later entry into industry, longer life after retirement—all these represent on the one hand a greater demand for recreation and, on the other, a greater opportunity to enjoy it.

Every sign points to all of these major social trends continuing. They represent one of the major factors to be taken into account in any thinking about the nature and welfare of the society of the future.

#### **PUBLIC AND PRIVATE RECREATIONAL RESPONSIBILITIES**

The respective roles of private enterprise and of government are questions which haunt most branches of man's activities, and recreation is no exception. Even within the field of government the respective recreational roles of the locality, of the state, of the nation, and even of international organization are likewise to be found among the most perplexing problems. Without being at all dogmatic as to what ought to be, it may be of interest to outline the present trend.

The sphere of private enterprise and activity can rightly claim most of man's recreation in which he is more or less passive. Movies, watching sports, resorts, are cases in point. Certain luxury sports, such as golf and horse racing, normally also fall within the sphere of private enterprise. When one considers that this vast range of private recreation extends from the weekend bender to listening to the blare of the radio, it is perhaps clear that in terms of the national interest it is doubtful as to whether private recreation as now constituted actually lies on the credit or the debit side of the picture in terms of human betterment.

The provision of recreation by our municipalities and local government units becomes, not so much a problem of the alternative use of our resources, as of urban values. As such it is almost entirely outside the scope of this chapter. The needs and nature of a balanced urban recreational system are theoretically well established, but require translation into action. The bulk of public provision for recreation for children and youth, after hours recreation for adults, and some weekend recreation are obviously the primary responsibility of local governments.

Increasingly the states are playing a role in the recreation field. In part this is "promotional." Out-of-state visitors are to be attracted and state residents are to be kept within the state borders, presumably with the beneficial by-product of their spare cash entering or remaining within the state. State parks, state recreational facilities along highways, state parkways, are illustrative of this trend. Beaches and other water front developments under state auspices are increasing. In general, the state caters to weekends of its own residents, to short vacations and to tourists from other states. Substantial natural



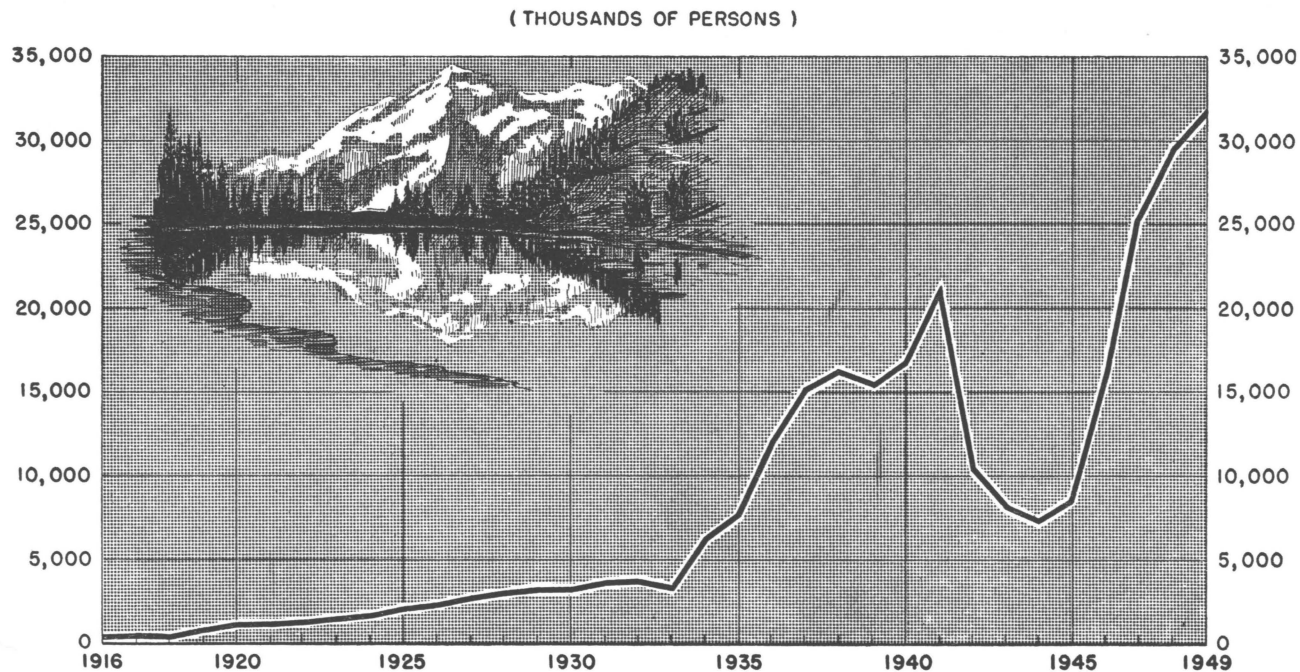
resources are to be found in many state park systems, especially those of states such as New York and California that have led in this development.

However, the real concern of most persons lies in the program of the federal government. It is unnecessary to enter the controversial field of federal aid to state and local recreational programs to indicate the tremendous importance of Federal recreational responsibility, especially in connection with our public lands. Here surely is a field ample enough to engage the interest of our government for many decades to come. Many of the considerations advanced will apply also to the states. Before outlining the issues and suggestions for an ideal program, let us examine what we now have.

Paramount responsibility in the federal recreation field is shared by two agencies: The National Park Service of the Department of the Interior and the Forest Service of the Department of Agriculture. This is not to underrate the incidental and occasionally important recreational aspects of the work of other agencies, such as Fish and Wildlife Service, the Bureau of Reclamation, and the Indian Service. To list these agencies is itself to further underscore the fact that, as far as the federal government is presently concerned, the problem is almost exclusively one of land management or the alternative uses of our public domain.

Let us first take a brief look at the National Park Service. By 1947, there were 28 national parks comprising over 11 million acres. In addition, there were more than double this number of national monuments—many of them of considerable acreage. The total number of visitors in 1948 in the National Park System has been estimated at over 25 million, of whom over 11 million were to the national parks (Fig. 10.2). The National Park Service also administers several important recreational areas for the Bureau of Reclamation and the Army Engineers, areas which have been developed in connection with certain flood control and irrigation projects of these two agencies. A complete catalog of the National Park Service activities would also include a number of minor classifications, notably the National Parkways and the National Capital Parks. Of historic interest, although not affecting the resources picture materially, are the national memorials and national cemeteries, also under National Park Service jurisdiction.

The National Parks themselves are the most spectacular and the most important of the activities of this agency. The scenic resources of our country are by no means evenly distributed, nor



NOTE 1916-18, exclusive of visitors to National Monuments  
1916-42 and 1947-49, figures based on travel year ending September 30  
1943-46, visitors for fiscal year ending June 30

FIG. 10.2.—Visitors to national park service areas, 1916-49. Note: 1916-18, exclusive of visitors to National Monuments. 1916-42 and 1947-49, figures based on travel year ending September 30, 1943-46, visitors for fiscal year ending June 30. (United States Department of Interior.)

can their preservation safely be left to private enterprise. The Park Service policy has been clear and consistent: at least one example, and if possible the best example, of each type of our outstanding scenic resources should for all time be preserved—as nearly as possible in its natural state. To call the roster of the National Parks is to indicate how splendidly this ideal has been sustained. The majesty of the Grand Canyon, the luxuriant rain forests of the Olympics, the natural curiosities of the Yellowstone, the scenic grandeur of the Tetons, the tangled beauty of the swamps of the Everglades, the rock-bound sea coast of Acadia, the natural volcanic wonders of Crater Lake and of Hawaii—these, and the other national parks thus far established, constitute a priceless heritage that we dare not threaten by commercialism on the one side or by public development on the other. To add to such a system, as well as to preserve inviolate what we now have, is surely a not-unworthy objective in the management of our public domain. Moreover, in certain of the national parks such as Mesa Verde; and in many, if not most of the national monuments, there are also historical and archeological values which are second only to those scenic values which determined the establishment of most of the parks.

The very success of the national park system has itself created the major day-to-day problems which face the Park Service. The enclaves of private land within the park borders soar in value through the growth in use of the parks themselves and hamper the purchase program which is our declared national policy. The very popularity and the resultant overuse of the parks threaten at least some of their value as exhibits of nature at her finest, and at the same time create serious problems of inadequacy of staff as the crowds come. These crowds, sometimes bringing with them a hankering for some type of amusement to which they are accustomed in the city, continuously exert pressure for a whittling down of standards to the lowest common denominator.

It is not ordinarily appreciated that the Forest Service ranks along with the National Park Service as of equal magnitude in the recreational horizon. Statistics indicate that about 21 million people annually visit the national forests for recreational purposes (Fig. 10.3). This does not include those who necessarily passed through the forests in transit from one place to another. Over 6,000 public camps, picnicking grounds and other recreational facilities have been provided by the Forest Service for public use. The scenic resources of the national forests likewise do not suffer by comparison

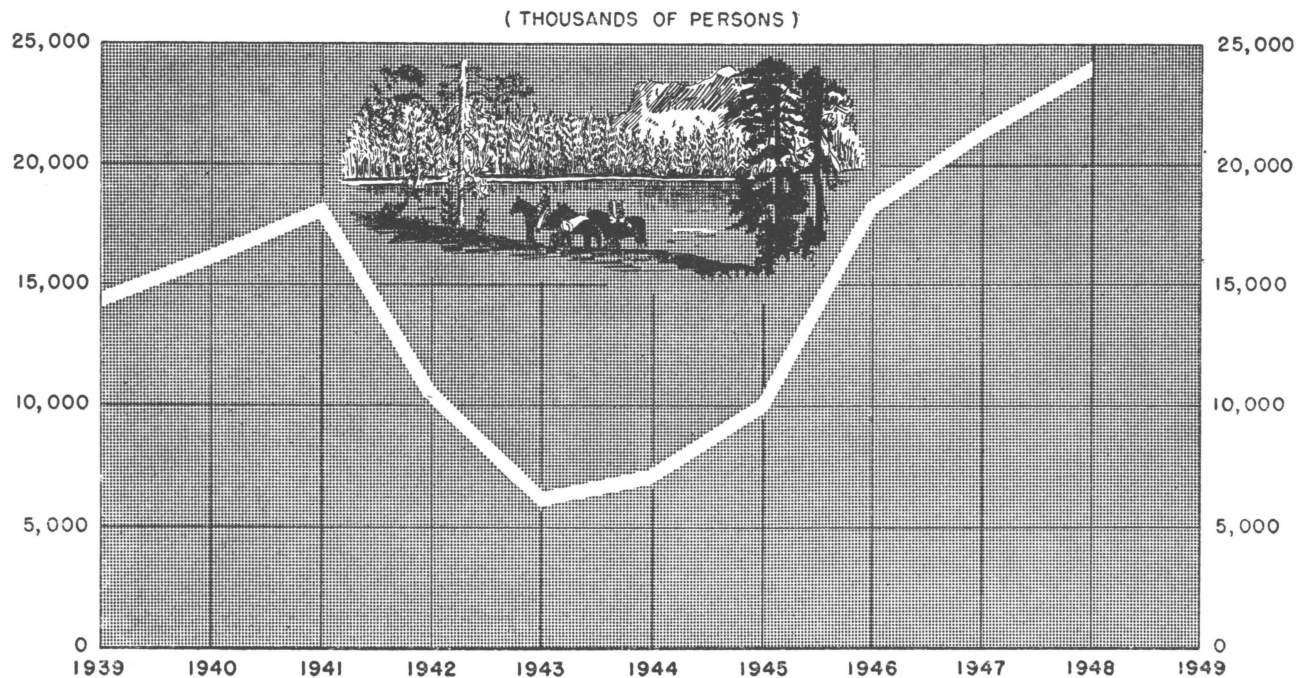


FIG. 10.3.—Visitors to National Forests for recreational purposes, calendar years, 1939–48. (Forest Service, USDA.)

with those of the National Park Service. Moreover, there are more and greater wilderness and wild areas preserved in their primitive state in the lands under the jurisdiction of the Forest Service even than in the national park system. Seventy-seven such wilderness and wild areas comprising 14 million acres have been so designated under the powers given to the Secretary of Agriculture and the Forest Service. Trails, scenic highways, skiing and winter sport facilities, hunting and fishing governed by state laws, boating, trails and facilities for trail riding also play their part in the recreational program of the Forest Service. The problem of the Forest Service, however, is different in kind from that of the Park Service. In the latter, recreation is by statute the dominant objective in land use. Artificialization of lakes and streams is forbidden, the grazing that remains is to be eliminated, timber cutting permitted under the terms of the original acquisition of land is eventually to be stopped and the national parks are not ordinarily subject to mineral entry. On the other hand, the part of the domain under the control of the Forest Service is for the most part meant to be utilized on a sustained yield basis in the national interest—broadly considered. Timber cutting, flood prevention, grazing, storage and use of water for irrigation purposes as well as recreation are important, and often more important uses from the standpoint of national policy. Furthermore, safeguards of recreational interests in the Forest Service lands are administrative rather than statutory. Under these circumstances, recreation must take its place as one of many competing uses.

Time does not permit discussion of the status of recreation in connection with lands under the jurisdiction of the Fish and Wildlife Service but the problems are essentially not dissimilar from those of the two agencies already discussed.

#### ISSUES IN RECREATIONAL USE OF THE PUBLIC DOMAIN

With this over-all picture in mind, we are ready to consider in somewhat greater detail the major issues in connection with recreation and the public domain.

Within recreation itself there is the ever present issue of balance rising out of competing recreational needs and demands. In the famous study made in 1941 by the National Park Service entitled, "A Study of the Park and Recreational Problems of the United States,"<sup>3</sup> there is rich material indicating the relative interest of

<sup>3</sup> *A Study of the Park and Recreational Problem of the United States*. U. S. Department of the Interior, National Park Service, U. S. Govt. Print. Off. Washington, 1941.

people in various forms of recreation. By a somewhat arbitrary grouping these forms may be divided into four categories. In the first category—that of greatest popularity—come sight-seeing and touring, picnicking, swimming, and fishing. Group two comprises activities popular with large numbers of people, but nevertheless caters to a considerably smaller group than does group one. These include camping, hiking, boating, and nature study. There is a further group of minor interests such as trail riding. Winter sports belong in a somewhat different category, in the light of their very rapid increase in popularity.

Unfortunately some of these types of recreation are in conflict, and there is some danger of mass demand seriously hurting the concept of balance between the various uses. We must beware of putting Blue Ridge Parkways on every range or demonstrating spectacular engineering skill by making possible the ascent of every mountain in the plush recesses of a late model car. Each type of demand obviously ought to be supplied within limits. Planning on a national scale could minimize the conflicts, and cater to all groups.

It is doubtful whether the commercial type of recreation belongs in our national forests, and certainly it has no place at all in our national parks. Plenty of opportunity exists on privately owned land for any and all types of commercial development, and such development seriously impairs the superior value to the nation of the noncommercial forms of recreation.

On the assumption that the concept of balance has been successfully worked out as between competing forms of recreation, we next face the far more difficult problems of multiple use and of conflict of interest in our public domain policy generally. This conflict is most noticeable in the constant struggle between the recreation groups and the lumber, the grazing, and the mining interests. The present threat of the lumber interests to the superb and irreplaceable virgin timber stands in the Olympic National Park will serve by way of illustration, as will the constant efforts of livestock men to obtain permission to graze in the park lands. At times, such conflict of interest originates, not with any private group, but rather with one of the other agencies of the Federal Government. This is especially true in connection with irrigation, power, and flood control projects. Without yielding to the temptation to pass judgment on particular situations, we may illustrate by indicating that the program of the Army Engineers threatens the present boundaries of Glacier National

Park; and that the preservation of the wilderness status of Lake Solitude in the Cloud Peak Primitive Area in the Big Horn National Forest falls athwart the plans of the Bureau of Reclamation.

But all is not conflict. Broadly speaking, there is a parallelism of interest between the use of the public domain for recreation, the conservation of the forests, and the preservation for future generations of at least some of our mineral resources. The parallelism of interest of recreation and of watershed protection with the tremendously important secondary consequences of the latter to the programs of siltation prevention in our dams and of flood control is a parallelism only commencing to be appreciated. The conflicts between recreational values and the activities of the Fish and Wildlife Service are easily resolvable. Hunting is probably an exception. Scientific research in land use, botany, mineralogy, geology, zoology, and a large number of subsidiary sciences is obviously, in general, aided by preservation of land in its native state. Moreover, the depression-born program of the Civilian Conservation Corps left as one of its ultimate products, not only a fine record of disease and pest control, but the opening up through trails, camps, and other suitable recreational facilities of larger areas of our parks and forests hitherto for practicable purposes completely inaccessible to all but a very few of our people.

#### VALUE JUDGMENTS IN RECREATION

Is there then some basis for an answer to this most perplexing of all problems involving alternative land uses? Can there be for recreation a program, imaginative and adequate, and yet at the same time reasonable—one which will bring balanced use within its own sphere, and the development as well as the conservation of our resources in other spheres?

Some forms of value judgments in the choice of various forms of recreation can be given a plus rating and others a minus rating in their effect on the individual. Surely government in its concept of the public interest has a responsibility to weight the scales on the side of the plus forms. This holds true, whatever may be one's theory as to the role of government in discouraging or prohibiting the minus. This generalization of aiding the plus is extremely attractive, but it does lead straight into fundamental considerations of philosophy and ethics. The term, "public interest," has never been defined precisely to the satisfaction of everyone, nor have criteria been evolved sufficiently precise on which to base judgment in

particular cases. We have preferred too often to remain in the convenient ambiguity of broad generalizations. Nevertheless, the advocate or opponent of a particular program owes it to his audience to define his value system in these matters. To measure the public interest is to judge a matter in terms of its contribution to the fulfillment of individual personalities in such fashion as to enhance and not frustrate the personality fulfillment of others. This has been said thousands of times before and better said. Adopting personality fulfillment as the criterion, a recreational program should promote seven objectives, each one of which seems to be part and parcel of such personality fulfillment when this fulfillment is spelled out in detail.

The first of these is physical fitness. A recreational program should be a participating program, maximizing the opportunity for hiking, swimming and other health-giving activities. This is so obvious as not to require any lengthy explanation.

A second objective, the enhancement of mental hygiene, is less well appreciated. The din of city life, the tension of the intricate economic and social relations and conflicts, the ever present rush and hurry—these lie at the root, not merely of the tremendous increase in nervous and mental breakdowns, but also of a high percentage of those halfway stations on the decline from complete sanity and poise to actual breakdown which are characteristic of most of us. Feelings of resentment, irritability, anxiety, are by-products in many, if not most, instances of the type of life to which an urban society at top tempo condemns the great majority of our people. Psychiatrists and psychologists through intricate analysis attempt to patch up or adjust personalities to these situations, but these practitioners of the mental art would be the first to agree that rest, the practice of contemplation, the complete absence of any distraction have therapeutic values to troubled minds, and form an integral part of any sane and normal personality. If this rest, this contemplation, this solitude can be in scenes of great beauty, of grandeur, of majesty, how much more will the experience mean.

In the third place, there is no reason for not placing equal emphasis upon the spiritual strength that recreation in close communion with nature at her finest and best can give. It is not an accident that the great faiths of the world have been hewn in the deserts and mountains, and not in the cities. The solid core of spiritual strength which democracy seems to need to give it its necessary dedication to the public good can of course come through



many channels. Yet one of these channels historically has been forest and stream, mountain and sea, and all the sights and sounds which cleanse man's thoughts from the clutter and irrelevancies and pettinesses of so much of our hectic society.

In the fourth place, surely man in all ages has held the growth of his esthetic appreciation as among his ultimate values. The beauty of the Gothic cathedrals traces to the forests of Western Europe. The sounds of nature have brought some of music's greatest symphonies; and whether or not the individual has the talent or the chance to translate his esthetic experience into the media of painting, or poetry, or music, or architecture, the thing that beauty of nature can do to his personality in increasing its significance is beyond price.

In the fifth place, it is to the credit of our National Park System, that along with the preservation of the great achievements of nature, there is also an honoring of our history and thereby an urge toward love of country in its purest and finest sense among our people. The birthplace of Lincoln, the site of the Gettysburg Battlefield, the Alamo, the Oregon Trail—these too are America.

In the sixth place, surely the growth of scientific interest, of curiosity about man and things is part of the development of a full personality. A study of nature as well as its appreciation; the preservation of primitive areas as they were before they were touched by man so that the balance of nature, her conflicts and her ways can be observed; swamp and primeval forests, the erosion of a canyon, the sanctuaries of wildlife, the sand dunes from the ceaseless activity of sea and wind—these all have a scientific importance, little, if any, inferior to their contribution to the growth of the esthetic and spiritual.

Finally, of course, in looking toward the fulfillment of personality we must enhance man's chances to develop his social nature along lines that will promote cooperative ventures for the common good. It would be tempting to elaborate at this point on the particular contribution in this regard of boy's and girl's camps, but space does not permit. Suffice it to say that some, at least, of our national recreational program should and does recognize this particular value. That man himself recognizes and craves this type of development is at the root of why, for the most part, recreation of this type has proved commercially profitable as well as personally valuable.

The foregoing is the briefest of sketches of a philosophy of constructive recreation that lies close to the heart of our national interest.

### A NATIONAL RECREATIONAL PROGRAM

How much and what then do we need for an adequate national program of recreation? If you agree that these values are the paramount ones, what in practice should be the component elements of such a national program? Have we here a measure of recreation's stake in our natural resources? Here are three guiding principles.

The first principle is the inviolability in their primitive form of those areas which alone can give some of the foregoing values in full measure. Mental hygiene, spiritual strength, esthetic growth, scientific interest seem to be at their maximum only when nature is essentially left as she is. To commercialize our national parks, to invade our wilderness areas with the sights and sounds of civilization, to replace primeval forest by scrub growth and tangle, to dam a Yosemite Valley is to impair the very essence of what makes these areas the finest and best way of making their virtually unique contribution to the development of personality. To hold this is not selfishness on the part of those, even though they are as yet few in number, who value the primeval or who look toward areas of solitude or who do not want billboards placarded over a place of beauty or who resist the entrance of an airplane into the habitat of moose. For those who value these things have an incorrigible belief—a belief that somehow or other in this mad world those elements of poise and perspective and spiritual insight which we associate with nature have a contribution to make with which the nation can ill dispense. It is hoped that the demand and use of parks and wilderness areas will increase, but with the increase that the number of these areas will likewise be increased, so that the very education of the public as to their value may not so crowd them as to lose much of what they are meant to be and do.

As a practicable matter, such areas, though increasingly accessible through modern transportation, will still leave the great majority of the people without the opportunity to enjoy them. Consequently, the continual multiplying under Forest Service and state and local responsibility of a network of areas so developed as to make at least a modest contribution to the seven values indicated will be necessary. Small wild areas, parkways, roadside facilities, noncommercial development of at least some of the seashore, lakeshore, and river banks should bring some such opportunities within reach of millions.

Finally, foresight in planning recreation on a national scale is needed. We seem to be moving toward a period of multiple purpose

river basin development on a scale and with an imagination which dwarfs anything hitherto accomplished. Surely recreation has now reached a stature of parity with those other uses and purposes of the public domain, with irrigation, flood control, power and the like, which are more frequently associated in the public mind with such development. The doctrine that public welfare has many alternative expressions should be recognized, and irrigation, flood control, and power development, however important, must not be allowed completely free reign. They can constitute as great a menace as any commercial or private interest to the development of a recreational program. It is balanced planning that is essential. In order to make this suggestion concrete, attention should be called to a recommendation contained in the report of the Natural Resources Task Force of the Commission on Organization (Hoover Commission). This is the establishment in the Office of the President of a Board of Review on which a representative of recreation would sit along with representatives of agriculture, power, forestry, mineral resources, and all the other elements that go to make up river basin planning. To such a board should be submitted any and all projects for review, with a view to assuring that all these multiple interests have been integrated and preserved in the planning.

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# 11.

## *Problems and Policies of Wildlife Management*

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**I**N DISCUSSING THIS SUBJECT IT SEEMS DESIRABLE to review the basic developments which have caused many students of wildlife problems to conclude that some forms of wildlife are facing their greatest crisis since the white man arrived in North America. This crisis is due entirely to human activity. Many students now believe that man's industrial and agricultural developments have become of almost geological magnitude affecting wildlife and wildlife habitat in vast areas as much as, if not more than, natural factors.

The white man found a virgin continent. Indians were few and lived directly by hunting and fishing. They had little effect upon the abundance or scarcity of other life. In fact, except for areas about more or less permanent villages, they were probably relatively insig-

nificant predators. The Indians lived largely by hand-to-mouth methods and such agriculture as they practiced was limited to small areas which had little effect upon other creatures.

Unquestionably, there were at this period, areas which were abundantly stocked with wild forms, and others in which they were scarce. These varying abundances were related to such factors as fertility, rainfall, climate, and other various influences that determine the quantities of life that may exist. Aside from these limiting factors, varying annual vegetative growth certainly provided at times extraordinarily abundant food supplies, while at other times in the same communities food was scarce. The Indians prospered or failed to prosper as other forms, and all were part of a community in which biological and physical factors directly affected both man and beast.

In a few hundred years the white man has changed this picture—first by his extraordinary increase in numbers from a few straggling colonies to a nation of 150 million people. It is a well-known biological axiom that there are maximum limits to the quantity of life that can be supported by any territory. Therefore, the mere fact that additional millions of individuals occupy the land means that other living things must be relatively less abundant. There is less living room for them and, consequently, less chance for them to reproduce and survive in the numbers which once existed.

Other than by mere numbers, man has influenced the abundance of other creatures by intensive use of land for agriculture, dwelling sites, roads, cities, towns, manufacturing plants, and other many and diverse exclusive uses which are made of space formerly available to other creatures. As this exclusive use grows, there must be a corresponding decrease in other forms.

Various activities of man directly affect the fortunes of other living creatures. These include killing for food or other purposes, clearing of forests and plowing grasslands for agricultural use, drainage of land for agricultural or industrial purposes, great impoundments for flood control, irrigation, or hydroelectric power, pollution of rivers and lakes by domestic sewage and industrial wastes, destruction of soil by improper land use, and the growing reliance placed upon control of plant diseases, insect pests, and weeds by chemical methods. This list could be considerably extended, but certainly no one can quarrel with the statement that these activities directly influence the fortunes of other living creatures.

The first human activity which interfered with native creatures in the New World was killing for food and clothing. The early

colonists lived off the land. They killed birds, mammals, and fish for food; used skins for clothing; and made various other uses of these animals. This killing was for a time confined to the vicinity of settlement and had little other than local effect. It did decrease the numbers of the more desirable forms in the vicinity of each community, and as the earlier settlements grew and new ones pushed westward, it gradually reduced populations not only about the towns but to a less extent for an increasing distance about each. As long as this killing was not too severe, it acted more or less as a cropping system in somewhat the same fashion as had Indian activities. However, as the white man grew more numerous and guns and equipment became more effective, killing began to affect total stocks of wildlife.

The early colonists were concerned not only with food but with finding desired native products which might be exchanged for goods from the Old World. Furs and hides were available, and the early settlements paid for tools and manufactured articles by the sale of furs. The trappers constantly pushed ahead looking for new trapping grounds, and were unquestionably responsible for the exploration of much of the continent. As the settlements grew, they still depended upon wild things for food, but it became increasingly difficult to secure enough game and fish near the villages, and hunters were paid to bring in game for their fellow citizens. Commercial fishermen developed as it became increasingly less easy for each individual to supply his own table. The majority remained at home occupied with other tasks, while a relatively few men procured the furs and hides that provided clothing and the meat and fish for the larders of the pioneers. This continued for many years.

Paid hunters supplied meat to the construction crews that built the transcontinental railroads. They were largely responsible for the destruction of the buffalo herds which, however, would have gone with the development of dry farming and stock raising. There could be little place in an agricultural community for migrating herds of huge beasts in the numbers that roamed the Great Plains. Unquestionably, market hunting seriously reduced but did not completely destroy such species as the passenger pigeon. Perhaps it became extinct because of destruction of habitat by agricultural development plus market hunting.

The Eskimo curlew probably disappeared largely because of market hunting in the Mississippi Valley, since its Arctic breeding grounds were still intact. Deer, antelope, elk, and mountain sheep were hunted assiduously both for food and hides. By 1910, they were

practically gone in the United States, and mammalogists were freely predicting that the age of big mammals was rapidly drawing to a close.

Beginning about 1875, the volume of market hunting declined largely because of scarcity of game. At the same time the numbers of those who hunted for recreation began to increase. While such shooting provides food, it is primarily a recreational activity. The increasing interest in this gradually eliminated legal market hunting. Similarly legal commercial fishing was stopped in many of the inland waters. Commercial hunting and fishing to feed expanding populations, followed by a growing number of recreational hunters and fishermen, undoubtedly continues to have great effect upon many living things. Yet this is only one factor.

Other human activities were, even at the beginning of market hunting, beginning to cut seriously into wildlife populations. The earliest of these, which started with the beginning of settlement, was the clearing of land for agricultural use. Naturally the first agricultural lands on the Atlantic Seaboard came from clearing forests. Forests were regarded not as a natural resource but as an enemy which must be fought ceaselessly. If cultivation stopped, the forests struck back and invaded again the cleared plots on which settlers depended for their rather meager agricultural supplies. These clearings, like the first efforts at hunting, had little other than local effect until human demands caused the clearing of vast areas. The progressive destruction of forests necessarily meant a decrease in the forest life dependent upon and associated with such life.

When settlers reached the grasslands and land could be converted to agricultural use by the breaking plow, the change in environment proceeded even more rapidly. Even if there had been no slaughter of the grassland herds of buffalo, deer, elk or antelope, they were doomed by the destruction of their habitat. There was no place for them and eventually they would have vanished, though perhaps more slowly than before the guns of the insatiable market hunters.

Placing under cultivation hundreds of millions of acres of land in 200 years has profoundly affected the abundance and distribution of many forms of life which were not considered at all in the plans of those who broke and cleared the land. Drainage did not seriously affect wildlife until the supply of good free land decreased. Then drainage schemes were developed. Some were good and produced good agricultural lands. Many were based on the false premise that any land from which water is removed makes good farm land.



These drainage schemes lined the pockets of the promoters and those who financed them, but left behind ruined hopes and heart-broken people who had spent their savings trying to farm land totally unfit for such use.

Drainage directly affects fish and aquatic mammals and birds which depend upon marsh and water habitat. Drainage has had a profound influence upon the numbers, the movements, and the distribution of waterfowl. It has affected fishery resources and has been a major factor in the decreased abundance of valuable furbearers, particularly the muskrat. Drainage, by lowering water tables and reducing storage facilities of natural marshes, has an indirect effect upon wildlife as well as upon agricultural and industrial affairs.

Land drainage is not only of historic importance. Many such projects are still being promoted—some of them by the Agriculture Department. A bill introduced in the 80th and 81st Congress authorized the study of 57 million acres in the Southeast to determine how much of it could be drained for agricultural use. One and a half million of these acres include coastal marshes which are the last remaining east coast wintering ground for waterfowl.

The Soil Conservation Service and perhaps other agricultural agencies are actively promoting land drainage in the northern Great Plains. It appears that departmental memory is short indeed. As recently as 1936 the Department of Agriculture and other federal agencies poured millions into these same areas to provide water for stock and for production of any kind of feed—even Russian-thistle. Droughts will come again, and it is disheartening to know that official memories are as short as that of the average uninformed individual.

Great publicity was given in 1945 and 1946 to drainage promoted by the Soil Conservation Service in eastern Maryland; for example, the Whaley marsh on the Chester River near Quaker Neck. The publicity stated the work was being done for conservation purposes, primarily to improve the habitat for muskrats, and to favor wildlife generally. Any party interested in knowing how the improvement has worked might inspect this and similar units. Many such projects produced little or no additional agricultural land or any other values. The acres of land obtained during wet years must be balanced against the average of lost production in dry years to determine whether or not a net gain is achieved.

In recent years, the building of great dams has reached such a

peak that they have an important influence upon the relative abundance and distribution of living creatures. Giant hydroelectric dams are being built for power, irrigation, flood control, or navigation, and sometimes an alleged combination of all. However good or bad these works may be, they do profoundly affect wildlife populations, not only in the immediate reservoir areas, but sometimes for some distance around. They always disturb local biological patterns. For example, by flooding winter range of big game mammals, they sometimes render much summer range unusable for that same species, even though they do not adversely affect the summer range itself.

It is obvious that each big impoundment floods land that produced certain forms of life. It is not true that wildlife can be produced abundantly in waste lands as many unthinkingly believe. Wildlife is a product of soil and water. It can be produced only in meager amounts on unfertile lands or in sterile water. It can be produced in abundance only in productive environment. Therefore, the projects may destroy key areas without which wildlife cannot survive in numbers on adjoining less fertile land.

The impoundment of water affects fish populations usually for the worse in that impoundments normally develop more coarse fish and less of the better quality fish than virgin waters of the same territory produced.

Soil waste by improper land use has been another great factor affecting wildlife. Americans have reduced the productivity of soils at a greater rate than many other nations. These abused lands that can no longer produce agricultural crops produce poor crops of wildlife and weeds or such other plants as can still survive. America has vast areas which are, by natural processes, slowly growing back into productive condition. Such lands may again become productive, but today they are almost sterile as far as producing healthy, vigorous, and abundant life is concerned.

It may appear that this question of sound soil management is an agriculture rather than a wildlife problem. Yet, it is the growing conviction of wildlife students that it is almost impossible to over-emphasize the importance of good soil and water management from a wildlife standpoint. If this nation has been careless in managing its soils, it has been even more so in the management of water. During the last few decades, the country has become increasingly conscious of the land problems and is slowly developing a better land-use philosophy. Similar progress has not been made in developing a program of water management.

Most water-utilization projects are still developed as isolated units with little consideration for anything except the particular objective of the promoter, be it hydroelectric power, irrigation, flood control or navigation. Big impoundments have been and are now being developed without much effort even to keeping them useful as long as possible. No effort comparable to the original effort and expenditure for impoundment has ever gone into preventing excessive erosion from silting up the reservoirs. Any engineer will readily admit that only a limited number of sites are available. Yet, national engineering organizations are engaged in a mad race to see how many units each can build with little or no thought, effort, or funds devoted to the preservation of these reservoirs for future use.

Not only has this nation been prodigal of impoundment possibilities, but it still goes on the theory that streams should be open sewers into which any community or industry has an inherent right to dump waste material. Waters are only partially productive because of this practice. While a number of states have pollution laws, many of them are inadequate and others cannot be enforced because of the political strength of the polluters. The recently enacted federal pollution law has neither teeth nor the promise of development of teeth in its present form, and its best feature is the fact that it indicates a growing public concern regarding this problem.

Much emphasis has been placed on the necessity for increased food production in recent years. Yet, the production of fish and other valuable natural products of many streams has been destroyed or greatly reduced by silt from excessive erosion, domestic sewage and industrial waste. Any one of these factors can destroy a stream; all three are almost certain to do so.

The propensity of man to look for easy and painless ways out of immediate predicaments also has profound effects upon other creatures. In agricultural lands, this search for a cure-all has taken the form of one fetish after another. Once a fetish was made of clean farming. It was made to appear almost immoral for a landowner to allow shrubs, bushes, trees, or hedges to remain on the land. Successively, reliance has been placed upon miracle crops, miracle fertilizers, and miracle chemicals, or belief of some that a chemical cure can be developed that will in some magic way prevent all insect or disease damage.

Many new toxic materials, such as DDT, have direct and indirect effects upon wildlife. It is known that DDT used in heavy concentrations will kill birds; used in weaker concentrations, it does not appear to be directly fatal to them. However, it could easily have

serious effects by destroying food supplies at critical periods such as the nesting season. There is some evidence that this does occur, but the frequency of such occurrences is still a question. Similarly, 2,4-D and other plant-killing chemicals can affect wildlife by destroying the plants which produce their food or which provide essential cover.

Questions have been raised as to the necessity of the extensive use of insecticides and plant sprays if proper attention is paid to the maintenance of soil fertility. It seems obvious that fertile productive land will grow more vigorous crops, better able to withstand diseases and attacks of insects, than those growing on land of low fertility.

The preceding discussion of certain human activities which affect wildlife is not a catalog of all the possible effects. It contains only the more important. It is obvious that any human activity which changes the type of vegetation on land will affect wildlife. Any human activity which puts land to intensive and exclusive use also will affect wildlife. In the latter case, the effect is always adverse; in the former, it may be adverse to some species and favorable to others, depending upon the new type of vegetation and the type of land management installed.

All these adverse effects could easily be added up to make a very black picture. It would be black indeed if there were no other factors to be considered. Fortunately, there are others.

The first and probably the most important is the growing public appreciation of the necessity of intelligent management of natural renewable resources. More individuals have informed opinions and are more concerned than ever before. Not only is the number of citizens interested in various individual natural resources increasing, but there is a growing appreciation among leaders and the rank and file of conservation groups that the conservation and wise management of soils and waters, and their plant and animal products are a part of one picture. It is not possible to promote one unit without some effect upon others.

Another favorable factor is the development of professional groups interested in these resources. Professional foresters and numerous groups of professional agricultural workers developed many years ago. In recent years, professional ecologists working in both soil and water conservation fields and a rapidly growing wildlife management profession have been added. The existence and activities of such groups give some assurance that management will be based somewhat more on facts and less on dogmatic opinion. These factors are signs of progress. The effect of these developments will be much greater

in the coming years than in the past. Wildlife, which is one product of land and water, will continue to be affected by all activities—good or bad—in the human management of these basic resources.

Wildlife of forested lands has relatively brighter prospects than those forms found in purely agricultural lands. Wildlife management can be easily fitted into forest management, partly at least because man has not altered forest types so radically as to destroy essential habitat for most forest creatures. In recent years, the growing understanding of the mutual interdependence of resources has improved the prospects. Foresters are increasingly conscious of the value of forest life and, as a result, are more inclined to modify management plans and programs for its benefit.

In recent years, much publicity has been given to irruptions of deer and other browsing and grazing animals. These irruptions have been caused by a complex of factors, a major one of which has undoubtedly been the "cut-out and get-out" policy of logging so long followed in this country. Under such a system, vast areas were cut rapidly. Such areas may have started to become reforested immediately or may have been held in a nonproductive state for many years by recurring fires. A forest recovery from fire or logging grows up to a mixed stand of shrubs and trees. During that period it produces a maximum amount of food and cover that favors the rapid increase of browsing species. As the forest grows and the overhead canopy closes, food and cover suitable for such animals decreases. Add to that natural cycle the concentrated effect of overbrowsing or overgrazing by too many animals for the conditions then existing and a "deer irruption" followed by starvation often appears.

Sustained-yield harvesting of forests placed into actual operation will eventually help stabilize populations of such animals. Combined with an intelligent game management program, it is possible to foresee a long-range picture in which numbers will not grow to such peaks nor decline so violently. Not only browsing animals but many other forest-inhabiting species will be benefited by sustained-yield harvesting. This segment of wildlife has prospects of better rather than poorer living environment.

The outlook for grassland wildlife is not so rosy. The antelope has made a come-back in many western states. To a less extent, it has recovered in the prairie states where once it was abundant, but its numbers are not and probably never will be large. The reason is obvious. Regardless of the fact that there is comparatively little direct competition between antelope and cattle for feed, intensive cattle

grazing normally results in a decrease in the amount of other available food. Sheep grazing conflicts more directly with antelope grazing.

The complete grazing utilization of grasslands, plus dry farming of many grassland areas, adversely affects many other forms of wildlife. The prairie chicken and the sharp-tailed grouse, two important species, may be cited as examples. They have been extirpated from large areas by the destruction of necessary habitat as a result of changed land use. Such forms can only recover when the original vegetation is restored or some acceptable substitute provided. The fact that prairie chickens and sharp-tailed grouse have recovered on numerous wildlife refuges where native vegetation has been partially restored emphasizes this point. Such species do not have the necessary adaptability to persist in the face of radical habitat changes, and their places have to some extent been taken by such exotic species as ring-necked pheasants and Hungarian partridges, both better able to live under present land-use practices.

The fact that other grassland species have increased on refuges when vegetative types have been restored indicates that the decrease in necessary environment has been a main cause of their declining numbers. Such forms can be restored only as advantageous changes are made in prevailing land-use practices. The prospect, therefore, for greatly increasing the grassland species is not as favorable as it is on forest lands. They can and have been aided by some new practices and perhaps can be aided more by methods to be developed in the future.

Lands now devoted to intensive agriculture have experienced the most revolutionary changes except those used exclusively for such things as buildings, highways and other permanent structures. Many types of wildlife have been affected by these changes. Wherever forests have been cleared to make agricultural land, forest wildlife has been replaced by forms that can live under the new conditions; where grasslands have been plowed, the same reactions have occurred; where land has been drained for agricultural use, aquatic wildlife using the marshes or lakes either moves elsewhere or disappears.

Since agriculture has affected so many millions of acres of land, agricultural development is a direct cause of many major problems in maintaining wildlife populations. Many resident species can persist only to the extent that they can adapt themselves to present and future agricultural land uses. Change in major farm crops favors one form over another. In western irrigation districts a change from corn and alfalfa to sugar beets has been followed by a decrease in pheasant and quail populations. Similar changes often follow other

shifts in agricultural crops. Yet many resident creatures can persist under agricultural conditions, particularly when some attention is given to their needs.

Migratory forms of wildlife have perhaps been most adversely affected of all. Something like 100 million acres of land, much of it either breeding, feeding or wintering habitat for migratory waterfowl, has been drained in the past 75 to 100 years, and drainage for agricultural purposes is still being promoted extensively. The future looks darkest of all for migratory wildlife, particularly the major waterfowl species. Until the values of marshes and lakes as water reservoirs and regulators of water tables and the values of the products that can be taken from such habitat are more clearly recognized and land management practices developed to utilize such values, there is little hope for rebuilding migratory aquatic wildlife. Despite all other efforts, they are apt to continue on the decline as long as drainage of additional marshes and lakes continues.

If all recommendations made by agriculturalists in the past were made completely effective on an individual farm, it is highly improbable that wildlife could or would persist on it. A combination of clean farming, intensive insect and weed control, coupled with an effort to mine the last possible nickel out of every square foot of available soil, would unquestionably destroy all food and cover for wildlife, with the exception of such forms as the English sparrow, the starling, the house rat and the house mouse. Yet, many of the most valuable forms of wildlife are inhabitants of agricultural areas. As one measure of the importance of farm wildlife, a large part of the annual game harvest is taken in agricultural areas.

The saving factor is the fact that securing the last ultimate nickel in profit is not the only interest and incentive that motivates human activity. It is possible to practice profitable agriculture with sound soil management and to maintain soil productivity on land while still leaving adequate food and cover for much valuable wildlife. It has been demonstrated on many farms that wildlife needs can be fitted into individual farm management programs in a way that is not harmful and often beneficial to the land-management program.

The use of permanent vegetation to prevent excessive erosion offers infinite possibilities for supplying adequate conditions under which wildlife may live without interference with sound land management. New techniques and new methods are continually being developed which will make such programs even more feasible in the future than at present.

Two examples of such new developments are the growing use of lespedezas and of multiflora rose. Lespedezas, grown primarily for land-management purposes, also provide food and cover for wildlife. Multiflora rose used as a living fence and as a soil cover in eroding areas also provides essential cover for many wild creatures. Unquestionably, more study will discover other plants and develop additional techniques which will meet various needs better than present methods.

The Department of Agriculture is the federal agency primarily interested in agricultural land. Land is the basis for all of the crops and livestock in which the various units of the Department are interested. Despite this basic importance of land, no land-management policy, accepted as a part of the working philosophy of all departmental units, has been developed.

As examples, there are groups advocating the destruction of shrubs and trees in fence rows and hedges, while others are promoting the planting of perennial trees, shrubs, and other plants for varying purposes. Some groups promote more and more toxic insecticides to destroy all insects, while others, appreciating the importance of insect pollinators and the services of predatory insects, publicize their values. Some units are building farm ponds and stressing the value of such ponds in maintaining water tables, controlling run-off, and preventing excessive erosion, while other groups are actively engaged in promoting the drainage of existing ponds, lakes, and marshes that fulfill the same functions. The latest and most striking example is the Department's industrious promotion of high farm price supports which encourage mining of present land fertility while piling up huge unused and unusable surpluses of perishable agricultural products. At the same time it supports gigantic drainage surveys to develop more farm land to grow more unwanted surpluses.

Such galloping wildly in all directions simultaneously seems utterly inconsistent to outside observers. The assumption on which some of these recommendations are based seems to be that this nation has grown so desperately poor that it must mine to the maximum extent every square inch of soil available; others seem to rely on the contrary philosophy that the nation can afford to be more wildly prodigal of its resources than ever before.

In thickly populated sections of Europe, there is still room for shrubbery, trees, hedges, and for wild creatures. In relatively thinly populated America, we must apparently urge the landowner to attempt to destroy everything that interferes with the maximum dollars-and-cents production of each unit of land.



There is too little appreciation of the fact that land can be profitably used for other purposes than the production of agricultural crops. Little attention has been given to the use of water farming, although it is an important part of management in other nations. There is little appreciation of the values of marshland, and yet there are such lands whose net profit from management of aquatic resources is greater than that secured on adjoining intensively cultivated agricultural land.

The Department of Agriculture is the most potent single governmental agency influencing owners of agricultural lands and in changing present management practices. It seems obvious that this Department could make a major contribution of national welfare by developing a sound land-management program *and using it* as a basis for its action and educational programs. If such a concept could be developed, many of the present inconsistencies in the agricultural program would vanish. The use of perennial vegetation for soil erosion control, the control of weeds, insects and plant diseases, and the best utilization of land for particular purposes would fall more naturally into their proper perspective and perhaps be emphasized more nearly in line with their relative importance.

It may seem strange that a wildlife man should be so interested in land management. Yet the fate of wildlife in agricultural areas is inextricably bound up with land use. To the extent that intelligent, long-range land management based primarily upon maintaining productivity can be translated from the field of theory into actual practices upon the land, wildlife will benefit. Intensive agriculture, properly planned, can mean change rather than extirpation for wild creatures. Change in crops or in land use may affect some forms of life advantageously and others adversely. Nevertheless, agriculture does not necessarily mean twilight for wildlife. The reverse may easily happen to the extent that intelligent management can be substituted for the exploitive type of land use still far too prevalent.

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# 12.

## *Family Farm Problems and Policies*

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AMERICA WAS SETTLED BY PEOPLE WHO WANTED independence and freedom. They were hungry for land. Therefore, some of the early land policies tended to limit the size of farms and encourage farm operators to own their land. From recent discussion it appears that farmers are losing that independence. Of course this observation is due partly to the decreasing proportion of rural population in relation to the total population. But questions arise as to how the changing agricultural land policies of the United States have contributed to the present situation and what kinds of policies will help the farmer to produce economically the food and fiber needed by the world and also help him to live on a standard comparable to the rest of society. Should the family farm that has been basic to American land policy continue to persist? Is it desirable to develop new instrumentalities to strengthen the family farm when changing conditions bring new forces which weaken it?

### FAMILY FARM DEFINED

The term "family farm" creates a great deal of confusion because almost everyone using the term has his own conception of its meaning. Some people think of it from the standpoint of size; others define it as a farm where most of the work is done by family members; whereas others think that any small farm where a family resides can be called a family farm. Occasionally the term is used for a subsistence farm, and some of those advocating the desirability of legislating family farm protection think in terms of increasing the population on the land.

The well-being of agriculture and the people living in the country has been the concern of many men. In fact, much has been written about the family farm. It is necessary to have a clear concept of the place of the family farm that is both useful as an analytical tool and purposeful in the formulation of agricultural policy. We are all aware that in the years ahead American farmers may rise or fall, depending on how clearly we appraise the present situation and foresee the probable demands on agriculture. In order to discuss intelligently the problems and policies, let us start from a common concept of what is meant by the term "family farm."<sup>1</sup> Let us say it is one:

1. On which emphasis is placed on farming as a way of life, as well as on its economic returns.
2. On which the management is vested primarily in the family that lives on and operates the farm.
3. On which most of the labor is contributed by the family. ✓
4. On which there is opportunity for full use of the skills and abilities of the equivalent to at least one and up to two or three adult men. (This means that it would permit efficient use of labor resources of a farm family, and that it must be no greater than the amount of human effort that can be supplied by the family, with perhaps some supplementary help as may be necessary during seasonal peak loads or during the transitional stages of the family itself.)

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<sup>1</sup> This is the working definition adopted by a national conference on A Protestant Program for the Family Farm, assembled at Garrett Biblical Institute, Evanston, Illinois, March 22-24, 1948. Present were over 30 rural Protestant leaders and about 15 technical and resource persons from the U. S. Department of Agriculture, land-grant colleges and national farm organizations. The conference was sponsored by the Land Tenure Subcommittee of the Town and Country Committee representing the Home Missions Council, the Federal Council of Churches and the International Council of Religious Education.

5. Which will provide for full and efficient use of all of the land, labor, and capital invested in the enterprise.
6. Which, from the total farm and family enterprise, will make possible for all people on the farm to have adequate: (a) diet, clothing, and housing; (b) health facilities; (c) educational opportunity for children and adults; (d) recreational and social facilities; (e) religious opportunities and activities; and (f) security for old age.
7. Which, in exchange for things purchased, will provide food, fibers, and other products needed for domestic consumption and for export.
8. Which will fully conserve and restore the physical resources of the farm, including soil, forest, and water, as well as farm equipment.
9. Which will develop the human resources, particularly the operator's family, but also the other families that work directly on the farm.

The concept as developed uses both terms "the farm" and "the family." The concept is something which actually can exist, and does not necessitate reclassification as farm technology develops and as the supply of family labor changes. In a definition of the family farm, it is necessary to associate fundamental elements of a farm as a going concern, such as land, labor, capital, and management, into a usable concept. As most frequently used, these four factors of production reside wholly within the family that works the land. Under this concept it is assumed that a family farm must be managed largely by the family that provides labor, otherwise the family would have little tenurial relation to the farm as a going concern. The amount of land and capital must be sufficient to absorb efficiently the labor of a typical farm family, with perhaps some supplementary labor during seasonal peak loads or during the development and transitional stages of the family itself.

This concept of the family farm is not in accord with that held by many who uphold it as an ideal. In Canada the concept of the family farm takes in a larger number of farms than does the concept outlined above. That is, they include many subsistence farms and many farms which employ a great deal of outside labor.

France, on the other hand, restricts utilization of outside labor more definitely than does the definition developed by the conference. Also in France, a clear distinction is made between owner and tenant operation. In many European countries which have a large rural population the family farm tends to be smaller in acres and in

production. Even there, however, there is strict adherence to the family labor concept. The major difference in their concept of family farm is the necessity of maximizing production through the application of a relatively large supply of labor.

In evaluating the economic, social, and political implications of family farms, we need to consider many factors.<sup>2</sup> The farm as a going concern embodies land, capital, labor and entrepreneurship or management. The size of the parcel farmed is not the major factor to be considered. Instead, intelligence with which it is cultivated with relation to conservation, markets, prices, and the general cultural and economic welfare of those farming it are paramount in importance. It is significant that agriculture is almost the only great productive industry in this country which still retains a small-scale-unit-production in large numbers. There are more independent proprietors among farmers than among all other occupations in the United States, as shown by the statement that well over one-half of our total management and supervisory force, of an estimated eight million workers, is located in agriculture.

The farm home is an integral part of the farm business, especially on a family farm. Unlike the subsistence farm, the family farm should provide a satisfactory living and, in addition, a chance to accumulate savings for old age. This fact increases the competition for family farms, and frequently causes real estate investments to be higher than the productive value of the land. There is a feeling of security and family stability on the family farm. Members of the family have a better chance to plan and work together than under any other kind of experience. Family farms offer a favorable environment for rearing children, partly because of the low net cost of food produced on the farm and the value of the work contributed by the children. Individuals on family farms tend to develop a variety of skills and interests because, as a rule, many types of productive enterprises are undertaken. These enterprises stimulate economic and psychological incentives.

But all is not perfect. We may well ask if the family farm provides an opportunity for all its members to participate in well-balanced social experiences (security, educational, religious, cultural, medical, recreational, etc.). In areas where family farms prevail,

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<sup>2</sup> Ideas for this section (which follows) were gleaned particularly from Chapter XV of *Family Farm Policy*, edited by Joseph Ackerman and Marshall Harris, and from pages 14-18 of "A Protestant Program for the Family Farm", *Proceedings of the Town and Country Committee on Land Tenure*. See bibliography for complete citations to these references.

differences in social and even economic situations are minimized, and community development is stimulated. Experiences on family farms help the individual to develop a spirit of independence and self-reliance and capacities for accepting responsibilities in social and community life. It should be borne in mind, however, that this apparent element of strength in the family farm—*independence, segmentation, or whatever term you choose to call it*—may constitute one of its important weaknesses. Certainly closeness of family ties is often not conducive to active cooperation. In fact, detachment from problems which do not directly affect the family or the farm may cause its members to be uninterested in questions of broad policy and legislation affecting society as a whole. Since it is estimated that over a period of fifty years 80 per cent of all urban people will have come from the farm, it is important that farm families should have a broad knowledge and interest in the world outside their own fences.

The family farmer in and of himself has little political power. In fact, such power grows less as the farmer population decreases in proportion to the total population. In 1790, 90 per cent of our population was rural, but in 1945, the rural population had dropped to 25 per cent of our 138 million people. Yet, we must not be discouraged by this, since farm organizations so far have been able to wield an important influence. In a society where the division of labor and of functions has brought about a sharp separation of capital, labor, and management, agriculture, with its family farms, is in a unique position to balance the social and political conflicts between labor, management and capital, for the simple reason that farm people are entrepreneurs, capitalists, and laborers all in one. Studies show that where family farms predominate, there is greater support of established institutions and policies than in other communities. From this may we not infer then that policies and programs designed to strengthen the family farm will serve also to strengthen democracy?

#### **PROBLEMS FACING FAMILY FARMERS**

As a nation, we have always looked with favor upon the family-type farm, but we have not always followed through with the development of a consistent policy to adequately implement what was advocated. The chief fear expressed by some who feel that the family farm has received too much emphasis is that any general policy of extending family farms might again start an increase in the population in many areas which would prevent social progress,

particularly in the methods of producing goods and services for human consumption. The family farm has been called the seed bed of our population. However, in advocating the operation of the family farm on a basis which will offer a good life for those who operate the farm, we need to be concerned as to whether it can withstand the economic pressures and can adjust to the technological changes in this dynamic society, as well as to whether it will increase the population. There are many people who regard an increase in agricultural population as socially desirable. They say that it is better to live a wholesome life in the country, even at a low economic level, than to be unemployed over a long period of time in the city.

There are those who question whether the family farm is able to compete economically with highly commercialized industrial type farms. Is the family farm being supplanted by large-scale farms operated by big corporations using mass production methods? During World War II unofficial reports bobbed up which indicated that the number of farm operators had dwindled and that many small farms were being combined into one operating unit. Farm labor programs during that period also seemed to benefit the large fellow more than the smaller farmer. Census figures did show that there was some increase in farm ownership by corporations during the depression period of the 1930's, but it was an "involuntary" ownership through foreclosures on mortgages by insurance companies, banks, and trust companies. Much of that land reverted to individual ownership during the war. Many farms sold during the war were bought by non-operators who wanted an investment hedge against possible inflation—but that is a different problem.

To get back to the question of corporations vs. family farms, most economists feel that corporation farming will not make much headway because:

1. Advances in mechanization of agriculture make it possible for the family farm to compete effectively with larger units, since many technological advances have been in the direction of small and medium-sized farms.
2. Prospects of lower farm prices in years ahead tend to discourage large-scale investment in farming.
3. Farm production has been increased a third over pre-war levels and there is a question as to how much longer foreign outlets will continue. Government support programs tend to hold prices above world levels—will corporation investments be likely when there are such uncertainties about production controls, foreign trade, price levels, etc.?



4. Farm labor may be another deterrent for there will be reluctance to accept reductions in wages.
5. Social security, if extended to farmers, is likely to discourage corporation farming as such benefits would increase labor costs.

If the family farm is to continue to hold an important place in our economic, social, and political life, it must provide the great majority of the persons engaged in agriculture with a fair opportunity of becoming independent farmers. This does not mean necessarily that all farmers would have to own the land they operate, but certainly it implies that they would need to operate with independence and security. Quite frequently those who criticize the family farm say that the income has been inadequate. This means, in most instances, that the farm has been too small, the yields too low, or the operation inadequate to have proper allocation of resources and full utilization of labor and capital. In other words, the technical skills and the ability of farmers and their families determine, in a large way, the utilization of the resources at hand.

The maintenance of farms as economic units is of paramount importance. This involves the whole question of land transfer from one generation to the next, as well as the changes of farming practices to meet conditions wrought by alterations within the family. Of course, some claim that the human family itself shows so many variations in size and characteristics that it is impossible to fit the individual family and the individual farm together. There is either: (a) insufficient labor for optimum output during certain seasons, or certain life periods, or (b) surplus of labor which is costly and inefficient. Therefore, we need careful planning and good farm management practices.

As we look forward to the continuation of the family farm it is important that land should not be divided into uneconomic-sized units for the type of farming to be followed. The desirable thing, of course, from the standpoint of maintaining an adequate unit, is to transmit a farm to a single heir. This makes it necessary to satisfy the claims of other heirs without subdivision of the farm and also without loading down the operating heir with an impracticable burden of debt. Perhaps this can be done by making him liable for the rent value of the property plus an additional sum which, within a reasonable period of years, will amortize the capital value of the property. Such a manner of purchase removes the hazard of variation in price levels and is based upon careful appraisal of the productive value of the farm. There is a question as to the best time for perfecting a transfer. It seems that many farmers are not ready

land to  
transfer

to transfer their property when a son wants to marry and start out for himself. In that case, satisfactory arrangements between father and son, or father-son partnership agreements which look ultimately toward transfer of property, are desirable. One thing is fairly certain, if the family farm is to continue as a going concern, the units must not be divided into sizes which will allow only improper allocation of resources. The farm must be sufficiently flexible so that it can adjust itself to the variances of entrepreneurial skills and ability and family size. On most farms, adjustments can be made in the type and intensity of operation without making too great adjustments in the acreage of the farm, even though additional land may be available in some areas.

In a study made of the family farms in Denmark, Elizabeth R. Hooker reported in "Land Policy Review," summer 1945, that the predominance of family farms in Denmark conditioned in various ways the economic, social, and political situation of the entire country. She found that agricultural production, particularly of animal products, was greater than it would have been if land had been held in large estates. Cooperative agencies helped farmers to improve the quality of products sold, and, what is even more important, because family farms ranged in size from tiny holdings to fairly large commercial family farms, they provided a genuine agricultural ladder. From the social point of view, it was evident that family farms contributed actively to the social well-being of the community because they constituted a stable and contented rural population. Since there was no large landless agricultural labor class, Denmark did not have the hotbed of discontent which was found in many countries where laborers felt they were improperly treated.

Dr. A. W. Ashby, English economist, speaking before the Third International Conference of Agricultural Economists in 1934, expressed the feeling that the family farm finds its justification on general political and social grounds and on its appeal to a certain type of human individuality—a type which is, for the most part, reared and trained in close connection with the institution itself. He felt that it is practically certain that large-scale units would prove to be more economical than the present jumble of units of all sizes, because technical developments are more adaptable to large farms and because widely varying qualities of management, working under all sorts of conditions of organization and disorganization, make it difficult for the family farm to survive. Even though he points out that the family farm may not have economic advantages, he says perhaps no other system would give the same satisfaction to the

majority of those who have been reared on family farms, and that even higher material rewards or possibility of higher standards of living might not compensate for the change in status of an employer-employee relationship.

Certainly it would require considerable psychological change in the minds of American farmers if they followed any other type of farm organization than that which they have generally followed. As a nation we are interested in having a system which will provide a good living for those who remain in agriculture. At the same time, it is necessary to take into account the total national economy. Agricultural problems cannot be considered separately and apart from other national problems. We must be interested in having a system that will provide for conservation of our resources as well as efficient production of food and fiber.

Much has been said recently about the need of not only maintaining fertility, but of improving it and stopping soil losses. Frequently much of the loss has been attributed to the fact that farms were too small or too heavily mortgaged. Furthermore, a large percentage of our farms are operated by tenants under short leases with no assurance of continued occupancy. In this discussion there is no point of raising the question of whether the family farm should be operated by the owner or by a tenant, provided those who have the responsibility for operation and management of the farm have reasonable assurance of continued occupancy so plans can be made to allocate available resources in order to obtain maximum production. We have observed that the impacts of price and income disparity are particularly heavy on highly encumbered owners and also on tenants who are operating inadequate-sized units.

At present, with the increase in costs of local government, particularly schools, fixed charges are becoming relatively high. In addition, the technological advances have changed the entire composition of income and expense of our farm operators. Today, consequently, it is necessary to have a relatively large operation in order to meet fixed charges.

As we look forward to problems which may arise on the family farm, it is necessary to find some way of helping farm operators adjust their programs to these high fixed land and operating charges. Possibly our total tax program needs adjustment. Since a large percentage of our farms are operated by tenants, it may be necessary to find means whereby rental charges can be adjusted, particularly when they threaten to impair the best utilization of resources, both human and physical.

## **POLICIES TO BE DEVELOPED**

In appraising the position of the family farm in the national economy today, it is apparent that it has gained and strengthened its competitive position in the United States. This contradicts those who feel that large corporations or farms using outside labor are beginning to have the advantage over family farms. Some of the factors which enable the latter to forge ahead and remain a part of our economy result from technological advances. Many of the developments in crops, livestock, and equipment are such that they provided family farmers with opportunities for better allocation of resources and more efficient utilization of labor.

Information disseminated through extension services and the United States Department of Agriculture and other educational agencies bring to the attention of farmers, skills and abilities which help them to make necessary adjustments to better utilize their resources. Fundamental developments in cooperative marketing, credit, etc., have made available to family farmers economies which were formerly possible only to large-scale enterprises. As more information reaches the American farmers, they are adapting their production so as to more fully utilize family labor through diversification and use of various combinations of crops and livestock enterprises. Because of the various degrees of skills in management, because of customs, and because of regional differences, to mention but a few factors, there are still many farmers who need help in making adjustments to the resources at their command. Demonstration units, educational programs, farm accounting aids, and general guidance are but a few methods of assisting farmers who are operating family farms but who are not making the contributions they should to society as a whole.

In many instances, the reference to tremendous increase in acreage and the reduction in the number of family farms merely refers to a shift toward fuller utilization of machinery, land, and equipment. This is particularly true in extensive wheat production areas of the Great Plains. The income from these enlarged enterprises is sufficient to provide families with adequate living. There is some question as to whether the family farm in the high risk area will be able to survive the variations in yield and income that are likely to occur as prices change. They seem to have come through the last depression and have strengthened their competitive position during the war to the point where it would appear that, with certain social inventions which are likely to occur, such as crop insurance, flood

control and irrigation projects, flexible payment plans on mortgage indebtedness, etc., greater stability in farm organization will result. There seems to be some trend toward greater specialization and toward larger scale enterprises which will necessitate hired employees, at least part of the time. This trend will have a direct effect on the family farm system. Looking over the horizon one can already foresee certain demands on the part of permanently employed hired laborers for social security, insurance benefits, and other forms of social legislation which have been accorded to industrial workers, all of which tend to strengthen the family farm.

We have reached the point where careful land use planning is necessary for the maintenance of a sound and lasting agricultural economy. It is the responsibility at the national and state levels for our government to initiate well-considered over-all policies with respect to land and land tenure. The history of our land policy indicates that these have been conflicting programs regarding the family farm. Some help to hold the family farm ideal; others oppose it.

The family farm ideal generally has been held basic to our land policy, but the struggle between the family farm and the concentration of land in the hands of a few is constant and severe. In developing a long-time policy we must be realistic, recognizing that past developments may need modification in order to achieve the best results. For example, society should, through educational programs, research and even legislation when necessary: (1) foster as the mainstay of its agricultural economy the family farm which is large enough so that it can make effective use of modern methods of technology; (2) discourage excessive subdivision of farm units and farms too small to provide adequate family living; (3) encourage the enlargement of farm units which are now too small to provide adequate income under any feasible plan of operation; (4) improve tenure conditions on family farms which are tenant operated; (5) bring about equality between peoples and increase the dignity of all farm people by reducing the wide gap between large land owners and sharecroppers and laborers; (6) provide a means of transferring surplus population from rural areas through employment agencies or other means; (7) devise standards and means of attaining adequate housing; (8) provide training programs and educational courses, and develop institutions to enrich the lives of farm families by supporting programs looking toward a well-integrated community life.

Policy decisions need not be made only on economic bases but social and political implications need to be kept in mind. On the

basis of values attributed to the family farm it, therefore, is consistent with long-time policy to develop programs which will enable the family farm to remain in favorable competition with other types of agriculture and with other occupations.

Farmers generally are in a stronger financial position than they have been for years. Heretofore they used their incomes for the expansion of their businesses and have capitalized on some of the increased income and land values, but perhaps it is time to encourage utilizing increased income for better living, better homes, better institutions and better citizens in a free democracy.

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# 13.

## *Public Interest in Private Land*

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**F**OR SEVERAL YEARS NOW WE HAVE BEEN ASKING our graduate students, in their preliminary examinations, several fundamental questions. These questions, like all real questions, have no definite answers. The questions have usually been raised about like this: (1) How are public and private interests in land related? (2) How can you determine the extent of public interest in land? (3) What are some of the techniques the public uses to protect its interest in land? These questions form the basis for this chapter. In discussing these questions and possible answers, association with the people in Wisconsin who have for many years been carrying forward a land-use program involving public and private interests will be extensively used as illustrations. The success of such a program is the most valuable evidence we have on the questions raised.

Many economists define this subject outside the field of economics. Actually, we are dealing with questions in *political economy*. It is

unfortunate that many economists have dropped the concept of "political" in current thinking. We, as a nation, are becoming increasingly conscious of the public interest in private land. Witness the wide public reading of current books by Neo-Malthusians and the rebuttals or the almost universal inclusion in public programs of provisions to save the soil. To be sure, the public interest in land is not a recent phenomenon. Certain mineral rights were reserved for the public in our earliest land laws. Significant public consciousness developed in the United States at the peak of the lumbering in the Lake States, 1890 to 1910. The interest in the first World War shifted to food production and farm development. The public encouraged the development of farms in such areas as the Lake States forest region and the plains portion of the Dakotas west of the Missouri River. Then came the new public domain (the land nobody wanted), the dust storms, and the untiring and forceful presentation of soil losses by such leaders as H. H. Bennett.

The vital statistics of the topsoil have become common knowledge in urban as well as rural households. There is no question but that the public has been interested in land in a major way since 1890 and that interest has been rapidly increasing in the last ten years. However, we should mention a few of the more important reasons for the increasing public interest in private land. They suggest that public interest in land will continue. (1) We are only now becoming aware of the fact that only about 10 per cent of our population in the United States produce the agricultural products necessary to support our high standard of living. The public, at least those outside of agriculture, are concerning themselves about the future food supply—both amount and price. (2) We have been forced to accept a position of world leadership. In many parts of the world lack of adequate food supplies makes it difficult to have even such a basic essential of progress as order (freedom from civil wars). During World War II and since, our citizens have had many opportunities to observe the conditions in other countries. Farmers from Iowa who paid their expenses to visit with the farmers of Europe did an outstanding job of making rural people aware of the conditions in other countries. (3) The statistics on population growth are receiving publicity. World population in 1650 has been estimated at about one-half billion. By 1950, world population will exceed two and one-third billions—a fourfold increase in 300 years. And, although estimates of future world population vary widely, most estimates for 50 years hence fall between three and five billion.

The real question then is not whether the public has an interest in land, but rather one of how to go about analyzing a situation in a way that will help to get something done about it.

#### HOW ARE PUBLIC AND PRIVATE INTERESTS IN LAND RELATED?

The economic philosophy of the public in the United States and a major portion of the economists answer this question rather simply. The national wealth is a summation of individual wealth, so we place our efforts on maximizing individual profits. The argument highly simplified runs something like this. Each individual (firm) looks ahead to estimate what other individuals will pay for different products. Then he combines his resources to produce the products which will give the greatest profit. If he miscalculates and the price falls, he may lose money or make less than expected. He will then take a new look ahead and make adjustments necessary to bring the greatest profit. The consumers will in the process get what they want most (are willing to pay most for) and the wealth of the nation will be maximized. Admittedly this argument is oversimplified. The important point is that some such concept is in the minds of most of our people. Economists have spent a major portion of their time understanding the principles involved in maximizing the profits of the individual (economics of the firm) or the principles of wise spending.

When we look at specific situations we often have to say "yes but."

The lumbering operation in the Lake States was carried on by individual firms. Much of the timber was wasted and the land "cut-over" was of little value for many years. Communities were stranded with no resources. Did this operation increase the wealth of our nation? Even today many timber users are engaged in wasteful practices—cutting small trees before the profitable growth is put on, etc.

The plow moved into the plains and turned over good grass to produce wheat. Those who saw the area in 1930 wondered whether the result was an increase in wealth. Now the plow has moved in again over the loud protests of those who want to save the soil.

We have all seen a picture of a farm in northeast Iowa, southeast Minnesota or southwest Wisconsin with the land ruined by gullies or of the results of flood waters leaving soil a foot deep around the buildings of a valley village.

These are a few of the illustrations which demonstrate that the individual in search of his own best interests does not always perform in the public interest. This is the critical point for most people, particularly economists. You can either define yourself right out of the problem and spend your time on the further elaboration of the economics of the firm, in which case you just refuse to acknowledge a problem, or you can become disillusioned with the whole system. Many things can happen to you then.

Of course, we should do neither. Rather, we should accept the economic philosophy of the public and the most refined mathematical analysis of the economist. Then in those instances where the public interest appears in jeopardy we should attempt to see what factors are causing the trouble. Here are a few examples.

You have probably heard many times that the ranchers of the West overstock the range; buffalo and grama grass are replaced by inferior grass and on many acres the land is laid open for serious wind and water erosion. As you get closer to the situation you see the land most overgrazed is uncontrolled (wild) land or land on which the lease is about to run out. Much can and was done to use the land better by simply working out methods of getting better control of the land—grazing associations, soil conservation districts, requirements for written leases by the Agricultural Adjustment Administration and Farm Security Administration or blocking into operating units.<sup>1</sup>

The lack of interest in soil saving and development practices by tenants who do not expect to remain on the farm, by owners who are about to have the farm foreclosed, or by elderly farmers with no children to take over is commonly known. These are all illustrations of individuals who lack security of expectations. And this lack is one of the most important reasons why more people do not adopt proven soil conservation practices.

The paper making corporation, with its large investment in plant, expects and wants to continue in production over a much longer period than the saw mill of the past. As a result, paper companies are practicing good timber management on their lands in Wisconsin. Security of expectations affects timber management too.

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<sup>1</sup> R. J. Penn and Charles Loomer, "County Land Management in Western South Dakota," S. D. Agr. Exp. Sta. Bull. No. 326, September 1938. R. J. Penn and Taylor, "Management of Public Lands in North Dakota, N. D. Agr. Exp. Sta. Bull. No. 312, May 1942. Charles Loomer and Craig, "Collective Tenure in Montana," Montana Agr. Exp. Sta. Bull. No. 406, February 1943.

Market prices which do not accurately reflect public needs may push an individual into a use of land which appears contrary to public interest. Cotton, wheat and potatoes are currently priced so as to discourage individual adjustments often recommended in the public interest.

An individual should not be condemned for acting to maximize his profits. Where his interests coincide reasonably well with the public interest no problem exists. In fact, government action in this area has no place. When an individual's quest for maximum profit leads him to do things not in the public interest: (1) we should be very careful that we have correctly determined the public interest and not some individual's statement as to what the public interest ought to be; (2) we should look to the reasons for the existence of the disparity and try to make adjustments which will bring the two interests together. Adjustments of this kind will in many instances increase the individual's profit possibilities and no investment of public resources is necessary (increased control of grazing lands and change in tax procedure for forestry land are cases in point).

#### **TO DETERMINE THE EXTENT OF PUBLIC INTEREST IN LAND**

This is the difficult question. Our legislators must answer it nearly every day. They must translate their estimates into dollars. They must divide the limited dollars among many projects with varying amounts of public interest and must decide whether more or less taxes are desirable. Too often we say they are not acting in the public interest. Yet what is the public interest in land? Technicians of nearly all kinds have attempted to work out formulae to answer this question—zoologists, botanists, agronomists, engineers, lawyers and economists. When they get through, practically no two will agree. Why? It is partially because they fail fully to realize what is involved. First, the question is a valuation. This means a judgment as to which of the several alternatives will result in the greatest returns. Second, the judgment is a public judgment rather than an individual's. Public judgments are not simple to make. And third, the judgment is made to a large extent in terms of intangibles—the value of recreation to urban people, the value of excess power for national security, the value of lives that may be lost in floods. About the only place public judgments can be reduced to the convenient dollar yardstick is when our legislators appropriate money to save or develop land. In public regulation such as zoning, weed districts, and the like, the public valuation is not reduced to dollars.

The question of public interest in land is a valuation—a judgment. As such the public interest in a particular piece of land cannot be established by formula. For instance, a large part of our literature on forests sets up the rule that the cut should not exceed the growth. Yet during the 1930's when men were unemployed, we spent large sums of money to improve the quality of timber growth and to plant trees which would increase production. When we had unemployed men, equipment, and other resources, the public costs of forestry activities were not much in excess of what the costs would have been if nothing were done. The costs of unemployment are high. Compare that situation with the one in which we found ourselves during and immediately following World War II.

During the war not many men could be spared to work in the woods at timber stand improvement or planting trees (incidentally, the tree planter was perfected and came into use because of manpower shortage during the war). At the same time the timber cut was heavy and in general exceeded growth. We urgently needed wood for paper, for cartons, for cantonments, etc. Following the war the drain continued. We need housing. The point is that the public interest in forestry land must be continually revised and will not follow the cut-growth rule of thumb. There is no reason why in some periods we should not make investments to increase timber growth far in excess of cut. And in other periods we may have to take a calculated risk and cut in excess of growth.

Public interest in soil losses follows a pattern quite similar to forestry. There is much literature to the effect that we should prevent all soil loss. If that had been completely followed in the past, we would be without some of our most valuable scenery such as the Grand Canyon and our mountains. Also, we would be without some of the world's most fertile soil—those laid down by wind and water. The decision on saving soil will not be based on the simple rule that all soil must be saved. We will decide how much to invest in saving soil by relating the returns from that investment with returns if the investment is made in some alternative way. Some areas may cost much more to save than the cost of developing new land, improving existing land or developing substitute products. The question may come at us in a different way. Many feel that grass land is being plowed up for wheat, and soil will be lost in the process. The State Department says, however, that we must send wheat into famine areas of the world if our international efforts are to result in peace. We send the wheat and the price is kept up. More grass is turned over. How would you decide such an issue?

Valuations—judgments—are the basis for determining both public

and private interests in land. If we accept some rule of thumb formula as giving the public interest in land we may easily misdirect our efforts. Large sums of money can be used to put "the rule of thumb facts" before the people. It has been said that an individual can afford to save all his soil or that the public can afford to make an investment sufficient to save all soil. When neither individuals nor the legislators go as far as this kind of an argument would indicate as desirable we are apt to become disillusioned and say people are ignorant or legislators are not acting in the public interest. The danger, of course, is that disillusioned technicians will want to direct individual action and they may be successful. Actually, in a large majority of the cases the individuals and their legislators have included a different set of factors in their valuation.

We are here concerned with how public valuations are made. It is not an easy matter for an individual to decide whether to buy a piece of land and how much he should pay for it (valuations). But we will undoubtedly agree that an individual's valuation is not as difficult as a public valuation.

Arriving at the public interest in land is a continuous process of public policy and program formulation. It is the process that counts. If the means are faulty the objective will not be satisfying even if reached.

Somewhere along the line we have acquired the habit of hiring other people to do our work for us. We hire a forester, soil scientist, economist or other technician to look at a piece of land and tell us how it should be used and how much the public can afford to regulate or spend to get it into the recommended use. Public valuations should not be made by technicians acting for the public. The technician will have to make his best information available and recommend what he thinks is the best of the alternatives presented. But the people must work at this job. They must participate and make the decisions. They will accept and put into effect their own decisions much more readily than decisions made for them.

Wisconsin has a couple of illustrations on this point. The way in which rural zoning ordinances were developed is an illustration of a procedure which many think is desirable.<sup>2</sup> Our school district reorganization procedure during the last two years is an illustration of "how not to."

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<sup>2</sup> W. A. Rowlands, F. B. Trenk and R. J. Penn "Rural Zoning in Wisconsin," Wis. Exp. Sta. Bull. No. 479, November, 1948. R. J. Penn, W. F. Musbach, and W. C. Clark, "Rural Zoning in Corson County, South Dakota," S. D. Exp. Sta. Bull. No. 345, September 1940.

In 1929, the Wisconsin legislature authorized the county governments to pass zoning ordinances affecting agriculture, recreation, and forestry. The county boards of supervisors can legally enact a zoning ordinance by the following procedure: (1) pass the ordinance at one meeting, (2) get the approval of the town boards of supervisors in the towns affected, (3) pass the ordinance at the second meeting of the county board and publish. But when Messrs. Walter Rowlands, Fred Wilson, Fred Trenk and the county agents began working with the people of the county and their county boards on the problem of how to develop a desirable land use program, something more than the legal minimum procedure followed.

These are the extra legal steps that were followed by the 27 counties in northern Wisconsin with strictly rural zoning ordinances. First, the county boards formally requested the College of Agriculture, the State Conservation Department, and other state agencies to help in meeting the county land problems—problems of cut-over land, tax delinquency, isolated settlement and high cost local government.<sup>3</sup> The formal request for assistance might at first glance seem like an unimportant step. It had the effect, however, of making the technicians a part of a team in the county working on the problem. Second, the technicians worked closely with the county board in preparing as much information as possible on land utilization in the county.<sup>4</sup>

Third, a series of community extension meetings were held at which the land problems were discussed—existing land uses, alternative uses, primarily forestry and recreation, isolated settlement, relief, etc. The land facts were presented on readable maps. Rural zoning was described—what it is, how it might work, and what it might be expected to do to meet the problems of the community. The people at these meetings arrived at the decision as to whether or not to have rural zoning. In addition, they actually drew out the boundaries of the several zoning districts. At many of the meetings there were sharp conflicts between the residents of the community before a decision. The town chairmen were present and as a result there were unrestricted districts. But once the decision was reached it was their decision. The town chairmen were present and as a result there were

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<sup>3</sup> Hibbard, Allin, *et al.*, "Land Use and Tax Delinquency in Northern Wisconsin," Wis. Exp. Sta. Bull. No. 399, June 1928. Hibbard, B. H., Hartman, W. A. and Starhawk, W. N., "Use and Taxation of Land in Lincoln County, Wisconsin," Bull. No. 406, January, 1929.

<sup>4</sup> "Making the Most of — County." A series of Wisconsin Extension Circulars.



almost no dissenting votes when the ordinance came up for formal action by the town and county boards (The County Board in Wisconsin is composed of all the town chairmen). In the 27 counties in Wisconsin with rural zoning ordinances the local people restricted about five million acres against future agricultural use and settlement. Incidentally, you can find people in most northern Wisconsin counties who believe they are "the father of zoning." Fourth, although not required by law in the enactment of the ordinance, a public hearing was held to further safeguard private interests and permit everyone to be heard. Actually the extension meetings where the plans were made and the decisions arrived at were most effective in accomplishing the purposes of the hearing. The formal public hearings did not develop any major opposition.

We have here a tribute to those men who were the leaders of rural zoning for their insight into how to make a public judgment. They knew how to work as a team and they knew who must make public decisions.<sup>5</sup>

But we have another illustration in Wisconsin. Our state legislature has established in each county a school committee with authority, among other things, to combine school districts and change school district boundaries. Combination of school districts is, of course, a delicate job. It is hard to keep the decision based on reasonableness. The reaction against the school committees was spontaneous in nearly all parts of the state. A few of the committees did succeed in reorganizing the school districts. In one case the people of a new school district met to elect school officers. The first motion was to adjourn, leaving the district without a governing body, and the Governor had to appoint a school board for this district. The 1949 legislature changed the law to permit people affected a vote on the reorganization plans. The school district reorganization would be much advanced if the program had recognized some of the procedures used in rural zoning.

Before we leave the question of how you determine the extent of public interest in land, we should comment on the problem of placing monetary values on such intangibles as public welfare. There is a lesson in a recent experience of the University of Wisconsin. The University recently received a letter from the Fish and Wildlife Service of the United States Department of Interior. A similar request undoubtedly went to other state universities and conservation depart-

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<sup>5</sup> "From Public Burden to Public Benefit," (the story of Marinette County's Land Program). Wis. Exp. Sta. Bull. No. 483. (Published jointly by the Experiment Station, Wisconsin Conservation Department and Marinette County.)

ments. The letter was a request for the University to help work out a procedure which would place a monetary value on fish and wildlife. A federal law now requires that the Fish and Wildlife Service must be advised of any federal plans for impoundments and an appraisal must be made of the effect of the impoundment on fish and wildlife. This appraisal is to become a part of the plans for the development. The problem is, of course, how can you place a monetary value on intangibles? Commercial, recreational, biological, social, esthetic, scientific, and negative values were listed in the letter and we were to suggest ways of fixing monetary values. The staff member assigned the task of working out a reply had a number of ideas on the subject. Here is some of the reasoning. First, determine the effect of the impoundment on fish and wildlife. What will be the increase or decrease in numbers of fish or wildlife? How will the types change, etc.? Second, determine who is interested in the fish and wildlife and the changes which would be expected as a result of impoundment. What is the nature and intensity of the interest?

Third, get any available indications as to dollar value. Appropriations for fish and wildlife might indicate dollar values. Courts have had to place dollar values on intangibles in eminent domain cases. Foundations pay good money to save the last of certain species. Fourth, have a group of persons representing various interests in fish and wildlife sit down with the technicians to appraise the development. The main result should be suggestions for change in the impoundment plans which would improve fish and wildlife. The group, however, could put a monetary value on the fish and wildlife if they wished.

As you can see, we would minimize emphasis on placing a monetary value on intangibles. Economists have had rather sad experiences trying to place dollar values on intangibles in connection with reclamation and recreation projects. Perhaps they have been trying to do the impossible. The valuation must be made by the public and not solely by technicians. Technicians' results will be more fruitful if they will describe alternatives in whatever terms description is possible.

#### **WHAT ARE SOME OF THE TECHNIQUES THE PUBLIC USES TO PROTECT ITS INTEREST IN LAND?**

If we decide that the present use of some types of land or some areas of land does not adequately protect the public interest, what alternatives are available to the public to protect those interests? I have quite arbitrarily grouped the alternatives as follows:

1. Changes in institutions.
2. Investment of public funds as inducements.
3. Land use regulations.
4. Acquisition of ownership.
5. Research and education.

At the outset we should make perfectly clear our belief that you should not generalize on the application of these techniques. Usually we are confronted with a specific problem and various combinations of the techniques will be used as the situation dictates. We should not be drawn into a discussion of which is the best or how much of each should be used. This is impossible apart from the specific situation and the decisions of the persons affected.

INSTITUTIONS MAY BE CHANGED. In a large number of instances where public and private interests do not coincide, the reason may be found in the customs, traditions, social sanctions, and laws which make up the rules governing an individual's activities. Customary rental arrangements, tax procedures, inheritance practices and laws, and, in some foreign countries, religious ceremonies are but a few of the institutions which in some instances have made it difficult for the individual to operate his land in conformity with public interest.

The experience with the Wisconsin Forest Crop Law supports this point and will be described in some detail. The production of timber was not considered very important in the United States much before 1900. Plenty of virgin timber was available. The foresters began to work on timber production problems as the end of available virgin timber came in sight. Mr. Fred Wilson, currently in charge of the Cooperative Forestry Division of the Wisconsin Conservation Department, demonstrated to the people in Wisconsin that trees could be planted and grown. About 1910 he planted several acres to trees at Star Lake. That plantation has been thinned several times and the returns have thus far paid all costs, plus interest on investment. The stand of Norway pine is now about 50 feet high. The foresters can grow the trees. It is a long process, however. Individuals who owned trees had to choose between having their capital in the form of trees (a form that could be and was readily taxed) or having it in the bank. The experience had been to cut and get out. It is not surprising then that the production of trees has been considered by many as a job which can be done best on land publicly owned.

Prior to 1927, the people were asking why is it not possible for timber to be owned, produced, and managed by individuals? The answer most often heard was taxes. All the tax procedures were based

on the supposition that land would yield an annual income. Here was a crop which might take 50 years to harvest. Then too, the individual had seen how the more valuable stands of timber had a higher valuation. If he were to make a 50 year commitment he needed to know definitely what his taxes would be. He knew his taxes would be increased as his stand approached maturity and he didn't know how much.

The Wisconsin Forest Crop Law passed in 1927 established essentially a program to change the tax procedure so that individuals could more easily own and grow trees. And at the same time local units of government were advanced funds to carry on government services. Here are the essential provisions: The individual owner enters a contract with the state (Cooperative Forestry Division, Conservation Department). He agrees to practice good forest management on his land. He agrees to pay an annual land charge of 10 cents an acre to the local government, which amounts to a land tax and becomes a part of the general fund of the local governments. He agrees to pay the state 10 per cent of the value of any wood products harvested from the land. The state agrees to advance the local governments 10 cents an acre annually in lieu of taxes. The advance by the state is repaid by the 10 per cent severance tax.<sup>6</sup> About 200,000 acres of privately owned land is entered under the program. Although this is not a large acreage, the amount in the program has increased about 40,000 acres since 1945.

In the Forest Crop program we have an example of how institutions can be changed so that an individual need not operate contrary to public interest.

**PUBLIC FUNDS MAY BE INVESTED AS INDUCEMENTS.** You are all familiar with this type of technique. Certain practices may be desirable from the public standpoint but the individual does not get sufficient returns to warrant his investment in the practice. The public may contribute that portion of the investment which is not profitable for the individual to make.

Federal programs have been largely of this type. The best known is the conservation program of the P&MA (AAA). A farmer can earn an amount of money (allotment set up for each farm) if he follows a prescribed number of practices recommended for his area.

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<sup>6</sup> Wehrwein, Geo. S. and Barlowe, Raleigh, "The Forest Crop Law and Private Forest Taxation in Wisconsin." Wis. Cons. Dept. Bull. No. 519, Madison, January, 1945.

The Wisconsin Legislature has used inducements in their recent revision of the school district reorganization law. State aids to school districts have been increased. The amounts of aid will depend in part on the improvements made in the schools.

Several difficulties usually attend this type of program. Public money has been used many times as an inducement to get a new practice started. The payment is used to overcome inertia. Also, payments are made to the individual for the use of his operation as a demonstration. The TVA test demonstration farms and some of the SCS demonstration farms are cases in point. Payments for this purpose should be clearly understood. They should be stopped when the inertia is overcome or the demonstration completed—either successfully or unsuccessfully. There is a possibility that such inducements will be continued after their purpose has been fulfilled.

Another difficulty is the possibility of paying individuals for doing something that is profitable for them to do themselves and that they would do without the inducement. This is a charge sometimes directed at the P&MA soil conservation program. A closer tie between the county P&MA committees who are elected by the farmers and the local SCS personnel who are usually trained soil scientists would overcome this difficulty in short order, particularly if both were parties to setting up a schedule of practices for each farm which would be used as a basis of conservation payments.

REGULATIONS ON LAND USE CAN BE IMPOSED. Zoning and the unused authority vested in most soil conservation districts are examples of this type of technique. Land use regulations are passed under the general police power authority of the state. Police power regulations were developed to protect one individual from the actions of another individual. The authority has been expanded in recent years to permit regulations which protect the public interest.

In zoning, districts are set up and the uses permitted in each district are established. An individual owning land in the district must use it for the purposes permitted. If he does not the governing body can evict him. Most zoning ordinances contain provisions protecting individuals. Land in use in conflict with the ordinances at the time of passage is considered a nonconforming use. That use can be continued. Also, regulations must not be arbitrary and must have a relation to the purpose. Some of the recent zoning ordinances specify that nonconforming uses must cease after a certain number of years—long enough for the value of the use to be depreciated.

Authority to enact land use regulations has been given to soil conservation districts in most states. The procedure varies by states. In general, the supervisors of a district may propose the regulations which must then be approved by a vote. Only two out of the more than 1,900 districts have enacted land use regulations—McKenzie County, North Dakota and one in Colorado. In neither are the regulations effective at the present time. Soil conservation districts have the authority to pass regulations which require the immediate stopping of present use or practices. For instance, a regulation prohibiting cultivation of all slopes of over a certain degree could be passed and the farmers would have to stop cultivating such areas,

We have in Wisconsin pressure to regulate the cutting of timber on private land. Several laws have been introduced containing such regulations. We believe timber cutting regulations could possibly be established under the authority of soil conservation districts.

Police power regulations do limit an individual's actions. If the individual loses a valuable use because of the regulation, he is not reimbursed. Caution is necessary in their use. An overwhelming need should exist for the regulation and the regulation must be reasonable. The people affected must understand the regulation and in the case of land use regulations should participate in their formulation.

**THE PUBLIC MAY ACQUIRE TITLE TO LAND.** The public owns considerable acreages of grass land, forest land, recreational land, historical sites and strips of land adjacent to highways. Part of this land was reserved from the public domain and part has been acquired more recently by eminent domain proceedings or tax reversions. If the public decides there is no other way to protect its interest in land, the land may be acquired by eminent domain proceedings. The land acquired must be for a public purpose and the owner is paid a reasonable price.

It should be remembered that the acquisition of ownership does not in itself settle many of the use problems. Procedures for use have to be developed which are satisfactory to the individuals who will use the land. This is public land management and is a big subject in itself. In forestry and grazing land, individuals in search of a profit will use the resource—exploit it. Arrangements have to be worked out which will give these individuals some security of expectations. The question of who is to get the resource increment on public land when it is ready to harvest has not often been satisfactorily answered. This is one of the problems ahead in our county forest program in Wisconsin.

RESEARCH AND EDUCATION. Our nation is great because we have made available such excellent facilities for research and education as our land grant colleges. The results have paid off the public investment many times over.

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# 14.

## *Planning the Use of Land Resources*

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**T**HE PLANNING OF LAND USES IS NOT NEW IN HUMAN experience, and most of the disciplines of learning have long been involved in the planning process. Physical, social, economic and political factors are constantly considered in the formulation of land use plans and policies. Planning is a broad field that at times takes form in following more or less established practices; at other times it appears as a concerted effort to reach ends sought by new patterns of organized effort. Farmers as individual operators constantly make adjustments in the use of land without direct public assistance. But individual adjustments have not been enough. Consequently, during the last 20 years we have heard a great deal about government assistance and positive concerted action for the best use of the land.

In considering a subject as broad as planning the use of land resources, we must select some aspect of the field as a special focus

of attention. This chapter will explore some of the broader aspects of land planning from a public viewpoint. Very little attention will be given to the purely private aspects of the subject; that is, to those decisions that individual operators make in planning for the profitable and desirable use of their land. No clear line of demarcation can be drawn between planning on purely an individual basis and that prompted by government action. However, the primary problems and setting that shall be discussed will center around public and group action in the land planning process. These include consideration of the concept of planning; the need for planning; objectives of planning, means for carrying out plans, relation of research to planning, planning and operations, and some current land planning activities and problems.

#### THE CONCEPT "PLANNING"

Planning involves four steps, each of which must be taken with a high degree of accuracy to be most effective. These are: (1) The establishment of policy objective or the ends that are sought. This is the most crucial of the four and probably the most difficult. Value judgments are more important, with statistical data less available; and quantitative proof is harder to assemble. Ethical and philosophical considerations are significant. (2) Determining where we are at the present with reference to each of the policy objectives. This involves a detailed assessment of the present situation. Here the selection of the crucial factors is important. (3) Measuring the distance between where we are at present and the end objectives that we have in mind. (4) Devising ways and means of bridging the gap between the present situation and the objective—of bringing present conditions up to the desired. This undertaking demands imagination and ingenuity and a keen sense of the institutional framework within which suggested programs of action must operate.

In planning the use of land resources, specific objectives are of prime importance. They change from time to time and place to place. In a highly dynamic society, planning constantly must keep abreast of the changing objectives toward which action must be directed.

Land resource goals have their origins partially in value judgments and not wholly in logical analysis, but it is through analysis of pertinent data and information in relation to reasonable objectives that goals take shape into desirable plans. The means to the attainment of a goal as expressed in a plan of action need to be

rationally conceived but they must also be politically and economically feasible.

In considering public planning in the use of land resources, one of the first essentials is a feeling that something is in need of being improved. That is, there must be a felt problem or condition that calls for some type of public action. In the determination of what is needed to deal with a difficulty, it is very often not possible to divorce the felt need from the way in which the need can be fulfilled through some type of administrative set-up, because the extent to which a need is satisfied is related to the means used to fulfill the need. Needs and means to ends are not independent variables. Thus, planning for the wise use of land resources is simply organized social intelligence striving toward determined objectives through a designed course of public action.

#### THE NEED FOR LAND PLANNING

The early "planners" predicated many of their action programs upon the classical theory which held that if an individual were left to his own devices he would so conduct himself in a competitive economy that the best interests of society would be served. Our early land policy was designed to place the land in the hands of those who tilled the soil in family-sized units. It was reasoned that under private property the owner would "turn sand into gold." Time has proved that the short-time interest of the individual is not always in harmony with the best long-time interests of society.

So long as large acreages of land in the United States were unsettled and undeveloped, we were not very much concerned with how the individual used or abused the land. Other and often more fertile lands were to be found by moving on to new sites. But as the supply of good undeveloped land became scarce and as we began more fully to recognize that exploitation of land was a matter of national interest, it was both natural and imperative for us as a people to become concerned over land exploitation and undesirable land use practices.

Throughout much of our history we have had abundant production from the land. This, in itself, did not engender a spirit of conservation. Our timber, mineral, and all other types of land were profitably exploited. It was to no small extent true that through the mining of our land resources, we as a nation became strong and prosperous. There were assets as well as liabilities in the practices followed.

Our land has been very much in the same category as farm commodities in the right of the owner to use and dispose of as he sees fit. No criticism of this established policy is implied here. Within the last half-century, however, a change has come about in our attitudes toward land. We more firmly realize that the way in which an individual uses his land directly and vitally affects the present and future welfare and security of our nation. This recognition is creating a new attitude toward the land, an attitude that some of the older countries of Europe and Asia have held for many centuries.

The spirit of better land use is assuming greater proportions as we become more familiar with the problems surrounding our land resources and as we more fully realize that the interests of the individual and of society in conservation are not fully compatible. The public has a real stake in conservation investments. Public interest or value is the core of the land conservation problem.

It may well be pointed out, however, that the adjustments in land use now needed are greater than are realized by our citizens. Individuals must assume greater responsibilities in the care and development of our lands. We need a more widespread and fundamental individual philosophy that will reflect a greater concern for the public interest in the wise use of land resources. Too often we simply look to the federal government to do jobs for which individuals could well take primary responsibility.

Another item of vital importance in planning the use of our land resources is the production of the desired quantity of an acceptable quality of each needed agricultural product at the right time and place. Many aspects of this problem are quite apart from the matter of conservation, although the two objectives must be harmonized. Adequate production under emergency conditions, as for example during a war, may well call for some exploitation of certain land resources, for national survival then becomes of more immediate importance than soil conservation. At other times, when total requirements are low, it is advisable to under use land resources and to build up soil reserves. In either event, planning on a national basis is called for.

Individuals live in the present and it is often to their immediate interest to exploit land resources. Public policy, however, requires constant consideration toward the use of resources for the benefit of future generations. Free and unrestrained private ownership of all types of land has not always directed land into uses or under conditions of use that have been most beneficial from the standpoint

of society. This is not intended in any way to detract from the great contributions that our free competitive system of private enterprise has made to our way of life.

"Not until 1872 was there any indication that the federal government would retain possession of any part of the land except for such purposes as military reservations, forts, post offices, etc., under the delegated powers of the constitution. In that year Yellowstone National Park was set aside, the first of the park reservations, and in 1891 forest land was withheld from alienation, thereby initiating the federal forest policy."<sup>1</sup>

The change in our philosophy in regard to public ownership of some types of land grew essentially out of two factors: (1) The increasing complexities of our social and economic life and the accompanying necessity of satisfying arising needs by public action, and (2) an embryonic recognition of a need to conserve and develop our land resources. It would hardly be true to say, however, that any real concern existed before 1900 over the conditions of use of farm or range lands.

Planning for the use of land resources in the United States arose out of the existence of underlying conflicts in the use of land. To the extent that these conflicts were resolved by general agreement or public support for goals or objectives sought, our progress has been generally satisfactory. But the sharp struggles for power by groups with selfish interests or the presence of such groups in strategic positions have not always led to the best use of land resources.

### OBJECTIVES OF LAND PLANNING

Many people feel that a need exists to spell out in some detail our objectives of land use. For instance, should not we as a people be more specific in setting forth our aims in regard to family farms, the retirement from farming of submarginal agricultural land, land conservation, and the development of land by irrigation and drainage? We realize that any policy statement should not and could not be definitive for specific situations and also that conditions are constantly changing. As we progress in a piecemeal manner, at best a policy statement would be a more settled course or direction for government action with respect to public problems in which land is a major factor.

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<sup>1</sup> Ely, Richard T., and Wehrwein, George. *Land Economics*. p. 90. New York, The Macmillan Company. 1940.

It has been said, and truly so, that we have had no well-defined land policy in the United States. We have had, however, a number of dynamic leaders who were wholeheartedly concerned with the condition of our land resources, and very largely through their efforts land programs have been advanced and launched to carry out phases of a land policy.

The objectives of land planning should be in line with, or a phase of, the over-all national objectives of planning, of which the following are well accepted: (1) to enlarge the national income; (2) to progressively broaden the distribution of the national income; (3) to maintain freedom of enterprise; (4) to increase the economic security of the people; (5) to provide greater economic opportunities for individuals; (6) to so use our resources as to insure sustained and efficient production; and (7) to safeguard and strengthen our position among nations.

As one looks ahead from the vantage point of today, the main over-all objectives of a policy statement, or planning for the use of land, appear to be: (1) to greatly expand farm and home planning in order to produce as nearly as possible the needed quantity and quality of agricultural products with desirable land use practices; (2) to extend the soil conservation program throughout all of its needed aspects; (3) to develop and restore many lands for agriculture, forestry, grazing, recreation and other principal uses; (4) to give more stability to desirable land uses; (5) to improve effective tenure arrangements on both public and private land and thus improve their condition of use; and (6) to maintain a fair income to land users through shifts in land uses and an improved pattern of production.

The final formulation of objectives and the determination of programs of action to bring the existing situation up to the desired goals demand the attention of many minds. Researchers are partly responsible for problem refinement and delineation and for the presentation of alternative lines of action. They should also evaluate the relative merits and probable results of specific proposals. State and federal legislative bodies are responsible for final selection from among the various alternative actions and for the timing and speed with which programs are instigated. Administrators and farmers are responsible for helping in the formulation of over-all programs and in their adaptation to local conditions.

#### **WAYS OF CARRYING OUT PLANS**

In carrying out the purposes and objectives of a course of action

that takes shape in some type of land program, there are, in the main, six ways by which government—local, state and federal—may bring about changes in the use and condition of use of land. They are: (1) Direct administration of land by public ownership; (2) public regulation of privately held land through the use of the police power; (3) agreements that may be made with special districts as in case of soil conservation districts; (4) taxation, particularly yield and severance taxes; (5) regulations induced by or incident to conservation payments and aids; and (6) educational activities and programs.

It is not a purpose of this chapter to deal in any detail with these techniques or measures for bringing about adjustments in the use of resources. However, brief consideration of them is appropriate.

The mention of public land ownership brings to mind the extensive forest and grazing land holdings of the federal government. And during the 1930's we had the submarginal land purchase program. Although it is true that land in public ownership has not always been managed by sound or forward-looking policies, public ownership in the main has been and is an effective means for the development and conservation of certain types of land resources. This is true particularly for those lands that yield relatively low returns, lands that must be operated at high risk, lands needed for watershed protection, and those whose use is in the nature of a group consumption good, as in the case of recreational land.

Through the exercise of the police power, governments control the use and occupancy of land. Under the police power the state may establish reasonable use and occupancy regulations of private property, if to do so is in the interest of the public. The people themselves vote upon the controls that may be established. Rural zoning is the outstanding example of land use control effected through the police power.

To date some 36 states have enacted rural zoning enabling legislation; and within 23 states, 173 counties have adopted land use ordinances. Some of the soil conservation districts and some of the grazing districts also may enact land use regulations to deal with conservation problems. A number of districts, as in Colorado, for instance, have adopted ordinances that deal essentially with grazing regulations in the management and protection of grazing lands.

Contractual agreements are also made by farmers and ranchers with soil conservation districts. Under these agreements much has been done in the way of farm planning and improved land use.

Closely related to this program are conservation payments made to farmers for performing certain practices. Price-support programs are also significant. When government assistance is used to bring about shifts in land use that occur as part of a program, either to increase or to decrease production, and such effort results in a better use of the land resources, it is proper to credit such aids to one means of planning for more desirable land use practices. At times, payments have not been used to bring about desirable shifts in land use but it is true that payments have been so used and could be used in the future far more effectively in obtaining shifts in land use with a lessening of group conflict and individual sacrifice. So far it is probably true that Agricultural Conservation Program payments have been far more effective in shifting to a more desirable allocation of resources than in controlling agricultural production.

Taxes on land are not generally looked upon as a way of regulating land use. Rather, they are considered a means of raising revenue. Nevertheless, taxes are used for both purposes. We are all familiar with yield or severance taxes on forest lands and with the rather widespread homestead exemption legislation adopted to promote farm home ownership. Adjustment in taxes as a device for effective land use is a field that might well be given future study. In the Great Plains, for example, thought may well be given to adjusting payments on both property and income taxes over a period, in order to see what could be done to minimize the risk factor and to encourage conservational uses of land by means of tax flexibility and variations in taxes according to conservational classes of land use.

Land planning is a process and as a part of that process in a democratic society, education is particularly important. Acceptance of a program and willingness to support it are basic to its success. And the start of a program must be from the levels of the culture, knowledge, skills, and organizational competencies of the people affected, rather than from levels introduced from outside. Representative government must be close to the source of power—the people. The educational aspects of land planning are most significant in that progress is made through the understanding and growth within individuals of a felt need for desirable social objectives.

To reach objectives sought in land use planning, through whatever means or combination of means, requires an enlightened social consciousness. In fulfilling this need, education has a definite place in the planning and formulation of land use programs.



## RELATION OF RESEARCH TO PLANNING

Land use planners need basic data on soil, land cover, production practices, plant and animal diseases, market outlets and a whole host of things of which this list is merely a random selection. Not only is basic information needed in formulating a plan but, as the program unfolds, problems arise that are in need of answers by currently provided facts.

Problems of obtaining the adoption of conservation land use practices involve analyses of who will pay the costs of conservation and who will get the benefits. The cost-income balance must be observed as between private individuals and the public, and between private landlords and tenants. Tenure arrangements, adjustments in the ways of doing things by and for land operators, institutional changes and changes in systems of farming are strategic to the success of a conservation program.

Whatever the type of research needed—be it on soil conservation, watershed management, forest or range problems or evaluation of costs and benefits—statistics and ideas arising from analysis of data on problem situations that give rise to difficulties in program planning are the grist of the planning process. Without research, which supplies knowledge, social intelligence must drift or muddle along. One of the functions of research is to help solve or delineate problems, and there are plenty of problems in the planning process and in the formulation of sound land programs.

As government enters more and more into our economic life, to an increasing and expanding degree solutions to conflicts of interests between groups take place through government action and not in the market place. We no longer rely solely on the play of free competitive forces to solve problems. Therefore, it behooves government to know a great deal more about the means and consequences of public action than was formerly necessary. This requires intelligent research.

Tremendous good should come from a dynamic research program that comes to grips with institutional and economic problems relating to land resources. For instance, from studies of such problem situations as: (1) achievements in conservation under present programs; (2) obstacles to conservation practices; (3) economic feasibility of land development in specific areas; (4) alternative means of bringing about best use of resources; (5) public control or ownership of land where public investments are high; (6) changes in tenure arrangements, both public and private, in the interest of better land use

practices. You can readily think of many other timely subjects in need of research. We all realize that in a period such as the present, with farm income exceptionally high, the feeling against group controls which follows major wars, and the many struggles and adjustments that are taking place, it is exceedingly difficult for research to venture very far in studying current issues and policy problems. It is true that one can stop short of policy issues, but this can hardly be done if we are to come to grips with some of our real land problems. And we must be aware that researchers are human, that they are likely to come up occasionally with crackpot panaceas or pleas for special causes, and that they may also get original ideas which are commonly found to be disturbing.

Nevertheless, in the hands of a truly capable analyst, alternative proposals or ways of doing things can be objectively analyzed for the choice of policy makers. We are obligated to do a good job in this field.<sup>2</sup>

We are at the threshold of a period of great emerging public interest in land resources, and the demands for improved techniques of investigation were never greater. Research methods and techniques are the essence of economic investigations that deal with problems of public interest and which have largely been neglected as a field of study by students and professional researchers. Not just the types of methods as statistical, case, psychological, and so forth, and their use in themselves, but of their integrated use in ferreting out significant human relationships. The door of opportunity is wide open in the field of land planning for social scientists to make an immense contribution through research in the study of problems arising in land conservation, in land development, and in the sharing of responsibilities in resource development between individuals and governments.

It should be emphasized that research and planning are not synonymous. Research can refine, delineate, anticipate, and describe problems. It can develop alternative means of action, and it can indicate probable results of specific plans. In short, research can supply information, facts, and ideas. Research is not planning, but for research to be most useful it must contribute to the improved well-being of man and, in this sense, it is an essential phase of planning.

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<sup>2</sup> Salter, Leonard A. *A Critical Review of Research in Land Economics*. p. 51-53. University of Minnesota Press, Minneapolis, 1948.

**PLANNING AND OPERATIONS**

At this point it might be well to consider briefly the question of the relationship between planning and operations. This question has never been satisfactorily answered. Those who insist that the functions are separate and should be maintained apart hold that different kinds of psychology, of personality, and of approach and training are required for planning than for operations. It is held that the planner is the contemplative type who seeks data, continually balances relationships, appraises, weighs, thinks, and lacks the initiative and drive to act; while the operator, on the other hand, lacks the capacity for contemplative thought.

Another consideration affects the merging of plans and operations. Operations require immediate attention and decisions; they involve pressing day-by-day problems. Postponement is often costly, sometimes impossible. On the other hand, planning is a slow and cautious process. Thus, it is held, if plans and operations are merged within the same organization the urgency of pressing operational problems will occupy the principal attention of the staff, with the result that the development of new plans will be neglected.

It has been pointed out, too, that the planner will remain contemplative and unrealistic as long as his planning is not tied in with operations. Only as the planner must also act can there be assurance of realistic plans. It is too easy to suggest what should be done when one takes no responsibility for explaining how to do it or does not participate in the actual doing of it. It is held that we do not want the sort of plans that are prepared by persons incapable of acting, nor the sort of actions taken by persons incapable of planning.

In the development of land programs, what we actually find is the need for planning at different levels. It would be difficult to see how those agencies that deal with land programs could divorce planning from operations. In fact, a little more planning might be, and very likely would be, a good thing. However, at the top level of government, as for instance, in the Office of the President, or on a lower rung of government, as in a county, there is believed to be a definite place for planning completely divorced from operations.

**EARLY LAND PLANNING ACTIVITIES**

The first significant acts relating to planning were designed to conserve resources. Proponents of more efficient utilization and conservation of our land resources became aggressively active toward the end of the 19th century. President Harrison was the first to set aside

from the public domain a sizable tract of land as a national forest reserve. The three succeeding presidents, Cleveland, McKinley and Roosevelt, set aside additional tracts of land as forest reserves amounting to some 180 million acres. A Bureau of Forestry (later designated as the Forest Service) was created in the Department of Agriculture in 1897.

In 1906, during the tenure of President Theodore Roosevelt, all valuable coal lands in the public domain were withdrawn from entry. Soon afterward, Congress endorsed this policy by passing a withdrawals act. In this and subsequent acts, however, coal lands withdrawn from private entry were made subject to agricultural entry for surface rights only.

Additional forest reserves, mineral, water, and military reserves, and National Park areas were set aside at frequent intervals. With a land area of more than a quarter-billion acres in reserve prior to World War I, the Government was obviously in the planning business to stay.

Planning such as that referred to during the period before World War I was piecemeal or subconscious planning. Even though there may be an uncanny relationship between the sequence of governmental acts, often referred to as policies, it must be candidly admitted that governmental acts pertaining to use and conservation of our land resources were largely the results of demands for corrective action or for the prevention of further maladjustment in resource uses. In that period of our history the sequence of governmental proclamations, laws, or administrative rulings had little relation to a projected plan of action.

The great depression which followed World War I and grew increasingly serious during the early thirties brought about, in effect, a mandate for the federal government to assume responsibility for reviving the economy. We are all familiar with the many land programs that sprang up during the 1930's and the rise of a number of land planning agencies. Reference to this period brings to mind the National Resources Board and its successor, the National Resource Planning Board. Within the framework of the National Resources Board, a Land Planning Committee was set up to report on land use and water resources. Whether the Resources Board was, in fact, a planning agency, is debatable. Published reports of the Board usually carried this notation: "The National Resources Board assumes no responsibility for the views and opinions expressed herein." In discussing the work of the Resources Board, a former employee of that agency writes:

If the Board's published reports from 1934 to 1943 are critically examined, it is immediately apparent that none of these reports is an actual plan for administrative operation. Rather the reports deal with fundamentals of public policy. They provide factual data indicating essential public needs. The outlines of desirable public policy are either implied in the data set forth or are presented by the Board or by the Board's committee making the study. . . . Only the broadest recommendations are made in these studies.<sup>3</sup>

Nevertheless, Congress was not in favor of having such a body engaged in planning even to this extent, and the Board passed out of existence.

Another major planning development occurred in July of 1938, at Mt. Weather, Virginia, with the drawing up of a cooperative plan of action to build land-use programs and policies more applicable to varying local conditions. This plan, often referred to as the Mt. Weather Agreement, was drawn up between the land grant colleges and the USDA, and "constituted a new charter of relations between the agencies of the two sovereignties, state and national."<sup>4</sup>

Under the Mt. Weather Agreement the Department of Agriculture was committed to correlate all of its programs in the field and to provide the best machinery available for encouraging farmer participation in agricultural program planning. The land grant colleges through the state extension services were to take the responsibility for setting up in each of the agricultural counties an Agricultural Land-Use Planning Committee — a subcommittee of the over-all County Agricultural Program Building Committee. The proper functioning of the county committees was to be implemented by the establishment of community committees made up entirely of farm men and women from neighborhoods having similar problems or interests. These community committees were to channel their recommendations to the county committees.

Planning experience under this charter of working arrangements between the state and federal agencies was of limited duration and varying degrees of effectiveness; and the merits of the program were obscured by conflicts of interests that developed between agencies and organizations as to who should formulate plans. However, that it had lasting and continuing values few will doubt.

Planning, of which land planning is a significant part, has

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<sup>3</sup> Millett, John D. *The Process and Organization of Government Planning*. pp. 18-19. Columbia University Press, New York, 1947.

<sup>4</sup> Tolley, Howard R. *The Farmer Citizen at War*. p. 48. Macmillan, New York, 1943.

become definitely established as a function of government. But by whom is the planning to be done? This question is pertinent not only within the federal government; it remains unanswered at the state level, and it also involves federal-state relationships. One of the present problems is to resolve conflicts that have arisen in the organizational aspects of the planning process. When this is done we shall be in a better position to do a good job of land planning.

#### **CURRENT LAND PLANNING ACTIVITIES AND PROBLEMS**

A glance at some of the current land planning activities in the federal government should be helpful in exploring further the mechanics of the land planning process. In addition to the regular work for land and water conservation and development by agencies of the federal government, a number of special programs are under way. For example, in the Department of Agriculture, programs are being planned and submitted to the Congress for flood control work and for the development of comprehensive agricultural conservation programs for selected river basins. Other departments and agencies are also involved in planning for better land use. A total of approximately 40 billion dollars has been proposed or requested of the Congress by various agencies for multiple-purpose water-land conservation and development purposes. In addition, the states have under way or are planning significant land resource development programs that are not in cooperation with the federal government.

For some river basins, flood-control planning in the Department of Agriculture is now carried on as a part of comprehensive agricultural planning for river basins. This is true in the case of the Missouri River Basin. This program is a joint planning endeavor of the agencies and bureaus of the Department, in cooperation with the land grant colleges of the Basin on certain aspects of the program. It is designed to develop an integrated agricultural plan for land and water development and conservation in the Missouri Basin.

In many watershed areas, however, flood-control work does not now encompass all the aspects of comprehensive land use planning. But, as this work is designated by legislation as a program for water retardation and soil erosion prevention, the task in its broader aspects does involve many activities of the entire Department. In the words of Secretary Brannan:

The Department's responsibilities as distinguished from those of the Department of the Army . . . have to do with treatment and

management of watershed lands for the purpose of retarding flood water run-off and reducing sedimentation. The measures employed for these purposes are, for the most part, identical with those employed in the Department's regular soil and forest conservation and agricultural betterment programs. These considerations have led us to administer the flood-control work as a co-ordinate part of our broad conservation program as a supplement to work performed under the Department's regular conservation programs. It is recognized that a large portion of the total flood-control benefits in the watershed programs come from the ordinary conservation practices which are essentially a part of wise land use and management. In short, the Department's watershed work in aid of flood control consists broadly of several major types of service, some of which have been successfully in force for many years. Furthermore, flood control is one benefit among several to be derived from what is essentially a multiple-purpose program of watershed conservation management. Just as conservation is a part of wise productive land use and not a separate function, so flood control on the watersheds is bound up inseparably with conservation in its broadest sense.

In carrying on planning and development work in river basins one of the real problems is the dovetailing and coordinating of the work of the departments of the government. A step in this direction is the operation of the Federal Inter-Agency River Basin Committee. This committee has served as a means of keeping the several agencies currently informed of activities. It is further operating under a voluntary agreement to clear, in advance of submission to the Congress, each project proposal. Even though the agencies are not bound to follow the suggestions and criticisms obtained through this joint-clearance procedure, the process does have a beneficial effect.

Another major difficulty, beyond the mechanics of doing a good job of program operations, is securing the integration of watershed-treatment measures, soil conservation needs, improved land practices, and essential institutional adjustments in a way that will insure the security of big public investments. For instance, measures that will obtain maximum waterflow retardation frequently conflict with current economic interests of landowners and operators. When, for example, in the Great Plains might it be desirable to restrict grazing in order to protect reservoirs from erosional wash from watershed lands? Can we always safely assume that a very large public investment will be protected without some degree of public control over the use of private lands?

In commenting on the means needed to do a good job of resource development in river basins, Secretary Brannan has said:

Investigations, preparation of plans and carrying out of plans dealing with the agricultural phases are all involved in river basin developments. When the Congress decides that resource development activities in any given basin or region are to be intensified and accelerated, the regular nation-wide programs of the Department of Agriculture may not fully meet the resulting special needs. Means should be available for authorizing intensified and accelerated agricultural activities to complement and balance the other special programs and projects authorized by Congress for the area. Means should be provided for any necessary stepping-up of agricultural services in a basin or region without drawing from other areas. The Department of Agriculture should be authorized, in cooperation with state agencies, to proceed with investigations and planning, similar to the authorities already available to other federal agencies. Plans and proposals developed under this procedure, when authorized by the Congress, would provide the means for . . . putting into effect the special programs and services needed to bring about effective and well-balanced regional development undertakings.

#### ORGANIZATION IN PLANNING

As has been indicated, a real need exists for improved means and better organizational arrangements in the planning and programming of land and water projects. There is no one useful form of administration for all purposes. That a lack of true coordination exists between agencies is also known.

It is often contended that unification of responsibility for like types of functions would make for more orderly and efficient planning and operations. But disagreements arise in the proposals as to how this should be done. One of the most difficult problems that immediately arises is that of satisfying the need for unified administrative responsibility while retaining the values of established line agencies.

The TVA type of organization is strongly advocated by some people. It is argued that such an arrangement has many advantages over trying to integrate and co-ordinate all work from the federal level because decisions of importance can be made close to those affected and primary attention can be given to their needs, desires, and attitudes; and also because it is felt that relationships among resources in the region are more important than relationships on a national basis with respect to a single class of resource.

The nature and form of organization required to deal with land resource planning problems is far from settled. In fact, except for the TVA type of organization, thinking on organizational arrangements has not been too well crystallized. This does not mean that a number of other proposals have not been made, but experience



has been limited. We are learning as we progress in experience.

The Hoover Commission dealt with the present organization for land and water programs. Among other proposals, the Commission recommends a number of shifts and realignments in the work within the federal departments, and the transfer of certain activities from one department to another. One novel suggestion is the creation of a Board of Impartial Analysis to report to the President on the public economic value of water development projects, to review authorized projects and to recommend to the President discontinuance of those projects deemed undesirable.

This Board would be composed of outstanding men who could advise the President on the public welfare aspects of program development. Great responsibility rests at the level of the Presidency and the best possible advice is needed. Many persons feel that the President needs the additional counsel of a group of men, not associated with any specific program, who are engaged in the study of land and water problems.

In looking ahead, it appears that the federal government and the states, either directly or indirectly, must assume an increasing degree of responsibility in planning for the use of land resources. Whatever may be the organizational setup for doing the job—whether it be done by agencies, departments, types of regional authorities or what not—it is a responsibility of great magnitude that involves continued over-all appraisals of aggregate national welfare consideration so that the interests of all people may best be served.

Dynamic and positive planning of the use of our land is emerging slowly, painfully, but surely; and as it develops piecemeal and fragmentarily, it requires increased integration and a progressive approach to a comprehensive public point of view for the wise use of land resources.

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# 15.

## *Land Programs in a Policy Framework*

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AS THE PRECEDING CHAPTERS HAVE MADE CLEAR, a variety of land programs have been and are the subject of attention in programs of this or that sort. It is less certain, however, that in general these programs have been or are being guided by sufficient foresight and intentness of concentration on over-all objectives to make them fit together nicely into a comprehensive public policy. Without such a guide, it would be a miracle if some of the programs did not conflict.

### EVOLUTION OF LAND PROGRAMS

Without in any way attempting to catalog land programs, reference to a few might well be made.

When this country first achieved its status as an independent nation, land was the one resource which was in relatively abundant supply. The thought is not always easy for us today to bear in mind that the land originally was in public not private ownership. Much of the land in the original area of our country was still publicly owned at the time independence was achieved. The original colonies wisely turned that public land over to the federal government and by so doing created the public domain. One shudders at the thought of the confusion and conflict which would have reigned if the states had attempted to handle this domain each in its own way. Expansion of the borders of the United States to the Pacific later added vast areas to that public domain.

The major question with regard to land confronting the new nation was one of disposal. Theoretically, at least, there was a choice between retaining the land in public ownership or turning it over to private owners. The debate, however, did not center on this question. Overwhelming sentiment favored private ownership. The differences with respect to policy related to whether the purpose should be to dispose of land gradually in a manner to provide the greatest income to the treasury through its sale over a period of time or to get it into private hands rapidly with the view to its development and exploitation. While sale was the usual method of disposal, the program came to be guided primarily by the urge for settlement and development. This was illustrated by the disposal operations. It was made clear in the pre-emption program of 1841 and later in the Homestead Act enacted in 1862. Land grants for various purposes in the main were part and parcel of this same program of expansion and development.

Hindsight tells us that the program of land disposal fell far short of perfection. While few would take exception to the broad objective of transferring land from public to private hands, students of land economics today are well aware of many instances where modifications in the program and methods employed would have prevented or at least lessened some of the problems of land use pressing on us today. Some lands not suitable for agricultural development were turned over to private ownership for this purpose. In general, the tendency was to regard nearly all land as being potential agricultural land and to treat it accordingly. As we look back on these activities, we can see a number of instances where public interests might have been protected more effectively if greater discretion and more selectivity had been employed.

Our criticisms, however, must be tempered by the realization of the fact that those who preceded us had to make decisions with relatively little information available to them regarding the suitability of the land or prospective needs in various uses. Forests seemed limitless. Mineral resources were largely unknown. Erosion was not a matter of concern. There is no reason for believing that we would have done the job any better under the circumstances. There was no urgency in those days arising from a limited land supply. Instead, there was almost an embarrassment of abundance of land with respect to other resources and the public reacted accordingly.

With the passage of time, our understanding of and concern over land problems has broadened and deepened. We are gradually appreciating more and more that land is one of our basic resources and that how well we live and what the prospects will be for generations yet unborn are determined largely by how efficiently we use land and how well we conserve that resource.

The majority of our people today depend entirely on others for their food supply. Even the farmers themselves are far from being self-sufficient with respect to their food needs. Assurance that an adequate food supply will continue for the longer-run future, consequently, has become a matter of vital importance to the public generally. This, of course, does not mean that the urgency of our food supply compares in any way with that in some of the overpopulated areas of the world as, for instance, the Orient. While there is relatively little concern over the ability of agriculture to provide an ample supply for current needs, the public rightly takes an interest in having produced the proper quantities and qualities of food and having that food distributed as efficiently as possible in order that the rank and file may enjoy the highest possible levels of living.

Our ability to produce agricultural products continues in the stage where we are more concerned with supplies pressing on the market than over the pressure of population on food supply. We have experimented and are continuing to experiment with governmental programs designed to increase farm incomes by manipulating prices of farm products and with efforts to hold production and sales in check in order to produce the desired price levels. These undertakings inevitably have a bearing on land use and we ought to consider them carefully from that standpoint and to see whether they actually fit into the framework of policy which we are seeking to formulate.

Farm credit problems similarly have been centers of attention over the years and attacks upon them likewise involve questions of land and land values in a variety of ways. We need to bring some angles of these programs into review in this connection.

Farm tenancy has been a matter of popular concern for a good many years. This country started out with an ideal of farmers owning their land, and ownership of the farm by the operator has continued the cherished goal for the vast majority of farmers. We are concerned about facilitating its attainment in every way possible. Programs to this end cannot be ignored.

Taxation also enters this picture, particularly because of the importance of the general property tax in the support of local units of government and the major reliance which must be placed upon farm real estate as a source of revenue to support public services in rural areas. Taxation furthermore becomes an important aspect of programs involving outlays of public money.

Then, there is the entire field of soil conservation which today is attracting attention not only from farm people but from citizens generally. Here are many policy angles and problems.

The preceding are illustrative of types of programs bearing on land which need to be fitted into an over-all policy framework to avoid repetition of present cross-purpose operations. It may be profitable to examine these and other matters in some detail.

Before we undertake this, however, we need to develop some notions regarding what we expect from a framework of policy. Few of us are likely to argue for a master plan to blueprint all details. Not many of us are that sure of our knowledge and understanding. We also are skeptical of anyone else having the required knowledge and understanding to do so. We consequently are looking for basic principles to guide us, rather than seeking iron-clad rules to bind us. We believe in experimentation. Heaven help us if we ever lose the willingness to venture. We recognize that trial-and-error processes must be kept available in this experimentation. We want answers but we want to be reasonably certain that they are the right answers, or at least the best attainable under existing conditions.

#### **PRINCIPLES AND GUIDES FOR POLICY FORMULATION**

A general policy and guide for land programs may be found in the over-all aim of securing the best possible productive use of land as a resource for the satisfaction of man's wants.<sup>1</sup> It must be granted

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<sup>1</sup> The most productive use is brought in here only as a general guide for land programs. It does not mean that it is the only one. The objectives of public policy

that this is somewhat elusive and intangible as a guide. However, any guide for such a purpose necessarily must be broad rather than specific. The latter would become a dictation rather than a guide. Let us hasten to add that best use of land does not mean the most intensive use of all land. In fact, for some land it will mean no economic use at all. Nor does it mean the largest possible output without regard to costs. Best use of land cannot escape giving consideration to fitting that use to existing and prospective conditions of the market. The economic use of land is for the purpose of meeting requirements which are reflected in the market place. Such a basic idea involves giving consideration to the use of land not only today, this year, and the next but also to its use over the longer run. Such a generalization at least provides us with a backdrop against which we may test specific programs and proposals. Unless they fit this general aim, we have reason to question their advisability.

No purpose will be served by pretending that it is an easy assignment to determine the most productive use to which all parcels of land should be assigned or to decide on the exact intensity in that use. Some land bordering on a natural harbor such as found at New York or San Francisco is used for a seaport and becomes the site of a metropolitan center. Even though such land were highly adapted to some form of agricultural production, shipping and related services would have first claim. No one will question that the primary use of the land in Story County, Iowa, is agricultural and that within agriculture, corn will continue to have a major claim. No one proposes that we use Lower Manhattan for a pasture or that it be converted into a forest preserve. Neither is anyone proposing that we scatter Empire State skyscrapers all over Story County, Iowa.

We observe the principle of first choice in operation in land use and while man's knowledge and judgment are not perfect, most of us will agree that the results obtained in the broad allocation among uses are not too bad. They are far short of perfection, however, and consequently we see the need for further study and research to correct past mistakes and to guide future decisions in land use. We also see that individual initiative and discretion may not always be adequate to serve the best interests of general welfare and conse-

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in general cannot be reduced to one single item. The economist naturally emphasizes maximization of returns. The political scientist, the sociologist, the psychologist, and others will rightly insist that there is a whole complex of factors which influence the expectations and demands of people from public policy.

quently have found place for some public direction, participation, ownership and control.

Examples of the latter are numerous. Providing for our timber needs for the long-run future involves operations beyond the readiness of private citizens to assume in full. Markets two or three generations away are hard to appraise and compounding of return on investments piles up where such an extended waiting period is involved. In consequence we have established extensive public forests and have made some progress in regulating the cutting of the timber on private lands as well as in public forests. Some regulations likewise are imposed on extracting oil, natural gas and other natural resources from the earth. Zoning ordinances also have a place in this picture. These are well established in cities and adaptations to rural lands are progressing. While perfection has not been attained in regulatory measures, the basis on which they rest is that of best resource use.

A number of years ago a leading soil scientist of that day criticized very severely the economist's concept of submarginal land. His principal objection was its intangible nature. He was accustomed to dealing with factors subject to physical measures and did not find in the idea of marginality any standard yardstick which he could employ in deciding exactly how a given parcel of land would classify. By contrast, this scientist pointed to physical productivity as something identifiable and measurable. He wanted to discard the concept of marginality and to rely solely on physical productivity as the guide.

His concern apparently was that of finding some formal way of classifying land which could be applied under any and all conditions. What he failed to appreciate adequately was that to be serviceable land classification must be helpful in answering questions regarding the use of the land. Physical productivity is an important factor but by no means the only factor in deciding the use for which a given tract of land is best suited. Islands of good farm land may be found in areas such as the cutover sections of the lake states but may remain undeveloped because of location, costs of clearing and other limiting factors.

The point which this emphasizes is that problems of land policy and land use are not reducible to simple, automatic measurement. They are a complex bundle of factors and judgment must be given wide latitude. There are differences of view regarding what the most productive uses of land are, but in spite of those differences, the general guide of efficient land use is the best backdrop available for testing out how well specific programs fit into a general policy framework.



## SPECIFIC LAND PROGRAMS

With that background, we move next to a review of a few specific illustrations of land programs. In the instance of farm lands, a widely accepted ideal in the United States is ownership by the farm operator of his farm. Some will not be satisfied unless it is also pointed out that those farms should be "family-type" units. How far shall we go in our insistence on these points? Do we want all farms to be operator-owned regardless of whether this results in the best and most productive use of our resources, or will we accept some modifications in the interest of good resource use? Similarly, are we to demand that only family farms be permitted to exist and that large-scale enterprises in agricultural production be banned without weighing pros and cons in terms of want satisfaction?

The "family farm" has become glorified in the popular mind. There is no clear-cut concept of what a unit must be like in order to qualify for this classification. Wide differences on this point are evident with the result that some who plead for the retention of the "family farm" neither know just what they are after nor what it is that makes it such an ideal. Some, especially nonfarm people, have the impression that it is a small, relatively self-sustaining unit. Some are inclined to view farming as a way of life, implying that the farmer should not be too concerned over the matter of economic returns. They fail to see that the market supply on which our population depends does not come from farms where the operator is engaged primarily in a mode of living. It comes from farms which are managed by persons of considerable skill and capacity. Such farms are business enterprises rather than a way of life. The operators cannot escape concern over costs, prices and economy of operation. They have expenses to meet, bills to pay and success or failure depends on their skill in managing the farm business. It is time that city people get over their notion that farming is an activity calling mainly upon brawn rather than brains.

Perhaps it is not intentional but there are some who apparently want to make of the farm a sort of bed of Procrustes, that is, they want to make the man fit the farm by stretching him to the size, if it is beyond his capacity, and lopping off the ends if his capacity is beyond that of the farm. Would these persons likewise restrict the expert driver of a ten-ton behemoth mounted on rubber to a half-ton pickup? This does not seem to fit the general objective of best resource use too well. Had we not better recognize the importance of fitting the farm to the man rather than the man to the farm if

we are concerned with attaining the best use of resources and developing the greatest satisfaction of our wants?

Every farm management study of operators' earnings reveals a surprisingly wide range in the results on different farms, even on similar units in comparatively restricted areas. The human factor too often is overlooked even though it is of prime importance. We will do well to free our minds of the notion that farmers run close to a given type and that there is one ideal size of farms which will fit all cases. At the best, the popular measurement of size in terms of acres is far from a fixed standard. A quarter section farm in one area under one system of farming actually may be a larger farm business than a section farm under other conditions and in other areas. If we hold up best resource use as a guide will we not concentrate more on fitting the farm to the man rather than vice versa? Is not the ideal size of farm one which fits the capacity of its operator? It is poor use of the resources placed at our disposal to assign a one-talent man to a farm calling for five-talent ability or to put a big operator on a self-sufficing unit. While the results would not show up in vital statistics in the same way as the peculiar practice of Procrustes in adapting man's size to the bed, the notion is equally absurd.

The worry evidenced in some quarters lest agriculture be taken over by corporate farms is without substantial foundation. While some lines of operation are well suited to large-scale enterprise, it is apparent that the individual farm unit remains the most efficient type for our agricultural production in most instances. There, no doubt, are many more cases where farms today are too small than where they are too large. The size pattern was determined before the advent of modern machines and methods. From the standpoint of efficient production and desirable levels of living it will be well to aid rather than hinder the enlargement of farm units in many instances.

Should we shy away from the large-scale, corporate farm where such a unit has distinct advantages over the individual farm? Where would we be industrially if we had insisted that the village carriage maker should have prevailed and that large automobile concerns should have been kept from seeing the light of day? But the protest may arise that such large farms may exploit labor and take undue advantage of their position otherwise. One retort might be that of calling attention to the presence of considerable exploitation with small units. The real answer, however, lies in dealing with these problems realistically as they arise. As suggested previously, however, there is nothing in prospect now which would justify a forecast of

any general replacement of the individual farm unit in the foreseeable future. There, consequently, is no reason for getting very excited over the development of corporate farming.

But what about the other phase of this question, namely ownership of the farm by the operator? There are a good many things to be said for having farmers own their farms. Most of these relate in one way or another to the permanence of occupancy, or in other words security. We see the effects of short-lived tenancy arrangements on the tenants and their families and also on the communities where such a situation prevails. We also find instances where a landlord may take some unfair advantage of a tenant. This gives rise to demands that farm tenancy should be abolished. That proposal, however, takes on proportions of wanting "to throw the baby out with the bath water." Again, if best resource use is the aim, should not programs recognize that tenancy has good features as well as bad and seek to strengthen the good and, as far as possible, eliminate the undesirable?

A point which may be missed is that the institution of tenancy in agriculture is a consequence of the relatively small unit of production which is best suited to most lines of farming. It enables the separation of ownership of the land and its cultivation. In modern business and industry, a similar situation often prevails as a result of the corporate enterprise. The stockholders who are the owners of large business enterprises often take little or no part in actual operation. That is left to salaried executives who not only provide management but often determine broad policies as well.

Can the idea of resource use be applied as a guide to farm credit programs, as well? Attitudes with respect to farm debt often are colored by emotions rather than by careful weighing of facts. It is natural to sympathize with the debtor. He is assumed to be at a disadvantage. Perhaps, the image of Shylock and his demand for a pound of flesh is back in the recesses of our minds. The creditor usually is pictured as the silk-hatted, diamond-studded, opulent character; the debtor is more often caricatured with a patched-pants, down-at-the-heel, bedraggled appearance. What is forgotten is that some of our largest enterprises are debtors. A host of persons of modest means are creditors. Every holder of a life insurance policy, a government bond or a bank account is a creditor.

The basic purpose of farm credit is to facilitate production and ownership. The use of farm credit is for the purpose of increasing productivity and net return. All of us have heard representatives of farm credit agencies say that their function is to get the farmer

out of debt. Basically, that is not their function at all. It is instead that of helping their clients increase their productivity and returns by lending them capital. Borrowing is good business if the use of the funds is so productive that the returns provide more than the cost of the loan. Not all loans are in this category. However, farm loans should be. Programs of farm credit should aim to serve this end and to the extent they do will fit into an over-all policy framework.

Pressures become strong at times to use public funds to subsidize farm credit of one type or another. Before any programs of this sort are embarked upon, it is in order to examine how they will fit into the framework. Will they be of public benefit or are they in the nature of grants or benefits to certain individuals without due consideration to the rights of others whose claim for consideration may be fully as meritorious?

May there not be justification for some change in our attitude towards debt retirement? Our thinking is colored by the generally accepted idea that a farmer should be able to buy and pay in full for a farm within his productive lifetime. Many have and are doing just that. But why view it as such a criterion of success? If the operator earns a return adequate for a satisfactory living and is able to make suitable provisions for contingencies and for old age, is he not accomplishing all we expect of individuals in other lines of endeavor? Let us find more adequate measures of success and financial progress than that of paying off the mortgage. This will become of increasing importance in the future with the mounting capital requirements in agriculture.

It used to be that the land and improvements thereon constituted the major capital of the farmer. The application of mechanization to agriculture and greater emphasis on livestock production and special enterprises have altered this picture. The latter involves a greater investment of capital than the land on a considerable number of farms.

This change may lead to a more realistic valuation of land. Up through World War I the popular assumption was that land would continue to rise in price. The owner who felt dissatisfied with this current returns could find some solace in the thought that the increase in the value of his farm was building up an estate. The drastic fall in land prices during the 1920's and 1930's demonstrated that prices can go down as well as up.

Buyers of farms should appreciate that what they actually are acquiring is the right to the future net income which that farm will

yield and that its value is the present worth of those future increments of income. Credit and other policies will do well to help encourage and support a more general understanding of this point. This should be helpful in reducing the swings in land prices which so often have been causes of major distress to many farm people.

Land reclamation needs to fit in with the general objectives of policy. Pressures for reclamation from localities desiring such developments often are strong. This is particularly true when opportunities are seen for distributing the costs generally by having these projects undertaken and financed by the federal government. Pressures are specific and may be intense because of the benefits localities may expect. Resistance to their development may be more diffuse and less effective because the burdens of costs are seen less clearly, if at all, by the taxpayers in general.

Better guides for use in arriving at decisions in regard to reclamation are needed. An important test should be the prospect which the project has of being self-liquidating or at least its promise of providing returns to the public sufficient to warrant the use of public funds for its development. Will the lands for which reclamation is proposed be used for needed production? Will they produce more efficiently than some existing land, everything considered? Will the net incomes be sufficient to pay off the costs over a period of time?

Adequate answers to such questions often are not easy to develop. This situation becomes even more complex when reclamation projects, as is frequently true, are part of a broader development involving power, navigation, flood control, and water supply. The complexity, however, is no excuse for not trying to do a better job than has been the case to date.

Taxation may be an important influence in land values and land use. Property taxes are relied upon to provide much of the revenue needed by schools and local units of government. The result is a wide variation in tax rates. Some communities have provided more elaborate services than others. Some have a much greater tax base to draw upon than others.

Tax delinquency on land has attracted much attention, especially in such regions as some of the cutover sections of the Lake States. In the case of these areas, the problem is in fact much more one of land use than it is of taxation. Delinquency in some instances is the outgrowth of excess tax rates resulting from expanding public services in anticipation of development which has failed to materialize. Where this is the situation, the attack needs to be primarily on the side of land use rather than on the tax side.

Mention may also be made of the effects which policies of state aid to local units of government may have on land use in some areas. Because of the general concern over adequate provisions for education, there is ample justification for some general sharing in costs through a system of state and other aids. The question of federal aid to schools which is being debated so hotly at present involves the same point. While accepting the principle of state aid as being desirable, it is important to make certain that these aids are not applied in such a manner that they run counter to the aims of desirable public policies. Question may well be raised regarding the wisdom of such aids where they encourage settlement or continued occupation in localities not suited to such use. Transportation of children to schools is an effective help in providing better schools but taxpayers must wince when confronted with cases where the head of a large family in a remote location may derive a considerable share of his income from payment out of public funds for transporting his own children to school. In fact, settlement in remote locations sometimes has been made inviting by this provision.

The public is warranted in protecting itself against abuses of this kind. It also is interested in helping protect the individual as well as itself from inadvisable or undesirable land use. Programs of land zoning referred to previously have been developed for this purpose. It may be anticipated that with the passage of time there will be additional protective devices of this nature developed.

Consideration of programs to influence farm prices and production in order to increase the incomes of farmers opens up a "Pandora's box" of questions involving land. It is not evident, however, that questions of good land use have had any very prominent part in deciding upon features of such programs.

Agitation for or experimentation with farm programs has had a spot in the limelight for the past three decades. Talk of farm surpluses was heard frequently during the 1920's and the McNary-Haugen and other proposals were brought forward, mostly designed to attack the problem through action in the market by disposing of "surpluses" abroad. The Federal Farm Board was established in 1929 and soon found itself on the hot seat because of the disastrous break in prices which started in the fall of that year. Its influences on price were exercised mainly by withholding some supplies from the market. Effects on land use, consequently, were indirect.

The unfortunate situation in which the Farm Board found itself, with supplies for which it had no outlets, cleared the way for the adoption of a program of production adjustment designed to influence

price, and hence farm income, by reducing supplies of some commodities placed on the market. This shift in emphasis brought land use squarely into the picture even though the approach was not from that angle.

The unfavorable decision of the Supreme Court in 1936 voided much of the original adjustment program. In seeking other means of attaining the objectives, the idea of tying production adjustment to conservation was developed and that of shifting land from so-called soil-depleting to soil-conserving crops and of making payments to farmers for following certain practices continues to have a strong hold.

Principles of good land use have not been given full recognition in many of the programs which have been undertaken over the past two decades to manipulate farm prices in an endeavor to give the farmer a greater share of the national income. Honesty forces us to admit that good resource use often has had to take a back seat, if not being left behind entirely. To be sure, many of these undertakings have been viewed as meeting an emergency. But if we persist in employing emergency measures, that form of activity in time will come to represent our permanent policy. Nor does it seem unreasonable to stress the importance of recognizing sound principle even in emergency measures.

A difficulty which arises in any program involving limitation of production or sales is that such limitation usually is tied to some base period of the past. That pattern may have been far from ideal at the time and the farther away the base period is in point of time, the less adequate it will be for the current situation. Its perpetuation tends to lead away from best use of resources. Land use requirements tend to be dynamic; control programs are likely to be more on the static side and, consequently, interfere with adjustments.

To hold production in check temporarily because of a temporary surplus condition in the market or as part of a shift in resource use is one thing. To embark on a program of maintaining excess human or natural resources available for use in agriculture and as claimants to shares in the farm income is something else. Programs to this end do not fit into a framework of policy guided by good resource use.

This reference to resource use may also remind us of the limitations of price in effecting an increase in return by itself. Price yields income only as it is coupled with goods or services. If curtailment of output is required to produce a given price situation, incomes will be reduced correspondingly. The growing complexity of eco-

conomic society makes it easier for man to overlook the elementary fact that wants are satisfied by production, not by its lack. As a consequence, efforts to get more for less have great popularity. The only way to get a larger slab of pie for everyone is to bake a larger pie, that is, by producing more goods and services. This calls for good use of land and other productive resources.

An aspect of marketing quotas and acreage allotments which has not received the attention deserved by its importance is the tendency of bidding such "rights" into land prices when transfers take place. Where this occurs, the income gains from the programs go to the man who holds title while the capitalization process is under way. The new owner finds his costs correspondingly higher and that this increase nullifies his income gains from the program. However, he comes to have a vested increase in the continuation of the program because he fears that its end means a decline in the valuation of his farm.

#### NEEDED ADJUSTMENTS

Some of these adjustment activities have been glorified by describing them as being in the interests of conservation. Some of our adjustment programs may have had some very valuable conservation results as by-products. If we draw upon the public treasury for making payments to add to the incomes of farmers, however, we ought to do so knowingly and openly. Let us not cloak such payments in some other dress and in the process of trying to add to its respectability actually mislead the general run of people.

Also, where it becomes advisable to apply controls or restrictions to output let us constantly keep in mind the importance of efficient land use. Let us not develop rules and regulations which will keep poor land in use while better land lies idle. Let us not saddle ourselves with a program which runs contrary to the basic idea of good resource use. We need to keep ever in mind that agriculture is a highly dynamic industry and that we can ill afford to lose the flexibility necessary to keep our agriculture efficient. There is danger in historical bases, allotments and quotas in that they will tend to become protection to the ins against the outs and that they will tend to handicap the more progressive for the benefit of the less efficient. At least these are angles which need more careful examination in the formulation of programs than they have had up to the present time.

When it comes to the question of soil conservation, no one can deny that here is a field of tremendous importance to general welfare.



Both the individual farmer and farm operator and the general public have some very important stakes in matters of soil conservation. The job yet undone is that of determining with reasonable exactness the division of responsibility between the individual farmer and operator and the general public. Certainly, the public has some very decided interests in soil erosion because washing or blowing soil may do damage to people far removed from the place where the initial damage takes place. Losses of this sort are not purely individual matters. They are of general concern. Not only to the folks now on earth but to the generations which are going to occupy this planet in the future.

We are coming to modify some of our ideas with respect to property rights and are beginning to distinguish a little more clearly between rights to use resources and rights to misuse or abuse such resources. Without setting up a dictatorship to tell a man how he shall use his land, there is room for developing some rules which will help both the individual and the public to determine whether or not an individual is adequately protecting the resource which he is privileged to use.

We need to distinguish much more clearly and effectively between the private capital of the owner and operator and the public interest. Take the matter of soil fertility. It cannot be denied that there is a relationship between soil fertility and erosion control and that in this sense the public has an interest in building up soil fertility as a means of controlling erosion. However, in a large measure, soil fertility is part of the farmer's private capital. The major objective in maintaining and improving upon soil fertility is that of maintaining and improving upon the productivity of the land. For the individual, the goal is the highest possible net return. We should, consequently, distinguish between programs which serve the interests mainly of the individual operator and those programs which serve the interests of the general public. If public funds are going to be spent generally on building up soil fertility, then the public is entitled to ask for returns not only in soil conservation but also in terms of a share in the greater efficiency of production. In other words, the gains in efficiency should be reflected in lower prices in the market place.

The point is that while we need to give more rather than less attention to soil conservation that attention needs to be pointed up more effectively than it has been done up to the present time.

Some serious questions are raised by the tieup between programs to influence farm income and conservation. The popularity of con-

ervation is so great and the willingness of the public to provide funds for that activity is so strong that there is danger that programs may be sold to the public under guise of conservation when they are primarily something entirely different.

Considerable sums of money have been distributed to farmers under this program. In 1947, 2,729,794 farms were credited with conservation practices under the Agricultural Conservation Program and the total "credit earned" was \$264,796,570.<sup>2</sup> Apparently nearly 42 per cent of the total was for practices involving the use of lime and other inorganic materials. Practices involving protective and green manure crops absorbed 14 per cent of the total amount. Mechanical erosion controls covered another 14 per cent. Pasture and range practices totalled over 13 per cent. Drainage accounted for over 4 per cent and irrigation about 3½ per cent. Forestry practices received 0.22 per cent and miscellaneous practices nearly 9 per cent.

The contention is not that these are undesirable practices. Many of them unquestionably are very helpful in adding to soil productivity and to some extent in limiting erosion. The troublesome policy questions which these figures raise but leave unanswered are such as the following: Has or will the public receive 264 million dollars of benefits in terms of soil conservation from these expenditures of public funds during the year 1947? To what extent were these payments "earned" by farmers for doing things from which they rather than the public receive the gains? That is, to what extent does such a program provide conservation returns to the public and to what extent is it a program which adds to the incomes of the participating farmers? To the extent they are the latter, how acceptable would they be to the general public in a year when farm incomes were relatively high?

Surely, if we have programs to direct and adjust production they ought to fit into our soil conservation needs as fully as possible. That point is not in question. The issue is over the question of the extent to which we may be using conservation as a convenient cloak for making payments to farmers which add to their incomes.

If we find it advisable and necessary to continue programs to buttress the income situation of agriculture, payments to farmers may well have a prominent place. Their nature and the purposes

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<sup>2</sup> Statistical Summary 1947, Agricultural Conservation Program, U. S. Department of Agriculture, Production and Marketing Administration (processed December 1948).

for which they are made, however, should be kept clear at all times. To do otherwise is to delude the public. In the end any such subterfuge might do real soil conservation serious harm. A disillusioned public might turn thumbs down on the entire program of soil conservation throwing out the good with the objectionable.

In addition to the conservation programs just referred to, other programs designed more directly for dealing with the consequences of erosion by wind and water have been expanded very decidedly in recent years. The importance of the problem which these programs attack is so great that few will question the desirability of their objective. It is probably true that we have not had all of the knowledge and information which we need to guide us in these programs, and mistakes, no doubt, have been made and may be made in the future. The need for arousing public interest in soil conservation has led to the employment of methods which at times have had the flavor of evangelistic fervor. The result in terms of awakened public interest may be all to the good. However, it may be possible that a certain amount of exaggeration at times may have tended to mislead people. Confusion on this score has not been lessened by the appearance of some books which paint future prospects in rather doleful colors.

Population questions involve some matters of interest in connection with public policies. For example, population numbers, real incomes and the way in which the incomes are distributed are very important in deciding upon the demands for products of the land. A rapidly growing population calls for expansion of agricultural output because the volume of consumption is related to the number of mouths to be fed and bodies to be clothed. When population growth levels off, expansion in agricultural land use needs to follow suit.

While population numbers as such may not be the focal point of public policy, the geographic distribution of population may create situations calling for policies—and land use may be affected. Two important aspects of population are one, the slowing down in the rate of increase as a result of a fall in the birth rate and restriction on immigration and the other, the differential population growth in different areas. The urban centers do not have a birth rate sufficient to maintain their numbers so are dependent upon migration from rural areas to replenish and increase their populations. Nor are the rates uniform in rural areas. Some of the highest birth rates are in areas not too well supplied with either natural resources to provide economic opportunities in agriculture and other fields or

industries to provide employment. Areas such as the Southern Appalachian region seem destined to play an important role as suppliers of population to industrial centers in the years ahead.

This situation provides a setting for a number of lines of action involving policy decisions. From the standpoint of levels of living and efficient land use in some of these areas, programs to aid migration away from them or to develop nonagricultural opportunities near at home have an important place. Improved educational facilities, better provisions for health, expanded employment services, and the development of industrial and other employment not too far away may play important parts.

That there is underemployment of the available manpower in some lines of agriculture is well known. While such a situation becomes aggravated during prolonged periods of depression and non-agricultural unemployment, it exists continually. Mechanization and improved technology bring this situation into sharper focus. Changes in market requirements or shifts in production among regions, particularly in crops such as cotton requiring much man labor, have some far-reaching consequences. This nation is following a policy of maintaining prices on cotton which limit export sales and invite replacement by synthetic fibers. On top of this, regional shifts from the Southeast to Texas and other areas to the west, together with developments in Arizona and California have added to the problems of older regions. If the mechanical cotton picker is adopted at all, generally other major changes in both employment and land use will follow. These changes are not so simple and easy as sometimes assumed. A shift from an enterprise such as cotton calling for much labor to some extensive enterprise such as grain and livestock calls for enlargement of farm units and for other employment for workers no longer needed in agriculture. Instead of being resisted, desirable changes should be faced realistically in order to bring about a better use of resources and improved levels of living. Here is a situation calling for co-ordination of programs guided by a sound over-all policy.

The agriculture of the United States developed during a period when we had available an active foreign market. In fact, agricultural exports played a very important part in providing the means of obtaining and paying for capital for the development and industrialization of our nation. The growth of the urban population and of industries here at home has made the domestic market the outstanding one. However, farmers continue to have a very direct interest in foreign trade. Some farm commodities such as cotton, tobacco, wheat,

rice and the like still look to overseas outlets to provide markets for important shares of the total. Unless these export outlets can be maintained over a period of time, our agriculture will be faced with some extensive and costly readjustments. Farmers likewise are interested in international trade because of their interest in imports as sources of supplies of things which they need.

Farmers likewise are concerned with international trade as a phase of international cooperation so important to a peaceful living together of the nations of the world. All of us consequently should have a very direct interest in seeing to it that programs fit into our over-all international aims and objectives. This is particularly so because the United States occupies such a position of world leadership that its actions play a very important part in deciding upon the actions of other nations. Unfortunately, there is conflict between some of our domestic programs and our international interests. For example, if we continue to endeavor to maintain farm prices at artificially high levels, it is inevitable that we will endeavor to protect that price structure from competition from abroad. Such a program is inherently nationalistic in nature. The popularity of the idea that we can dump farm products abroad to get rid of surpluses illustrates the point that we have not yet thought through fully the consequences of some of these proposals.

It is to be hoped that our domestic programs will fit into our international interests and that we will not lose sight of the importance of maintaining and developing the best possible markets for farm and other products abroad. Our programs along this line have some very important relationships to the matter of land use.

## INTEGRATION OF PROGRAMS

The preceding review of illustrative cases suggests that not only do we need to fit various land programs into a general policy framework, but that we also need co-ordination in programs in various fields. The different segments of our economy cannot be treated as if they operated in water-tight compartments. Policies relating to land use and agriculture in general need to dovetail with policies relating to labor, industry, business, commerce, and finance. All of them should aim at serving the best interests of all.

This is a point which is not grasped too clearly at present. The tendency, not unnatural, is for each segment to be primarily concerned with its own limited field. Downward adjustments in prices are resisted even when resulting gains in maintained or expanded

output may outweigh the reduction in unit returns, or the losses may be less than in curtailment of output. Labor often sees wage increases more clearly than it sees the need for offsetting those increases by greater productivity if costs to workers and others are not to reduce or wipe out gains. Farmers center attention particularly on prices, and a good many appear willing to accept drastic limitations on their output in return for promises of price protection.

As far as agriculture is concerned, there is no government program of price protection in sight which can mean as much to farm welfare as active production and full employment in nonagricultural lines. Farmers need this to provide the best possible markets for the food and industrial raw materials they produce and employment opportunities for the share of the farm population not needed on the land. A major worry of our farm people today is that the rest of the economy may go into a tailspin. A good agricultural situation and the best use of our land resources depend upon reducing the violence of swings in the economic situation in order that losses of severe depression periods may be outmoded. This will not be accomplished through reducing the economy to a static state. It must continue to be dynamic. Without change there can be no progress. Not all changes are in the nature of progress. We must seek changes which lead to improvement and to check those which do not. This cannot be done without effective co-ordination of the entire framework of policy.

A repetition of the generalization made earlier may be suitable as a concluding observation. We live by production, not by its lack. The beacon light for policy must be that of getting the best and most efficient use of resources and the fairest possible distribution of the results to the end that mankind may have the highest possible levels of living attainable.

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# 16.

## *Building a Land Policy*

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**M**ORE THAN A QUARTER-CENTURY AGO, PROFESSOR B. H. Hibbard, the eminent land policies historian, summarized his views on our land policies in these words; "Thus far there has been no genuine land policy in and for the United States. True enough, there have been temporizing plans, some of them good for a time, and for certain sections. But a plan involving and comprehending the welfare of the whole nation, varied to fit the different parts of the country, we have not had."<sup>1</sup> The need for a genuine land policy comprehending the welfare of the whole nation varied to fit various sections has not diminished but has increased during the past twenty-five years. The enlarging scope of public policies over land use demands that serious study be given and appropriate action be taken toward the development of an integrated land policy whose

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<sup>1</sup> Hibbard, B. H. *History of Public Land Policies*, Macmillan Co. 1924, p. 562.

unified objectives direct the various efforts concerned with the use of lands.

The need for building a land policy is emphasized by the conflicts and confusions characterizing current land programs and policies. A few illustrations may aid in underlining this need. For example, one agency of government, the Reclamation Service, is authorized to invest billions of dollars which will help bring more land into agricultural production while another agency, the Production and Marketing Administration, is spending billions of dollars to support prices and take "surplus" products off the market. There may be justification for bringing land into agricultural use to produce some of the same kinds of products that are piling up in warehouses and storage bins but most current programs have not been subjected to the tests that would reveal such justifications. Another example may be found in the use of historical bases for controlling acreages of tobacco, cotton, wheat, corn and other crops. The allowable production as indicated by a historical base may be completely in conflict with the best use of lands providing the land has not been used properly in the years making up the base. Another example is found in the so-called favorable "benefit-cost ratio" applied to projects entailing public investments. A favorable benefit-cost ratio of 1.1 to 1.0 is not wise use of public funds so long as other opportunities for greater returns on public investments are available. Very little is known about the relative benefit-cost ratios existing at the time funds are allocated to a particular type of land project.

Current land use and soil conservation programs need clarification of their objectives and principles for allocating public funds. For example, income support, production control and conservation objectives should be clearly separated from each other to permit a clear-cut accounting of costs and accomplishments of various objectives and policies. This cannot be done by jumbling many heterogeneous objectives into a single mammoth program. Neither can it be achieved by a number of separate programs and policies unrelated in both objectives and expected results. This does not mean that several programs or policies can not be used to re-enforce or supplement one another. An income support or credit program might well require cooperators to meet certain minimum conservation standards. A crop reduction program might well be adapted to land use and soil conservation standards. Since all land programs should converge toward over-all goals of public policy, there complementariness should be enhanced and their conflicts minimized in the process of achieving common objectives.<sup>2</sup>

Many more illustrations could be cited to show the need for building a land policy but let us now turn our attention to the objectives to guide and direct the land policy of the future.

### NATURE AND OBJECTIVES OF LAND POLICIES

Land policies may be regarded as major lines of public action designed to improve the use of land resources and the conditions of property rights under which people work and live on the land. Objectives of land policy are governed by what people desire and what the functions of government are conceived to be in bringing about better land use and tenure—the twin aspects of land policies.

Changes in land use and tenure are desired when people (1) do not like existing conditions or (2) visualize better conditions than now exist. In developing a dislike for existing conditions or in visualizing better conditions than now exist, people have in mind some norm or goal by which they measure “dislikes” or “better conditions.” These norms or goals grow out of individual value judgments and as used by Rainer Schickele constitute a group consensus held by sufficient people to exert an influence upon the actions of people through public laws and administrative rules.

Land policy goals must be geared to and subservient to broader goals of economic policy of which land policy is but one segment. The master goals of economic policy consist of (1) maximization of social product and (2) optimization of income distribution.

Land use goals fall largely within the broader economic goals of the maximization of the social product over time, while land tenure goals fall more within the broader economic goal of optimum income distribution.

More specifically, land use goals mean that degree of use intensity and that system of use practices which will maximize the long-run social product value derived from land resources. Land use goals should be drawn up with the end in view of economizing public funds which are scarce and of minimizing regulatory devices which hamper private use. Although the application of this goal varies somewhat with kinds of land resource, an illustration of arable farm lands should help explain its meaning. Arable farm lands are a complex combination of flow, renewable fund and non-renewable fund resources. Public long term interest is concerned

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<sup>2</sup> The national resources task force of the Hoover Commission expressed general dissatisfaction with current land policies and programs and made a number of suggestions leading to an improvement in current conditions.

mainly with the nonrenewable sector. As long as utilization does not go beyond the renewable stage the management might well be left to a rather wide range of individual discretion since the resource's productivity may be renewed when desired. Consequently, the major objective of public conservation programs should be to control soil erosion and other forms of soil deterioration that dip into the non-renewable section.

Investment and disinvestment in soil fertility so long as the nonrenewable resource is not affected—as carried out through rotations, fertilizer, green manure and similar practices—generally should not claim public funds. Instead, public funds should be used in those areas and in those instances where serious erosion is involved. Certainly, there is little or no justification from a public interest viewpoint of spending public funds merely to subsidize farmers to use efficient practices many of which would be carried out by farmers whether or not public grants were made. Such expenditure of public funds is a confusion of public interests with private interests. It is a misdirection of scarce public funds available for land improvement that should go to protect the nonrenewable soil resource where public and private interests may be in serious conflict. Land use policy objectives involve the establishment of critical limits of use to help determine specific conservation objectives and methods applicable to specific land class and type situations. Such limits would include: (1) levels of land productivity to be achieved or maintained and (2) permissible variations of disinvestment and investment which constitute the desirable zone of land use surrounding the level of land productivity to be achieved.

Land tenure policy goals fall within the broader economic goal of optimum distribution of income. Although land tenure arrangements exert important influences on land use, conservation of land resources and the productive process in general, tenure arrangements are primarily important because they determine how land income is to be distributed among various holders of property rights.

Within this framework of optimum distribution of income and the earlier discussed framework of maximization of value social product from land, Schickele gives three guiding principles for formulating objectives of land tenure. First, competent farmers on inadequate family farms should be aided in acquiring more land, capital, equipment and supplies not only to obtain better returns for them but also to encourage a fuller utilization of their own resources and thus enhance their contribution to public welfare. Second, farmers should be encouraged to expand their managerial freedom and

responsibility in line with their abilities and technological developments. They should receive income rewards commensurate with their contributions to production. Third, limit concentration of ownership and control of land resources beyond the needs of productive efficiency.

#### **DEMAND FOR AND SUPPLY OF LAND**

In a broader sense, the objective of land utilization begins and ends with the satisfaction of human wants. The demand for land and its products and services is conditioned by both number of people and levels of living. Warren S. Thompson estimates the current population of the world at the half-century mark as between 2,300 and 2,400 million people. Since 1800, the world's population has increased two and one-half times, a greater increase than in any similar period in human history. Slightly over one-half of the world's people now live in Asia, which is a decrease of twelve points from 1800. About 16 per cent are in Europe, a decrease of four points over the past one and one-half centuries. Africa, North and Central America have 9 per cent and South America almost 5 per cent of the world's people. The Americas have gained ten points in the proportion of world population over the past one and one-half centuries. The remaining 8 per cent of the world's people live in Russia.

Thompson views the population problem in terms of adjusting man's numbers to his resources in light of his ability to use these resources efficiently at a given time and place. He concludes that the time has come when a laissez-faire population policy cannot safely be followed much longer by any country. The nature of population policies will vary by countries according to population density and growth and access to resources. On the basis of population growth, Thompson divides world population into three groups of countries. Class One countries including primarily western Europe, North America, Australia and New Zealand are characterized by very low death and birth rates. Population in these countries will grow slowly during the next few decades and will probably begin to decline after a decade or two.

Class Two countries, chiefly in southern and eastern Europe, Japan, some countries in North Africa and some in South America, are characterized by medium death rates which have been brought under a certain degree of control. It is quite probable that for the next few decades Class Two populations will grow at a more rapid rate than any other class and they may even grow more than Class Three countries in absolute numbers.

Class Three countries including the remainder of the world are characterized by high death rates and high birth rates. These countries, containing almost 60 per cent of the world's population, have neither their death rates nor birth rates under reasonably secure control. The potentialities of growth in Class Three countries are enormous as witnessed by growth of India and Java during the past few decades.

On the basis of this analysis most Class One countries do not have very serious problems arising out of increasing numbers. Problems of Class Two countries will depend in part upon the extent and quality of land resources they possess and the manner in which their resources are used. Class Three countries present the most urgent population problems. Here the nature of the problem points to (1) developing land resources to support more people at higher levels of living and (2) bringing population growth into line with available land resources to which these countries have access both within their boundaries and through trade with other nations.

In analyzing the supply of land resources, Charles E. Kellogg and Carleton P. Barnes limit their study to the United States where available data permit greater refinement. On the basis of crop yields for the period 1941-1945, and 355 million acres in crops plus 140 million acres of cropland equivalent of feed from pasture, 167 million people could be supported with a moderate cost adequate diet. Under the same assumptions, 203 million people could be supported at a low cost adequate diet and 137 million at a high cost adequate diet.

It appears clear from these calculations that many more than our present population could be supported with an adequate diet without employing any more land resources and with no greater production from the use of our lands. In the process, however, there would need to be some shifts away from some products now preferred by American consumers, especially meat. But even with the 1943-1945 civilian diet, a population of around 161 million could be supported. The United States population for 1950 is estimated in the neighborhood of 150 million people.

To compensate for additional population increases and improvements in levels of living, future technological improvements and potential usable land appear to provide a reservoir of sufficient products. From available information a further 10 per cent increase in agricultural production over the next five or six years appears reasonable. This would enable the nation to support 184 million people with a moderate cost diet or 150 million with a high cost

diet on present farm land. The estimated population of the United States by 1955 is around 155 million people.

Kellogg and Barnes conclude that the United States is in a position to choose among several alternatives in using lands because of our relatively abundant soil resources. We do not need to cultivate every acre of plowable upland, drain every swamp or use every available drop of water for irrigation. With present prospects of population growth and continued technological development, we shall probably not need to draft all land resources into high use in the foreseeable future.

### **PRINCIPLES OF LAND UTILIZATION AND CONSERVATION**

The science of economics provides a number of invaluable tools for analyzing the utilization of lands in the interest of maximizing the net value product from land over time. Sherman Johnson reviews the nature of these analytical tools and shows how they may be applied to land utilization. He points out the major economic principles governing the economic productivity of land, including the law of diminishing returns and the principles of specialization, location, and comparative advantage.

Land is characterized by special features which distinguish it from other capital goods and require different approaches to its efficient utilization. First, land is a natural resource in the sense that it cannot be reproduced as such. Second, land is distributed over space. Third, land is almost completely immobile; it must be used where it is found. The immobility and spatial factors give special importance to location factors in land use.

Land derives value from its economic productivity—that is, its current and expected value of its marginal productivity. The basis for its economic productivity is partly physical and partly economic with respect to its location in a given economic environment. Land of high natural fertility which is physically suitable for a number of crops may be located in an area relatively isolated from a market for its production potential. On the other hand, physically infertile land close to population centers may be used intensively at a profitable level of land use. Land must have capacity to use other resources in an efficient combination for a particular market situation.

The economics of soil conservation centers on the problem of maintaining the above concept of efficient land utilization over time. When efficient land utilization is considered currently and over some time period, the use of labor, capital and management resources

must be allocated in such a way that marginal returns are equalized among such alternatives as (1) current production in agriculture, and (2) current production in other lines as well as (3) future production in agriculture and (4) future production in other lines.

If returns from additional units of labor and capital invested in current agricultural production are lower than if invested in other lines or lower than if invested in future production either within or outside of agriculture, it is apparent that labor, capital and management should be shifted to the most remunerative investment alternative. This reasoning assumes that society is interested in employing all resources in their most productive uses which is the same as the objective of maximization of value product over time analyzed by Schickele.

Returns expected from investments over time in land use depend largely upon the following factors on the supply side; (1) land depreciation or improvement, (2) land development and (3) technological advances and trade policy. And on the demand side; (1) population growth, (2) per capita income and its distribution, (3) food habits and (4) international trade. From these factors may be prepared estimates of future demands and supplies of agricultural products along with relative costs and prices.

If such analyses point toward an increasing demand and higher prices, there is indication that investments in future land productivity sufficient to meet the increased demand would be likely to prove profitable to the public. If, on the other hand, land investments result in a large increase in output which cannot be absorbed by consumers, such investment may well be postponed until market demand has increased to the point where the investment is justified.

The critical point is that capital investment is potentially productive—either present or future. If returns on investments which yield an income only in future years are to be equal to returns on investments that yield current income, their net value returns must be enough higher at some stage in the production cycle to equalize returns between current and future production for the entire period under comparison. This is essential for sound land conservation policy.

#### **POLICY ADAPTATIONS TO KINDS OF LAND USE**

Numerous uses compete with each other on their respective margins for the use of land. The limit or margin of one major use is determined by the net value product of a competing use. Of course the inter-relationships between uses may be complementary as well as



competitive. At any given time land is usually in one particular use. However, over a period of time, use of the same land shifts from one use to another from grazing to wheat and perhaps back to grazing, from farms to urban uses, from farms to wild life preserves, from grazing to forestry and recreational uses, etc. One of the most difficult as well as most important problems of land policy is to determine which uses to encourage or discourage over time. This is particularly important since current investments made within expectations of future returns from a particular use tend to freeze land in that use for long periods of time. Principles of land utilization with regard to present and future uses discussed by Sherman Johnson aid in making these kinds of use decisions.

Factors to be considered for each particular use vary considerably with regard to the demand and supply, both present and potential, for the products and services yielded by a particular use. Also, use practices and policies vary with different land uses.

About three-fifths of all land in the United States is used in farms. H. H. Bennett discusses the use and conservation of these lands. He defines soil conservation as the treatment of land with all proven appropriate measures that are needed to keep it permanently productive while in use. He also includes all technological improvements that enhance the efficiency of land use.

Bennett traces the nature and development of soil conservation as practiced by the Soil Conservation Service and soil conservation districts. Around 2,100 districts including 1,152 million acres have been organized. Approximately 683 thousand conservation farm plans have been drawn covering 187 million acres, 93 million of which have been treated with conservation measures. Bennett points out the remaining needs to meet his conservation objectives and sets 1970 as the goal for completing the job.

R. R. Renne in his analysis of range land problems and policies states that two-fifths of the United States is devoted largely to the production of livestock through grazing of natural vegetation. Renne reiterates the need for analyzing the factors affecting the demand for livestock produced on rangelands as the key for determining the kind and extent of range land improvements. He emphasizes the characteristics of ranching which demand special consideration in land policies. Included among these characteristics are; (1) large size of holdings needed to form an economic unit, (2) relatively slow turnover of investment, (3) high fixed charges, (4) high degree of commercialization and (5) elasticity of demand for range land products.

The necessity of collective tenure devices for working out solutions to range land use problems is emphasized. Renne concludes that the solution of western range tenure and utilization problems is not private ownership except in a few and limited instances. The record of state and county land management does not provide much encouragement for proponents of state or county ownership either. Of all public agencies, the federal government is in a position to do the most effective job of public range land management.

Water resources are assuming an increasingly important role in land utilization as the demands on water increase and as the supply of water becomes more and more limited in light of increasing demands. Marion Clawson emphasizes the growing importance of water utilization and the problems growing out of the numerous conflicting uses of water.

Clawson outlines the growth of large scale water programs during the past two decades including irrigation, hydro-electric power, navigation and flood control. He believes these programs will increase in relative importance in the future. Clawson points out that the Bureau of Reclamation has provided full water supplies to two and one-half million acres and a full or supplemental water supply for two and three-fourths millions additional acres. Long range programs provide for ultimate irrigation of between ten and twenty million acres. However, these plans need to be re-examined constantly in light of changing demand and supply conditions affecting the products to be produced.

Forestry is another major use of land and, as defined by J. D. B. Harrison, is the deliberate management of existing forests and the establishment of new forests when necessary, to insure that people shall receive in perpetuity the greatest benefit from all forest lands at their disposal. Estimates of potential future demand in the United States require the provision for domestic consumption of 14.6 billion cubic feet annually. This represents a 20 per cent increase in total growth including an increase of 80 per cent in growth of saw timber. Worldwide, the consumption is around 53 billion cubic feet of roundwood. The problem is to determine whether productive forests now in existence could, if properly managed, provide that amount of wood or more in perpetuity.

Although forest conditions vary considerably among nations, prospects for the future are encouraging in the opinion of Harrison. National forest policies are still lacking in many countries and are far from adequate in others. For example, the United States and Canada

have only progressed to a stage of transition from uncontrolled exploitation to forestry. Regional and international policies, particularly necessary where forestry of different countries are naturally complementary, have never been formulated. However, an encouraging change is currently taking place in the adoption of an international approach of major forestry problems. Although the world still experiences many forest shortages, Harrison believes the forests are inherently capable of producing far more wood annually than has ever been taken from them in a year. Improved management and international cooperation in forest use are the keys to sufficient forest products.

Recreation is rapidly taking its place as a major land use throughout the United States according to Ernest S. Griffith. Increasing leisure time and the need for relaxation from stress and strain of today's hustling civilization are reasons behind the increasing demand for recreational land use developments.

Griffith recommends recreation planning on a national scale commensurate with planning for irrigation, flood control, power and other land resource developments. He emphasizes balanced planning in the interest of adequate recreational land use developments. Reference is made to the report of the Natural Resources Task Force of the Hoover Commission which proposed a Board of Review be established in the Office of the President on which a representative of recreation would sit with the representatives of agriculture, power, forestry, mineral resources and all other elements involved in the planning of river basins and other related land resource developments.

Ira N. Gabrielson calls attention to the necessity of integrating wildlife use with other competing uses of land. He points out how the draining of swamps for farming purposes curtails or even extinguishes wildlife in certain areas. Likewise, multiple purpose projects generally exclude wildlife from multiple use objectives. Certainly the importance of wildlife for recreation, food and clothing demands that it be properly considered in analyses of alternative uses of land. Fortunately, however, wildlife is a renewable resource up to the point of extinction. The future of wildlife is contingent upon adequate planning and management. Even intensive agriculture, if properly planned, means change rather than extirpation for wild creatures. For example, the state of Iowa with over 96 per cent of its total land area in farms has realized a steady increase in pheasant population with all sections of the state enjoying a generous open season and plentiful shooting opportunities.

### PROGRAMS AND POLICY

As pointed out by O. B. Jesness, numerous individual land programs have sprung up from time to time in an effort to achieve particular objectives. These programs have not been guided by sufficient foresight nor over-all objectives to make them fit together into a comprehensive public land policy. Without such a guide it would be a miracle if some of the programs did not conflict. Unless specific programs are tied together in a framework of policy with common objectives to be attained, it is difficult if not impossible to make programs into the means of carrying out the desired ends of land policy.

Jesness reiterates the viewpoints of Schickele and Sherman Johnson that the objectives of land policy involve achieving the most efficient use of resources and the optimum distribution of production to the end that mankind may experience ever-increasing levels of living. Viewed in this perspective the best use of land cannot escape giving consideration to fitting that use to existing and prospective conditions of the market, because the economic use of land is for the purpose of meeting requirements which are reflected in the market place by consumer wants. This involves consideration of the use of land not only today, this year, and the next but also over the longer run. Such a generalization at least provides a backdrop against which we may test specific programs and proposals. Unless they fit this aim, there is reason to question their advisability.

### PUBLIC INTERESTS IN PRIVATE LANDS

After pointing out that the entire nation is dependent upon food and other products and services coming directly from land, most of which is in private ownership, Raymond J. Penn concludes that the real problem is not whether the public has an interest in land but rather one of how to go about determining the nature and extent of public interest and how to protect it. This is not a new viewpoint, since private rights in land in this country have never been absolute—only exclusive. State powers of eminent domain, taxation and police have always stood between the private owner and user of land and absolute control over land. Although the public has always held these powers to protect and carry out their interests in land, there have been few clear-cut principles developed for using them.

Penn believes that public interest in land is a matter of valuation and judgment. Public interest in a particular piece of land cannot be established by formula. Arriving at public interest is a continuous

process of public policy and program formulation. The process is extremely important. If the means are faulty the objective will not be satisfactory even if reached. While technicians and specialists are necessary in formulating alternatives of land use in line with expected consequences, the people concerned must participate and make the decisions. People will accept and put into effect their own decisions much more readily than decisions made for them. This viewpoint emphasizes the importance of the role of people and local governments in the policy making process. Penn uses the Wisconsin experience with rural zoning to illustrate how public interest in land use was determined and how people worked out the means to carry out this interest in the use of land.

### LAND PLANNING PROCESSES

The development of a satisfactory land policy depends largely upon the quality and extent of planning of the use of land resources. Since land policies involve current action with expected future benefit, the necessity for foresight exercised today in behalf of increasing the certainty of expected benefits in the future becomes obvious. V. Webster Johnson outlines the land planning process in four steps; (1) establishment of policy objectives or ends sought, (2) determination of current situation with respect to these objectives, (3) delimitation of the gap between the present situation and the desired objectives and (4) working out ways and means of bridging the gap between the present situation and the desired objectives. This process of steps demands imagination and ingenuity and a keen sense of the institutional framework within which suggested programs of action must operate.

Johnson outlines six ways by which government—local, state and federal—may bring about changes in the use of land. These are; (1) direct administration of land through public ownership, (2) public regulation of privately held land through the use of the police power, (3) agreements made with special districts, (4) taxation, particularly yield and severance taxes, (5) regulations induced by or incident to conservation payments and aids and educational activities and programs.

The nature and form of organization required to deal with land resource planning is far from settled. Experiences with organizational arrangements have been limited. This does not mean that a number of other proposals have not been made. But we have not succeeded in studying, evaluating and comparing various experiences and proposals.

The Hoover Commission dealt at length with the organization for land resource planning and programs. One suggestion dealt with the creation of a Board of Impartial Analyses (1) to report to the President on the public economic value of water development projects, (2) to review authorized projects and (3) to recommend to the President discontinuance of those projects deemed undesirable.

Looking ahead, the federal government and states, either directly or indirectly, must assume an increasing degree of responsibility in planning the use of land resources. Planning of land resource use—by agencies, departments, states, regional organizations and other groups—is emerging slowly, painfully but surely; and as it develops piecemeal and fragmentarily, land planning requires increased integration and a progressive approach to a comprehensive public point of view for the wise use of land resources.

#### DECLARATION OF LAND POLICY

A first step in building a sound land policy is the declaration of objectives and principles by federal and state governments. Such a declaration might well chart the direction of future land policy and land programs. It could provide the basis for testing particular land measures for consistency and furtherance of the stated objectives and principles. This declaration of policy should find expression in legislative enactments, in administrative programs, in research, educational and planning activities and in the lives of people using land and depending upon land resources for a livelihood.

If the type of organic land policy which is needed is to be developed, the first and basic steps should be taken by the President and the Congress of the United States. Such action at the federal level is needed to bring into national focus all major land problems and alternatives of action.

The President of the United States might appoint a National Land Policy Commission to analyze existing land laws and the programs of the executive branch of government directly concerned with land problems, with the view toward formulating recommendations for action that will help achieve a sound, long term and well integrated organic land policy.

The Governors of the several states, likewise, might appoint State Land Policy Commissions (1) to analyze existing state land laws and land programs within their respective states and (2) to recommend improvements in these laws and programs. This action at the state level is particularly important because (1) most land laws

dealing with rights and responsibilities of private users of land, in relation to public welfare, are within the domain of state legislation, and (2) state analysis of land laws and land programs would help insure analysis of various land problems and solutions peculiar to particular sections of the country. The analyses and recommendations of the state land policy commissions should be incorporated into the work of the National Land Policy Commission. There should be close working relationships between the state and national groups. Many of the land problems and some of the solutions which the commissions would want to consider are discussed throughout this volume.

The Congress of the United States might enact a Joint (Senate and House) Resolution embodying broad declarations of land policy and directing executive agencies to bring their respective land programs into conformity with this declaration of policy. Such a congressional declaration might await the report of the National Land Policy Commission or it might come first and provide an operational basis for the work of the national commission. In any event, a congressional declaration of land policy objectives and principles is highly desirable in the interest of integrating and directing the various land programs toward common objectives.

#### **A NATURAL RESOURCES COUNCIL IS NEEDED**

While the proposed national and state commissions and congressional declarations are needed (1) to create public interest in land policy, (2) to establish broad participation in formulating a land policy national in scope yet modified to fit the various sections of the nation and (3) to formulate the objectives and principles for land policy to follow, there remains the need for a continuing agency to integrate, study, plan, evaluate, and recommend proposals and programs concerned with land use and control. In fact, it is difficult to see how a well defined and integrated land policy can be fully developed, kept up to date, and carried out without such an integrating agency. This agency, which we shall name the Natural Resources Council, might well be in the Office of the President. Although the Natural Resources Council should be separate from land resource action programs, its personnel should work closely with those in the agencies administering land programs. In addition to a small core staff, the Natural Resources Council could draw collaborators and consultants from the land grant colleges, private foundations and state and federal land agencies. Through these collaborators and consultants the Natural Resources Council could tap the large reservoirs of

knowledge of land problems and land policy research and experience which has evolved and is continually developing.

One important function to be served by the Natural Resources Council is to bring together in one place all pertinent facts relevant to land resource supplies, conditions, use, and probable demands. At the present time this information is piecemeal and scattered among a number of different agencies. It needs to be brought together and kept up-to-date by the Natural Resources Council.

Another function would be the preparation and publication of periodic reports on the status of the Nation's land resources, the problems and possible solutions. Such reports would help materially in keeping the general public, as well as legislators and administrators, informed on land resources. This is a needed complement to the President's Economic Council's annual report on prices, production and employment.

A third function of the Natural Resources Council would be to evaluate alternative proposals for land resource conservation and development and to make appropriate recommendations.

A fourth function would consist of initiating proposals for the utilization, conservation and development of land for appropriate action by the Congress or the administrative agencies.

A fifth function would involve integration of current and evolving land programs of the various agencies in the interest of implementing the land policy as declared by the Congress.

The first and second functions are concerned largely with keeping up-to-date inventories of our land resources and analyzing factors affecting their supply, demand and utilization. The third, fourth and fifth functions involve the integration of programs and the allocation of public funds among those public resource investments which are most necessary in the public interest and which promise the greatest returns on funds expended. Since available public funds for land resource investments will probably continue to fall far short of the needs, it is important that available funds be used where expected returns to the public will be greatest. This involves analyses of land investments by kind and by area. It involves working out recommendations to questions of the following order. Should available public funds go to irrigation of new land or conservation of old lands? What about drainage or clearing? How much should go to forest? How much to recreation? How much to grazing lands? To flood control? How much funds should go to the Missouri Basin? The Columbia Basin? The Tennessee Valley? Where swamps are



drained for agriculture, what is the effect on wild life and recreation? Where dams are built for flood control or power, what is the resulting loss to agriculture in the reservoir area?

At this level of questions, the proposed Natural Resources Council could make a real contribution by ranking various kinds of proposed projects by regions, in terms of prospective benefits for each dollar of public funds to be expended. However, the function of the council should not stop with the screening and ranking of proposals submitted to Congress but should include initiating proposals of its own based upon analyses of what regions and which types of land investments offer the best use of public funds.

Even after appropriations have been made for a given purpose—say flood control—or for a given area—for example, the Little Sioux Watershed—proposed construction units within the area should be reappraised and ranked according to priorities as determined by relative returns to the public for each dollar invested.

We are not without valuable experiences in going forward with a Natural Resources Council. Experiences and information obtained in the operation of the former Natural Resources Planning Board should be helpful as would experiences gained from Land Resource Boards and Land Policy Commissions in a number of states in recent years. For example, the 1949 Legislature of the State of Iowa enacted legislation setting up a State Natural Resources Council. This council has been organized and is at work on numerous land and water problems within the state pressing for solutions. All these experiences should be studied carefully in developing the proposed Natural Resources Council for the United States.



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