the HUGH BENNETT LECTURES

Foreword

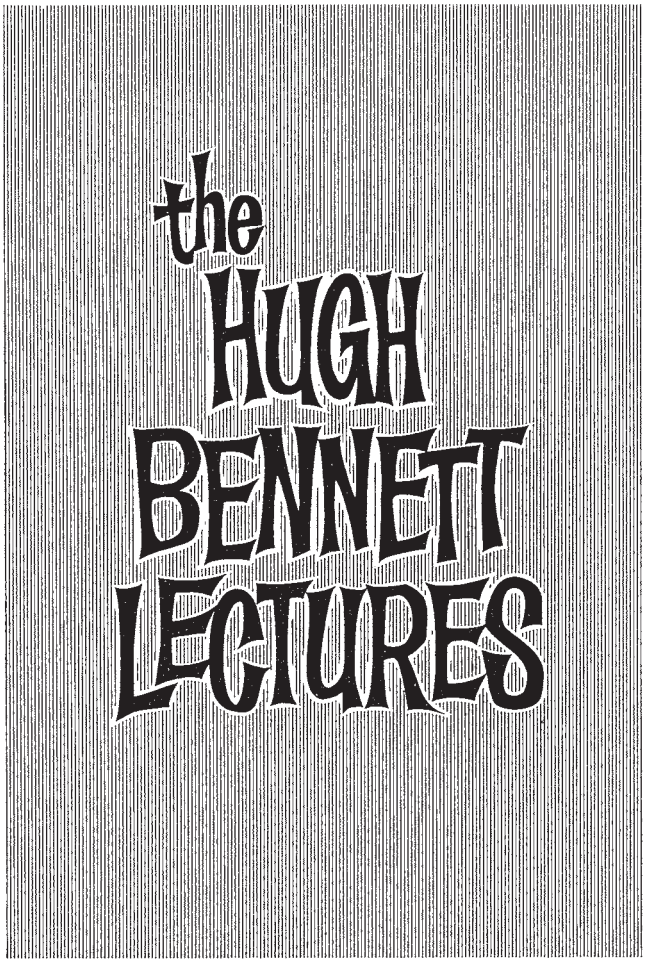
Hugh H. Bennett, son of North Carolina and "the father of soil conservation," gave a series of lectures at North Carolina State College at Raleigh between January 15, 1958 and February 12, 1959.

This publication is not offered as a literal record of these lectures. It is offered as a book of essays on soil conservation based on the lectures. The original lectures have been condensed and edited by the author.

Dr. Bennett, internationally known scientist, retired in 1952 as the first Chief of the U. S. Soil Conservation Service. He was born in Anson County, North Carolina in 1881. He was graduated from the University of North Carolina in 1903. That same year he joined the U. S. Department of Agriculture as a soil surveyor. He served the Federal Government from that date until his retirement.

In a preface to "Big Hugh, the Father of Soil Conservation," by Wellington Brink, published in 1951 by the Macmillan Company, New York, the late Louis Bromfield called Hugh Bennett "one of the greatest benefactors of the American people since the beginning of their history."

Mr. Bromfield's preface to "Big Hugh" is reprinted here by permission of the publisher.



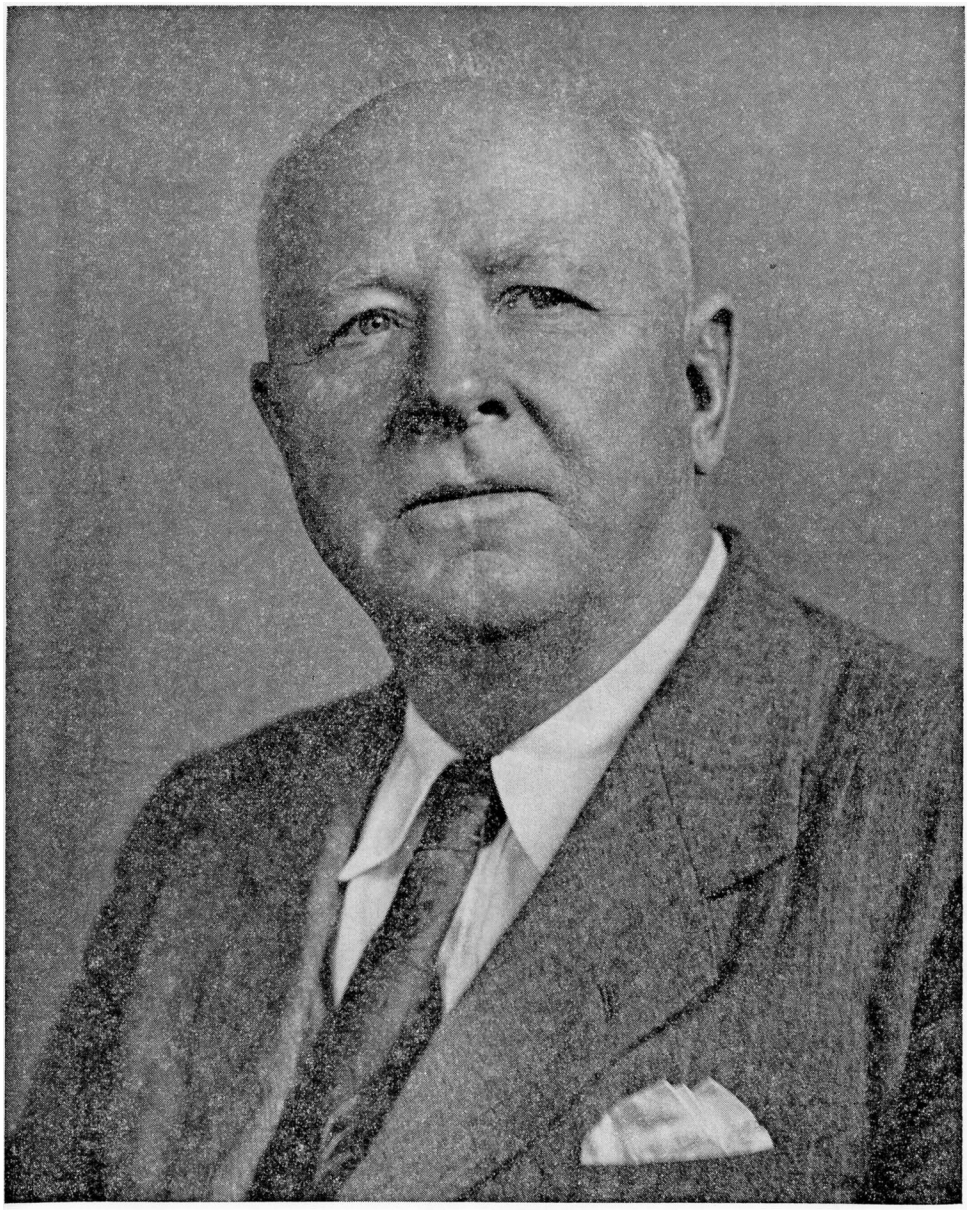
Published by

The Agricultural Foundation, Inc.

North Carolina State College

Raleigh, North Carolina

June, 1959



HUGH H. BENNETT

Preface

A good many years ago while in the midst of the wasted cotton lands of Georgia I met a big hearty man named Hugh Bennett. I knew what his job was. At that time and today I think the biggest problems of this country and the world are food and the conservation of natural resources and real wealth. I had seen nation after nation in every part of the world reduced to poverty and virtual starvation by the very process which had been taking place in the United States since the first soil was dug up by the white man. Here, tramping about on the barren, eroded red soil of a Georgia cotton field, was the man who was doing something about the disaster.

The important thing was that he was getting the job done and getting it done largely through the force, vigor and intelligence of his own personality. Within five minutes I knew that I was in the presence of a great man and a man to whom this nation and the whole world owed a very great debt. Like all great men, he was simple and direct, with no time for shiftiness or pomposity. The farmer liked him, the average citizen liked him, the scientists recognized in him that most needed of all forces—the one which translates research and knowledge into action and achieves results.

In the many years which have intervened since that first meeting, Hugh Bennett became one of my best friends. We have talked from the same platform many times and have traveled hundreds, perhaps thousands, of miles across country over back roads, past farmhouses where in summer you could look through the sides of a house and see the wasting gullies on the other side. I know him as well as I know any man alive and there is no man whom I respect and admire so much. I think this is because he has the old American virtues of integrity, simplicity, directness and honor—virtues which are not too plentiful in these times or are, at least, obscured by the age in which we live.

In those same years I have traveled on an average fifty to sixty thousand miles a year mostly helping to fight the battle which Hugh Bennett started and organized—for conservation of our natural resources and for a better agriculture which could stand on its own feet and contribute to the wealth and welfare and health of the nation rather than simply devour its economy. And in all that traveling I have seen something miraculous happening. I have seen, perhaps for the first time in history, a whole

nation turning to right a wrong, to check an evil before it was forced to do so by utter disaster. I doubt that this could have been accomplished without the leadership and wisdom of Hugh Bennett. Certainly, without him the progress would have been infinitely slower.

It has not been an easy fight. There were and still are many enemies and many fools and many small men whose jealousies loomed larger than their interest in the nation's welfare. Because we spend two to three billions a year in attempting to aid and educate the farmer, it is assumed by the average citizen that we have, and had, in this country a sound agriculture. Few errors of public thinking could be greater. In the past, particularly in the single-crop corn, cotton and tobacco areas, we had one of the worst agricultures ever practiced by man and much of our agriculture is still upon that level. Except for the isolated "good" farmer, we practiced in the past a system of tillage which could certainly not be dignified by the word "agriculture" and could, indeed, scarcely have been called "farming." This fact has cost the nation billions of dollars in real wealth, and the individual citizens billions in high prices and in taxes, and industry billions in purchasing power.

Conditions, fortunately, have begun to change and every year there are more good farmers, and more bad farmers are economically liquidated regardless of subsidies, parity guarantees and government support buying. Eventually out of grim economic necessity the level of our agriculture will be raised and we shall have lower costs for consumers and higher profits for the farmer arising out of high and efficient production and the arresting of destruction by erosion and flood.

The progress already made is astonishing to any veteran in conservation and much of the progress can be credited to Hugh Bennett, who dramatized the situation, formulated the pattern of its cure, and then pressed forward to translate theory into action.

Every year there are more contoured and terraced farms. Every year there are more grass and legumes planted. Every year more sensible and effective crop rotations come into operation; and every acre properly treated can be measured in benefits to every citizen of the United States.

The battle has not been an easy one and in the field of erosion and floods Hugh Bennett has been in the bruised and bloody vanguard, fighting to get knowledge to the farmer, fighting, sometimes desperately, for appropriations from Congressmen who

were willing to vote hundreds of millions in log-rolling pork-barrel operations but grew penny wise when it came to spending money for the benefit of the whole country instead of some single small area.

The word "bureaucrat" has come to be a term of opprobrium in the last generation and less. It is the story of a good word gone wrong and perhaps we need another word to designate those good servants of the government who work devotedly at low salaries for the welfare of all of us. Such men, in so vast and disorganized a government as our own, are still in the minority. They deserve a fine and noble word to designate them, to distinguish them from the parasites and the meddlers. Perhaps "public servant" is the expression needed. There are many of them in the fields of research and action, of constructive public undertaking, who do not depend upon politics to provide them with jobs but upon their own character and abilities and the contribution they can make to the good of all of us in terms of intelligence, integrity and human dignity.

Such a man is Hugh Bennett, who deserves the greatest honor from the American people as one of the greatest benefactors since the beginning of their history.

Louis Bromfield

Malabar Farm
Lucas, Ohio, March 6, 1950

The Lectures

1. A Half Century of Effort

To give a series of lectures on the development of our program of soil conservation is not easy because of the time limit and the vast store of personal experiences associated with this work. It has been 53 years since I came to understand the full significance of sheet erosion. Since the beginning I have been closely associated with soil conservation. It is with these associations my talks will be chiefly concerned.

Progress was exceedingly slow in the beginning. This was chiefly due to lack of public understanding and consequent lack of interest. At first, few pertinent land facts had been acquired. Then, as we began to understand what was going on and to acquire additional pertinent land facts, facilities for disseminating the information were not available. And, too, we were dealing with the shackling grip of habit that came down from the past.

Twenty years after the 1908 Conference of Governors in the White House dealing with conservation in its varied aspects, a few individuals here and there began to show some interest in conservation of forest, wildlife, and finally the land.

It was four years after the beginning of the soil conservation research period in 1929 before we had an active program on the land. This began in 1933, and almost immediately showed promising signs of success. With this, converts and experts in soil conservation turned up by the thousands from all sides. Books dealing with the subject, some of them excellent, suddenly poured from the printing houses. And almost as suddenly there came insistent proposals to Congress to turn the program over to other agencies which the formerly inarticulate reformers loudly asserted could do the job faster, better, and at less cost, than the agency that had started it all. Congress listened politely, printed the proposals and turned them down as fast as they came up. Congressmen liked the new program, probably because farmers

liked it. Another reason was that we kept them informed of what was going on in their districts.

Then there were proposals to make soil conservation mandatory. Some felt that the Federal Government should handle the job in its entirety. And there were recurring distractions of many kinds, some troublesome and many innocuous. Finally recognizing these as a necessary adjustment to progress, we learned to live with them.

We Are Still Losing Soil

Although we are living in an age of rapid and profound change, we still can find certain processes which seem to have been fixed in the original scheme of worldly affairs, biologically and physically. For example, so long as raindrops continue to spatter bared soil into muddy sludge, soil will continue running off cultivated slopes into the rivers and oceans. This is soil erosion; its control or prevention is soil conservation.

We are still losing by erosion an estimated half-million acres of farmland every year. This is only about half as much as was being lost in the beginning of the conservation program, but it is more than we can afford to lose in view of two important facts: (a) our population is mounting with astonishing rapidity, and (b) we are still losing soil by erosion and by using land for new roads, buildings, airstrips, parks, and so on at the rate of about three million acres a year, some of it top-grade farmland. This loss of arable land is dangerously excessive in my opinion.

Another point deserving the closest scrutiny is the tendency to consider mechanized agriculture a safeguard against erosion. Without proper guidance, mechanization could intensify the problem on steep, erodible land. Machines don't think. They can readily be used, however, on land that is too steep for cultivation under most circumstances. With skilled guidance, machines can be made a part of sound agriculture. At any rate, they are here to stay; we must learn to use them properly. This I think we will do with the aid of those who manufacture and sell farm implements.

Sound Land Use Would Help Solve the Farm Problem

I again offer a proposal that I believe would help solve the farm problem. It has been offered before, but hasn't yet cracked the tough armor of complacency and lack of understanding. I propose that from now on the use of land for agriculture and other purposes be determined as nearly as may be practicable by its capability.

Land capability would be determined by specialists of the Soil Conservation Service. Such action would necessitate early com-

pletion of the capability survey pretty much in conformity with SCS survey methods of 1951. At that time 375 million acres had been surveyed in detail through the 48 states and much has been done since then—enough to start on the proposed new basis at any time.

Classification of land by its capability and need was devised by the Soil Conservation Service for the specific purpose of guiding its nationwide program of soil conservation and sound land use. It has served that purpose admirably. Farmers have understood it and liked it.

Marginal Land Makes Marginal Farmers

Recently a press dispatch in reporting suggestions for "solving the farm problem" mentioned taking *marginal farmers* out of the business of farming by shifting them into other activities. This suggestion about shifting farmers would have fitted the situation more realistically and more scientifically if, instead of proposing the shifting of marginal farmers, it had proposed the shifting of *marginal land* into other channels of use. Usually it is marginal land that breeds marginal farming and marginal farmers.

Much better uses for this kind of land can generally be found, as for improving pasture or range or for timber. Also, at least some of it might very well be used for the location of new roads, buildings, airstrips, and so on, instead of taking out of cultivation so much good farmland as is presently being done.

Land use according to its capability conforms with natural law. If we had not earlier left this concept so largely cut out of our planning for solving the economic aspects of the farm problem, it is my conviction we would be much further ahead than at present.

For economic reasons, adjustments would be necessary from time to time under the proposal. These, I am convinced, could be made with much greater efficiency and effectiveness with, than without, the proposed scientific procedure in all of our land use actions.

In the practical sense the identical principles underlying the proposal have successfully guided the program of soil conservation on millions of acres.

The farm problem is not simple, but if we know the capability and location of all the important areas of the different classes of land, needed adjustments unquestionably could be fitted to conditions and requirements with much greater accuracy and to greater advantage than under the present way of under-valuating scientific principle.

Soil Conservation—The First Step

Permanent soil conservation is an essential first step toward solution of the farm problem. There can be no real solution without real soil conservation, the kind that can be applied only with the help of technicians who know the land and what to do for the land. There are not enough of these but there appear to be too many of those who are more on the order of self-acclaimed soil conservationists than of the honest-to-goodness scientific type with grass-roots experience. The latter can get the job done; the others cannot.

As time passes the farm problem gets more complicated. Its solution seems to recede, with confusion mounting. For a time we had a program which at least was understandable and helpful in the economic phase of our agricultural difficulties. During the past few years the program appears to have mushroomed into a state of constant and increasing confusion. Today it takes experts experienced at unraveling the fetters of red tape to find a way through the intricacies of the program. Scientific procedure has all but vanished from the multiple aspects of what is referred to as the farm problem.

There is acute need, I am convinced, of scientific principle—and that is what I am proposing. Piecemeal attempts at remedial legislation seem to be of small promise. Major surgery is called for, in my opinion. Several operations may be needed, but the first essential step will be to get back to the land facts—as can be done by swinging over to the land capability basis as nearly completely as may be practicable and as soon as may be practicable.

2. I Begin To Learn

During my four years in college, beginning in 1897, I cannot recall having heard or read anything about land damage by accelerated erosion, beyond broad references to geological erosion or denudation as it was called in courses on geology. Nor can I recall any reference to soil conservation, spoken or written, during my four years in college.

I had specialized in chemistry, but also had taken the usual required courses in geology, economics, mathematics, languages, and so on. If any particular interest in man-accelerated erosion had existed, some reference to it undoubtedly would have come up in our geology or economics classes.

Slow to Understand

I am convinced that I had, at the time, no real conception of soil erosion as a national problem, even though I may have had some understanding of it as a local farm difficulty. I recall helping my father lay off a terrace system on the Peter Place in Anson County, North Carolina, at the age of about 10. This was 67 years ago on the Bennett cotton plantation where I was raised.

In this work an old-fashioned, farm-made bipod was used as a substitute for transit and tripod to establish the terrace lines. This implement of the pre-mechanized farming epoch had two legs set about 12 feet apart with a carpenter's level fixed at the center on a crossbar. My job was to go along digging small holes with a light hoe to mark the successive points where the forward leg touched the ground as my father stepped the frame contrivance across the field, marking the desired grade lines by 12-foot spacings to guide the plowing up of the terraces. The gradient was fixed by the relative length of the legs of the wooden "horse," as the implement was called.

That was about 1891. After 67 years, I can still recall my father's reply to my question as to why we were doing the work:

"To keep the land from washing away," was his laconic answer. Although I have remembered it, I could scarcely have understood it except in a vague sort of way.

I Turn to Soil Surveying

It was necessary to drop out of college after two years owing to low prices for cotton. With a slight bit of financial recuperation, together with assistance from my brother, Doctor Joe, I was back two years later. I finished in June 1903, with a B.S. degree, a certificate in chemistry, and a Civil Service job in the old Bureau of Soils at $83.33 per month.

Soil surveying was only a few years old at the time. I had been told something about it by Collier Cobb, my geology professor. A little while before time to start work in the chemical laboratory in Washington I was asked by the Bureau if I objected to starting on the soil survey field work. My quick response was "no objection." That reply fixed my life's work in soils. So, on July 1, 1903, I started soil surveying in Davidson County, Tennessee.

The work suited me from the first day on. Thus a temporary assignment turned into a near 50-year job. Having been reared amongst cotton fields, with the amenities of plantation life, soil surveying being strictly outdoors work, was my line.

Although the damaging effects of soil erosion were in evidence to right and left through the rolling farm country encountered in North Carolina, Tennessee, and Virginia during my first two years of surveying, it was not until 1905 that I began to understand just what was taking place on the land. Following that awakening it soon became obvious that few were interested in soil erosion or knew very much about it, while soil conservation meant little or nothing to the public, including farmers and others. The term had scarcely attained dictionary status.

My first clear understanding of the widespread damage of man-accelerated erosion was derived from field studies while making, along with W. E. McLendon of Bishopville, South Carolina, a soil survey of Louisa County, Virginia, in 1905.

The Chief of the Bureau of Soils had requested us to look carefully into the reason for the reputation of the locality for the poverty of its soils. We found much naturally poor soil derived from magnesian schist, along with a large area which had been made poor by erosion of unprotected cultivated sloping land.

This finding, together with later observations in other parts of the country, aroused a genuine interest on my part. It was, however, T. C. Chamberlain's profound paper on *Soil Wastage* presented at the Governor's Conference in the White House in

1908 that fixed my determination to pursue that subject to some possible point of counteraction.

N. S. Shaler, before Chamberlain, had forcefully pointed to the need for erosion control in his paper, *Origin and Nature of Soils,* but this missed public attention. It was published in the 12th Annual Report, 1890-1891, of the U. S. Geological Survey, a ponderous volume of 675 pages.

The Long Trail to Soil Conservation

Classifying and mapping soils together with observation and some mapping of the effects of erosion continued as my main activity across the years. We made our own base maps with simple plane table and horse-and-buggy facilities. We saw the land in its main physical characteristics, and stopping over night with all kinds of farmers we had excellent opportunity to ascertain the economic effects of erosion. Little more could be done. People were not ready for serious consideration of the problem. Gullies they could see, but stealthy sheet erosion proceeds too slowly and inconspiciously for most farmers to bother about. Just why so many of them, along with nearly everybody else, failed to grasp the meaning of streams flooded with red, yellow, and dun colored waters flowing off the land following every heavy rain I have never understood.

A few farmers, mainly in the Cotton Belt, sensed the impoverishing effects of continuing erosion and tried to do something about it. Some of them terraced their fields, constructed "hillside ditches" and practiced near-contour cultivation long before the 1900's. For the most part, however, the work was either improperly carried out or practiced on slopes that were too steep. Failures were the rule.

More Information—Little Increased Interest

I wrote the report on the Louisa County, Virginia soil survey.[1] Some of our findings on the effects of erosion included in the manuscript failed to survive editing in Washington. They may not have dovetailed with headquarters theories about the relation of toxic soil substances to soil productivity.

We went ahead, notwithstanding, gathering land facts. Almost every soil survey in the Old Cotton Belt turned up startling information on the impoverishing effects of erosion. This information was published in the Field Operations of the Bureau of Soils. It provided, later on, good educational material for soil conservation. For example, what was found by the Lauderdale County,

[1] Field Operations, Bureau of Soils, U. S. Department of Agriculture 1905

Mississippi, soil survey in 1910 had much to do with developing the basic concept of using land within its capability and its protection in accordance with the needs of the different kinds of land a farmer has—the concept that was to guide the nation's program of soil conservation starting in 1933.

I had charge of the Lauderdale survey, wrote the report, and recall how the findings influenced our nationwide soil conservation program. Here it was that some of the most important principles of sound land use began to crystallize into useful guide material.

A few quotations from the report will illustrate the point.[2] They refer to the characteristics of the *Orangeburg sandy loam* as it varied from place to place, particularly in relation to slope and degree of erosion. Some 23 thousand acres were mapped in the county, together with 26 thousand acres of the closely related *Orangeburg fine sandy loam.*

To quote: "Unfortunately, the type is peculiarly susceptible to ruinous erosion under the conditions of rolling topography obtaining in the area. . . . If the gentler slopes are not terraced and the steep situations kept in timber, deep gorgelike gullies or 'caves' gradually encroach upon cultivated fields, eventually bringing about a topographic condition too broken (gullied) for other than patchy cultivation. In the steeper situations these gullies have eaten out canyonlike hollows, even through timbered areas, until the Orangeburg sandy loam occurs in many places as narrow tonguelike ridges reaching out from the higher elevations in all directions. Bridges placed over the heads of these gullies are of common occurrence along the ridge roads. . . . The gullies often have perpendicular walls, sometimes 25 to 50 feet or more in height.

"To check this ruinous erosion, slopes must be terraced, seeded to Bermuda grass, and even planted to trees or rapidly growing and fast-holding plants like honeysuckle. The best way of handling erosion in the case of the Orangeburg soils is to begin before deep gullies have been cut, to terrace and incorporate vegetable matter. In many of the gullies the advancement can be checked by cutting down the sides so as to get a slope on which to start Bermuda grass, lespedeza, honeysuckle, or willows, which are good soil binders. . . . The more broken areas . . . are of little agricultural value except for forestry, Bermuda pasturage and fruit culture in patches. . . . The soil is predominantly the most productive of the uplands except, perhaps, the closely related Orangeburg fine sandy loam. It is suited, where topography is

[2] Field Operations, Bureau of Soils, U. S. Department of Agriculture 1910

favorable, to the . . . production of a wider range of crops than any other type in the county. With good treatment a bale of cotton and from 40 to 50 bushels of corn per acre can easily be secured. . . ."

Here are the first recorded recommendations I have found for utilizing land according to kind and need.

First Erosion Survey

In 1911 a soil survey of Fairfield County, South Carolina found and mapped 90 thousand acres of formerly cultivated land so cut to pieces with gullies that it was classed as non-arable *Rough Gullied Land.*[3] An additional 46 thousand acres of once highly productive stream bottom was classed as *meadow*. Frequent overflow due to increased runoff of rainfall from eroding lands upstream had, together with the clogging of channels with erosion debris, converted the rich alluvium into useless swamp. In places the overlying deposits of sand and silt measured as much as 15 to 20 feet in thickness.

This formerly cultivated land was covered with willow, alder and other worthless growth. In its damaged condition it was valueless for crop production, forestry or wildlife. This survey turned out to be the first large erosion survey that I know anything about. It was not made specifically to show what erosion was doing to the land; that was an incidental finding.

I was not so much surprised at finding 136 thousand acres of formerly good land ruined for further immediate cultivation by erosion as I was that publication and distribution of the report failed to arouse any discernible interest on the part of the public.

Some 10 years after my first visit to Fairfield County, I returned to see how the land was fairing. It hadn't improved. Some of the old roads I had traveled previously had washed out. Impassable gullies had taken their place. As roughly estimated the area ruined for cultivation by gullying had advanced to considerably more than 100 thousand acres and that of swamped stream bottom to around 50,000 acres. Rural population had decreased by half. A decade had passed with nothing done to arrest the damage.

In January, 1958, I again visited Fairfield County, this time to find that a vast change for the better had taken place. Soil conservation had come to the rescue. It came in 1936, a quarter of a century after the discovery of the depredations of erosion in that county. The gullies were not all filled up, but they were filling. Good land use and improvement of woodland, along with the de-

[3] Field Operations, Bureau of Soils, U. S. Department of Agriculture 1911

velopment of good pastures had wrought a miracle, both physically and economically. Pines, pastures and ponds had done it, according to local appraisal, proudly proclaimed.

The miracle was one of good land use, protection of fields from erosion, improvement of woodland and pastures and better use of rainfall. I was told that no land was for sale and that the owners were happy about the whole thing. That made me very pleased that I had returned.

Fairfield County a few years ago was famed around the world as an example of imprudent land use and ruinous erosion. Now it is an outstanding example of what conservation and prudent land use can do for ailing land.

The decline and revival of Fairfield County's productive capacity may sometime be appraised as South Carolina's most historic event, if the details are not forgotten.

3. What Took Us So Long?

It took a long time after the 1908 Conference of Governors in the White House to get around to a program of soil conservation action in this country—25 years.

At that conference conservation of nearly all of our important natural resources was discussed in relation to supply and need. Some 90 papers were presented by many distinguished scientists, specialists and leaders in the fields of industry, economics and politics. President Theodore Roosevelt participated.

Following the conference there was increased action in forestry and wildlife as well as an upsurge in the reclamation of the dry lands of the west. Need for soil conservation was stressed but nothing came of it—at least no one of the participants stepped out subsequently to advocate a comprehensive program of nationwide soil conservation.

Forestry activities moved ahead rapidly. New national forests were established and arrangements for fire protection and grazing regulation were made. Passing from the status of unregulated and often abused public domain to that of national forest administration resulted in an increase in long-needed protection of our public lands from the evils of trespass. This forward movement, fired by the Governors Conference, led to considerable improvement in the conservation of timber, grazing resources and wildlife on the national forests.

Some soil conservation came out of these stepped-up forest activities, mostly on land within the national forests which was too steep, too dry, or too isolated for cultivation. All of these improvements were on the side of public benefit but they failed to reach out in any substantial degree to the farmlands of the country. Privately owned land was forgotten.

Water was conserved on the reclamation projects for irrigation but nothing of much importance was done about soil conservation, even on irrigated slopes that were subject to erosion.

Myths, Ignorance and Complacency

As well as I have been able to appraise the situation, delay in getting on with a comprehensive program of soil conservation action was due chiefly to widespread ignorance with respect to the subject, and to habits and customs inherited from the past. Some of the most troublesome deterrents were as follows:

1. Man probably began losing land to erosion when he first started farming, but for many generations there was always more land in the next valley or across the mountains. Land was so readily available, people came to regard it as limitless and inexhaustible.

2. The ready availability of good land and wildlife for so many generations gave rise to a careless and prodigal attitude toward our wealth of natural resources.

3. Even in modern times our leaders have too often had little or no personal knowledge or understanding of the land. They have been trained in law, medicine, finance, trade, banking, philosophy, astronomy, military science, economics, education, or some field other than agriculture, and especially that vitally important part of agriculture having to do with maintenance of agricultural base—productive land.

4. In many parts of the world too much of the land traditionally has been in the hands of inexperienced men with little specialized or adequate training for the job. The most precious natural resource on earth in many parts of the world has habitually been in the charge of those who often have had no greater qualifications for the trusteeship than the coincidence of inheritance or of birth on the land.

5. Too few farms have produced surplus capital for the owner over a period of years. On the contrary, the farm much too often has been no better than a marginal or subsistence enterprise on marginal land. Even in the United States, many farmers have not had the personal resources or training to undertake or seek out technological improvements. They have generally been almost wholly dependent on outside help, from government or private sources, to provide them with improvements in machinery, methods and fertilizers. Too often they have not even thought of including in their calculations any cost for depreciation or maintenance of their basic plant—their farm land.

6. Too many of our agricultural scientists failed over bygone years to recognize land for what it is—a complex resource within a complex environment. Too often both agriculture and the land have suffered for the lack of knowhow.

Soil has long been confused with *land*. It is but one part of

land. For conservation purposes land must be regarded in terms of all its component parts: soil, slope, climate, susceptibility to depreciation by erosion, over-cropping or other processes of deterioration. Some geologists understood what was going on but no one drove ahead to get necessary funds for a program of control.

7. Many of the early agricultural scientists ignored erosion, paid too little attention to slope, called the weather inevitable, and allowed the problem of erosion to go unconsidered, misunderstood and untouched. Only a few recognized the difference between the tediously slow but generally beneficial process of geological erosion and the exceedingly rapid and harmful process of man-accelerated erosion following the removal of nature's stabilizing cover of vegetation.

8. Soil science for a very long time was not greatly concerned about what changes were taking place on the surface of the land. It was primarily concerned with processes of soil development, soil classification, mapping of soil types, and with the chemical and physical composition of soils. Agricultural science stressed fertilization of crops, tillage methods, crop rotation, the health and breeding of livestock and poultry, plant improvement by selection and breeding, control of plant and animal insects and diseases, and improvement in and extension of the use of farm machinery. All of this was important and beneficial but sometimes over-emphasized, with a tendency to neglect the capital stock of agriculture—the land.

9. In agriculture, as in other enterprises, we often have waited until the land was sick before calling in the doctor. We did not practice preventive medicine and so were confronted with the problem of trying to cure a malady after it had gotten into the system and weakened it—the land—and many of those trying to make a living on the ailing patient.

We Overlooked the Explorations of Archaeologists

Our soil specialists have too frequently overlooked the work of archaeologists. Look at the work of Professor T. L. Shear in his excavations at Corinth, Greece, where 21 thousand tons of erosion debris that covered the ancient theater had to be removed. Subsequently, when the rains came, protective walls had to be constructed to prevent covering the excavations with the same kind of debris.[1]

Dr. W. A. Campbell, connected with excavations at the site of old Antioch, wrote me that in some places it was necessary to dig

[1] **Soil Conservation,** Bennett, H. H., McGraw-Hill, New York

through 28 feet of waterborne deposit to uncover remains of that former city of wealth and splendor.

Contouring, probably the most fundamental principle of engineering conservation, is described by Pliny. With reference to this, Pliny (who lived from A.D. 23 to 79) said:

> "Upon a hillside furrows are to be drawn traversely only. It is a good plan, too, to leave a channel every now and then if the nature of the spot requires it, by making furrows . . . to draw off the water in drains." [2]

Xenophon in the fifth century B.C. commented on the profit he was able to get by purchasing old, worn-out farms, restoring them and then selling them.[3]

Six Keys to Soil Conservation

Little is to be gained by reviewing past shortcomings in caring for the land, except as it may help avoid similar pitfalls in the future. Today we are profiting from the lessons of the past. We know now that:

1. Productive land is neither limitless nor inexhaustible. On the contrary, we have learned that the area of productive land is steadily shrinking before the onslaught of erosion and use of land for roads, buildings, and other nonagricultural purposes.

2. Land must be expertly cared for if it is to be maintained in a productive state.

3. Productive land must assume an ever more prominent position in the thinking of the people and their leaders. As the source of food for all people, rural and urban, it must have the regular, intelligent consideration that such indispensable wealth merits.

4. Since society as a whole depends on the produce of the land for its present and future existance, society as a whole must share in the responsibility and costs of maintaining land in a productive state. The individual landowner or operator has neither the resources nor the ability to carry the burden alone, and moreover he has control only for a lifetime.

5. Science must inevitably devote an increasing share of its attention to the problems of maintaining and improving the yield of productive land.

6. The technological key to future consideration of land development is scientific analysis of each parcel of land of any important extent in order to determine: (a) the type of produc-

[2] **Soil Conservation**, Bennett, H. H., McGraw-Hill, New York
[3] **Soil Conservation**, Bennett, H. H., McGraw-Hill, New York

tion for which it is best suited physically and economically, as between row crops, forage, grain, trees, or wildlife; and (b) the conservation measures necessary to maintain it in a permanently productive state under maximum use.

There Are No Shortcuts

We have found that there is no blanket, short-cut method for getting the conservation job done. There is no quick and easy way out. In order to assure its continued productiveness, every acre of land must be scientifically treated—which means treatment according to need and use according to the capability of the land for producing the various crops whether it is corn, wheat, grass, timber, or wildlife. This is the first basic principle of sound soil conservation. Our experience over the years has proved the soundness of this kind of soil conservation—and the lack of soundness in all attempts that overlook these fundamental principles of land capability.

And this means permanent soil conservation.

4. *The Program Develops*

Progress in soil conservation was speeded up with the adoption of Public Law 46, 74th Congress, in April 1935. By June 30, 1936, the Soil Conservation Service had in operation 147 demonstration projects, 48 soil conservation nurseries, 23 research stations and 454 Civilian Conservation Camps. Total SCS employment on that date was 10,394.

Other agencies assisted SCS in its earlier years. On September 26, 1936, 23,709 WPA relief laborers (Works Progress Administration) were assigned to the Service for work within areas near their homes. During the period of May, 1941 to August, 1945, up to 15 Civilian Public Service Camps ("conscientious objectors") were assigned by Selective Service to SCS as labor assistance.

Civilian Conservation Corps Helps

The CCC boys did a magnificent job helping with the conservation demonstration projects and drainage projects. Many farmers had not fully recovered from the costly effects of "the great depression" of the 1930's and were unable at the time to provide adequate labor for satisfactory operation of the demonstrations. The Camps met the shortage in numerous instances.

The work of the Civilian Conservation Corps is a story in itself—an epic in conservation accomplishment. The camps assigned to the Soil Conservation Service carried out a prodigious job in winning the confidence of farmers in the effectiveness and practicability of soil conservation. It probably is too late to evaluate the full beneficial performance of the Corps, partly because its activities were highly diverse and widely scattered about the country. Demands for CCC assistance were so insistent the technical directors apparently had little time for recording the full details of the work. Spare indoor hours, to a large degree, were devoted to school work and planning the activities of the following day, whether it was to be field work, recreation or school.

Many of the camps were assigned to SCS—for labor in connection with the soil conservation program. We worked them; the Army did the housekeeping. At one time we were using more than 90,000 of the boys throughout the nation. They built check-dams by tens of thousands, planted millions of trees and shrubs in gullies and on eroding slopes too steep to cultivate. They terraced fields and contour-furrowed overgrazed pastures and ranges. In times of floods they rescued scores of flood-trapped people and helped to clear houses and cultivated bottom land of sand, gravel, rock and other aftermath of overwhelming inundations. And finally they returned to replace fences and level off flood-scarred fields.

Congress Provides Legal Status for SCS

The Soil Conservation Service had its birth in the Soil Erosion Service, a temporary emergency relief agency in the Department of the Interior. I confess to a strong personal desire to see the soil conservation program survive the emergency of the 1930's. I was convinced we had started something that should be carried on to completion, and this without delaying interference.

Accordingly, a bill designed to establish the Service as a regular agency was prepared for Congressional consideration. There was no trouble getting it introduced in both branches of Congress.

Ruts and Jolts Along the Way

At about this juncture a variety of contingencies developed—enough to keep us on the double alert. First, a major incident was the transfer from Interior to Agriculture. The transfer order covered "funds, personnel and property." Bureaucratically speaking, that takes all you have. It means the same as "lock, stock, and barrel" and in common parlance that means everything you can put your hands on.

Our bill went through Congress almost without change, except for such things as substitution of the words "Secretary of Agriculture" for the "Secretary of the Interior" (before the House and Senate Committees on Agriculture).

There were other incidents, such as the timely arrival of a dust storm during the Committee hearings. It might be added here that it has proved a durable bill. It was amended in 1936 by tacking on—for life-saving purposes—the Agricultural Adjustment Administration when that huge agency fell victim to a Supreme Court decision. The Soil Conservation bill was approved by the President on April 27, 1935.

I still think ours was the best soil conservation bill ever passed by Congress or any legislative body anywhere. This evaluation derives from the success we had with soil conservation under it.

We Are Moved from Interior to Agriculture

Let us say a little more about that transfer to Agriculture, which was approved by the President on March 25, 1935.

I have been asked many times how the transfer affected my feelings. The question has never been easy to answer. In the confusion my feelings were probably considerably mixed. There was no time at the time for contemplation. One thought, I remember, was that probably we could not have made as good initial progress in Agriculture as we had made in Interior. Secretary Ickes kept close watch on our progress. Occasionally he would question certain actions, particularly those involving large expenditures. He conformed strictly to the name "Honest Harold" in the handling of public funds, so far as my experience indicated. And, while he never hesitated to scrutinize important departmental actions, he invariably came to the assistance of his bureaus in arguments originating outside the Department.

How did SCS fare after the transfer?

Not so badly at the time. Fitting in proceeded slowly as was to be expected. Inter-agency relationships were complicated in the huge Department. A new bureau dumped bodily into it had to be careful of its actions in order to avoid stepping on the multitudinous bureaucratic toes of the many agencies and their widely ramifying functions. Our SCS type of program bordered closely on the fields of most of the scientific bureaus as well as some of the "administrations." Occasionally we strayed across agency boundary lines, but such misunderstandings or in-infractions were usually settled out of court—that is, outside the Secretary's office.

If Congress had not set us up pretty much as transferred, we might have been, probably would have been, torn to pieces in Agriculture and distributed in little pieces among hungry bureaus. As it was, only our name was changed—to the Soil Conservation Service, and that was done by Congess. We had had from the beginning close relations with the Congress. Most of those members of both branches having farmer constituents knew us and seemed to have liked our program.

Anyway, we got fitted into Agriculture without amputation—after some more or less detailed examination by the committee process. As I recall, there were six examining committees composed of a variety of specialists, most of whom had little opportunity to become acquainted with us and our concepts and methods. Fortunately, one or more of the technicians from SCS was put on each of the committees. That helped. It may have saved us. Actually, it seems in looking back we were helped by the ignorance of our captors.

There was nothing wrong with the idea, and it worked out better than we had expected. One of the committees came up with the recommendation that within a year following we were to conduct our activites through cooperative arrangements with soil conservation districts. This was completely in accord with our thinking.

About the report of the committees, here is an item from the Chronological History of the Soil Conservation Service, U. S. Department of Agriculture, June 5, 1935:

> "Report of the Secretary's Committee on Soil Conservation signed and submitted to the Secretary of Agriculture, who approved it on June 6, as submitted. The report dealt with the functions and activities of the Soil Conservation Service in the Department of Agriculture, its relation to other Federal and State organizations, and methods of procedure in its various activities.
>
> "By memorandum of June 11, the report was transmitted by the Chief of the Soil Conservation Service to all Regional Directors and heads of sub-projects with instructions to develop their plans upon the basic principles in the report."

This committee report proved helpful in a number of ways. It helped get us adjusted to the organizational structure of the big, complicated Department. Also it helped along lines of departmental bookkeeping and governmental business procedure. We called the report the SCS Bible. It told us how to behave ourselves Department-wise, but left out almost completely matters pertaining to how to apply conservation measures to the land.

Other Difficulties

The principle of using combinations of coordinated skills or techniques of sound agriculture is part of the basic concept of permanent soil conservation—or modern soil conservation as it is sometimes called.

In the beginning we had some difficulty with effectuating this principle of using combinations of practices in the field work. Agricultural engineers and agronomists, for example, worked together like so many bulldogs and tomcats in the same pen. It was necessary to bring our technicians around to the point of understanding that ours was a new type of program in which success depended on making use of all available and effective measures of control, singly or in combination, as needed in order to establish durable conservation on all the land.

With surprising rapidity our technicians got the point and were guided by it thereafter. The principle proved so effective in practice that it increased morale throughout the Service. Our workers had something new and outstandingly effective to work with and this on a problem which had plagued man across the

centuries. It gave them confidence and pride in their work. Visitors from other countries marveled at the wonderful morale of the SCS personnel—their enthusiasm, spirit of cooperation, and pride in what they have done. I am constantly asked, "How was it done?"

It probably grew out of finding the solution of problems we had lived with, too often unsuccessfully, for generations. There were other contributing causes of course. One outstanding contribution came from the good fellowship—esprit de corps—so commonly derived from understanding cooperation among people. Also, I believe, Mother Nature had a hand in it. We had a sort of tacit understanding that the Old Lady was easy to cooperate with, but a bundle of contrariness otherwise.

We Started in the Right Place

I still think it was fortunate we started in the Department of the Interior. There were certain advantages in that Department for infant organizations and disadvantages in the other Department, as already explained. Many have agreed on this point. Proof cannot be presented now. At any rate we started in Interior, not in Agriculture. However, there is no point in pursuing the matter since it is difficult to make meaningful comparison. There were, unfortunately, bureaucrats in both places—and doubtless still are.

When I retired from SCS (April 30, 1952) my feeling was that excellent progress was being made. At the close of the preceding fiscal year on June 30, 1951, we had completed the conservation job, up to the stage of maintenance, on more than 140,000,000 acres, not including spread-of-practice work done by farmers who had not been reached by the program of the Service.

A significant point was that the rate of treatment was moving ahead at a progressively accelerating pace. For example, in 1942 something over 5,000,000 acres were completely treated in soil conservation districts; in 1950, eight years later, the area completed amounted to more than 26,000,000 acres. This was an increase of 388 per cent with an increase in facilities (chiefly technical manpower) of only 54 per cent.

As to rate of acceleration, only 0.8 per cent of the total job was completed in 1942, but the corresponding rate for 1951 was 3½ times greater, or 2.8 per cent for the year. The average rate of increase for the three-year period of 1943-1945 was 1.1 per cent; the corresponding rate for the 1949-1951 period was 2.6 per cent of the total nationwide job.

5. *The Birth of Soil Conservation Districts*

Early in the life of the nations's soil conservation program it became apparent that farmers would have to assume a much larger share in all aspects of the work than was possible in the beginning.

The program had started on a demonstrational basis. There was no choice; realities had to be faced. Farmers and others had little understanding of this new concept of safeguarding the land while using it for production purposes. They had to be shown—and that is what demonstration means.

Hence our beginning work in the Soil Erosion Service was what we called the demonstration phase of the program. The newness of this kind of work and consequent lack of familiarity with it precluded the use of practically everybody except the handful of more or less experienced soil and engineering specialists from which our technicians were recruited. And most of these had to be further trained by a kind of apprenticeship or assistantship to the more experienced. This explains why so few farmers took part in the initial activities involved with the planning, application and directional aspects of the work—aside from the part they took on their individual farms.

The great majority of farmers cooperated splendidly with the conservation technicians and they learned rapidly. I have sometimes thought that if all things contain some good, perhaps the great depression prevailing at the time may have contributed to farmer interest in and willingness to take hold of new ideas and push them. At any rate this is exactly what happened. And it helped in many ways. For one thing, it proved that a vast potential for conservation work existed among farmers. The question quite naturally arose, how could this potential best be harnessed for the good of the nation?

We Develop A New Idea

And thus we began thinking about how could farmers be brought as more active participants into the work of safeguarding the nation's limited supply of productive land.

There were other reasons why be began looking around for ways to bring farmers into a position of greater and more helpful participation in the nationwide program. One deficiency in our program we ourselves recognized as outstanding: We were not moving fast enough. Criticism would surely arise as a delaying complaint if the situation were not remedied. Fortunately, we recognized this possibility as well as the need for a piece of machinery we didn't have. Out of our collective thinking along these lines came the Soil Conservation Districts.

It might as well be pointed out at the outstart what I have repeatedly said: I consider the soil conservation districts movement one of the most important developments in the whole history of agriculture. It has proved even more effective, I am convinced, than we had dared to expect.

So, we put on our best thinking caps. Suggestions came from conservation technicians throughout the country—and to some extent from other sources. Then came a most important publication, the product of nearly a year of technical and legal work, *A Standard State Soil Conservation Districts Law.* This was followed by State Soil Conservation Districts Laws and these in turn by the Soil Conservation Districts.

There was more to it than this, much more. I shall get around later to some of the many things that transpired between the concept of the districts' idea and districts in action.

Frequently the question is asked, who first thought of the districts? My answer has been: The districts' idea, as I have understood it, was something of a synthetic product derived from the collective thinking of soil conservationists under the urge of necessity. We clearly recognized the need for a number of things, such as increased progress, better means for maintenance of conservation measures applied to the land, and greater utilization of the advantages of neighbors working together.

As to the exact origin of the name, I am not sure, and this is of small importance. I believe, however, the county districts for control of wind erosion set up in the Texas panhandle preceding the soil conservation districts may have had considerable effect on our thinking and probably something to do with the name. Suggestions favoring the establishment of conservation districts came from various sources but chiefly from our soil conservation technicians, prior to our transfer to Agriculture.

Districts Speed Progress

In 1935, after two years of work, and before the birth of districts, the Soil Conservation Service was able to report the completion up to that date of less than a million acres treated. At any such rate, we could scarcely have expected to get the job completed ahead of widespread exhaustion of all patience. Not less than 700 million acres of various kinds of land needed treatment. We were faced with a situation that had to be overcome. Five years after establishment of the first district, Brown Creek District in Anson and Union Counties, North Carolina, on August 4, 1937, basic conservation measures were applied to 5,338,000 acres in one year alone (1942). For the fiscal year ending June 30, 1950, the same kind of treatment was applied to 26,071,342 acres in this one year.

Now the districts are proving a powerful catalytic agent toward mutual aid among farmers. The Soil Conservation Service has given the principal and guiding assistance to the districts. Actually, as the originating agency, the Soil Conservation Service quite naturally has been the principal supporting agency by way of furnishing technical assistance. This it has done from the day of birth of all the districts, although other agencies, state and federal, have helped.

Early in the districts program the Soil Conservation Service took a position resembling somewhat that of a junior partnership with the districts and worked so closely with them it was not always easy to distinguish district officials from Soil Conservation Service Technicians. That is as it should have been, and should continue to be, since it means mutual cooperation of the first order. This is not intended to imply that help from other agencies is not needed.

The relationship, however, has gone no farther. The districts belong to the farmers who brought most of them into existance by their own votes and they remain under farmer direction.

There is no doubt, however, the Soil Conservation Service from the beginning put its best efforts into developing the districts into an indispensable state agency for maximum and optimum conservation and wise use of soil and water. This pertains to Soil Conservatin Service action all the way from the preparation of a Standard State Soil Conservation Districts Law, to getting it adopted by the states and on into that phase of the conservation job involved with furnishing, on request, high-quality technical assistance to the districts in action. Its funds are appropriated with the understanding that they are to be used chiefly for supplying technical assistance to the districts.

In a sense, the Service deliberately proposed and worked untiringly for an action that would put leadership for soil conservation into the hands of local people.

The phenomenal growth of the districts attests their widespread approval by farmers. In 1938, only 69 districts had been organized by farmer referenda covering a total area of 36,107,227 acres. Fifteen years later, 2,549 districts had been organized, with a combined area of 1,403,988,782 acres. As of July 1, 1957, 2,770 districts had been organized with 1,597,000,000 acres.

On June 30, 1957, about 84 per cent of the land area of the 48 states was included in districts along with 88 per cent of the *land in farms* and 93 per cent of all the farms of the nation. Present estimate is that about 95 per cent of the cultivated land in the United States is covered by districts.

The following 18 states are completely covered by districts—in the order of their coverage (between the dates of April 24, 1941, for Alabama and July 2, 1957, for Georgia): Alabama, South Carolina, Delaware, Rhode Island, New Hampshire, Vermont, New Jersey, Massachusetts, Nebraska, Mississippi, Iowa, Connecticut, Kansas, Kentucky, North Carolina, Arkansas, Wisconsin and Georgia.

Several other states are nearly covered: Texas, Virginia, Tennessee, Oklahoma, Illinois, Maine, Michigan, North and South Dakota, Washington, West Virginia, Florida, Louisiana, Maryland and Ohio. Some of the mountainous western states are only spottedly covered—mainly because of topography and the many parks and national forests. Least headway among the eastern states has been in Missouri and Pennsylvania.

District Planning for Conservation

First among many things a district does after organization is to prepare an overall work plan for the entire area. Soil Conservation technicians assigned to work with districts have helped the supervisors in this by supplying information on land capability revealing land facts basic to the needs of the area. If not previously completed, a capability survey is made of the district as quickly as possible.

The overall or long-range work plan can be explained by an example. Take the plan for the Broad River Soil Conservation District of Georgia. This is in the Piedmont hill section and comprises all or parts of eight counties. It is one of the earlier districts on a watershed basis.

The capability survey showed that much of the cultivated land was not suitable for cultivation for row-crops, while part of the

idle land was suitable for such use. Here are some of the long-range changes in land use approved by the District supervisors:

Cultivated at time of planning	473,592	acres
Recommended for continued cultivation	369,333	acres
Remainder to be used for:		
Kudzu and lespedeza sericea	47,350	
Permanent pasture	52,085	
Farm forest	2,367	
Wildlife	2,367	
Total	104,169	acres
Idle at time of planning	150,000	acres
To be used for:		
Cultivation	20,000	
Kudzu and lespedeza sericea	67,000	
Permanent pasture	24,000	
Farm forest	24,000	
Wildlife	4,500	
Total	150,000	acres

The technicians of the Soil Conservation Service made the land capability survey without which the district work program could not have been made with accuracy.

Individual farm planning should insofar as practicable follow the general pattern of the long-range district plan. The farm plan is, however, more of a day-to-day work plan. It gets closer to the grass roots—following the acre-by-acre needs of the farm. It shows necessarily much greater detail than the overall plan. It must take into consideration alternative uses for each cultivated piece of land in order to take care of seasonal, economic and other conditions not susceptible of predetermination. To be of greatest use it must be based as nearly as practicability permits on the land facts over the entire farm, not only with respect to their individual effect but to their combined relationship effect. In other words, it must be a coordinated plan, with all parcels of land of workable size included in the program.

Never before, so far as I know, has the world had anything quite like the soil conservation districts.

Main Steps in District Development

It took nearly a year to prepare the model act, A Standard State Soil Conservation Districts Law, but only a short time to get it in the hands of the President who liked it and sent it to all the Governors of states recommending enactment of some such legislation by which the States and the Federal Government could enter into cooperative arrangements for effectuating district programs of soil conservation.

Some objections were raised to certain features of the recommended districts legislation in some states, but most of the

states without much loss of time enacted legislation along lines quite similar to the model act. In a few of the states, however, the districts enabling legislation departed from the lines suggested, mainly as to methods of establishing districts, no referenda being required in a few states.

Up to this point not a great amount of interest in the proposed legislation had appeared, for or against. There was some local opposition but most of it was dissipated by explanation of the objectives. In a few states, however, objections arose to the extent of confusing the situation and causing delays of several years in adopting enabling legislation of any kind.

Within 12 years all the states and Hawaii, Puerto Rico, Alaska and the Virgin Islands had adopted districts—enabling legislation. This seemed short time for so much far-reaching legislation.

The most difficult step had to do with setting up districts through farmer referenda. Even here things moved along with reasonable smoothness in most states. Locally objections became quite noisy and some proposed districts were voted down. Some of these were approved by a second referendum a year or so later. A few that were proposed have not yet been established.

It should be emphasized that most of the districts were voted in with healthy majorities, many being approved overwhelmingly. For example, there was only one negative vote in the referendum that gave legal status to the Brown Creek Soil Conservation District in North Carolina—first such district of history.

The stimulating force of the successful work of the conservation demonstrations and of the CCC camps explains the heavy majorities favoring districts. There is nothing like the words *success* and *first* in America—and everywhere else for that matter. Lindbergh's flight was a thrilling first, for illustration.

Discussions pro and con became so ardent in some instances that considerable bitterness was engendered spottedly, but gradually as more and more districts prospered and grew in public esteem the bitterness was eliminated through processes of good American horse sense and "seeing is believing." In a few states individuals or groups had delayed district formation by offering substitute procedures.

I had expected even more opposition. The districts movement was clearly something new, almost revolutionary. Man is a creature of habit. He moves slowly into new procedures from the old, customary way of doing things.

Some Recommendations

I believe that the Soil Conservation Service should have full control of the strictly scientific aspects of the U. S. Department of Agriculture's soil and water conservation application work.

Authorized payment for applying approved conservation measures might better be made by some other agency, but first all such measures should be approved by the Soil Conservation Service. Measures not so approved probably should be stricken from the eligible list for payment of any part of the cost by any Federal agency. All measures intended for permanent soil conservation, farm planning for conservation and planning for the small watershed flood-control program should be assigned to the Soil Conservation Service for technical approval and technical direction of installations. Agency designations probably can best be determined by Congress.

I believe that more technical assistance should be provided for the districts for maintenance of high-quality work and to meet the increasing demands for land treatment. Man-years of technical assistance per district have dropped from 8 in the fiscal year 1942 to less than 4 in 1955 (estimated). These are the most recent figures I have seen. I recall that Soil Conservation Service was short on technical assistance as far back as 1942. Now that the assistance apparently has been still further reduced, the seemingly logical conclusion is that deficiencies have continued to slow progress.

Average dollars available per soil conservation district were approximately $22,000 in 1942 and a little less than $20,000 in 1955.

This apparently tends to bypass the needs of the older districts. I am unable to give detailed explanation as I am not close enough to the operational program. It is suggested, nevertheless, that a detailed report be made to Congress showing the probable effects of any inadequacies or stumbling blocks. Congress is the branch of government which handles matters involved with appropriations, and that probably is what has happened, a lag in funds for technical assistance to the older districts.

National Association of Districts

A short time after the soil conservation districts began to get under way in large numbers a feeling began to develop that some kind of non-governmental organization should be formed to promote district interests.

My own view was that such an organization could be most helpful in assisting the districts as they grew in numbers and responsibility without advantage of precedent. Among a variety of possible tendencies toward deficiencies in growth and usefulness was the thought that too much dependency on outside help could result in impairment of self-confidence and independence in planning and action on the part of district supervisors. There

was no question as to need for technical assistance. The question was, would response to this need be permitted to grow in the wrong direction, toward deficiency in freedom of independent action, creative thinking and constructive planning? Over the long run this has not occurred to any serious degree.

Aside from any such tendencies the district movement was a genuine American product. It deserved all possible assistance because of its high and worthy objectives—adequate protection and prudent use of man's most basic resources of productive land.

Also and aside from basic considerations, most of our activities, economic, scientific, engineering and educational, are supported by one or more national associations as well as local organizations of a promotional or welfare character.

For one, I was in favor of the quickest practicable action in the development of a nation-wide, private non-profit organization to assist districts in getting on their feet as independent and competent units of state government, thoroughly capable of doing their own thinking and making their own decisions without interference or coercion of any kind from any source. Our Soil Conservation Service technicians have had this same point of view to a man from the beginning, so far as I was able to determine.

I favored immediate action along with most of our personnel, but there was some feeling that we could move over-hastily. Time, it was felt, was not quite ripe for the move.

My reaction to delay was that at best it would take around a year at least to get such an organization ready even for initial action and a year more to really get going. That seemed long enough to wait.

The idea once started, grew so rapidly that somewhat ahead of expectation we had the National Association of Soil Conservation Districts and a highly competent President.

A. E. MacArthur, first President of NASCD, was eminently fitted for the job. He was a successful farmer in South Carolina, an experienced supervisor in his soil conservation district and a most genial gentlemen of energy, quick wit and practical ideas, and he was completely fearless.

The Association began immediately bolstering district morale and encouraging independent thinking and action. Fears that the districts might not grow into a powerful and active implement for conservation quickly melted away. And most encouraging, the district movement has gained in usefulness and public favor from year to year.

6. *Up Stream Flood Control*

Recent floods were beginning to focus some attention on the flood-control program in small watersheds when the Sputnics virtually cleared the front pages and the television and radio programs of everything but talk about outer space and Russian science.

Fortunately, the Soil Conservation Service had shown that flood control is not only feasible but practicable in small watersheds.

In the beginning the Service conducted its demonstration program on a watershed basis. The very first demonstration was in the watershed of Coon Creek, a small tributary of the Mississippi in southwestern Wisconsin. This project was so successful from the standpoint of controlling both floods and soil erosion that agencies of the State of Wisconsin have erected a bronze marker in the Coon Creek area commemorating the achievement.

The marker bears the following inscription:

> "This point is near the center of the 90,000 acre Coon Creek Watershed, the nation's first large-scale demonstration of soil and water conservation. The area was selected for this purpose by the U. S. Soil Conservation Service (then Soil Erosion Service) in October, 1933.
>
> "Technicians of the SCS and the University of Wisconsin pooled their knowledge with experiences of local farm leaders to establish a pattern of land use now prevalent throughout the midwest. Planned practices in effect include improvement of woodlands, wildlife habitat and pastures, better rotations and fertilization, strip cropping, terracing and gully and streambank erosion control.
>
> "The outcome is a tribute to the wisdom, courage and foresight of the farm families who adopted the modern methods of conservation farming illustrated here."

Along the trunk streams of the big watersheds flood control operations of a purely engineering character have been going on for generations. But the small watersheds of the headwater

tributaries, where floods begin, were completely left out of consideration until the advent of the program of the Soil Conservation Service.

Big Floods Are Spectacular

Big floods in big rivers are more spectacular than those along the small headwater tributaries that gather the rains and feed them into the big waterways. But when damages are totaled those in the small upstream basins exceed those in the big river basins because there are a great many more of the small drainages and they are flooded much more frequently.

Floods are costly at both ends, upstream and downstream and all the way from the uppermost drainage divide to the sea. Control is needed all along the way. Downstream, on the big rivers, protection is needed by means of levees, channel improvement, bank stabilization floodways, and big dams; upstream, control is somewhat simpler, requiring principally erosion control and retardation of flood flows with small dams. Erosion control, of course, is necessary everywhere; the beneficial effects on flood prevention and control are easier to see near the small streams.

There is a rather marked difference between the needs of the small drainage basins and the big ones. In the former the primary needs are more on the order of *flood prevention*; in the latter, operations need to be designed more on the order of *flood control.* In the little basins the needs are to store more of the rainfall in the reservoir of the soil and to retard the flow that reaches into the little drainages. In the big waterways the objectives are to confine flood flows within channelways along which various major engineering improvements and installations are required.

It's all flood control, however, and coordination is essential. Congress may have to mark the line of separation as between the upstream and downstream programs. It is my conviction that too much time is being lost arguing over jurisdictional matters pertaining to the respective programs. To insist on having one program doubtless would result in overlooking or ignoring some of the differences and needs.

Both types of programs are needed along with better coordination than we have had in the past. Big dams are needed but they might not all need to be so large and costly if the upstream work were done first. As to sequence, we have been putting the cart before the horse so long I am afraid we have gotten far off beam. Some have insisted that big dams have no place in flood control; with equal insistence some engineers claim that only engineering structure and operations are required. Actually there are places

where little can be accomplished without big dams. On the other hand, I have seen situations where upstream work would probably eliminate the need for any kind of big dam.

No Single Method Adequate

No single method of flood control can do an adequate job. We saw in the recent big Kansas-Missouri flood, for example, that levees high enough to withstand the largest previous floods on record were overtopped. We saw also that the soils of fields and pastures became so nearly saturated after weeks of heavy rains that they could absorb but little more of the final big rains. To meet all kinds of flood conditions and prevent or minimize resultant damage wherever there is a hazard, we must use every available method of control we know about.

Every additional gallon of water that can be stored in the soil through the use of conservation measures means one gallon less contributed to flood flows.

A first step, then, in flood prevention is to keep the soil in optimum condition for maximum water intake. This will require the maintenance of good soil structure, good cover of vegetation wherever practicable, and efficient structures wherever required. What excess water runs off the fields into the drainageways must be slowed down with small retarding structures along these headwater drainages, and what flows out of these lesser drainage basins will have to be handled in the main river valleys downstream by more imposing structures—large engineering installations, such as reservoirs, levees, floodways, bank stabilization and channel improvement.

The job of flood control then, begins where the rains fall and does not end until the runoff reaches the ocean.

Some of the recent legislation in relation to these matters may help bridge the gap between small watershed operations and those of the big drainage basins.

Coordinated Approach Essential

It is important to determine what kind and combinations of measures are needed, where to use them, and how best to dovetail their use, watershed by watershed, in order to accomplish the best possible job of flood control and prevention. In doing this we must, of course, bear in mind the continuing need for water storage for irrigation, power, municipal water supply, pollution abatement, preservation of fish and wildlife resources, and maintenance of underground storage. It must be borne in mind that the use of the limited number of suitable sites for large reservoirs should be considered in relation to the multiple

needs for land and water before they are dedicated solely to flood control. Also, along some streams requirements for navigation will call for special attention.

Distribution of Flood Damage

Another feature necessitating co-ordinated effort relates to the distribution of flood damages and benefits. The crops of upland fields that are washed out or covered with eroded soil resulting from rains upslope are just as truly lost as those on overflowed land in the valleys below. Soil washed out of upland fields reduces the productivity of that land just as much as, or more than, deposition of smothering soil carried by waters flooding agricultural bottomlands along the rivers. Floodwater damages to agricultural lands in the hundreds of thousands of miles of small, upstream creek bottoms represents just as much loss per acre in many instances as the flooding of the wide Missouri River bottoms between Kansas City and St. Louis.

The Soil Conservation Service, in its preliminary survey of the storm and flood damages in Kansas and Nebraska during July, 1951, found that losses of crops on upland farms amounted to an estimated $110 million. Losses of rich topsoil were estimated at $200 million. Losses from floodwater and sediment in the small creek bottoms above the points where anyone has yet proposed specific flood protection measures were estimated at $102 million. The total of these estimated damages amounted to $412 million. Probably 90 per cent of these losses could have been prevented through the soil and water conservation and flood control programs of the type being carried on by the Department of Agriculture. And the benefits would have largely exceeded the cost.

Technical Skills and Detailed Treatment Needed

It should not be overlooked that planning and application of upstream watershed programs require special technical skills. Downstream, the highest order of engineering skill is necessary for building dams, main-channel stabilization works, and so on. Likewise, upstream technical know-how is required to plan and install sound land-use and land protection treatment as well as the engineering and hydrologic skills required to install essential water-retardation structures at the right places. Such work must be based on painstaking research, surveys, and practical experience. It must take into account the principles of hydrology, engineering, agronomy, land and conservation science, forestry, biology, and other related fields.

We cannot depend on windshield surveys and office planning

to carry out a job of the complexity and magnitude of safeguarding our farmlands and controlling floods. Nor can we have a ready-made plan including a fixed set of practices to slap on any farm or watershed. Land and the behavior of water falling on land differ from watershed must be dealt with individually.

That, briefly, is how we are going about the treatment of agricultural land for effective soil conservation and flood prevention and control. We have developed a unique combination of soil conservation, engineering, and vegetative practices designed to dispose of surplus water safely while making the best practical use of the water that otherwise would also be wasted. Thus, we are going into the small watersheds to do everything possible to provide relief from recurring flood damages.

The flood control part of the Department's contribution, over and above the normal soil conservation work on farms and ranches, covers such items as the construction of water-detention reservoirs, channel improvement, gully stabilization, diversions, and roadside stabilization. Farmers ordinarily cannot carry out such operations by themselves because of their size and technical requirements. Moreover, they should not be expected to do so, because these works result in public benefits, affecting many people downstream from the points of installation—even more so, frequently, than the farmer on whose land the work is done. But farmers are helping, county highway authorities are helping, and Soil Conservation Districts are assuming responsibility for general maintenance operations, necessary easements, and farmer cooperation and are sharing the cost.

Roadblocks and Controversies

Recently I have heard some complaint of slow progress in the Small Watershed Program. This seems to center about claims of too much red tape and dissatisfaction with the cost-sharing arrangement, which some feel requires too much of the soil conservation districts involved with the work area.

It can be said, I think, that most programs of this general nature get off to a slow start. Nevertheless, matters of this kind need the closest scrutiny. Progress can be hampered by a variety of difficulties, including even self-imposed hinderances. Minor impediments are to be expected in most human activities. These can usually be disposed of by clearing the roadways of confusing regulations and too many long-distance bosses.

There is evidence of the existence of even more difficult stumbling blocks, such as may require some revision in the Small Watersheds Act.

For purposes of good progress it is suggested that the interest-

ed agencies, individually and collectively, eliminate as much red tape or "paper work" as may be possible and then explore by every avenue the possibilities of establishing better all-round understanding of the functions, objectives, and working fields of all agencies taking any important part in the program.

The mere action of getting together for discussion would improve matters, in my opinion. A little publicity on the objectives of such meetings might help. Allowing things to drift is a pretty sure way of going from bad to worse.

The Army Engineers were in the flood control business before either the Soil Conservation Service or the Soil Conservation Districts were born, and because of that, might have acquired the feeling that the whole field belongs to them. There is not much logic in such a point of view, but it perhaps is more or less a natural one.

In their work, the Army Engineers have customarily dealt with projects of major engineering proportions such as levees, revetments, channel improvement and floodways. They have worked principally on the larger waterways along which there are many large cities. I think for these and other things they may have pretty well overlooked the point of my discussion—the needs of the head water tributaries that fed downstream into the big rivers.

So great was this oversight that a number of interested people, including myself, Morris L. Cooke and F. A. Silcox, planned and held, in Washington, September 22-23, 1936, an Upstream Engineering Conference, proceedings of which were published by the U. S. Department of Agriculture in cooperation with the Rural Electrification Administration in 1936.

That conference turned increased attention on the small tributary streams. First, however, attention to these small waterways was stressed by the program of the Soil Erosion Service, which agency based its program from the beginning of work in small watersheds. This program led to the publication of *Little Waters*, a unique little book that should not be forgotten.[1]

The Army's program gradually grew from flood control into flood control, improvement of navigation and power development. Exactly when the attention of the Engineers was attracted to the small watersheds I am unable to say, but I have reason to believe they were not greatly interested until SCS began to spread its activities in that direction under Congressional authority in the late 1940's.

At first they were not interested and said nothing; later they

[1] Published by the Soil Conservation Service and The Rural Electrification Administration, 1936.

seemed more or less satisfied if SCS restricted its operational jurisdiction to the construction of dams not higher than 20 feet and to impounding only small acreages of water, not much larger than a fish pond.

Another seeming tendency is for the Engineers, who have usually gotten on the job first with their planning and surveys, to pretty well exhaust the supply of "benefits over cost," leaving only residues of estimated benefits for the planners of small watershed operations to include in their proposals to Congress for operational authorization—where the benefits must exceed the cost. This can fool the public as well as those responsible for appropriations.

This inequality could be remedied by completion of the upstream operations first. As a matter of sound procedure, upstream operations should come first because the more water that is stored upstream in the reservoir of the soil or retarded in the headwaters, the less that runs immediately downstream to pile up flood flows in the big rivers.

An important contribution of thus keeping the horse before the cart would be to reduce cost by building downstream, say, a 100-foot dam instead of a super-costly 200-foot monster.

There are other reasons for a two-phase type of flood control program. What I have said is perhaps enough to give you the idea. Probably Congressional action will be necessary to resolve all the difficulties of present maladjustments. It would be better, however, for the interested agencies to do what they can to get together before Congress is forced to take a hand. That would be the ethical procedure anyway.

7. *Bread and Butter*

I want to talk about bread and butter—the food that sustains us and where it comes from.

And I would call your attention to the clothes we wear, the houses many of us live in, the paper we print our daily papers on, and many other things we use in our everyday lives without thinking very much about their origin.

My purpose is to show that in spite of the tremendous decrease in the number of people directly engaged in farming, the numbers indirectly affected in one way or another by activities that have some tie-in with agriculture are all but countless.

A very large share of the essentials of civilization come from the soils through biological processes of life and growth. To be perfectly clear this statement has no reference to minerals, fossil fuels or other extractive substances.

Day in and day out almost all the things we eat, a large part of the clothes we wear, and all of the wood with which we build dwellings and manufacture thousands of useful articles come from a limited supply of productive land. And there are the vegetable oils and fats, leather, tobacco and many other products of industry.

These are facts many of us have somehow overlooked or forgotten as more and more of us have taken residence in cities and lost everyday contact with the land. But we are fast approaching the time when we can no longer afford to ignore these pertinent facts.

In many parts of the world the supply of productive land is running out. In some large areas the supply was exhausted long ago or ran so low that millions have been undernourished. In times of drought famine has taken uncounted toll of the population in some parts of the world.

It is conceivable that through continuing waste and misuse of

our productive land we, too, could eventually run short of good land—right here in this new world where not long ago many thought we had more good land than we could ever use. Such an eventuality, if we should permit it, would first lower our customary high standard of living and then put us on the list of declining nations. My feeling is that we are not going to permit any such disaster. We have too much ingenuity and business sagacity to let it happen. Danger signals, nevertheless, have appeared in the form of protracted droughts, dust storms and mounting floods. Fortunately we have seen the signals and already have underway programs of counter-attack. These programs have proved highly effective, although they have not made their fullest possible contributions because they have not had time or we have not given them adequate support. We have too often and in too many places given way to assumptions, postponement and complacency, all of which have exacted heavy toll of our resources.

From Soil to Hot Cakes

What happens to the corn land of the Corn Belt, the wheat land of the Wheat Belt, the cotton land of the Cotton Belt, the vegetable lands of the Southeast, the fruit lands of California and other producing areas is eventually reflected in the business of New York, Chicago, San Francisco, Dallas, Atlanta and Denver. What happens from day to day to the crops growing on these lands is reflected almost immediately in the big commodity exchanges through the nation.

Think of all the people who depend wholly or partially for their income—their living—on the processing involved in getting grains of wheat from Kansas or the Dakotas to the breakfast tables of the nation in the form of cereals, hot cakes and hot biscuits. There is first the farmer and the manufacturer of the machinery the farmer uses. And there are truckers, millers, processors, advertisers, stenographers, bakers, bankers, carton manufacturers, salesmen, wholesalers, retailers, warehousemen, railroad workers, and so on. All of this long chain of producing, processing, marketing and distributing is made possible because seed planted in the soil multiply, become edible and nutritious and ultimately are transformed into what we know as cereals, cakes, biscuits, and so on.

There is even more to the chain. The farmer and all the rest who contributed to producing the boxes of cereals and the sacks of flour also buy goods and services. They go to doctors, dentists, lawyers, barbers; and their wives, sisters and cousins go to beauty parlors and cosmetic shops. They go to the movies, ball

games and grand opera. They buy newspapers, hats, suits, automobiles, radios, electric light bulbs, and houses. They hunt and fish and take photographs and buy guns, shells, fishing rods and cameras. Their taxes help to build roads, bridges, planes and missiles.

Back of all these things is productive land.

Think for a minute of all the things in your daily lives that come from the land. It will be a very long list. Millions of people, however, never think of these products in their relation to the land from which they come. Instead, they associate them with the stores where the processed articles are bought. These appear on store shelves and they are for sale. Who bothers about what happened before the articles got into the store?

People will begin bothering only if the articles become scarce, if the price gets too high, or if the quality deteriorates. And all these things can happen if our land supply should run too short.

Land Use Everybody's Problem

When white men came to America, the United States (then virgin country) was covered on an average with about nine inches of productive topsoil (as indicated by still existing virgin areas). Across the intervening years that average has been reduced to about six inches, as indicated by erosion surveys.[1]

This unnecessary wastage of soil concerns you—and me. It affects all of us whatever occupation we are engaged in. Moreover, it affects all of us as a nation. Now and in the future we can do something about it, individually and collectively. As a nation we will conserve our productive land and use it prudently only if there is sustained public demand for such a course of action. Neither as individuals nor collectively can we deny our responsibility. The men and women of the cities must help develop this demand, for they now constitute by far the largest part of our population. If you will take the trouble to ascertain the facts about our farmland—and other natural resources—and then lend your support to our conservation programs we will get results and hold on to them. To stand by silently will not help.

Man has been so occupied with his business, professional, and industrial affairs that these and other chapters in the history of land have been generally overlooked until recently. Improverished land not only explains much that has happened down through the world's history; it has had a great deal to do with the present unfortunate situation, in some countries, of a shortage of food due to a shortage of productive soil.

[1] Circular 33, U. S. Department of Agriculture, 1928

Improper use and neglect of land have brought mankind to the forks of the road, not just to the crossroads where there are three ways to go forward, but to the forks where there are only two ways to go forward: One, the right way; the other, the wrong way. From now on, unless we go the right way, moving rapidly, effectively, and persistently ahead with the job of sound and lasting soil conservation, the world will be faced with difficulties of increasing seriousness in providing food enough for the rapidly increasing peoples of the earth. A mounting world population, coupled with a limited and declining supply of productive land, can defeat man here on earth—will defeat him certainly if he goes on stupidly wasting the substance of life—productive land.

8. *Principles of Permanent Soil Conservation*

Productive land is our base. Everything we do, all we share, even whatever we amount to as a great and enduring people, begins with and rests on the sustained productivity of our agricultural land.

A prosperous and enduring agriculture depends on an adequate supply of productive land, properly used and so protected from erosion that it will remain permanently productive. Without such a lasting agriculture, there can be no assurance of full national strength and permanence. As long as people have enough productive land, they can continue producing their food and fiber and many of the raw materials required by industry. These are the sinews of a sound national economy.

And what is critically imperative in these times of world uncertainty is a clear understanding, backed by efficient, timely and adequate nationwide action, of the fact that our land resources must be maintained at all times in condition for ready production of our utmost needs of food, fiber, lumber, vegetable oils and fats and other raw products of industry. This means, in other words, that a thorough going program of nationwide soil and water conservation is an indispensable part of our first line of national defense.

For these and other reasons, effective soil conservation is imperative everywhere.

Land Supply

We have left in the United States approximately 500 million acres of fairly good to first-class cropland immediately or potentially available for plowing, including that now in cultivation. The total plowable area is somewhat larger than this figure, amounting possibly to something near 600 million acres; but much of this, probably about 100 million acres, is either not

suitable for safe cultivation over long periods or is not immediately available for such use.

It would be unwise to overlook the fact that part of our better acreage—probably not less than 100 million acres of it—is still susceptible, through imprudent use and lack of protection to damage by erosion, waterlogging, flooding and silting. These hazards can be overcome, but only through modern soil conservation and flood control operations. This means that soil conservation measures must be scientifically fitted to the land according to kind and need and that flood control must be carried out all the way from the crests of enclosing divides on down to the main channels of our drainage systems and from there on to the sea.

In the world, there is also a limited supply of productive cropland. And this too is decreasing in area because of continuing erosion and imprudent use. In the meantime, world population is increasing at an estimated rate of 1½ per cent a year. Some specialists estimate the present world population at 2½ billion. This would give, if continued, another billion in 27 years. It takes a large area of fair to good land to feed a billion people.

These conflicting trends of increasing population and decreasing area of agricultural land give cause for all countries to look searchingly into their ultimate sources of food for today and tomorrow. The United States is now growing at an estimated annual rate of about three million while our stock of arable land is decreasing by about three million acres. So we, too, must be on guard and not be deluded by temporary over production of some crops. Near some of our more densely populated centers, evidence of a scarcity of land for agricultural purposes is already gathering.

With all the know-how of our advanced agriculture, we have not yet learned how, on any substantial scale, to convert rock into productive soil for practical cultivation. Hanging satellites in space give us not one additional acre of productive soil. Increasingly, we are learning through unprecedented advances in medical science how to extend the limits of life, meaning more mouths to feed.

There is, of course, the possibility of producing synthetic food for livestock and perhaps something that people will eat. And there are various ways for increasing food production with methods not currently in wide use, such as hydroponics, fish culture in waters normally running to waste from land to sea, and the growing of tree crops on non-plowable land. But these matters of increased production are possibilities, not necessarily probabilities. Further research and experience are needed.

Our present best knowledge leads to the conclusion that productive land is our most dependable source of food and will continue to be for undeterminable time. In my judgment, complacency with respect to the security and sufficiency of our land is what we have most to fear.

Solution of the Land Problem

Solution of the land problem calls for the use of every acre of every farm and ranch throughout the nation according to the kind and needs of each parcel of land of substantial size, as nearly as this may be practicable. This is a physical requirement that cannot be overlooked if we are to have sound and enduring use of the land. And there can be no point in overlooking it, since there are almost always various safe uses to which land can be put as well as effective and practical ways for establishing its security against impoverishing erosion, overgrazing and waterlogging.

Carrying out an effective nationwide soil conservation program is not a simple matter in a large country of diversified characteristics and interests. It means with us, among many other things, that some of the land now used for cultivated crops should be turned temporarily or permanently to grass, perennial legumes or trees. It means, also, that from now on all land, whether used for crops, grazing, timber, or wildlife, must be protected from erosion, fire, flood and other soil-impoverishing influences as well as unnecessary use of high-quality farmland for non-agricultural purposes.

Let's Finish the Job on Time

Unfortunately, many millions of acres are still not being adequately protected. They are not being used according to their natural capability and are not being protected with essential conservation measures fast enough. Consequently, many millions of acres are still being permitted to decline in productivity or to be ruined for further immediate and practical cultivation. This is going on much faster in some countries than in others.

Fortunately, the margin between land deterioration and land conservation in the United States has been narrowed considerably within recent years, particularly by reason of its soil conservation work. We still are not going fast enough, however, although we have now reached the point where our goal of establishing on time a sound basis for permanent agriculture is almost in sight. By increasing our present conservation operations on the land, we can, and should, control erosion and related processes of land impairment within reasonable time. This we

can do if we work together helpfully and with confidence in one another, and are provided with the necessary facilities, chiefly adequately trained conservation technicians. Our more experienced technicians now know pretty well what the problem is, where it is, and how to solve it. Moveover, a great many farmers, and others too, understand what the problem is and the need for solving it now.

We have made a splendid start; let's complete the job. All we need now is to go ahead fast enough to do the job on a scientifically sound basis before it is too late—before we have used up or wasted too much of our limited supply of land.

If modern soil and water conservation could be pushed ahead on a world-wide basis, I am convinced that the problem of underfed people could be reduced by much more than half. This would require world-wide cooperation, instead of the existing world-wide distrust, misunderstanding and conflicting ideas. We need more research, with double emphasis on people working together as they are doing in many of the soil conservation districts.

Complexity of the Soil Conservation Job

If there is any activity of mankind that requires the most scrupulous use of all that conservation science and hydraulics can provide, it is the work of keeping our land permanently productive and making the best use of our water supply. Two actions fit together perfectly.

Around 100 soil and water conservation measures have been used in the work of the Soil Conservation Service to halt erosion, conserve water, and improve the land. Each measure is used, as the particular situation demands, to meet a definite land need or to produce a specifically desired result on the different kinds of land a farmer has. Usually, combinations of several measures are essential, used wherever necessary in mutual support of one another to obtain the most effective conservation.

Technical Assistance Needed

Records indicate that some farmers are but little more prepared to solve alone their difficult problems of erosion and water control than they are prepared to solve their legal and medical problems.

Practically all farmers need the specialized scientific assistance of experienced technicians on the ground to help solve their more complex land and water problems. Without such assistance, they cannot be expected to bring their agriculture to full fruition on their more difficult lands. With such assistance more

than a million farmers have shown that they can cope with the problems of erosion and land use.

Effective and lasting soil conservation work demands the utmost in technical excellence. A trained, experienced soil conservationist prescribes for the land in much the same manner as a physician prescribes for his patients. In a sense, Soil Conservation Service technicians are land doctors, who have learned that half-way measures and improperly applied practices not only fail to get the job done but often do more harm than good over a period of years.

Public and Individual Responsibilities

From every conceivable angle—economic, social, cultural, public health, national defense—conservation of natural resources is an objective on which all should agree. It is also a need which all should recognize and agree on. The public—our society as a whole—has a vital stake and continuing responsibility in safeguarding these resources, many of which are neither renewable nor replaceable.

Public interest in making the wisest possible use of a nation's natural resource is, in a sense, of greater importance than the individual's interest—if that is of any significance. Actually, both are tied together in such a completely complementary way, there is no point in pursuing the subject beyond indicating that no man should have the right legally or otherwise, to recklessly or willfully destroy or unnecessarily waste any resources on which public welfare is dependent. Such destruction of resources essential to life amounts, in the end, to public injury and injustice.

Productive land occupies a position of such basic importance to everybody that some individuals have come to favor public control in the use and management of land. They contend that because of man's utter dependence on the limited supply of land, the question of how land is to be used should not be left entirely to individual discretion.

Our American experience, however, has apparently developed a majority feeling to the effect that our soil conservation effort should, insofar as security permits, proceed along lines of cooperative action, without the use of compulsion at any point, at least not until there has been time for adequate education and farmer response. The present national program of soil conservation, under which the Government supplies, on request, technical assistance to soil conservation districts, has become highly effective and very popular. Its continuation is essential, in my opinion, to our best national interests.

Under state laws, many of the soil conservation districts have been given legal authority to impose land use regulations through the process of local referenda, but the authority has rarely been exercised. At this time it appears to be the feeling of the great majority of soil conservation district supervisors that many of the farmers who move slowly at first later on become the most enthusiastic and effective kind of conservationists. Accordingly, they have generally seen no need to propose the use of compulsion. Moreover, they have been impressed by the fact that nearly everywhere farmers are requesting technical help for the establishment of soil conservation practices on their lands faster than such assistance can be provided.

Some of you are not farmers and probably have no intention of becoming farmers. You may feel that soil conservation is something farmers should attend to themselves. Certainly it is something farmers should attend to. But suppose they don't attend to it quickly enough? Or suppose they don't know what to do? Who suffers?

The answer, of course is you and I suffer, along with everybody else. Therefore, each of us has a responsibility—you, myself, and all the others. And public responsibility even exceeds that of the individual, not excepting even the farmer himself. Farmers have only temporary control over their land. It can be theirs for a lifetime and no longer. The public's interest, however, goes on and on, endlessly, if nations are to endure; thus overshadowing but not replacing the individual's lifetime interest and responsibility in the stewardship of the land.

Deficiencies in the farmer's *temporary* stewardship over the land or in the public's *permanent* interest in the land are very likely to contribute to soil impoverishment. If permitted to go unchecked too long on too much land, the tendency will be to undermine national strength.

Strength through Cooperation

In this divided world our Government must be kept strong in every phase of its complex life. Every competent citizen should help with this. There can be no deserving place either for drones or those able-bodied individuals who refuse to cooperate in the national welfare. We fail ourselves, our nation, and our children's children by yielding to any other course.

We can excel in our endeavors if all of us work together in friendly and understanding cooperation. And time is the essence, along with excellence in performance, of national strength.

We are the kind of people I believe who, once we have clearly understood threatening problems of nationwide importance, are

inclined to attend to such matters with determination and vigor. In some instances, however, time and hard work have been required to develop adequate understanding.

Probably the quickest action on record followed the orbiting of Sputniks I and II. In this field it was easy for everybody to understand that Russia had taken the lead— and we Americans don't like being second-raters. Admittedly, this situation had a strong emotional twist. Paul Sears' appraisal of the situation was close to right according to my understanding. He said in an article in *Science* (Jan. 3, 1958) dealing with outer space:

"Our future security may depend less upon priority in exploring outer space than upon our wisdom in managing the space in which we live."

Accessibility Statement

This document is not accessible by screen-reader software. The U.S. Department of Agriculture is committed to making its electronic and information technologies accessible to individuals with disabilities by meeting or exceeding the requirements of Section 508 of the Rehabilitation Act (29 U.S.C. 794d), as amended in 1998. Section 508 is a federal law that requires agencies to provide individuals with disabilities equal access to electronic information and data comparable to those who do not have disabilities, unless an undue burden would be imposed on the agency. The Section 508 standards are the technical requirements and criteria that are used to measure conformance within this law. More information on Section 508 and the technical standards can be found at www.section508.gov.

If you require assistance or wish to report an issue related to the accessibility of any content on this website, please email Section508@oc.usda.gov. If applicable, please include the web address or URL and the specific problems you have encountered. You may also contact a representative from the USDA Section 508 Coordination Team.

Nondiscrimination Statement

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the

Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at http://www.ascr.usda.gov/complaint_filing_cust.html and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by:

(1) mail: U.S. Department of Agriculture
Office of the Assistant Secretary for Civil Rights
1400 Independence Avenue, SW
Washington, D.C. 20250-9410;

(2) fax: (202) 690-7442; or

(3) email: program.intake@usda.gov.

USDA is an equal opportunity provider, employer, and lender.