# WASTE BY WIND AND WATER*

It was not so long ago that enormous dust clouds were rolling out of the Middle West to drop a stifling shroud over the country from the Mississippi Valley to the Atlantic Coast. In June, raging flood waters were bringing havoc to portions of three western states. The first week of July witnessed a tornado in Montana and a cloudburst and flood in New York. Since then Ohio and Wisconsin have experienced record-breaking rains followed by flood waters, and just a short time ago a disastrous hurricane in Florida was accompanied by torrential rains as far north as Maryland. Damage was estimated at millions of dollars.

But the estimates failed to include the most permanent damage of all — *the destruction of the soil.* Houses and other properties destroyed by the raging waters can be replaced; crops swept out by prairie winds can be replanted. But the fertile soil blown high into the sky or washed by the ton into streams and rivers is lost forever. Spectacular and destructive as these storms are, and as violent and harmful as the floods have been, they do not constitute the really great menace to our soil resources.

---

* By H. H. Bennett, Chief of the Soil Conservation Service, U. S. Department of Agriculture. Reprinted from *The Scientific Monthly*, February, 1936.

The truly tremendous waste is constant. Ruination of the soil is not confined to brief periods when nature exerts the full force of her elements. It proceeds steadily wherever man's cultivation of the land has bared the soil to the wash of descending rain and the sweep of the wind. There is no way of preventing cloudbursts. We have to accept them as they come and hope they will be few and far between. All we can do is attempt to control the floods that often follow.

Dust storms are different. Where cloudbursts are the product of some strange array of nature's elements, dust storms are brought on by man's own misguided failure to protect the soil as he tills it. By simple reasoning, therefore, if he can be guided into the use of practical measures of soil conservation, the cause of the dust storms will be removed. The very nature of these storms has given rise to the popular belief that they are the beginning and the end, the fact and symbol of all soil erosion. This is not true. The gradual washing away of rich topsoil by the runoff of rainwater is far more serious because it is not only constant but wide-spread.

In the work of erosion control, we have come to divide soil erosion into three classes; namely, wind erosion, sheet erosion and gullying. I need only to recall the dust storms to define wind erosion. Sheet erosion is the washing away of a thin layer of topsoil from sloping fields. Gully erosion follows in its wake to cut deep chasms and ravines which ultimately ruin our fertile fields for cultivation. So we find our country's soil damaged by both wind and water.

Few people realize how tremendously important this land wastage problem really is and how certain it is to effect the permanent welfare of the nation. It is not generally known, for example, that approximately 50 million acres of our erstwhile fertile farm land has been essentially ruined for further practical cultivation; and that another 50 million acres is bordering on this tragic condition.

A nation-wide erosion survey, conducted last year by the Soil Conservation Service, revealed that the extent of damage and ruin to basic farmland far exceeds all prior estimates, and that the 100 million acres so severely impoverished or ruined do not tell the

whole sad story. Something like 125 million additional acres, still largely in cultivation, have lost all, or the greater part of their most productive topsoil, with a direct decrease in crop yields that is appalling.

And here, for a moment, I should like to discuss the philosophy which underlies our objective of soil conservation. Right now, as every one knows, agriculture in this country is facing an economic crisis brought on by an accumulation of circumstances in which overproduction had a leading rôle. Few people realize, however, that agriculture also faces a physical crisis of tremendous importance to the continuing welfare of this nation.

The remedy for the economic problems which confront the farmer must necessarily be of an economic character. It is, of course, necessary to adjust the total production to the total effective demand. Certainly there is no virtue in producing so much that the price drops to a point which is less than the cost of production. It is never advisable, it can never be wise, to sacrifice productivity. There is nothing incompatible or inconsistent between adjustment of production and conservation of natural resources. For the entire agricultural structure, after all, depends fundamentally upon the physical integrity of the soil. If that physical integrity is depleted at a rate which will see our entire cultivated acreage virtually non-productive in half-a-century, there is no alternative for conservation. In other words, while we find it essential to control production, we must at the same time exert every effort to lower production costs, widen markets, improve quality of products and — this is what I wish to stress — maintain our basic resource, the soil. There is a danger, when the country is confronted simultaneously with agricultural crises of an economic and a physical nature, that this distinction may be obscured.

We likewise should remember that thousands of farmers have suffered continuous losses in revenue and are now fighting a losing battle against the poverty which is at least partially the result of extravagant, careless land use, as well as of price declines and maladjustments of the economic balance. If the farmland already ravished and ruined by soil erosion should be divided into 80-acre

farms, and restored to its former productiveness, it would be physically capable of supporting no less than 1,250,000 families!

Soil erosion is a serious problem in every one of the 48 states. Naturally, in some states it is more acute than in others. Nebraska, for example, has been affected considerably more than Delaware. Erosion is more prevalent in Texas than it is in Vermont.

Yet we have learned from sad experience that a state comparatively free from erosion this year may be seriously menaced within a decade unless proper care is taken to conserve the soil. Who would have predicted, back in 1925, that the entire Midwest would be so severely hit by dust storms in 1935? Who would care to predict what will happen in 1945 unless measures to protect the soil are taken at once? As can readily be understood, this is a national problem, which must be met on a national scale. The problem has gone beyond the local stage. It is no longer the concern of the individual farmer whether his land is washed or blown away. The very basis of America's future farming prosperity is at stake and that stake is too high for any but the most profound of considerations. Active leadership by state and federal governments is essential.

So the Soil Conservation Service, one of the youngest of established Federal Service agencies, has been assigned the job of saving our remaining area of good farmland from destructive erosion. It is a sizable commission, but we are moving ahead. The Service proposes to promote farm practices that will protect and conserve the farming lands of the country for permanent agricultural use. Certainly there can be no broad advance or strengthening in the individual farm position; or in upbuilding farm communities, until the land involved is stabilized in relation to soil erosion. In different words, the betterment of economic and social aspects of farm life is closely linked to the solution of the erosion problem.

If the Soil Conservation Service can initiate erosion-control measures on all seriously eroding lands within the next 10 years; if it can secure reasonable control of erosion within the next 20 years; and if it can establish preventive measures on practically all the better lands of the country within the next generation, it will have gone a long way towards the solution of the problem. Although the

Service has been in existence less than two years, it has already brought an area of approximately 40 million acres under its influence. Plans for expansion will more than double this area at an early date.

We appreciate the gigantic proportions of the task in front of us and are approaching it in all humility. We realize that the job can never be completed successfully without the concerted action, the consistent support and the creative co-operation of the whole people. For, after all, it is primarily and fundamentally a problem of the whole people. The task of conserving the soil is so vast and erosion has already made such headway that the Service could not possibly hope to treat all the land of the country, acre by acre, with necessary measures of erosion control. The job must be done through co-operation between federal and state agencies on the one hand and the farmers and landowners on the other.

The procedure adopted at the outset is one of demonstration. In this way the Service is able to carry its program to the greatest number of farmers with the least expenditure of time and money. As any thinking man will realize, the work of soil conservation must be carried on as economically and quickly as possible.

So, by demonstration, the Service is attempting to show that the impoverishment and destruction of our remaining areas of good agricultural land can be curbed to a very large degree. At the same time it is laying the foundation for a permanent national erosion control program of scope sufficiently broad to meet the acute land crisis created by wasteful methods of land utilization.

As a step towards its goal, the Service has established, or is in the process of establishing, 141 demonstration projects in 41 states, with the average working area for each project limited to approximately 25,000 acres.

Usually a demonstration project comprises all the land within a watershed; that is, all the land lying within the drainage basin of a given stream. Each project area is selected with the most careful consideration of its adaptability to an effective demonstration and its availability for inspection by a large number of farmers. In other words, a project area must be readily accessible to a great number of farmers and it must present erosion problems that are representative

of the entire surrounding countryside. If water erosion is prevalent in the region, the project area must present opportunities to demonstrate how water erosion can be halted. If gullies are numerous around the countryside, work on the project must show how gullies can be controlled.

The farmers of a project area enter into contracts with the government, whereby they agree to operate their farms under guidance of the Soil Conservation Service, to furnish as much labor and material as possible to put the program under way, and to maintain for a five-year period the cropping plans and erosion control structures installed by the Service. In return, the Service agrees to lay out a complete erosion control program for each farm, supervise the work and furnish whatever supplementary labor and material is needed to do a complete job.

Once the Service has placed its control measures in operation, the farmers in the surrounding territory are invited to visit the project and inspect the methods being used. It is hoped in this way to show them just how they themselves can control erosion on their own farms. A demonstration project is in fact a show window.

Today more than 10,000 farmers have signed formal co-operative contracts, agreeing to carry out for a period of five years the control measures recommended by the erosion specialists as most adaptable to the needs of their lands. Yet the problem of soil erosion extends even further. In addition to the enormous loss incurred by abandoned acres, reduced crops yields and decreased fertility, the country is paying a heavy price for damage to its power and water supply reservoirs, its irrigation systems and its harbors and waterways.

Soil that is valuable on a farm is a menace when it begins to fill up our reservoirs and waterways. The soil washed from farms eventually empties into streams and rivers. Channels that have been deep have become shallow. Unable to hold the volume of water within its banks the river grows wider and wider, over-running its former boundaries. The possibilities of floods are greatly increased.

Frequently the silt washed from farm lands comes to rest in the bottom of a reservoir. Little by little the reservoir fills up. The capacity is decreased. Millions of invested dollars in the reservoirs are endangered. Social and economic values dependent upon the reservoirs are jeopardized.

The control of erosion is essentially a matter of better land use. It means that we must be more careful — much more careful — of the type of crops we plant, where we plant them and how often we plant them. It means that the day of unintelligent farming is past, just as surely as the day of farming by superstition is past. We have progressed beyond the stage where farmers plant their crops only during certain phases of the moon and harvest accordingly. Farming today must be as efficient as a city industry.

The program of the Soil Conservation Service aims primarily at the establishment of agriculture on precisely such a basis of efficiency. Adoption of the program does not mean that production will be impaired. On the contrary, we have already proven that protection of the soil is compatible with production. Our objective is merely to readjust agricultural practice to the needs of the soil.

The realization of that objective is far off. Years of tradition have dictated the farm practices now employed in many of our major agricultural regions. We should be tilting at windmills were we to attempt an overnight rearrangement of these practices, though, to be sure, we have accomplished almost that in several localities. We must proceed carefully, slowly and thoroughly to convince the farmer that our way is better than the way his father taught him. We must strive to inculcate in his mind a faith in our methods as strong as the faith that links him to the soil. We must instil into the farmers of America that almost reverent attachment for the land which has preserved the agriculture of certain smaller agricultural countries through the centuries.

Ours, certainly, is a goal fully worth the striving. For its attainment will mean that our children, and their children, and their children after them, in truth, "will inherit the earth."