CLASSIFICATION OF ILLINOIS LANDS

BY

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"The shock of the depression has at last awakened us to a new attitude. We no longer regard land as land alone; we regard it as one of the central and controlling elements in our whole national economy. More than that, we realize that upon the manner and character of its use may depend the welfare, not only of our descendents, but of ourselves."—Rexford G. Tugwell, Assistant Secretary of Agriculture.

The widespread interest in land use noted by Doctor Tugwell and the more recently developed agitation for planned land use and removal of less productive lands from production has focussed attention upon the need for land classification.

The approach to the problems of land classification varies somewhat with the training and experience of the one proposing classification. It is proposed in this paper that any classification of land for the purposes of land use should be based on the adaptation, producing capacity, and the capacity for response to fertilizer treatment of the soils making up what we commonly speak of as the land.

Land, as we use the term, comprises the layer of unconsolidated material which more or less continuously mantles the earth's surface and which varies in its adaptation, in its capacity to produce plants, and in its capacity to respond to treatments designed to increase the quantity, or quality of its products or to change its natural adaptation.

If this concept is sound it follows that land is not the same thruout its extent and that, therefore, it must be divided into units of some sort if it is to be understood. The kind of unit will depend on the purpose for which the division is made.

Our task then in developing a land classification seems to involve the creation of soil units. After the creation of these soil units, it is necessary to become familiar with the properties of each unit and then to combine the units into groups which will satisfy our requirements. This sounds simple enough but difficulties arise which only time and an immense amount of work can iron out. One of the chief sources of difficulty is that the soil units must be established and grouped or classified before they have been sufficiently studied and therefore, mistakes are

made and revision of earlier work is constantly called for. In short, the classification of soils is an evolutionary process and as knowledge increases changes become imperative and confusion is likely to accompany change. This situation is not peculiar to soil science, but I understand, troubles the botanist, the zoologist, the chemist, the physicist, and probably the workers in every field of knowledge.

I assume that we are interested in the classification of land in Illinois from the standpoint of its use. The use of land is influenced by other factors in addition to those having to do with the character of the soils which make up the land. Economic and social factors cannot be neglected, however, many of these factors are intangible and changeable and some of them may lack the significance ascribed to them by the specialists in the respective fields. It seems that there is need for a clear-cut analysis of the economic and social factors, presumably involved in land use, as to their significance and stability. It is only in this way that we can avoid beclouding the picture by our failure to distinguish between significant factors and those which lack significance and between those which are relatively stable and those which are so unstable as to be incapable of evaluation.

With this brief mention of the factors involved in land classification, other than soil factors, we will pass at once to the soil factors.

Soil units or soil individuals, often called soil types, have come into being because each soil is the product of the environment under which it was developed and environments differ within very short distances. The environmental factors are parent material, atmospheric climate, native vegetation, topography and underdrainage.

The parent materials of the soils in Illinois are almost entirely glacial in origin. Large areas in the state are blanketed by a wind-blown deposit known as loess which is of glacial origin. The loess varies in thickness from a mere film in the east central and northeastern parts of the state to many feet in thickness adjacent to the Illinois, Mississippi, Ohio, and Wabash rivers. It varies in geological age from Sangamon to post-Wisconsin. These variations in thickness and in age are potent causes of differences in the soils developed from the loess. In the east-central and northeastern parts of the state where the glacial drift is the parent material of the soils of the region, the character of the drift becomes of great importance. The drift in certain sections of this region is highly impervious resulting in shallow, relatively poor soils. In other localities in the same region it is excessively gravelly and stony. Soils developed from drift of this character are likely to be droughty. A third type of drift contains enough sand, gravel, and pebbles to insure sufficient permeability to water and plant roots and yet not enough to be objectionable. Soils developed from this type of drift rank well in agricultural value.

Alluvial sediments deposited in bottom lands, terraces, and outwash plains cover a large total area in the state and comprise a third parent material of significance in influencing soil character.

Climate, the second factor mentioned as important in influencing soil character, is relatively less important in a single state than in a large region. However, in Illinois the rainfall varies from about 35 inches in the extreme north to 43 inches in the extreme south and the growing season varies from about 150 days in the extreme north to 190 in the south. Differences in rainfall and temperature of this magnitude operating through long periods of time are reflected in easily recognizable soil differences of great importance in land use.

Native vegetation, the third factor mentioned, is recognized as having important relationships to soil character. In a humid, temperate climate, forest growth always results in organic matter and nitrogen depletion and in accelerated weathering. Forest soils are, therefore, recognized to be inferior to grass land soils in producing capacity and in lasting qualities.

Topography, the fourth factor mentioned, is of primary importance in influencing soil character because of its relation to rate of removal of soil material by erosion and to the development of an impervious clay pan subsoil. Slopes in Illinois in excess of about 3 per cent are subject to injurious erosion. The severity of erosion increases rapidly with increase in slope though there is no universal correlation between severity of erosion and per cent slope because of variation in resistance to erosion shown by different soils. No force is now more active in destroying the soils of Illinois than erosion.

Underdrainage, the fifth and last factor mentioned has had far reaching influence in determining the character of our soils. Excessively slow natural underdrainage has given us impervious clay pan subsoils while excessively rapid natural underdrainage has given us leachy, droughty soils. The recognition of these two conditions is essential in land use studies.

One other factor, that of age or stage of development, should not be overlooked in considering our soils from the standpoint of use. Soils developed in a humid, temperate climate are doomed to depletion because the predominant movement of water is downward carrying with it the loosely held plant nutrients. It is for this reason that in evaluating soils for use purposes, their age or stage of development is an important consideration. With the elapse of time, Illinois soils formed on nearly level surfaces develop an impervious clay pan and soils developed on rolling surfaces become leached and if sufficiently rolling are destroyed by erosion. This is a gloomy picture and it should be said that much can be done to retard these processes. It remains true, however, that soils pass

through a life cycle just as certainly as does a human being and that in our environment the ultimate end of all soils is decreased producing capacity.

An effort has been made in the foregoing to point out the necessity for recognizing and dealing with soil individuals when thinking of land use. The farmer does not till the soils of a county or of a township but rather the soils on a farm. To use his soil or soils to the best advantage he must recognize the capacity and characteristics of each soil with which he is dealing.

There are in Illinois something over two hundred soil types now recognized. These soils have been rated in a scale of from one to ten based on producing capacity. In this scale soils rated one are the highest producers and those rated ten are the lowest. This rating constitutes a soil classification based on producing capacity. With it soil maps showing any desired degree of detail can be constructed provided detailed soil maps are available which show the soil types rated.

Several state maps which may be considered land use maps have been constructed. None of these maps make use of the capacity for production rating and therefore, can serve only as guides to regions where certain types of farming or land use may be feasible. The first of these state maps was constructed in 1927, revised in 1929, and is now in need of a second revision. This map shows the soils of the state in 16 groups and while the capacity for production rating is not shown on the map it can easily be applied to it. A second map classifies the state on the basis of the severity of erosion. It will be noted that 9 per cent of the state is subject to destructive erosion and is suitable only for timber, that 8.5 per cent is subject to severe erosion and is suitable only for timber, permanent pasture or orchard, that 36.0 per cent is subject to harmful erosion but is general crop land and that 46.5 per cent is not subject to erosion if farmed intelligently. A third map has recently been constructed for the State Planning Commission, and it will be noted that this map is based on adaptation with little attention being given to relative producing capacity. This map shows that 65.5 per cent of the state is adapted to general farming, 11.5 per cent to pasture or orchard, 10.4 per cent to red top, pasture or meadow and 12.6 per cent to timber only.

Further progress in making available in the form of a state map the large amount of information contained on the detailed county soil maps will involve making use of the capacity to produce rating as well as the adaptation of the various soil types. By grouping the soil types a strictly land use map can be constructed which, if supplemented by the county soil maps, will serve a useful purpose as a guide for individuals in the use of land and as a basis upon which state and Federal agencies can build comprehensive and long-time plans for land use.