LAND-USE PROBLEMS
IN NEBRASKA

By G. E. CONDRA

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As defined by law, the Conservation and Survey Division of the University includes the following state departments and surveys: Soil, Geological, Water, Biological, Industrial, Conservation, and Information Service. Its major purpose is to study and describe the state's resources and industries for use in development. Reports of the Division are published in three series i.e., those of the Nebraska Soil Survey, Nebraska Geological Survey, and the Conservation Department.
Land-Use Problems in Nebraska*

by G. E. Conrad

Have we used our land wisely? Have we impoverished some of it beyond recovery? Have we understood the fundamental principles in land-use, and can these principles be formulated for use in the future development of the state? These questions are involved in the subject at hand.

Land Resources.—The area of Nebraska as given by the U. S. Geological Survey is about 77,510 square miles or 49,606,000 acres. However, a careful study made by the State Geological Survey shows it to be about 77,300 square miles, of which 495 square miles is river surface, 163 square miles is lake and reservoir surface, and 230 square miles is occupied at times by intermittent lakes. The mean water surface is about 650 square miles; the minimum during drought is about 300 square miles, and the maximum, not including river floods, is about 890 square miles.

The leading land resources of Nebraska are soil and groundwater, but stone, sand, gravel, and clay have considerable importance. Thin beds of coal occur in the southeastern counties. There are some oil and gas possibilities. We have some potash, salt, gypsum, and volcanic ash, but only traces of gold, iron, zinc, and lead have been found, and there probably can be no important production of them in our state.

Uses of Land.—Coal is mined at Dunbar; stone is quarried at a number of places; clay is produced for the manufacture of brick and tile, and the sand and gravel output of the many pits and pumping stations has an annual value of about $2,000,000. Our coal resources are too limited for more than local production, and it remains to be seen whether the state has oil and gas in commercial quantities.

A relatively large acreage of our land is cultivated to corn, wheat, alfalfa, and other crops. About the same amount of it is native grass land used for grazing and hay production, and nearly three per cent of the total area is occupied by natural and planted forest.

More of Nebraska than is generally supposed is occupied by public roads, railroads, airports, stock yards, farmsteads.

* Reprint from the 1934 Nebraska Blue Book with some modifications and additions.
improvements, agricultural experiment stations, municipalities, parks, recreation centers, fish hatcheries, game preserves, playgrounds, athletic fields, churches, cemeteries, schools, state institutions, county fairs, forts and rifle ranges, industries, and irrigation works.

Land Ownership.—The Nebraska Indians held the land collectively. The natural products of the land and of the streams and lakes became their necessities of life. We, who followed the Indians, have operated on a different basis. Our purpose at the beginning was to settle and develop the country under the private ownership of land.

The Federal Government sectioned the public domain prior to its settlement, but made no investigations of the land resources or of the favorable and unfavorable conditions under which they occur. A scramble for land followed, and with the exception of certain reservations, the land passed to private ownership. Both success and failure followed as might have been expected under the diverse conditions.

Twice, the state has experienced severe drought—one in 1894 and the other in 1899. The droughts gave rise to slumps, and the owners of land found it difficult to sell. Following the year 1894, much land in the western part of the state was abandoned and sold for back taxes. Now, tax delinquency is general in the state, but apparently little of the land will be sold for taxes.

The Pre-Emption Act, Free Homestead Act, Tree-Claim Act, Railroad Grants, and the Kinkaid Act, by which the public domain was opened for settlement, proved effective in transferring the domain to private ownership, but not so successful in some ways as might have been expected. The promotion of colonization was also helpful in the main, but was wrongly directed in some areas.

It seems now that the lands of the state were placed under cultivation too generally and with too little regard for the soils and the climatic conditions under which they occur. However, certain results—good and bad—have been obtained, valuable lessons have been learned, and our land policy has changed markedly the past few years.

Only 20,536 acres of scattered tracts of the public domain remain unrounded in Nebraska. The state now owns 1,601,548 acres of school land, also a number of small parks, experiment stations, recreational centers, and fish hatchery areas. The Federal Government's largest tracts are forest reserves and wild life preserves.

Very little land has come into possession of the counties and the state through tax delinquency. Our land is largely privately owned. Some of it has been foreclosed by loan companies, and the Federal Government is buying land for a number of subsistence homesteads and has refinanced farm loans to the extent of more than $190,000,000 in Nebraska within the past two years. It is apparent in this latter connection that drouth and other unfortunate circumstances might cause the return of a considerable acreage of this land to government ownership. At any rate, the trend within recent years has been towards the collective ownership and use of land. The Government gave the land to settlers and is now buying it back for public use.

Costly Experience.—It was natural for the settlers to do as they did with the land, i.e., destroy too much of the original prairie and deplete the soil resources. They wanted to establish homes. It seemed to them that the land resources were inexhaustible, and that land values would advance, making them financially independent.

The tax rate on land has increased until recently; the mortgaged indebtedness has also increased; and the farm revenue and land value have declined. A considerable amount of land is now in distress, and some of it is slipping from cultivation. The people of the state now know from experience, that not all of our land is suited to cultivation, and that the best of it varies greatly in its adaptability for cropping. They know also that the ownership of land is inferior to the right of the state to tax land for the support of public agencies, and that there is no virtue or benefit in simply owning land under present conditions.

The wrong use of land has impoverished the soil and the people in some cases. It has developed a serious situation in our state, but not to the extent found in certain other states.
CONSERVATION AND SURVEY

Some land is now out of production, and we face the problem of adjusting the tax delinquency, the tax schedule, and the agricultural procedure.

Marginal Land.—In some quarters much is said about marginal and submarginal lands, and what to do with them, yet it appears to the writer that a better way to approach the subject would be on a basis of what the lands are like, and what use can and should be made of them. From this angle, there is no submarginal land in our state, because all of it can be used in some manner, private or public. We have misused our land and must work out a plan of recovery.

The main problem in the low class and impoverished lands relates to their utilization. The trend will be for them to pass into large private and corporate holdings for sale at some opportune time in the future. It is urged by many persons that the Federal Government should purchase the low grade land for forestation, game preserves, etc. Unfortunately, however, the lands in distress in some states are not well suited for such public purposes.

Survey and Inventory.—The land resources of our state are being studied closely by the Geological, Soil and Water Survey departments of the Conservation and Survey Division. The data obtained by these surveys are indispensable in the study, classification, and mapping of land-use.

Fortunately the Soil Survey has covered most of Nebraska, and good base maps are available for further study. A large, preliminary land-use map has been made of the state, and a more detailed map is being compiled, which will be the first of its kind in the United States. This map and a bulletin on land utilization are to be published by the Conservation and Survey Division in cooperation with the College of Agriculture. These will give a detailed inventory of our land resources and should be of use in the adjustment of land taxation and the erection of a land-use program for the state.

Experiment Station Work.—The College of Agriculture of the University of Nebraska, in cooperation with the United States Department of Agriculture, performs a notable investigational service in the development of crops suited to the various regions of Nebraska. The success attained with wheat, alfalfa, and corn are well known, and the studies relating to other rural enterprises are also recognized because of their contribution to the standardization of agricultural procedure. All of the agricultural experimental work done at Lincoln, North Platte, Scottsbluff, Alliance, Valentine, and Union has a relation to the best use that can be made of our agricultural lands.

Extension Service.—Based on the results of survey, research, and experimentation, the College of Agriculture leads in a program of extension service in the agricultural development of Nebraska. This service emphasizes soil conservation and the cropping systems that should be followed in the various areas of the state. It is the contact agency in agricultural education.

The fundamental surveys and investigations relating to land conservation are functioning effectively in Nebraska. The brief statements following show the leading conditions and features that influence the use of our agricultural lands.

Rainfall.—The amount of rainfall is an important factor in the agricultural use of land, yet it is sometimes overestimated or not fully evaluated. When the rainfall occurs during the year, and what becomes of it, whether stored in the soil or lost by run-off, are also influencing factors. The steep slopes of the hard lands shed their rainfall, thus adding water to the colluvial slopes, terraces, and bottom lands below them. This shows the unequal effect of rainfall on adjacent areas.

The state has three poorly defined climatic belts—humid, sub-humid, and arid. The condition of the native vegetation of these belts shows the relation that obtains between the rainfall, temperature, and soil moisture, and also indicates to some extent what might be accomplished in agricultural development without reclamation. As noted before, the amount of rainfall does not alone determine the agricultural possibilities of the state.

Drouthy Soil.—Some of our soils store relatively little rainfall and are said to be drouthy, because of the relatively small amount of moisture they retain for plant growth. The very
open-textured types without claypan drain the rainfall downward beyond the reach of plant roots. The fine textured (clayey), thin soils on some of our hilly lands cause much of the rainfall to run-off at once and pass relatively little of it into soil storage. The soils with these types of drainage are droughty, especially where the rainfall is light, and are agriculturally defective.

Well Water Supply.—There are certain areas of Nebraska, but not so large as in some states, where the well water supply is inadequate for domestic purposes. This condition affects adversely the value of land and must be taken into account in planning land-use. Some of our leading economists have entirely overlooked the value of water supply in land use.

Reclamation.—The three principal forms of land reclamation in Nebraska are irrigation, drainage, and forestation. They change the use of land in ways well known to all. A total area of 675,000 acres of dry land of the state has been placed under canal irrigation. Large tracts are irrigated from wells, and a much larger area is sub-irrigated.

Drainage has been installed in most of the principal valleys of the humid areas to reduce marshes and floods and to add to the farm land. The bad effects of drainage are evidenced in places during periods of drought.

Tree planting has been carried on in a small way on many farms and ranches mainly for woodlot and wind break purposes. It has been done by municipalities in park improvement, by the state in the development of recreation centers, and by the Federal Government in the forestation of sandhill lands. The change is from prairie or farm land to trees and forest. An area of about 20,000 acres has been forested in the Sandhill Region.

Shelter Belt.—The Federal Government proposes to plant a timber belt from Canada to Mexico, passing through west-central Nebraska. The original purpose of this project was to increase the rainfall and to prevent drouth in the area east of the belt. However, a few persons, who have studied the subject, claim that this major purpose is not well founded, but that the trees would have some effect on winds and temperature, and thus modify the local climate. They emphasize the fact that trees require much water for growth.

Those who have been selected to guide the development of the shelter belt project face a difficult job. The belt crosses a sub-humid area and soil regions differing greatly in their adaptability for tree growth. The failure of trees in this general area has been marked, due to a lack of moisture, especially during drouth periods. It will be necessary, therefore, to select trees adapted to a variety of conditions.

The directors of this work have had extensive, technical experience in forestation. Several of them are former Nebraskans, graduates of the University of Nebraska. They are confident that the project can be carried out with beneficial results.

The plantings are to be made as disconnected strips and not as a solid belt. Lands are to be leased or purchased, and the forest is to be planted and operated by the Federal Government. The project will remove land from local and state taxation and change its use from grazing and farming to forestation. Whether the project will be worth the cost cannot be adjudged at this time. It will demonstrate what can be accomplished with trees in climatic control and will afford employment for many needy persons. Evidently, all Nebraskans should hold a friendly interest in this undertaking and hope that it may prove to be as effective as claimed by its promoters.

Mineral Land.—The term mineral as here used refers to stone, clay, sand, and gravel. There is considerable wastage in our production of those materials. Stone and clay occur as related beds at most quarries, where the latter material usually goes to the dumps as discard. From the viewpoint of the state, the clay should not be wasted in this fashion. Again, in stone quarrying for riprap and revetment along the Missouri, all pieces of rock under a certain size are discarded regardless of the quality of stone. This also sends much useful material to the dumps along with the quarry overburden.

A few years ago the State Geological Survey worked out a
method for mining stone from the heavy lime stones that outcrop along the Platte Valley in the vicinity of Louisville. This method has been used, with the result that most of the rock is now mined without wastage, and the mining can be carried far back into the upland. There is no overburden to be removed, and operation can be carried on irrespective of weather and season. Furthermore, a better grade of stone is produced by mining than by open quarrying along the weathered outcrop.

Our commercial sand production results in the wastage of much fine sand and in the making of unsightly dumps, but it does give lakes for bathing, boating, and fishing. In sand production, the agricultural land gives way to mineral production and finally to recreational purposes. There are about 100 rather large lakes in the state where formerly was farm land. There are no statutes in Nebraska regulating the conservation of stone, clay, and sand.

The state’s mineral lands include several hundred acres of workable stone and several thousand acres of sand and gravel. These deposits are adequate to supply the needs of the state for many years. They are being studied very closely by the State Geological Survey.

Urban Land.—Most of our towns have come into existence without plan. Many of them are shrinking in population, area, and trade, due primarily to their failure to compete with places better located with respect to transportation facilities and natural advantages. The larger places are being zoned and otherwise planned on a basis of local needs, and the services that should be extended to their trade areas. Transportation systems, parks and play grounds, water supply and lighting, property uses, public buildings, and health, educational, social, and industrial activities are considered.

The total area occupied by the incorporated towns and cities of the state is about 226 square miles. The lands and the improvements in most small towns are shrinking in value and use. This presents a problem in land utilization.

The agricultural lands adjacent to them have prospective value for municipal purposes but their taxation is too high, with few exceptions, to be paid from the farm income. Apparently, municipal planning should be made an integral part of county, regional, and state planning to remedy this condition.

**TABLE SHOWING THE AMOUNT OF LAND PUBLICLY OWNED OR USED FOR PUBLIC PURPOSES IN NEBRASKA**

(1) School land, state-owned..........................1,601,548 acres
(2) Public roads, rural..................................750,000 "
(3) Railroads, rural right-of-way........................78,611 "
(4) Airports ..................................................5,000 "
(5) Schools, rural............................................2,448 "
(6) Cemeteries, rural.........................................6,306 "
(7) Church yards, rural......................................600 "
(8) County fairs (82)........................................2,287 "
(9) State Fair..................................................287 "
(10) University of Nebraska..................................5,666 "
(11) Main Campus, Lincoln.................................56 acres
(12) Agricultural College, Lincoln......................320 "
(13) Havelock Farm, Lincoln................................461 "
(14) Fruit Farm, Union........................................80 "
(15) Medical College, Omaha................................16 "
(16) Valentine Experiment Station.........................1,133 "
(17) Scottsbluff Experiment Station.......................1,120 "
(18) North Platte Exp. Station..............................1,920 "
(19) Curtis School of Agriculture..........................400 "
(20) Alliance Potato Experiment Farm, leased............160 "
11. State Teachers Colleges.................................364.5 acres:
(1) Peru .....................................................60 acres
(2) Wayne ...................................................59 "
(3) Kearney ..................................................32.5 "
(4) Chadron ..................................................213 "
12. Other State Institutions.................................4,792.34 acres:
(1) Soldiers’ and Sailors’ Home, Milford.................41 acres
(2) Soldiers’ and Sailors’ Home, Grand Island............640 "
(3) Hospital for Insane, Norfolk..........................615 "
(4) Hospital for Insane, (Ingle-
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<thead>
<tr>
<th>Land-Use Problems in Nebraska</th>
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<tbody>
<tr>
<td>(2) Stolley State Park, Grand Island</td>
<td>43</td>
</tr>
<tr>
<td>(3) Victoria Springs State Park, Custer County</td>
<td>60</td>
</tr>
<tr>
<td>(4) Chadron State Park, Dawes County</td>
<td>800</td>
</tr>
<tr>
<td>(5) Fort Kearny, southeast of Kearney</td>
<td>80</td>
</tr>
</tbody>
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17. State Game Preserves: 1,800 acres

18. U.S. Game Preserves: 16,360 acres

19. State Fish Hatcheries: 680 acres

20. U.S. Fish Hatchery, Crawford, on Fort Robinson land.

21. U.S. Forest Reserves: 205,384 acres

Note: The foregoing table does not give the area occupied by post offices, county poor farms, court houses, town and city schools, public libraries, streets, municipal hospitals, municipal parks, public water works, etc. Nor does it show the area of the Indian Reservations on which about 7,403 acres are allotted. As noted before, only 20,536 acres of undesirable public domain remain unallotted in Nebraska.

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*Land is being purchased for this preserve the area of which is to be 60,000 acres or more.
Figure I accompanying this paper shows the fourteen topographic regions of the state to which reference is made in the following brief review of the types of land and the conditions that present agricultural land problems in our state.

1. Pierre Shale Land.—An area of about 600 square miles of this type of land occurs in the northwestern part of the state. Its surface is hilly, and the soil is clayey, thin, and dry, due to the low rainfall, rapid runoff, and the low rate of soak-in from the rainfall. The ground water supply is scanty.

A considerable amount of this region has been cultivated but nearly all of it is now in native sod or is idle. Most of the people have moved out, because of drought and a lack of water supply.

It seems that this region and small tracts like it in other parts of the state are destined to be largely given over to grazing, and that the ranches should be re-aligned with respect to sources of water supply.

2. Idle Tableland.—Certain smooth to hilly areas on the tablelands where the soil is sandy and dry, or where it is thin, have failed under cultivation. They are now idle and should be revegetated to grass. It takes about 25 or 30 years by nature's processes to develop a sod, which means that a man-made method should be used to restore the grass cover within a shorter time. About 1,400,000 acres of the tableland regions of Nebraska should be revegetated for grazing. How and by whom this is to be done is a problem.

3. Rough Stony Land.—About 760,000 acres of Nebraska is too stony and rough for farming. Its soil cover is thin and discontinuous. The land supports some grass, shrubby plant growth, and thin to thick stands of yellow pine and red cedar.

Land of this kind occurs at the borders of Pine Ridge, Box Butte Tableland, Cheyenne Tableland, along the Niobrara, and in Wild Cat Ridge. Parts of it are scenic. Thus far it has been used chiefly for grazing, with some return from the forest. It seems that much of this land might be forested under a State or Federal program.

4. Bluff Land.—The steep valley-sides, as at Omaha, Blair, Fremont, Plattsmouth, and Nebraska City, are called bluffs.

This land is largely covered with native grass and forest. Small tracts of it are cultivated to fruit, alfalfa, and grain crops with the consequent hazardous soil erosion.

Experience has shown that the bluff lands should not be plowed except where the land is terraced and used for some special purpose as for vineyards. It has also shown that the forest is not used very economically, but that it has public importance in connection with soil erosion prevention, the regulation of runoff, and recreationally. Nebraska City and Omaha have utilized the scenic and recreational features of the bluff lands quite favorably, but no policy has been accepted generally for the utilization of our bluff land.

5. Sandhill Land.—About two-thirds or more of the Sandhill Region and its outliers is occupied by grass-covered sandhills proper, and the rest is level to rolling plain, hay flats, basins, marshes, or lakes. The Kinkaiders plowed too much of the sandy ground and allowed it to be damaged by wind erosion. Since then, however, and until the over-grazing of this year (1934), the grass cover has become more uniform, and wind erosion has become less active.

Some of the hay lands of this region and certain lakes and marshes were drained during wet years, which lowered the water table and reduced the yield of hay, especially during dry periods. It is generally known now, however, that drainage was done too generally in the Sandhill Region.

Some of the ranchmen have, by conservative grazing and by seeding the meadows (on the sod) to blue grass, white clover, or alsike clover, increased the quality of grass and hay and thus increased the grazing capacity of the land. The main problem in much of the sandhill country is the improvement of the grasses.

The tree planting at the U. S. Forest Reserve at Halsey is done to demonstrate that trees can be grown on sandhill land. The Bessey nursery of this reserve supplies tree stock to the ranchmen to beautify their homes, and to afford shade and shelter. It is not the purpose, however, to grow forest for industrial purposes.

There are several State Recreation centers in the Sandhills, also Federal game preserves. The lakes afford fishing
and duck shooting in season. The region is a great ground water storage area, which supplies a uniform flow to several of our important rivers.

The sandhill country is well suited to cattle raising because of its healthful climate, good water supply, and abundant grass for pastures and hay. Apparently, it should be developed primarily for cattle raising and secondarily for game preservation, fishing, forestation, hunting, and recreation.

6. Irrigation Land.—Some of the land placed under irrigation in Nebraska is in distress because of a lack of water, and some of it is not well suited to irrigation because of rough topography and unfavorable soils. This means that all such land should be re-classified with the purpose of striking out the undesirable acreage. The general purpose in the close classification of irrigable land is to make certain its adaptability for this form of reclamation and to make the use of available water as effective as possible without wastage.

The Conservation and Survey Division has re-classified the land of one of the largest irrigation districts of the state and plans to extend this work generally in the state. It has also reported upon the land of the irrigation projects seeking Federal aid for their development.

Over-use of water in irrigation has caused heavy seepage along the edges of the bench lands in Scotts Bluff and Morrill counties, and the water evaporating from the seepage places here has deposited alkali in and on the soil in such amounts as to change the character of the soil. Similarly, alkali has accumulated to shallow depths in basins and valleys at other points in the state.

The best way to control alkali is to prevent its accumulation, as by drainage. The alkali can be corrected in some places by the use of fertilizers of the right composition. The deterioration of land by seepage and the accumulation of alkali in the soil are problems in parts of Nebraska.

7. Flood Land.—At times the runoff from the rainfall accumulates excessively in depressional areas and upon the low-lying bottom lands, causing damage and loss of life. These floods have influenced the location of railroads, public roads, towns, and the agricultural use of land. They have been reduced by drainage, but we fail to recognize the flood hazard during dry years when water is most needed.

A combined area of about 230 square miles on the upland plains and table-lands of the state is occupied by small depressional areas in which the rainfall accumulates as lakes. These lakes soon disappear by evaporation and percolation, yet they have some importance in duck shooting. Their beds and borders afford some grazing and native hay. Few of these depressional areas can be drained.

Although much of the flood land of the valleys of our state is occupied by fertile soils and is used generally for farming, the occasional floods destroy the cultivated crops, but with it all, the average yields are relatively high, especially during the dry years. Native grass for pastureage and hay gives the surest return from the sandy flood lands and probably should be conserved.

The flood lands of the state present a problem, and a comprehensive program for their best utilization should be determined. This must take into account the nature of the soils and measures of flood control.

8. Drouth Hazard.—The effects of the severe drouth of 1934 are known. They fill our minds with an ugly landscape and misgivings regarding the future of the state, but we should know that this is the third hazardous drouth in the history of Nebraska and near-by states.

Drouths test the land-use that is developed during humid years, and since they probably will recur at rather regular periods, we should recognize drouth as a hazard to be reckoned with in long-time planning. In the past, Nebraskans over-estimated the value of certain lands during wet periods when the agricultural production was high, and under-valued such land during drouth and failure, whereas experience shows that we should evaluate the highs and lows in the use and production of this land and thus arrive at a dependable basis for its future use.

9. Our Best Agricultural Land.—Broad areas of our state are well suited to cultivation. They are the bottom lands, terraces, moderately hilly lands, and the table land areas having deep, fine-textured soils. About one-fourth of the state
is high grade agricultural land. Its power to produce must be conserved.

Some of our best hilly land has been depleted by sheet erosion and by gullying, resulting from cultivation. Soil erosion-prevention, as shown by another paper in this book, has become the big conservation problem in the hilly land areas.

10. Degree of Slope.—Studies made of the hilly lands of the eastern part of the state show that the degree of slope in the Loess Hill and Drift Hill regions has a close relation to the use that should be made of the land. The rolling to moderately hilly areas have comparatively little sheet erosion, and their soils are deeper and more productive than on slopes of six degrees or more. Then, with a yet higher degree of slope, more and more grass cover or forest must be used to hold the soil unless contour farming and terracing are employed. Finally, the land with quite steep slopes should not be cultivated.

11. Use of Fertilizers.—It is sometimes claimed that Nebraska soils do not need fertilizers. This is an error, because there are soils that respond to certain kinds of treatment, as by lime, by phosphate mixtures, or by nitrate fertilizer. As a rule, however, most of our soils are quite well supplied with the essential mineral compounds. Their organic matter content (usually called humus) is first to become exhausted to a damaging degree. This can be restored by the use of manures or by growing legumes where the soil moisture supply is adequate.

12. Weed Infestation.—Cultivation has destroyed most of the native vegetation and introduced, among other things, a number of bothersome weeds, some of which are hard to control. The morning glory, known as the bind weed, is gaining a foothold in about one-third of the counties of the state. It affects the value and use of land. Farms badly infested with it are not salable. The presence of this weed on a farm makes it difficult to obtain a loan on the land, and places badly infested are not accepted for loaning. There are several other damaging weeds in the state, but none so outstanding as the bind weed which must be eradicated.

13. Conservation of Humus.—The original prairie soils were high in organic matter (humus), but farming has removed most of the top soil on the steep, hilly lands, and the surface is now on the former subsoil. The humus problem is two-fold—first to save the top soil of the best lands, and second, to build up the humus content of the depleted soils.

Contour farming and the use of alfalfa or sweet clover in the rotation system are the methods most used in restoring humus. Of late years, however, sweet clover has been used more generally than alfalfa for land building on the uplands. A big agricultural problem at this time is the maintenance of humus in the soils of the sub-humid areas of Nebraska.

14. Conservation of Soil Moisture.—The soil moisture is the dominant factor in cultivation, the main purpose of which is to prepare the soil to absorb and hold the maximum amount of the rainfall. Moisture is lost from the soil by percolation, evaporation, and transpiration. The farmers' problem is to store soil moisture and prevent its depletion by evaporation. The soils that do not conserve moisture have little importance agriculturally.

A second way of supplying moisture to the soil is by capillary action from shallow ground water. This makes sub-irrigation of the lowlands possible and also makes an ideal situation for alfalfa, the water requirements of which are too high for its production on the sub-humid uplands. Alfalfa, the past few years, has moved largely to the lowlands under irrigation proper or under sub-irrigation, and, as noted before, its place in the restoration of organic matter in the upland soils has been given over to sweet clover.
CONSERVATION AND SURVEY

FUNDAMENTAL PRINCIPLES IN LAND-USE

1. The producing-capacity of our soils must be conserved to support the fundamental needs of the people.
2. The wrong use of land works a detriment to the community and the state and must be controlled for the protection of the general welfare.
3. Those who impoverish the soil by careless husbandry destroy the source of plant and animal life.
4. The fundamental basis in the private ownership of farm land lies in the opportunity given the owners to develop homes, self-reliance, initiative, and good citizenship.
5. Farmers who know and understand their holdings, and carry on their enterprises with success to themselves and the community, are our benefactors.
6. Farming presents many hazards and requires close attention and a wide range of experience. It is a basic industrial activity.
7. It is a duty of the State and Federal governments to survey and otherwise investigate and describe the resources of the land for guidance in their proper development.
8. The use that can be made of land is affected by the general social and economic conditions, some of which are controlled to some extent by the government, and the farm people and the land enterprises are entitled to the same fair adjustments and protection that are made for the workers in other lines of industrial activity.
9. Nebraska, like other commonwealths, should create by statute a non-partisan Board or Commission to erect a plan for the use of our land resources. The members of this board or commission should have a close, technical and practical knowledge of the land resources and their development.