Curbing the wind

The twenty-ninth biennial report of the Kansas State Board of Agriculture includes this short article by L. C. Aicher, superintendent of the Fort Hays Experiment Station in Hays, Kansas. In the article ("Curbing the Wind" in Twenty-Ninth Biennial Report of the Kansas State Board of Agriculture for the Years 1933 to 1934"), Aicher describes the most effective techniques for preventing wind erosion, stating that "the secret in preventing soil from blowing is to keep the surface in a roughened condition." He also gives directions about the best methods for listing land and caring for fallow fields.

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poses if the needed information is secured and then a constructive program is based on such information.

Kansas has scarcely begun to secure the information needed to solve this problem. The more quickly the needed information is secured the sooner will the present processes of perpetuating misery and privation on submarginal lands be stopped. Also, this will stop losses to the state and nation which are incurred whenever relief must be extended to those who make the mistake of attempting to farm marginal and submarginal land.

This discussion has dealt with the problem of the land which is marginal or submarginal. Little has been said of the efficient use of the supermarginal lands. More efficient use of these better lands would naturally result from more definite information concerning them. This is one of the greatest values of a program such as has been outlined. It is one of the most certain ways of increasing the prosperity and the happiness of the people of Kansas. Delay in starting such a program will result in losses to the people of the state that will be far greater than the cost of securing the needed information and putting into operation a program for the efficient use of Kansas land. When this is done Kansas can have a satisfactory land utilization program and it will be possible to answer the question of whether there are any considerable areas of marginal and submarginal land in Kansas. Until this is done the state and the citizens of the state must continue to guess concerning these vital matters with all of the individual and social losses that go with such guessing.

CURBING THE WIND

L. C. AICHER, Superintendent, Fort Hays Experiment Station, Hays, Kan.

THE blowing of soil, excepting in the very sandy areas, is a sign of carelessness. Most soil blowing can be prevented by the proper use of the right kind of implements at the right time.

Heavy winds this past year and a half removed the top soil as far down as it was plowed from a large number of farms in the great plains area. Other farms were heavy losers of top soil, soil which was thousands of years in forming, and it cannot be gotten back nor can topsoil on the areas thus denuded be rebuilt in a single lifetime. The topsoil over most of the plains area is not deep and every effort should be made to preserve it.

Land which shows a tendency to blow cannot safely be farmed

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by the suitcase farmer, the city agriculturist, or the shiftless tenant. When light, sandy soils or the finely pulverized soil from the so-called hard land areas begins to pick up due to high wind, it needs attention immediately and if proper tillage is not given at once a disaster next in importance to the old time prairie fire may be in the making. The famous paint slogan, "Save the surface and you save all," applies just as effectively to the topsoil of the agricultural land of the nation, whether it is subject to loss by wind or by water.

The character of the soil has a great deal to do with the method which must be followed to prevent the soil from blowing. As a rule the sandier the soil the more difficult it becomes to hold and still farm successfully.

FARMING LAND TO PREVENT BLOWING

The blowing of soil is brought about by getting the surface soil too fine. The secret in preventing soil from blowing is to keep the surface in a roughened condition. This is done by the proper use of tillage implements at the right time and by taking advantage of the binding effect of crop residues. The soil should be worked sparingly when dry. Moisture is helpful in holding soil together and along with crop residues assists in forming clods, the condition so much desired in the preparation of a roughened surface. When the soil is so dry that clods no longer form when the land is cultivated it is too dry to work.

Frequently moisture is available at 3- to 5-inch depths and if the proper implements are used the land can be worked, and by bringing up the moist earth from below a roughened surface can be provided.

As far as possible implements such as the disk harrow, the so-called one-way plow, and the drag harrow should be used very sparingly on land which shows blowing tendencies, for these implements pulverize the soil, thereby aggravating instead of preventing the difficulty. The excessive use of the one-way plow was a large contributing factor in the development of the blow area in southwestern Kansas this past year.

Another contributing factor was the burning off of wheat stubble preparatory to the preparation of the land for wheat seeding in the fall. The dry fall, linked with the powdery condition left from the burning of the stubble and the excessive use of the one-way plow provided an ideal blow condition. Soils which tend to blow are especially in need of organic matter. Crop residues, such as

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straw, aid very materially in holding the soil and preventing it from blowing. The lister is especially valuable as a tillage implement in the lighter soils because it does not cover up all the straw as does the plow. In leveling the listed land with the ridgebuster much of the straw is still left mixed up with the top soil where it is of much value in holding the soil.

Other implements which are especially valuable in the handling of soil having tendency to blow are the duckfoot weeder, sometimes called the field cultivator; spring tooth weeder; a spring tooth carrying a duckfoot blade; the revolving rod weeder; and the spring tooth harrow.

The Fort Hays Experiment Station has successfully prevented light soil from blowing. The methods used on annually cropped land and on fallow are presented to indicate best methods for central western Kansas. Modifications may be required in other sections, depending upon conditions.

Method used on annually cropped land. The stubble land is blank listed behind the combine or as soon thereafter as possible. When the first weeds and volunteer wheat appear the listed ridges are leveled off with the ridge buster. The operations leave much straw at or near the surface. If rains come to start more weeds and volunteer wheat, the one-way plow with a subsurface packer (not a cultipacker or roller) tied behind and weighted, is used to destroy the weeds and firm the soil. With this last operation much of the straw is still left in the surface soil, and the packer has left the surface in a roughened condition. The land is usually ready for planting after this last operation. Sometimes, however, wet seasons cause more weeds to grow, making it necessary to kill another crop, in which case the one-way plow is used, since there is plenty of moisture to bring up the wheat crop soon to be planted, hence a blow condition need not be anticipated.

Method used on fallow land. The first operation is that of blank listing. If it is felt that the land will hold over winter without blowing the land to be fallowed is not listed until about the middle of May; otherwise it is fall listed. When the first weed crop appears the listed land is leveled off with a ridge buster. Successive weed crops are destroyed by the use of one or the other of the following implements: duckfoot weeder, revolving rod weeder, or the spring-tooth harrow. Care is always taken to cultivate at times when a roughened surface can be obtained. The only time that the one-way plow is used on fallow land is during seasons of

excessive weed growth brought about by a wet season. In that event the weeds are destroyed as soon as the ground is dry enough to permit cultivation. Moist soil is brought up quite generally at that time and the surface is usually left in a roughened condition, but not as rough as a rod weeder would leave it. Soil blowing is not a problem in wet seasons, for with plenty of moisture winter wheat can be depended upon to germinate readily and make sufficient growth to hold the soil against winter and early spring winds.

The duckfoot weeder, the spring-tooth weeder, the revolving rod weeder and implements of a similar nature can be used effectively in the killing of weeds on fallow land without danger of fining the soil too much, and they are especially recommended for use on soils of a light nature.

The duckfoot or field cultivator is coming into use as an effective implement to prepare wheat stubble land for fall seeding. The knives are run about three inches below the surface and work very well excepting when the ground is too wet. Under those conditions the straw sometimes clogs the machine. This implement is especially desirable, however, on sandy areas where tillage with other implements would leave the soil in condition to blow.

Most of the soil blowing takes place after the fall wheat has been planted and before the wheat has made enough growth to protect the soil. The conservation of moisture by the early destruction of weeds and the use of the subsurface packer aid greatly in retaining in the soil the maximum amount of moisture for the effective use of the plant in making sufficient growth to prevent the soil from blowing.

Once the soil has started to blow, the problem then arises as to how to control it.

CONTROLLING BLOWING SOILS

If blowing takes place in large areas and over a wide territory the control of the blowing soil becomes a community enterprise and occasionally a county enterprise. The sooner the services of all in the affected area can be enlisted in a combined effort to stop it the less will be the damage due to blowing. The lister, shovel cultivator, and modifications of these implements are called upon for use in stopping the moving soil.

The lister or other implement should be started through the field at right angles to the direction of the damaging wind and on the side of the field nearest the source of the wind. If the soil is just beginning to pick up lightly, furrows eight rods apart could be

tried to determine their effectiveness. If the blowing is not stopped with furrows at these intervals then a furrow should be run between the furrows previously made. The furrows then become four rods apart and should be just twice as effective as the first set was. If these do not control the blowing the dividing of the intervals is called for again and if necessary another dividing should be given. To save loss in the wheat crop due to destruction from furrow making, the least number of furrows necessary to hold the soil should be used. Loss in yield from fields having furrows run at four rod intervals is very small, for the nearby wheat plants utilize all the available moisture and produce heavier. The furrows in the wheat fields should be closed up as soon as the wheat is high enough to protect the soil.

It is a much more difficult task to stop soil from blowing after the entire field has had an opportunity to blow. If fields all around a farm are blowing or if the roadways are moving it is difficult to control blowing on land thus surrounded. Intelligent community action is essential in the prevention of soil blowing. Unless all the land in the affected area receives protective attention just as soon as the soil begins to move tremendous effort at a later date may prove fruitless.

MANURES, LEGUMES AND COMMERCIAL FERTILIZERS

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IN GENERAL, when virgin land is broken the farmer deals with a soil of relatively high-producing capacity. Under such conditions he is not at once interested in methods of soil building or improvement. The soil under cultivation rapidly loses this virgin fertility and finally reaches a point where the level of fertility becomes so low that it is difficult to produce profitable crops. It is then necessary to attempt to build up its fertility. There are several methods of soil maintenance and soil improvement that may be practiced. These include the use of barnyard manure and crop residues, the application of commercial fertilizers, and the growth of leguminous crops. The problem then is to know which method or methods should be used in attempting to maintain or build up the fertility of Kansas soils.

In the first place it should be made clear just what each contributes to the soil. Manure, which constitutes the residue of the