BULLETIN No. 103

Cropping to Flax on New Lands of Semi-Arid Land Areas

BY

H. L. Bolley AND M. L. Wilson

Any farmer, teacher or student in the State may have this bulletin mailed to his address, free of charge, upon application.

FARGO, NORTH DAKOTA, U. S. A.
MARCH 1913.
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CROPPING TO FLAX ON NEW LANDS OF SEMI-ARID LAND AREAS

By H. L. Bolley and M. L. Wilson.*

Traction farming has introduced a new element into agriculture, and has brought into the work a new class of farmers. It also offers an opportunity for great improvement in agriculture, and has brought into the work a new class of farmers, jury of the soils.

The men who are opening up these new lands, whether we speak of them as homesteaders, real estate men, or other business men, are men of intelligence. Accordingly, as they handle the land when they first break it, so will the harvest be in the near future. This cropping of the new lands can be done in the right way, or it can be done in the wrong way. It is hoped to present in this pamphlet in a concise manner the methods of cropping to flax on new lands which are most

*This circular is a joint publication of the Montana and North Dakota Experimental Station and is published simultaneously as Montana Circular No. 22. All photographs for the illustrations have been furnished by the Montana Station and are based upon the demonstration work and field observations of M. L. Wilson, Assistant Dry Land Agriculturalist of the Montana Station.

The manuscript was prepared and the circular has been edited by H. L. Bolley, Botanist and Plant Pathologist of the North Dakota Station, after having visited the fields in company with Mr. Wilson.

This publication, therefore, represents the joint conclusions of the authors. The circular is intended chiefly to be a picture book representing best methods for work on new land of the semi-arid plains of the northwest.
suitable for those areas which are described as semi-arid. It may also be of some interest to those who are working upon those types of land which may be strictly classed as "dry land" farming areas.

Diseases: The diseases of the flax crop are very serious. They are caused by root, seed and stem injuring and leaf modifying organisms which are capable of maintaining themselves in the soils for a number of years after they have once been introduced thru improper or other methods. Such diseases are very destructive to the crop when under best conditions, and, of course are more destructive under poor conditions of cropping. If the fertility, or the moisture content, of the soil is low, or abnormal, these diseases which destroy the roots are all the more effective in preventing the crop from producing a pay yield. It is therefore of great importance that the methods of cropping with reference to diseases be correct.

The organisms which produce the flax diseases are plants and must have certain growth conditions. Therefore, tillage, moisture and types of fertility do largely affect their development. Later, we shall see that the conditions of tillage most suitable for the development of the crop, which have in the past tended to produce large yields, have been largely ben-

Fig. 2.—Teaching a group of men how to recognize the flax diseases which infect the soil and bring about crop deterioration.
official because they have tended to keep these organisms in control.

What Must Be Done:

1. The soil must be properly broken and tilled to conserve moisture.
2. It must be properly packed and tilled so as to reduce the development of any parasitic fungi and also to give the roots of the flax crop the best possible growing conditions.
3. Seed must be so selected, graded, and treated as to prevent much introduction of disease into the soil.
4. Such crop rotation should be conducted that in case a certain amount of disease is introduced, it will die out.
5. Such steps should be taken as to preserve soil texture and fertility.

Fig. 3—Ripping up the sod. It is wrong to do it in this way. The soil will dry out. It should be packed, harrowed and worked down at once.

Figure 3 shows an outfit doing a good job of plowing, but it should not be done without the packer immediately following. Notice how the dust is blowing. It is evident that the wind and the dry air will soon take all the moisture out of the fresh turned soil. The way to save that moisture is to drag behind that outfit a very heavy packer, and behind that a harrow or other tool which will leave a light mulch on the sur-
face, one which is rough enough and so firm that the wind will not start the dust cutting. A farmer who has only a team to work with should not plow faster than he can pack or harrow down the same day.

The Root and Seed Diseases of Flax: If one expects to succeed with the culture of flax, he must take into consideration the characteristics of the root and seed diseases of the crop. He must learn to know them in the field, and to know the condition or portions of the soil in which they are most destructive. He must learn to recognize the types of seed which are liable to introduce the diseases. The sick plants have a very characteristic appearance. When a field has become infected, the diseases tend to kill out the plants in spots. The plants in such areas come up yellowish, die early and wilt and blight very characteristically. On new lands one often finds scattering sick plants in the drill rows which have been introduced by the seed. If flax is allowed to follow flax, wherever a sick plant stands the first year, the next year there will be an enlarged area of "flax-sick" soil.

Flax canker is a disease which accounts for the breaking over of plants near the ground line which many farmers have attributed to the action of insects such as ants. The plants which break over were in most cases internally diseased in the
seed before the seed was planted. When the ground becomes thoroughly sick with flax canker, the plants are yellowish and weak and sickly in the spring, and later tend to dry up when the hot weather sets in.

Figure 2 illustrates one of the methods taken by an expert to explain the characteristics of diseases to groups of farmers and other people. Elevator men are particularly interested in proper methods of farming. Their business depends upon the amount of crop which the farmer has to store. They often buy and sell seed for sowing purposes and are in fine position to select the seed which is of the best quality for this purpose. One of the reasons why the new lands of the northwest have

![Image](https://via.placeholder.com/150)

**Fig 5—Preparing the solution for disinfecting flax seed for use on new lands.**

One pound of full strength formaldehyde is used in each 40 gallons of water. All seed should be treated.

been so rapidly thrown into a "flax-sick" condition is the fact that the newcomers have not been able to procure fit seed. They usually go to the elevator and buy any mixed lot that may happen to be there, which may or may not be a badly diseased lot. The authors wish most emphatically to recommend that the elevator companies instruct their agents to select seed from the best crops grown by the local farmers. This should be set aside in a separate bin or bags. In so far as the elevators enter the seed business, they should use this sort of seed to sell back to the farmers or newcomers. In this manner
the managers will be able to help in the conservation of the purity of the soil which, so far as the flax crop is concerned, is all important.

**Grading Flax Seed:** What we have said regarding the elevator agents and others interested in the buying and selling of seed for sowing purposes applies directly to the work of the individual farmer who is saving his own seed. He should save only the best, most mature, bright, properly colored plump seed, and should thoroughly grade it to remove the straws, chaff, dirt particles, and immature or shrivelled seeds. We have never seen any sample of flax seed that did not contain some diseased seeds due to wilt, canker and other root destroying flax diseases. However, if nice, bright, plump seed has been selected, saved dry and properly graded to blow out the light weight seeds which may chance to be present, the number of internally diseased seeds which may be present will be reduced to a minimum.

**Treating or Disinfecting Flax Seed:** All flax seed, no matter what the variety, whether called "wilt resistant" or not, no matter how bright and plump or how well it has been...
graded, should be thoroughly treated or disinfected with formaldehyde before it is sowed upon the land. The purpose of such treatment or disinfection is to destroy the very minute spores of disease which may be dusted over or scattered upon, or included in the hulls of the flax seed. **Use the standard strength formaldehyde and sixteen ounces avoirdupois to each forty gallons of water.** Wet the flax seed thoroughly in any manner which you see fit in which you can do the work and yet not have the seeds mat together.

Our figures 5, 6, 7, 8, and 9 will show you some of the methods and steps of the procedure. It is easier to treat flax seed for sowing purposes than it is to disinfect any other type of seed grain. Remember, the grains must be thoroughly wet or evenly wet over the entire surface so that each grain has received the moisture. It can be done if the grain is evenly raked, shovelled or stirred during the time when a fine forceful spray is being thrown upon it. The most successful way and most economical way is to prepare a box or boxes with handles which can be easily handled. Then do the treatment in the open air in the field at the time of seeding. (See Fig. 10.)
The best form of box is perhaps shown in figure 9. Best results have been obtained by all those farmers who have sowed the seed while it is yet damp, not waiting for it to become thoroughly dry. If it is done in a wagon box, or other large box, as shown in Figure 6, or is treated upon a large canvas, as shown in Figures 7 and 8, the grain can be left piled in a pile for a time covered by blankets or canvas, and the seed will take up the excess moisture. Fine results have been obtained by those who have treated the seed once, then allowed it to become nearly dry and then have given it another treatment.

Fig. 9.—A handy form of box for treating seed in the field thru spraying and raking method.

In this manner they are able to use about twice as much solution and in all probability succeed in soaking up the seed coats or hulls in such manner as to do a better killing of the fungi which are there included.

Preparing the Seed Bed: Flax needs a good even continuous deep supply of moisture coming from below throughout the entire growth season. It is a lover of hard, firm soil, therefore, the soil must be packed down, excluding essentially all air spaces. All of the fungi which attack the roots of the flax crop are air loving organisms. They, therefore, are lovers of a loose, mellow, open soil. They cannot thrive well in a compact properly constructed seed bed. A firm seed bed tends to confine the activities of these roots destroying organisms more nearly to the surface and thus tends to check destructive effect because they become exposed to the destructive agencies of the sun and air drying.

In all those regions of the western Dakotas and eastern Montana and similar regions, in which there is sufficient rainfall during the winter and spring months to mature a crop and the soil is of such texture as to conserve the moisture, the best crop will be produced by such methods of handling the sod as will allow of the plowing and working of the ground and the seeding to be done at one and the same operation, or at such time as to essentially meet these requirements. Our figures 11 to 18 inclusive show most of the essential steps. We
would especially call attention to Figure 11, the rough plowed land with the air spaces underneath the sods not only allow them to thoroughly dry out and become impervious to the roots of the flax plant, but results in the loss of a large portion of the seed, and eventually brings about a condition under the sods which proves very destructive to the crop. As the roots of the flax perforate the sods, they come into the open air chambers, and by the action of the wind and air are quickly injured, being alternately dried out and wet up according to conditions. These sub-sod air spaces are particularly destructive to the flax crop when there is any disease sown with the seed, for they, at times, form damp chambers in which the

![Fig. 11](image)

Fig. 11—This photo shows a roughly broken sod with narrow slices cut across. Notice the holes and air spaces between and under the sods. This is bad for the coming crop.

moisture from the sub-soil collects on the decaying vegetation underneath the sod and the flax disease producing organisms or moulds develop in quantity in much the same manner that ordinary bread mould develops upon wet bread under a tumbler or other bell glass. The result is that the young roots of the flax plant, as soon as they come into these damp chambers are attacked by such moulds and damp off so that they are not able to penetrate the sub-soil. Under such conditions, the first hot or dry wind which comes along readily blights the crop. Though it may appear to have a strong stand of sturdy straw sufficient for a large yield, when harvest time comes, it is often found that the seed is shrivelled and the yield very greatly reduced.
Fig. 12—A fair job of breaking, but should have been mashed down flat with heavy packer. Notice how the furrow slices overlap so that the grass side does not lie flat on bottom of furrow. The plow should not turn more than it cuts off clean.
Fig. 13—Breaking and packing with a home-made cement roller. This roller does the work. This roller weighs 230 pounds per running foot.
The manufacture of packing tools has not kept pace with the demand with regard to weight. Makers have been afraid that farmers would not buy heavier tools, and, as a result,

Fig. 14—Another home-made packer of large form, made of 2½ x 8 inch plank set into heavy ball wheels. A packer must be heavy or else loaded.

the ordinary packers on the market are not heavy enough, or properly constructed to allow them to be weighted in such manner as to mash down the sods. We call attention to the work

Fig. 15—Homesteader finishing the seed bed on a well packed sod—using spring tooth harrow. This man made an almost ideal seed bed.
done by a Home Made Cement Roller shown in Figures 13 and 18. Figure 18 shows the manner in which the deep plowed sods can be made to lie with their grass faces firmly in contact with the underlying sub-soil.

When the roots of the young flax plants pass thru such sods, they come into immediate touch with the sub-soil and go on downward so that it takes more than an ordinary hot wind to have any effect. There are no damp chambers left under the sods for the accumulation of molds and other destructive root destroying organisms. The moisture can also come freely from the sub-soil upward to the surface. A properly constructed shallow mulch on the surface completes the seed bed and tends to prevent the evaporation of the moisture. The seed bed should be so firm that when the discs of the drill are run over it, they cannot be made to cut much deeper than one-half to three-quarters of an inch. If the packing and working has been well done, the moisture should be so close to the surface that such drilling will bring the seed in contact with it.

Work by Team: Those who do not have traction outfits may say this is all right for some farmers, but what can we do? Start early, plow as much as you can and do the same day. Do not continue this process until you have the entire area you intend to seed to flax done before you commence to seed. Be satisfied to prepare the seed bed for from 10 to 20 acres, then sow. Start seeding just as early in the spring as you can without too much danger from frost. Young flax will stand a rather heavy frost in the spring. It is better to have it frozen off twice in the spring than once in the fall. After you have the first 10 or 20 acres seeded, prepare a similar area and do likewise.

Soil should not be worked when it is wet for that spoils its texture. It is, however, hardly possible to do so much work upon soil or sods when in good tillage as, by chance, to make them too firm.

Types of Tools: There are many types of tools which are satisfactory. The stock raiser makes a success of raising a certain kind of stock because he has a liking for that particular kind. So it is with the man who undertakes to make a seed bed on sod. He makes a success because he understands or knows how to make use of the particular kind of tools which he is using. One principle, however, should be kept in mind; do not cut up the sods or loosen the slices in any manner. The purpose of all the steps is to cause the sods to lie flat.
Depth of Plowing: Plow as deep as can be done and yet have the slices mash flat. Three and a half to four inches on most types of soil is about right. If you have a light team, be sure not to cut more than can be properly turned down flat. In dragging, discing or harrowing, have the tools so set as not to stir the sod, but rather to work it flatter and form sufficient mulch to fill up the cracks and under sod spaces. When there is sufficient sub-soil moisture, shallow breaking properly handled to form a seed bed will very often give a good yield of flax. When there is sufficient power, we recommend the deeper plowing. Yet there is no object in plowing so as to turn up the light gravel in some of the lighterlands.

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Fig. 16¼—Shows a common narrow tire spring wagon in which were seated three men. The depth at which the hind wheels cut into the dirt indicates that there was a pretty firm seed bed. This was on old worked land. It is the opinion of the writer, however, that the ground could have been packed even more firmly to advantage of the crops.

Fig. 17—Homesteader working down a thin tough sod with the harrow. If he harrows enough the cracks and air spaces get filled with a fine mulch of dirt which is a good substitute for packing. The team is also an aid to packing.
Fig. 18—Rear view of plowing and packing outfit. Notice the farrow slices, how the grass side fits down on the sub-soil. This is how sod lands should be packed for flax—or other crop.
How To Determine Whether To Seed Immediately Following the Plowing in the Spring Or to Summer Work the Land for the Crop the Following Year: There are certain regions and certain types of soil in which sufficient moisture cannot be maintained to produce a crop if seeded immediately following the spring breaking. Such lands naturally fall under the "dry land" methods of agriculture, and summer tillage for storage and conservation of the moisture which falls is indicated. It has been proven by many dry land farmers in the drier regions of Montana and the drier regions of Northwest Dakota and British America that spring plowing of the sod lands, followed by careful summer tillage throughout the first season usually results in a crop of flax seed which pays abundantly for all the work done. There is only one drawback and that is, if such summer worked lands chance to be surrounded by a weedy district, it is apt to become thoroughly filled with weed seeds by the drifting action of the winds. It may thus be necessary to guard against the weeds. Fig. 19
illustrates a good method of determining whether or not the sods may be spring seeded with fair chance of success. If, in a good, compact clay sub-soil or clay-like sub-soil, the moisture does not extend downward from two to two and one-half feet, it is too much of a gamble with nature to seed a crop on that particular piece of soil that spring. In certain exceptional summer seasons there may come heavy rains sufficient to continue the crop on to maturity. This is against probability. If the ground is not already pretty well supplied with moisture at seeding time, the crop is pretty certain to reach a condition when a few hot winds destroy the possibility of a pay yield. Late spring and summer rains, even tho' very heavy are found to wet down but a short distance and in a few hours of sunshine and wind the moisture is again thrown into the air. The

![Image](image)

Fig. 29—All operations at once, plowing, packing, drilling and dragging or planking in tandem. This is the best method of procedure when soil is in proper condition. The grain goes at once into a moist, firm seed-bed.

crop is further damaged under such conditions by the tendency to cause it to produce its roots upon the surface so that when the hot winds dry out the surface the crop must blight, sicken and die.

Statistics and weather reports are good in their way, but they are more useful as agents for the sale of real estate than for determining whether a particular piece of lands does or does not have stored in it sufficient moisture to mature a crop. We think that each farmer can make soil moisture tests for himself in the spring which will be much more enlightening than the talk which one often hears about rainfall in inches. The question is not whether there has been a rainfall of 15 or 16 inches during the year, but whether the sub-soil actually does or does not contain moisture sufficient to carry the crop
to maturity. If in a dry region which year by year is naturally so elased, you had best make some tests for yourself.

The Time of Seeding: Each man must be his own guide and act according to the natural atmospheric environments of his own farm.

Liability to frost action varies in different localities of approximately similar regions. The region for which we are writing represents high table lands or foot hills of the rocky mountains. When spring opens there is not again apt to be heavy frost action which will be likely to be destructive to the young flax. If, however, it is frozen off while it is quite young, only the seed is lost. The work necessary to seeding the ground again will only be that much improvement on that which has already been done. On the other hand, in the same regions, frost is liable to come early in August, and sometimes is very destructive. Furthermore, the flax crop, when it is in blossom or when the seeds are not perfectly formed is very badly injured even by a comparatively light freeze. Even though frost does not come in the fall in time to prevent maturity, if fall rains set in and cold nights come on, the crop tends to remain green and grows a lot of new seed pods so that there is no time when an evenly matured crop can be harvested. Sow Early.

Rate of Seeding: Under dry-land conditions, or under semi-dry land conditions thin seeding should be the rule. If there is likely to be a shortage of moisture in the sub-soil at the time the grain is maturing, then the aim should be to have a comparatively few, sturdy, well rooted plants on the ground rather than many slender, weak, poorly rooted plants in competition with each other. The old rule of half a bushel of seed to the acre did fairly well in the wet regions, but even there is now found to be too much. The more common seeding is now one-third of a bushel per acre or less. On a properly prepared seed bed, in the regions for which this bulletin is written, not to exceed 12 to 14 pounds of seed should be sowed.

Calibrating the Drill: It is usually supposed that any ordinary drill can be set to sow a given amount of seed. This is not the case. Drills of the same make vary greatly in this respect. Even the two sides of the same drill may sow at a different rate. The size of the seeds of the particular sample of grain determines how many pounds should be used per acre. It is well, therefore, to set the drill to do the particular piece of work which each man has to do. Adjusting the drills to do the exact amount of seeding is called calibration. There
are 43,560 square feet in an acre. Divide this number by the number representing the width of the drill in feet. Divide the number thus obtained by the number of feet represented in the circumference of the wheel. This will give the number of revolutions which the wheel would make in drilling one acre of ground.

Jack up the wheels and turn enough times to represent the distance which would be traveled in sowing one fourth of an acre. Collect the seed and weigh it. If it is too much or too little the drill should be readjusted until it will throw the amount of seed desired. If large areas of flax are to be seeded, it will be found that this method of testing out the drill will pay for itself in the seed saved, and a very great improvement in the evenness of the crop will be obtained.

A very efficient method of trying out the rate of seeding is to set the drill to sowing over a smooth roadway. Count the number of seeds which fall in a yard of distance which a shoe travels. This will tell rather accurately, approximately how many seeds are falling per inch. If the flax seed is good and the seed bed is properly prepared, one seed per each three-fourths inch of distance will be enough. He who sows on an
unprepared seed bed had best stay by the old rule of sowing approximately one half bushel to the acre.

**Planking:** Many who have had success, have followed the system of planking after the drill. This is done even tho' the ground is well plowed, dragged, harrowed or disseed and drilled. The planker usually consists of three or four heavy planks built together in the form of an old-fashioned stone boat in the manner characteristic of weather boarding. This is dragged behind the drill so that the overlapping edges of the planks point backward. The action tends to pack down the fine dust particles, even up the ground, and cover seeds that might lie on the ridges uncovered. It also tends to firm the ground upon the seeds, and gives an opportunity for all of them to get an even start which tends to give even ripening. In the drier regions the old-fashioned press drill or press attachment will be found to give exceedingly fine results with flux. Any type of heavy plank or beam will tend to do the same kind of work. Fig. 22 illustrates how one homesteader prepared a very nice seed bed with a heavy beam.

It is not intended to carry the discussions of this bulletin beyond the finish of seeding operations. It may, however, be
well to remember that the work done upon the preparation of the ground for this crop should not be lost and the proper crop should be seeded afterwards in order to make use of the conditions here provided. (The proper crop is wheat.)

**Crop Rotation:** So far as flax is concerned, crop rotation is an absolute necessity. In spite of all the care which may be taken with the seed with regard to the prevention of disease, some of the root and seed diseases of the crop will yet be introduced into the land. Some wilt-sick and canker-sick plants occur in every crop under the best conditions. The straw, stubble and roots from these wilt and canker-sick plants when plowed under will soon distribute the disease to large areas of ground. If the flax be put on the land the following year, the roots from the young plants, as soon as they come in contact with this old straw will become infected and thus the spread of the disease will be rapid. While the crop the second year may not fall off in yield to such extent as to cause alarm, the amount of disease which is introduced into the soil and seed is greatly increased, so that it takes a strenuous system of
ground cleaning to purify the soil so that a pay crop of flax may again be produced there.

**Summer Cultivation:** This bulletin is written largely for those portions of the semi-dry regions in which the rainfall during the fall of the year, winter and spring months is sufficient to moisten the ground to such extent as to insure the crop provided reasonable method of soil preparation is done.

![Flax crop](image)

**Fig. 24—Does it pay to summer work dry land areas for flax?** It certainly does not pay to plant it if there is not sufficient moisture in the sub-soil. Good crops have been grown after bare summer cultivation in very dry regions. These two bundles show the contrast in one comparative trial. The larger bundle was grown after summer cultivation. The other was from an equal area spring worked.

There are many areas, however, in which the rainfall of a single season is not sufficient, nor can it be relied upon during the hot months. On such lands, proper summer cultivation can conserve the moisture and if properly done, deep tillage and consistent work will form just such sort of seed bed as is most desirable for flax. There are thus many parts of Montana and Western Dakota, in which the regular methods of dry-land
farming will be found to be most profitable, and even in those regions in which the rainfall is more certain, great success can be had by following this procedure. We would therefore, recommend that each farmer set aside twenty, thirty or forty acres each year to be prepared by surface tillage thru the summer. The method is especially applicable to all those regions in which the corn crop does not seem to be a success or for those farmers who have not as yet stock to make use of the forage. When corn can be grown, this crop may be used in place of fallow, after cereal crops. There are probably no large areas of lands in either state which can not be made productive of large crops under a system of alternate tillage and cropping.

Volunteer Flax: Where a previous first crop has shelled so that a good deal of seed is left on the ground, many farmers are inclined to sow flax there the second year because they think they will be able to procure the volunteer crop which comes. This is an error. If the seed bed is properly prepared the volunteer flax will practically all be destroyed. If not properly prepared, the volunteer flax will be mature many days before the seeded crop is ready. It is usually impossible to save the seeds from a volunteer crop and yet have a reasonably good yield from the new crop. In regions of sufficient sub-soil moisture, wheat is by far the best crop to follow on such lands, and the stubble should not be plowed. As soon as the flax is headed or taken off, the stubble should be disced, knocked down to prevent the upstanding stubble from acting as wicks to draw away moisture. First disc in direction of the furrow slices, afterwards in the diagonal or cross direction. On the last discing a clod crusher following the disc makes a fine improvement. The seed bed should essentially be prepared in the fall so that the wheat can be seeded at the earliest possible time after the snow leaves the ground in the spring. The volunteer flax, if any comes, will be saved in a wheat crop. (See Figure 25.)

Flax After Corn: Careful experiments and the work of numerous farmers have shown that flax, after corn, without plowing the land, is apt to give one of the best possible yields. It must not be cropped in the way which is indicated in Fig. 26. The average corn field, as cultivated in the west and northwest portions of our country is a nursery for weeds. If the corn is properly cultivated, and kept free from weeds the flax crop following will be clean. To prepare clean corn ground for seeding flax, level the same in the fall by the use
As soon as the stubble land should be thoroughly disked over, a lighter followed, it would pass not to the work. Knock down the stubble or break them off. This would add moisture from the sub-soil.
of discs and heavy railroad irons or split log drags. In the spring, disc, harrow and pack thoroughly and seed early.

![Image](image_url)

**Fig. 26—Crop rotation is a necessity to proper agriculture. Corn is a splendid crop to precede flax on old worked lands—but not with this sort of corn culture. It won't do.**

**Irrigation**: From a study of flax under irrigation both in Northwestern North Dakota and in various irrigation regions of Montana, it is evident that the crop is going to be one of the standard crops of the irrigated regions. It is too early to summarize final directions, regarding proper amount of water and time of application. It is evident that the preparation of the seed bed will need to be even as thorough as in the case of the dry land farming. It will be of much importance that there should be proper deep plowing and an even surface, so the drainage may be complete on the surface. Flax cannot thrive if water stands on the surface for any length of time, especially during hot weather. If seed production is the main aim it should be remembered that flax tends to continue to blossom as long as the supply of soil water is high, especially if the temperature is low. There should be a sufficient amount of moisture placed in the soil to maintain the crop throughout the growth season until near maturity. After boll formation the water supply should gradually become less and less until the crop is evenly ripened. It is probable that the best results will be obtained by one thorough soaking of the ground either just preceding the seeding time or immediately following the time when the flax is about three or four inches high. With most types of soil, under most conditions, it will not be found
profitable to irrigate at any other later period, at least not later than the blossoming stage.

It should be remembered that wilt is most destructive under wet land conditions. Therefore, under irrigation, great care should be taken in seed selection and treatment that the soil may not become infected, for the flood waters of irrigation will readily carry the fungi which produce soil sickness from one area to another. Wet lands also remain flax-sick for a longer period of time than do the dry land or the semi-dry land areas, where the action of cultivation is more destructive to the parasites.

Finally: To preserve the new lands from becoming flax-tired or flax-sick the farmer should cut his crop when it is dry, thresh it when it is dry, and never allow the seed to become mouldy or damp if it can possibly be helped. It will be wise to discontinue the process of throwing loose bunches on the ground to remain there an indefinite time subject to the action of rains and soil moisture. Under such conditions, the fungi form their mould like threads thru the straw of the dampened bundles and gradually infect all seeds. They also produce great masses of spores which are scattered by the wind and wash water to large adjacent areas. In all cases in which the flax is long enough to be tied by a binder, that is the most

![Image](http://example.com/image.jpg)
satisfactory method. If the header is used, the grain should be thoroughly ripe so that the headed straw can be taken immediately to stacks as shown in our Fig. 27 that the threshing may be done at the earliest possible date.

Wet flax and mouldy seed means deteriorated seed, rapid crop deterioration and flax-sick soil.