

**No-Till Notes:**  
**Planning Crop Rotations**  
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When my brother Bruce and I look at crop rotations for our farm, we feel there are some basic considerations to look at first. Those considerations are moisture and soil. These 2 factors control the intensity of your rotation and the likelihood of success for the cropping rotation you choose.

Rainfall can be highly variable in the High Plains year to year, month to month, and even during a thunderstorm on a particular day. You never know how much rain or when it's going to come in our area. The best you can do is to look at averages for your area and determine what type of rotation gives you the best odds for success. Rotations will fail in our climate, or at least part of a rotation will fail upon occasion. If you live west of the 100th meridian, the Nebraska Historical Society has a sign along I-80 which states the 100th meridian is the "line of aridity", west of which rainfall is usually insufficient to support non-irrigated agriculture. We have to drive a couple hundred miles to the east to reach this line. If your rotation doesn't fail during the dry years that come along, it probably needs more intensity. The underlying question is how much rainfall can I expect annually, and what types of crops will produce good yields given the average rainfall. In our area a dry land corn-sunflower rotation is a little to intense in moisture requirement to work very successfully. Shallower rooted crops that require less moisture like field peas, winter wheat, and proso millet have a better chance of success consistently.

The other factor with moisture is when it comes. The average "wet period" in our area is April-June. We do get rainfall throughout the growing season as the average rainfall in July and August show, but this can be the time of the year when rainfall gets hard to come by. When we choose a crop to add to our rotation, we like to have crops that are maturing by the end of June. Winter wheat and field peas stand the best chance of getting rain during their growing season when they need it the most. We also want some of the later maturing crops in the rotation which take advantage of the July and August rains in case we happen to have a wet summer where rainfall occurs throughout the summer. Proso millet and chick pea yields will increase dramatically with a rain in early July. Dry land corn will take advantage of late July and August rains. We like to have a crop growing that will take advantage of any rain that comes during any part of the growing season. We also tend to have the highest percentage of our acres planted to the early maturing crops which have the best chance of producing a good yield consistently given "normal rainfall".

Another major factor when choosing crops for our rotation is the types of soils we have to work with and what their moisture holding capabilities are. On our farm the soils vary greatly, from Valentine sand to a Keith silt loam type of soils. We also pay close attention to the depth of the soils. We consider a 4 foot soil profile when looking at our moisture holding capacity of our soils. We have some good soils with our Keith silt loam soils which will store 2.2 inches of moisture per foot. The limiting factor with our soils is they aren't 4 feet deep. Generally we have 18 inches to 2 feet of the Keith silt loam, with a limestone layer underneath. The limestone soil will hold less than 1 inch of moisture per foot. Our Keith silt loam soils will hold around 6 inches of moisture in a 4 foot soil profile because of the limited depth of the soil. The Valentine sand type soils will store less than an inch of moisture per foot, so they are even more limited in the moisture holding capacity in a 4 foot soil profile.

In previous articles we have looked at crop rotations and designing rotations looking at average precipitation and soil types. Other considerations Bruce and I look at are diversity and flexibility in our cropping rotation. Diversity in cropping sequence greatly enhances the overall health of the crops we produce. With crop diversity we can break up persistent weed, disease, and insect problems. We try to design our crop rotations so we are producing healthy crops which are weed free and don't have disease or insect problems. We design rotations that mix warm and cool season grasses along with warm and cool season broadleaf's. This diversity also encourages healthy and diverse microorganism populations in our soil which are crucial to overall soil health.

Flexibility is also important to us in our cropping rotation decisions. We want to be able to change our rotations based upon market factors for the commodities. We planted more dry land corn this past growing season than normal due to the high price of corn. We also like to stay flexible as weed patterns change. If a persistent weed is developing in our cropping rotation, it is because we are giving it the opportunity to do so. A change in cropping rotation will alter the success of the weed we are having a problem with.

Our typical dry land rotation is based on stacking wheat on wheat. We have had good success planting wheat back into wheat as long as we get away from wheat for a few years. We follow wheat with a warm season grass, either proso millet or corn. We generally plant more proso millet acres than corn, especially in the sandier soils where the moisture holding capacity of the soil is limited. We want some dry land corn acres to take advantage of any late season rains during later July and August. Following the grass crop is a cool season broadleaf, either chick pea or field peas. We haven't raised field peas for several years, but are looking at getting back to producing them on our farm

again. We like the idea of the field peas in terms of winter wheat production. The field peas will fix nitrogen and also allow for a little longer fallow period to give us adequate moisture to plant the following winter wheat crop in. We will also grow some chick peas to take advantage of early July rains and produce for the human consumption market, which can be lucrative if all goes well.

Our irrigated crop rotation follows the same principles as the dry land crop rotations. We do include a warm season broadleaf in this rotation in edible beans, usually pinto beans. This addition allows for control of some later emerging weed problems since the pinto beans aren't planted until late May or early June. This market is also for human consumption and generally speaking is the best cash crop for our irrigated acres.

We are fortunate in our growing region to have so many crops to choose from in our cropping rotations. I have listed the crops we grow on our farm presently, but there are numerous other cropping rotations. Sunflowers, spring wheat, oil seed crops such canola and brown mustard, numerous forage crops and cover crops all have their place in cropping rotations in our area.

I always like to remind producers that the best crop rotation for their farm is the one they choose. No one else knows the needs of your farming operation like you do. Choose the crops that fit your needs. Maybe this is forage for your cow/ calf operation, or maybe the rotation you choose fits the equipment you have on your farm. It's a good idea to listen to other producers and find what works for them in their operations, but the final choice in cropping rotations is yours.