COVER CROPS PROJECT

LAKELAND FARMS INC.

Fall 2021

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Abstract

Nutrient loss, soil health, and biodiversity is getting a lot of attention in agriculture and rightly so. The basis of any outdoor agricultural production really starts with the soil. We are learning that it is more that a simple growing medium that we can mine of available nutrients and manipulate as we see fit. Soil is a living, breathing entity teaming with life. It is intended to be a balanced, diverse system based on interdependent relationships of plants, microbes and minerals. A healthy soil will cycle water and nutrients without releasing critical nutrients like nitrogen, phosphorus and sulfur into waterways and aquifers in the surrounding area. These nutrients can leave the soil either through leaching (moving down or out of soil in water solution) or through erosion (attached to soil particles carried off during weather events such as flooding or high wind). Agricultural soils need constant monitoring and management to maintain balance.

Phosphorus buildup has been identified as an increasing risk to the Salmon River and Shuswap Lake system that surrounds our farm in a research project conducted by Megan Ludwig (1) and UBC in partnership with the Shuswap Watershed Council (2). The buildup of phosphorus poses a risk to ecosystem health and public health; agriculture is a potential source.

Cover crops are an excellent tool for soil and nutrient management and if managed efficiently a great source of value for the farm. They are grown during shoulder seasons to hold soil particles together and tie up nutrients in root zones and organic tissues, reducing the risk of erosion and nutrient leaching. We began using cover crops to regenerate the health of the soils on our farm in 2016. Our first trials were small but as we gained confidence we increased their use until nearly all of our acres had living plants in them through the shoulder seasons and winter months. We felt that the information we gained in their management would be valuable to other producers and that their use could help to improve soils and water quality in our area. In 2020 we applied to the Shuswap Watershed Council's grant program to help us grow cover crops across the farm. This report is designed to share the production knowledge and results obtained during the 2020 season implementing cover crops on our farm.

Our Farm

We are Lakeland Farms Inc. We are a 4th generation BC farming family operating on 330 acres of owned and rented land producing certified organic grains and forages. In addition we produce eggs from a 4,500 bird certified organic flock, manufacture bulk poultry feed for ours and other farms in the area and have just begun a rotational beef grazing program. All of our production acres are dry-land, we have no irrigation.

Our farm is located in the Salmon River Valley southwest of Salmon Arm, BC. We have ~ 1,100 meters of drainage ditch running through our fields which drain in to the Salmon River and eventually Shuswap Lake. The northwest corner of our property is 60 meters from the Salmon River at its closest point. Because most of our production land lies in the valley bottom our soils are extremely varied. We are classified as sandy loam and loam but a quick walk through the fields will also show some heavy clay areas as well. Our water table is quite high, peaking in late May and early June as close to the surface as 4 feet. We receive approximately 26 inches of precipitation per year, ¼ of that amount falls as snow of which the majority melts over a 3 week period typically in March. That creates a big risk for soil erosion and nutrients leaching from our farm into creeks and streams that border our property.

Nutrient Management

We use a variety of nutrient sources on our farm. Annually applying approximately 150 tons of compost made from our own poultry litter and straw, supplemented by off farm poultry compost. Occasionally, we utilize local dairy slurry. We also apply in season, seed placed granular organic fertilizers for maximum efficiency

of nutrients. These are typically made from blood meal, bone meal, potash and elemental minerals. Fertilizer applications are based on fall soil test results and the following year's crop requirements.

Nutrients are very important and expensive for us to replace if they leave the farm. It is sound economics to recycle nutrients through successive crops on the farm and prevent nutrient loss.

Cover Crops

A cover crop is a non-cash crop grown before, during or after an annual crop (corn, wheat, barley, vegetables, etc.) with the intention of improving soil health by:

1. **Increasing soil organic matter and soil carbon**

Soil organic matter is the fraction of the soil that consists of plant or animal (including microbes) tissues in various forms of decomposition. Soil organic matter serves as a reservoir of nutrients for crops, provides soil aggregation, increases nutrient exchange, retains moisture, reduces compaction, reduces surface crusting, and increases water infiltration into soil.

2. **Increasing soil microbial activity**

Living plants form a symbiotic relationship with beneficial soil life such as earth worms, protozoa, bacteria and fungi helping them proliferate in the soil. These organisms aid in cycling nutrients and water to existing and subsequent crops, add to soil organic matter and in the case of a legume/rhizobium relationship can pull nitrogen out of the air and make it available to plants. It has been shown that growing a cover crop after an annual crop can increase microbial abundance in the soil by 27% (3).

3. **Cycling nutrients and water**

Cover crops improve nutrient and water cycling in the soil profile. They hold nutrients in the field in 4 ways, first, by accumulation in their growing tissues (4). This prevents soluble nutrients from dissolving in surface water and leaching down through the soil profile into aquifers or underground streams. Second, growing plant roots release exudates (glomalin) that act like glue and hold soil particles and the attached nutrients in their root zones. Third, by physically holding surface soil particles and attached nutrients from flowing across the surface of the field by blocking the flow of water. Fourth, by improving water infiltration down into the soil during periods of high precipitation which reduces ponding and surface runoff. During wet periods cover crops utilize soil moisture and nutrients for growth, buffering soil moisture extremes.

Cover Crops and Phosphorus

The focus of this report and use of cover crops is on local water quality related to the Salmon River and Shuswap Lake. Specifically, accumulation of phosphorus which was identified in a research project conducted by Megan Ludwig (1) and UBC in partnership with the Shuswap Watershed Council (2). There are several functions used by cover crops to reduce phosphorus movement in to ground water.

Scavenging and Accumulating Available Phosphorus from the Soil

Cover crops can improve phosphorus cycling in the soil ecosystem. They absorb plant available phosphorus from the soil profile and hold it in their tissues, releasing it to successive crops during tissue breakdown (4). Holding phosphorus in the soil keeps it from leaching vertically through the soil in water solution to aquifers as well as horizontally in runoff water solution to creeks and rivers. This is cover crop species specific, some being more effective than others (which is a good reason for a multispecies cover). In the case of buckwheat, its mildly acidic roots can activate and absorb phosphorus sources otherwise unavailable to plants and release it during tissue breakdown (5). It is also soil test, pH, and fertilization dependent. By supporting soils microbial populations organic phosphorus (unavailable to plants) can be enzymatically broken down and made plant available (6). Not only is this good from a water quality perspective but can reduce the amount of expensive applied phosphorus a grower requires for future crops. In some plant species phosphorus can be released either into the soil or water solution from the cover crop following freezing events so growers should carefully evaluate site, season and species selected.

Reducing Surface Erosion

The largest risk to long term soil health and sustainable productivity on agricultural lands remains surface erosion. Soil particles (sand, silt, clay etc.) picked up by water during large precipitation events or snowpack melts will have nutrients such as phosphorus attached to them. The more phosphorus rich the soil, the more phosphorus is attached to these soil particles. This ladened water will travel downhill, eventually into surface water like a creek, stream, river, or lake. As stated above, cover crops greatly reduce suspended soil particles and increase water infiltration.

This Report

In this report we will consider the following cover crops trialed in 2020:

1. Winter cereal following a legume cash crop
2. Winter cereal following winter cereal cash crop
3. Buckwheat as a nutrient catch crop
4. Frost seeding clover in standing winter cereal
5. Inter-seeding multispecies mix in standing corn

Our trials always start with a set of goals. These goals dictate the timing of seeding operations and especially the species selected for the cover crop. Our intent is to provide a summary of the cover crops trialed during the 2020 growing season including production information, weather conditions and results. We hope it assists other producers in our area to evaluate cover crop options for their operations.

Costs Estimates

Cost estimates are based on the cost to us of our equipment (yearly lease/loan/own plus fuel and maintenance divided by the hours used), labor, seed, fertilizer etc. Costs were only estimated on the preparation, planting, and terminating of the cover crop. We did not estimate cost savings for this report, however, in many cases cover crops reduced the amount of tillage required to maintain weed free fields through the shoulder seasons.

Winter Cereal Following Legume Cash Crop

Goals

- Faba beans are a legume cash crop that fixes nitrogen through a symbiotic relationship with rhizobium bacteria. Our number 1 goal was to capture the nitrogen produced by this crop and other nutrients released from the residue to make available to future crops.
- Stabilize soil particles through the winter to prevent erosion
- Maintain a growing crop through the shoulder and winter months
- Improve soil tilth with living roots

Figure 1 - Oct 14, 2020 - 2 leaf stage

Field 1 on the west side of the farm was planted to Faba Beans in April 2020 with harvest in August 2020.

We followed bean harvest with 2 passes of a high speed Lemken disc at 4 inch depth to incorporate bean residue, control some annual and perennial weeds, break up compaction areas from harvest and prepare a level, firm seed bed. We chose to plant organic spelt seed for its winter

survivability, extensive root structure and cash crop potential.

Seeding took place on Sept 28-30, 2020 followed by a 3 mm rain event. This is 15 days later than what we consider the optimal date in our area for fall cereal seeding based on experience. Earlier seeding gives the crop more time for growth, accumulation of biomass, increased root structure and tillering. We waited to seed this crop because of the extremely dry conditions in early September 2020. A September 15 seeding rate would have been 1.2 million seeds per acre but because we were 2 weeks later we targeted 1.5 million seeds per acre (150 lbs) to make up for the reduction in tillering potential. Seed was drilled to 1" depth to protect the growing point over winter. Spacing was 7.5" rows seeded with a JD 1590 no till drill with moderate down pressure. We placed 50 lbs/ac of 8-3-3 granular fertilizer with the seed as a starter and coated the seed with a inoculant for mycorrhizal fungi.

Figure 2- March 29, 2021 - Green up

Cost

Tractor and disc with fuel x 2 passes	$9.60/ac
Tractor and seed drill with fuel	$20/ac
Tillage and seeding labor	$7.00/ac
Seed	$105.02/ac (organic)
	$141.62 /ac

Results

Germination happened quickly and seedlings were out of the ground on most of the field in 5 days. Some of the low clay areas needed a bit more rain following seeding and showed signs of moisture stress. Generally, the field averaged 3 leaves per plant by the time dormancy set in in late November. Winter was fairly mild with a couple of -20°C days after the snow left in late January and February that burnt a couple of areas with no snow cover on the sandy ridges. Greenup occurred in mid to late March and by May 8th we had 18" of growth averaging 620 lbs of biomass (dry) per acre. As compared, many of the fields around us with no cover crops had no growth over winter and were just being seeded for the growing season. While we didn't have the resources to measure

the amount nutrients accumulated in the crop we expect it to be significant. There are great opportunities to derive additional value from this rotation as an early season source of forage for livestock operations or an early harvest grain crop. I would not select spelt in the future as a cover crop because of the high seed cost and poor drought tolerance we experienced with this crop.

Figure 3 - May 8, 2021 - Elongation

Winter Cereal Following Winter Cereal

Goals

- Our number 1 goal was to stabilize soil particles through the winter to prevent erosion. Field 5 is very flood/erosion prone with heavy soils bordered by drainage ditches on 2 sides
- Improve water infiltration
- Hold nutrients in our soil profile
- Increase microbial activity
- Maintain a growing crop through the shoulder and winter months
- Improve soil tilth with living roots in preparation for spring 2021 seeding

Figure 4 - Sept 18 - Winter wheat seeding

Field 5 was seeded as a winter cereal fall 2019, it was harvested for grain August 2020. Our cover crop strategy with this field went through several variations because of weather challenges. Our first plan was to frost seed red clover in this growing crop March 2020 but a huge snowpack followed by a quick melt and heavy spring rains prevented us from getting on the field in a timely manner. Our next plan was to follow harvest with a multispecies cover crop of oats, radish, turnip, buckwheat, and phacelia. These cover crop species were selected to seed in late August/early September to get quick growth, increase biological activity and accumulate nutrients. It was hoped to then winter-kill leaving a trouble-free seed bed for the proceeding crop. However, an extremely dry August and September left us with little soil moisture to germinate anything and not enough time to grow a warm season cover crop ahead of cold fall temperatures so we abandoned that plan. That left us with only one good option, seeding with another winter cereal. This was not ideal from a disease and diversity perspective as we were using a grass to follow a grass. However, against the risk of erosion and nutrient losses it seemed like a must. Cereal rye is a great option for late seeding; it germinates in very low temperatures, is the first to start growing in the spring, grows incredible biomass and has a massive root system. But it is difficult to terminate ahead of a cash crop without chemicals, it uses a lot of soil moisture in the spring and has an allelopathic affect (exudes chemicals that inhibit germination and growth of other plants). We had contracted a buckwheat crop for this field for 2021 so we chose winter wheat as a cover crop instead. We expected winter wheat to use less moisture in the spring and have less of a negative impact on germinating seeds while still growing a fibrous root system near the surface and ground cover to reduce surface erosion.

The field received 5,000 gal/ac of dairy slurry as well as 1 pass with a Lemken disc at 3” depth to incorporate manure and reduce weed pressure. Wheat was seeded at 130 lbs per acre at 1” depth with a 1590 JD no till drill on September 17th followed by a ½” rain on September 18th.

Cost

Tractor and disc with fuel x 1 passes	$4.80/ac
Tractor and seed drill with fuel	$20/ac
Tillage and seeding labor	$7.00/ac
Seed	$28.60/ac
	$60.40/ac

Results

Winter wheat germination was a little disappointing, mostly caused by excessive straw residue from the preceding crop in some parts of the field. The drill hair pinned in those areas and left seed too close to the surface for good germination even though we attempted to increase the seeding depth. We did germinate a lot of weed seeds which were of little consequence because of the lateness of the season. They are suspected to be from the application of raw manure. By mid-November ground coverage was impressive between straw residue and wheat. Soil structure was excellent with active roots up to 10" deep. The crop overwintered reasonably well and with a light snow pack there was no risk of flooding or erosion with the cover that we had.

Figure 6 - Nov 28 - Winter wheat ground cover

Figure 7 - Nov 28 - Winter wheat root structure

During spring 2021 this field had no snow cover for a 3 day period of -20°C low temperatures. The wheat was noticeably burnt as it had already started to green up but we observed no plant death. I do think that event had a negative effect on early spring growth and general plant vigor through the season. By May 17th the wheat accumulated

moderate growth of about 10 inches and an average of 520 lbs/ac of biomass (dry) but well below some volunteer rye that was in the same field. Our accumulated precipitation was near zero from February to May which reduced the vigour of this crop and we elected to leave until the last week of May hoping that our typical June rains would replenish the soil moisture removed by the cover crop. The rain did not materialize in what turned out to be our driest growing season on record and the cover crop significantly reduced the viability and yield of our subsequent buckwheat cash crop. It certainly accomplished our goals though as the soil life below the crop was very active with high worm counts and incredible soil tilth. In future years I would grow this crop again but under dryland conditions I would terminate the cover crop much earlier if it looked to be a dry year.

Figure 7 - May 17 - Winter wheat growth

Buckwheat as a Nutrient Catch Crop

Goals

- Our number 1 goal was to cover the soil and maintain living plants through the growing season
- Stabilize soil particles through the winter to prevent erosion. Field 4 is very flood/erosion prone with heavy soils bordered by drainage ditches in the northeast corner
- Provide habitat for pollinators and beneficial insects
- Improve water infiltration
- Increase microbial activity
- Weed competition
- Improve soil tilth with living roots in preparation for spring 2021 seeding

Figure 8 - Nov 26, 2019 - Oat/radish cover crop

Field 4 is our lowest elevation field with heavy clay in the northeast 15 acres of the field. It is very prone to surface erosion, poor water infiltration, and nutrient movement in to waterways. In the fall of 2019 we planted a very successful oat, radish, pea cover crop following rye which winter killed. It was then planted as a corn grain crop for the growing season of 2020 along with a significant amount of granular seed placed fertilizer. However, an extremely wet start to the spring caused cold soils, slow corn, high weed pressure, and wireworm damage in that part of the field. Prior to the weeds going to seed we terminated the corn in this portion of the field with 2 discing passes to incorporate the residue and prepare a seedbed. One option would be to summer fallow this area for the rest of the summer with multiple tillage passes to keep the weeds at bay. This practice degrades soil health through exposure to the elements, creates compaction, releases carbon and reduces soil organic matter. It would also allow the expensive nutrients applied for the corn crop to move down or across the soil profile. Our other choice was to plant a nutrient catch crop. We chose buckwheat because it is a fast growing summer annual, it achieves quick soil cover ahead of the hottest part of the summer, its long flowering period attract beneficial insects and pollinators, it deters soil pests such as wireworms, and it could be terminated easily with a roller and left on the surface as a mulch to reduce surface erosion through the winter and early spring.

Buckwheat was seeded June 26th at 55 lbs/ac at ½" depth with a JD 1590 drill.

Cost

Tractor and disc with fuel x 1 passes	$4.80/ac
Tractor and seed drill with fuel	$20/ac
Tillage and seeding labor	$7.00/ac
Seed	$80/ac
	$111/ac

Results

10 days later the crop had emerged with 2-3 leaves exposed and by day 20 we had near complete canopy. First flowers emerged 40 days after seeding and continued through to termination with a cultipacker on September 1st. The crop peaked at a height of 5 feet tall. No estimate was made on biomass although literature indicates up to 1.5 ton/ac. While this was not our intention for this field it turned in to a very successful cover crop that accomplished all of our goals and provided excellent planting conditions for the following crops. The only drawback to this cover crop is the high seed cost.

Figure 9 - July 7th - Field 4 buckwheat

Figure 10 - Sept 1 - Buckwheat

Figure 11 - Sept 1 - Buckwheat termination

Figure 12 - Sept 1 - Buckwheat termination

Frost Seeded Clover in Standing Winter Cereal

Goals

- Our number 1 goal was fixation of nitrogen for the following corn crop (heavy nitrogen user)
- Improve soil tilth with living roots in preparation for spring 2021 seeding
- Stabilize soil particles through the winter to prevent erosion.
- Hold nutrients in our soil profile
- Improve water infiltration
- Increase microbial activity

We did not grow this crop in 2020 due to excessive flooding in our winter cereal field. But, this is one of my favorite cover crops and I wanted to include it in this report. It is by far the easiest, cheapest and most beneficial cover crop we have found yet.

Figure 13 - April 1 - Broadcast seeding red clover in standing rye

Frost seeding is the method of broadcasting cover crop seed into a living winter cereal crop during late winter or early spring while the ground is still frozen (with or without light snow cover). As the soil expands and contracts through several freeze/thaw cycles it draws the seed down in to the soil. When temperatures warm the cereal crop starts to grow again and the cover crop germinates. The cereal crop eventually shades in the smaller cover crop causing it to go dormant. Once the cereal crop is harvested in early August the cover crop is exposed to sunlight and begins to grow again without tillage or intensive seeding operations to get it established.

Figure 14 - Spring 2019 - Dormant clover under cereal rye

Field 3 was seeded to cereal rye in September 2018. On April 1, 2019 10 lbs/ac of a blend of single and double cut red clover was broadcast seeded using an ATV and spinner spreader.

We chose red clover because of its shading tolerance, high level of nitrogen fixation, and tap rooted root structure. We have since learned the differences between single and double cut red clover is double cut will flower in the seeding year, with vigorous regrowth after cutting and higher yields. Single cut is slower growing and matures about 2 weeks later than double cut. If we were using the crop as a forage source we could use double cut, however, single cut is less competitive with the cereal crop and causes less difficulty when harvesting the cereal for grain. We now use exclusively single cut in our rotation.

Figure 15 - August 2019 - Clover blend growth during cereal harvest

Results

Germination of clover was excellent following seeding. A mild spring with good moisture helped keep the clover alive under the competitive rye cash crop. The only areas that the rye killed the clover was on the driest of sand ridges where moisture competition wouldn't support the young clover. At rye harvest the clover caused mild issues with dry down but in the future we would likely try to straight cut the cereal. Regrowth was fast and aggressive and by mid September the clover had accumulated 1 ½ feet of growth and had to be mowed to reduce seed production. It was left as a mulch and living cover over winter 2019/2020. The following spring on May 8, 2020 the clover had accumulated a further 8 inches of growth and conditioned the soil for seed bed preparation and was seeded to corn. The clover area had a visual and measurable increase in corn yield over non-clover areas of the field during corn harvest 2020.

Figure 16 - May 8, 2020 – Incorporating clover regrowth prior to seeding spring cash crop

Cost

Quad and broadcast seeder	$2/ac
Seeding labor	$1.80/ac
Seed	$29/ac
	$32.80/ac

Inter-seeding Multispecies Mix in Standing Corn

Goals

- Our number 1 goal was to stabilize soil particles through the winter to prevent erosion.
- Hold nutrients in our soil profile
- Improve soil tilth with living roots in preparation for spring 2021 seeding
- Improve water infiltration
- Increase microbial activity

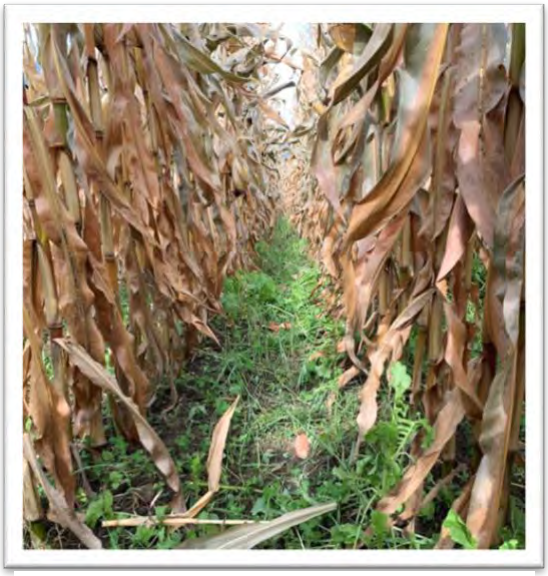

Figure 17 - Oct 12, 2019 - Successful cover under corn at harvest time

Interseeding is a cover cropping method of spreading seed in to a growing corn crop just before the corn canopies (shades in the soil surface). Cover crop seed is given enough time to germinate and grow to several inches in height before the corn shading causes it to go dormant until fall. As the corn crop matures and begins to dry down the leaves drop allowing sunlight to reach the cover crop below. The cover crop comes out of dormancy and depending on species selected can grow until frost kills it or overwinter until the following spring. The benefits of having a growing cover include a reduction in compaction (packing of the soil layers during harvest), catchment of leftover nutrients in the soil, protection of the soil during hot summer months, increases in soil microbial activity, and increases in soil organic matter. There are good opportunities for further value of this cover crop if a producer wanted to use it as harvested forage or as a grazing forage source. We used this in a grain corn system but it would work equally as well in a silage corn system. We used this in an organic system but I suspect it would work even better in a conventional/chemical system where weed competition is less during the growing period. This cover crop has been very inconsistent for us for several years of experimentation. Our 2019 interseeding trial was very successful in most parts of

the field and we attributed that to early seeding at a younger corn stage and good spring moisture conditions even in a competitive corn stand.

Field 4 is mostly a clay and clay loam field, it generally has good soil moisture throughout the season. We chose to interseed a multispecies blend including:

- 25 lbs winter wheat – to provide winter cover and green up early in spring
- 5 lbs red clover – to help replace some of the nitrogen used by the corn
- 3 lbs tillage radish – to provide fast soil cover and accumulate leftover nutrients
- 1 lbs turnip– to provide fast soil cover and accumulate leftover nutrients

The cover was interseeded June 25th at corn stage V6 (~24" in height, 6 visible leaf collars) with high moisture conditions. We mounted an Einbock pneumatic seed box on a Lilliston cultivator with distribution nozzles mounted to spread seed in between each 30" row of corn. The cultivator lightly incorporated the seed which we have found critical for good germination.

Figure 18 - Lilliston cultivator with Einbock pneumatic seed box

Costs

Tractor and Broadcast Seeder	$8/ac
Seeding labor	$3.60ac
Seed	$38/ac
	$49.60/ac

Results

Figure 19 - Interseeded cover crop germinating between 30" corn rows

Germination was excellent but the corn quickly shaded the cover crop in before it could create ground cover or build a reasonable root system to access moisture through the driest part of the summer. The cover crop was a failure in most of the field and we attribute that to seeding too late when the corn was too tall. However, there were some areas of corn that were affected by wireworms early on and in those areas of poor growth the cover crop did quite well. Some of the turnips and radishes grew to amazing size and certainly absorbed a lot of leftover nutrients, providing good soil coverage and weed competition. In the future I would target corn V4 (4 visible leaf collars) or earlier seeding of the interseeded cover crop. Irrigation would be an excellent tool in managing this type of cover to ensure timely germination and moisture support of the dormant cover crop through summer. I think that with proper management there is good value here including fall grazing or early spring forage production. While this particular year the cover crop did not meet our goals I believe it was a management issue rather than a system issue and will continue to experiment with this system.

Conclusions

- Cover crops make a massive improvement in soil health and tilth and provide good value, especially in a livestock operation.
- One of the most common practices locally is leaving annual fields (corn) fallow or uncovered over winter. This helps with soil tilth for seed bed preparation, especially in clay areas. We have found that a successful cover

crop with growing roots in the spring improves soil tilth more than winter fallow providing an excellent seed bed for spring crops.
- Cover crop species characteristics should be researched in depth and referenced back to a producer's goals for species selection.
- A producer needs a plan A through D and a willingness to keep an inventory of seed in case conditions are not conducive to a given plan.
- Producers should consider experimenting with cover crops on a small scale first rather than farm wide. There are a lot of interrelated potential hazards including pests, allelopathy, residue, and termination.
- Producers should manage their cover crops as well as they do a cash crop for maximum benefit.
- Irrigation in our area is almost a must for effective cover crop management. It enables early germination and maximum use of the available growing season. It also reduces the risk of cover crops using up all available soil moisture.
- Sowing and growing cover crops is not cheap. Growers should evaluate the cost/benefit and seek financial support where they can show ecological improvements. Governments and retailers should consider contributing to the use of cover crops on agricultural soils as a way of providing societal benefits.

Information Resources

There are a wide variety of information sources on cover crops and generally most sectors in agriculture are discussing soil health principals regularly. There are many podcasts, magazines, associations that report on cover crop use. Social media forums are a great source of on farm information straight from producers. Here are some of the more common sources we have used:

https://www.sare.org/

https://covercrops.ca/

http://www.regenerativeagriculturepodcast.com/

https://rodaleinstitute.org/

https://understandingag.com/

https://kindharvest.ag/welcome/

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