The Move to No-Till Farming in Alberta

Don Wentz

Alberta is in the shadow of the Rocky Mountains. Limited rainfall and warm chinook winds create an environment where moisture management is essential. Before there was machinery to manage for moisture conservation, farmers used summerfallow to store enough soil moisture to insure they could produce a crop. Wind erosion was and is always a concern, so strip cropping was the adopted method to prevent or at least reduce the erosion that usually occurred during the cold winter months. Machines like the Noble Blade kept residue in place and gave some protection from the wind as well as trap snow. Wheat was the dominant crop for many years. The Canadian Pacific Railroad realized that if they were to attract settlers, irrigation would be a benefit. Alberta has developed 13 Irrigation Districts with over 1,250,000 acres irrigated. Irrigation has given Alberta a level of crop diversity that would not be possible under dryland conditions. Sugar beets, potatoes, sweet corn, many vegetable and other special crops as well as high quality alfalfa and other forage crops are now grown on irrigated lands. There are problems that these crops create for soil conservation, like wind and water erosion and salinization. The focus of this paper will be directed toward our dryland cropping systems.

In 1982, a severe drought combined with winds that blew extremely hard created one of the most severe wind erosion events seen since the 1930’s. That date, often referred to a Black Monday, created dust clouds that airline pilots flying over the Atlantic Ocean reported seeing. Dr. Wayne Lindwall from the Lethbridge Research Station was speaking to producers about adopting no-till systems as a soil conservation practice. Equipment and technology was changing so fast that much of the equipment that was once used for soil conservation was outdated. Many of the early adopting no-till farmers lost their farms because of the huge financial risks they took on as they adopted the technology. It wasn’t just the cost of the machinery, but also the changes that occurred to the soil as producers moved from tillage to no-till. Crop selection had to be expanded, weed populations changed from annuals to perennials and other management changes were required. Marketing of the new crops was also a big factor.

It was at that same time that a group of farmers began to organize themselves. This first group of no-tillers called themselves, The Alberta Conservation Tillage Society, “ACTS”. In the early 90’s, ACTS lobbied the Federal and Provincial governments to put in place a team of agronomists who could help producers adopt the technology. From this effort, Reduced Tillage LINKAGES was formed. The initial focus of the RTL was on purchasing of equipment like no-till drills. Today, the focus on equipment is combined with a focus on crop diversity, better management practices (BMP’s) related to fertility and weeds, economic viability and recently green house gas mitigation. RTL has established a network of farmers we call “Farmer to Farmer Network” where producers can be coached by a fellow farmer who has adopted no-till technology on his farm. There are six RTL staff covering the Province. Our efforts are mainly extension events like workshops, seminars, field-days and demos. We network with other conservation minded groups and organizations to deliver a total package.

No-till has increased greatly in the 90’s and one development that occurred to speed up adoption of no-till was a reduction in the cost of Roundup or glyphosate. Roundup went from about $30.00 per liter to about $10.00 per liter in a short period of time. Roundup is the preferred chemical for total weed control as producers moved away from any tillage. Roundup at $10.00 per liter, made chemical fallow or pre-seed burn down economical. Farmers really appreciate the benefits that Roundup offers as a total weed and volunteer crop control product. Glyphosate also controls many of the perennial weeds that were replacing the annual weeds that once were problems. By using Roundup to control weeds and volunteer crops in the spring, producers have an effective and economic alternative to tillage. This is one of the reasons prairie
farmers oppose any further Roundup ready crop development. Further Roundup ready crops will add to the volunteer weed pool that farmers need to control in the spring.

The benefits of no-till are seen in the improvement of soil quality. Years of fallow depleted the prairie soils of organic matter, but also caused a reduction in the soil flora and fauna that improve soil quality. Tillage destroyed the pore holes that earthworms used to breath, reducing their numbers and thus the pores that improved water infiltration. So the tillage that was used to increase stored soil moisture was actually causing a reduction. Issues like soil disturbance, fertilizer placement and fertilizer rates are becoming bigger issues. Dr. Jill Clapperton, a scientist at the Lethbridge Research Station, noted that the move to no-till resulted in an increase in microrhyza, the plant and animal species that live in the soil. Earthworms, for example create long tunnels that allow moisture to move into the root zone rather than flow off the soil or create a mud bog. One no-till farmer noted that after a rain, his soil is moist and soft but not muddy. His neighbor, who still conventionally tills, has 3 or 4 inches of muddy soil over a dry compacted hard pan. This difference in the nature of the soil translates into yield.

Producers found that the traditional crop/fallow rotation was no longer required as better soil moisture retention was occurring. As a result a greater effort was made into developing BMP’s for crop rotations. Groups of Farmers made the trek to Dakota Lakes, South Dakota to see what Dr. Gary Beck was doing. Many Alberta farmers quickly accepted his philosophy of rotation, sanitation and competition. Crop rotation was the largest requested topic for no-till farmers made at a recent no-till conference. The equipment part has taken care of itself, although there are still issues. The first move from tillage to a no-till system was into a hoe opener. Most farmers preferred the seed placement and evening of the field that was accomplished by a hoe drill. Under no-till management however, producers are looking at lowering their soil disturbance. Producers are now moving to lower soil disturbance disk openers. Under typical dryland tillage conditions producers first also looked at widening their drill spacing for better yields. Now the move is to increase seedbed utilization. So the 12-inch spacing Stealth hoe openers that first appeared are being replaced with 9 or even 6 inch disk drills.

No-till has also created another problem. Now, previous crop residue is an issue and producers who leave their straw on the soil surface are looking at ways to manage that residue. Farmers are also beginning to spend more money on sprayers and smaller tractors than before. The 300 plus horsepower tractors are being used less and the 150 HP tractors are being used more. The result is, producers who filled their bulk fuel tanks 3 or 4 times during the spring and summer, now only fill it once and it lasts until fall.

Farmers are also looking at becoming more efficient in use of all inputs. Ammonium nitrate fertilizer is made for natural gas and we all know where those prices are going. Nitrogen is projected to costs over 50 cents per pound this spring and we expect it will probably stay at or near that level. As well, the cheaper form of N like 34-0-0 is being removed from the market so the other, more expensive forms, will have to be used. The result is a need to be more efficient when using fertilizers. This has encouraged more legumes to be planted in the rotations. Peas have gone form 25,000 acres in the 1980’s to over 700,000 in 2000. This trend to pulses will likely continue. Producers have also moved away from the traditional hard red spring wheat. More feed grains and specialty wheats are being bred and grown on the prairies. A whole new series of wheat classes have developed as well, winter cereals are gaining resurgence. The use of oilseed crops in our crop rotations has been one of our stable choices. The choices are canola, mustard and flax. Over the past few years an effort has been made to find new crops that will fit into our dry and short growing season. Warm season corps like German Millet, Proso Millets and other forage season crops are gaining acres. There are opportunities to grow fall rye and canary seed as well. The Beck strategy of planting crops with altering seeding dates suits many of these crop choices.
Over-use of certain herbicides has resulted in weeds becoming resistant. Alberta now has herbicide resistant wild oats. We are getting concerned with the potential over-use of Group 2 herbicides and potential resistance. Farmers are therefore becoming more aware of how to manage their herbicide programs to keep weeds in check without over-use of one herbicide. Using the most favored herbicide year after year has changed and producers are looking at crop rotations that rectify that situation. For example, winter cereals have been gaining acres in Alberta as producers realize that wild oats are reduced with winter wheat. Winter wheat and winter triticale can be sold into the food market or go into the livestock feed market. This gives producers another option to market their produce.

One of our prominent producers is celebrating 20 years of no-till on his farm this year. He explained his rotation to me. He has basically 4 crop types: cereals, oilseeds, pulses and forages. Perennial forages are grown mainly in problem areas and are not part of his total rotation. His cereals are spring wheats, which include hard red spring wheat, durum wheat, utility feed wheat and some times barley as spring cereals. He also has winter wheat and winter triticale for fall seeded cereal crops. For his oilseeds, he has canola and flax. Mustard is an option for producers who don’t want to plant canola but is not a selection of this producer. For pulses he has field peas and lentils. Chickpeas are also an option but producers don’t like chickpeas because of their high moisture use requirements. They don’t ripen well, have weed problems and often are hard to market. As well the need for other inputs like fungicides raise the cost of production. For forages, there are annual choices like the millets or some annual rye grasses. Cereal crops like barley can also be considered a forage when it is grown for feed or a silage crop. This producer has winter triticale that he sells as a feed grain but isn’t considered a forage. By looking at these 4 basic categories, considering that there are 3 to 6 choices in each category, the producer can create a rotation that suits his farming operation, market opportunities and BMP’s.

The move to no-till has been steady over the past decade and economics played a large role in the adoption of no-till. One producer for example, my age, farms about 3,000 acres by himself. He said he’d never be able to manage this large a land base unless he used no-till technology. The trend to no-till is shown by the 2001 Statistics Canada survey. There are presently about 20,000,000 acres in what we refer to as the white zone in Alberta with 35,000 farms. About 18 million acres are prepared for seeding, the remaining two million is summerfallow. About 19% or 6,490 of those farms practices no-till farming. This accounts for 27% of the land base. There are also 31% or 10,863 of Alberta farms that practice reduced tillage accounting for 35% of the total land base. The remaining 22,041 farms incorporate their residue accounting for 63% of the farms and 37% of the acres. We expect those producers who are in a reduced tillage program to continue to move toward no-till. We expect no-till farmers to continue to move to lower disturbance direct seeding. Fallow acres are usually located in the brown soil zone and are very dependent upon moisture conditions. In the southern region, those that are conventionally tilling are mostly irrigation farmers. There are some real issues with wind erosion on some irrigated crops, like potatoes, beans and sugar beets. We are working with these producers to develop management tools that will reduce erosion problems.

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