USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

The Economics of Stripper Header and Disc Drill Adoption

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The Problem

Dryland grain production is the dominant crop system in Montana, with 5.5 million acres in wheat cultivation, primarily in the Golden Triangle of central Montana and the Platinum Rectangle of northeast Montana (2022 Montana Ag Statistics). Anecdotal evidence suggests that the majority (>75%) of dryland producers in these regions use a hoe drill for seeding and an auger or draper header for small grain harvest.

While many producers like the convenience of the hoe drill, this seeding method poses multiple drawbacks from a soil conservation and soil health perspective. Harvest heights in these systems are low, typically about 6 inches tall, to accommodate the inability of hoe drills to seed into tall standing stubble as the residue can plug up around the shank. The hoe drill's inability to handle tall residue makes crop fields more vulnerable to erosion as standing vertical residue is three times more effective at controlling wind erosion than flat horizontal residue (NRCS National Agronomy Manual). Hoe drills also cause a high amount of soil disturbance, which breaks soil aggregates, releases stored soil carbon, and decreases pore space. This decreased aggregation and pore space results in decreased soil water infiltration rates and soil water holding capacity, making fallow more likely in the crop rotation for needed moisture storage. The high disturbance of the hoe drill can leave the fields bare and exposed to both water and wind erosion, and as a result, this drill type does not meet the NRCS No Till standard (Conservation Practice Standard 329).

The solution to preventing wind erosion involves using multiple conservation and soil health strategies, including increasing the amount of high residue crops in the rotation (small grains, grain corn, grassy cover crops, etc.), reducing field sizes and unsheltered distances, cutting small grains taller at harvest, and leaving the maximum amount of high carbon residue on the field. Hoe drills work against these solutions by requiring short stubble heights and decreasing surface residue. And while they do have one advantage in protecting against wind erosion, as they create a furrow to protect young seedlings against blowing sediment, this same protection could be provided by taller, high carbon residue.

Top: Hoe drill. Bottom: Field seeded using hoe drill.

Lentils are a low carbon crop that breaks down quickly and can leave soils with little protection against erosion unless coupled with high carbon crops in the rotation.

The Solution

Disc drills and stripper headers offer a solution to the problems caused by hoe drills and low harvest heights. Single and double disc drills have the least soil disturbance of all drill types and do meet the NRCS No Till standard (CPS 329). The design configuration of the disc drill allows for seeding into tall standing stubble, as there is no shank for residue to plug on. As a result, producers with disc drills can leave standing stubble much taller at harvest. This tall stubble protects against erosion and creates a micro-climate that reduces soil water evaporation.

While both auger and draper headers can harvest at heights of 10-12" or more, the stripper header leaves stubble even taller by only stripping off the grain head and leaving 90% of the residue standing and vertical (approximately 2.5 ft, depending on the finished height of the grain). Paired together, disc drills and stripper headers are the best machinery combination for conserving soil and water and increasing soil health in dryland small grain rotations.

Field seeded into stripper stubble with a double disc drill.

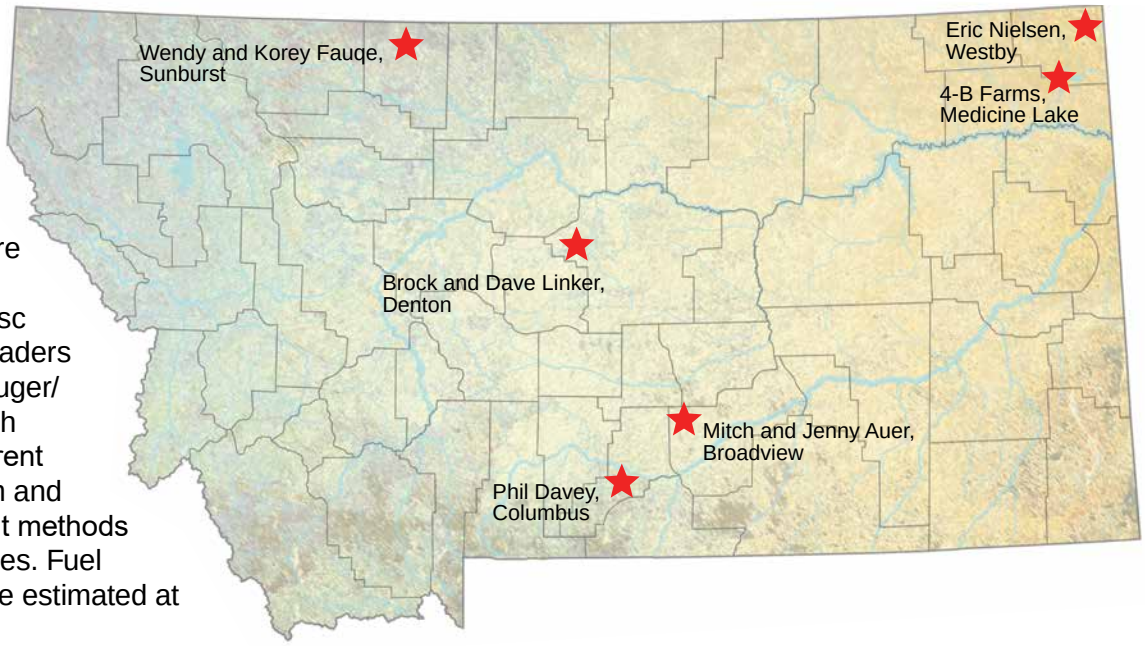
Double disc drill.

Stripper header.

Draper header.

Background

To promote the adoption of disc drills and stripper headers, NRCS Montana interviewed six dryland grain producers to compare the ownership and operating costs of disc drills and stripper headers with hoe drills and auger/ draper headers. Each producer has a different management system and incorporates different methods of soil health principles. Fuel and labor savings are estimated at 2021 prices.



Brock and Dave Linker – Denton, MT

Dave and Pam Linker (above) and Brock Linker (inset), of Linker Farms.

Brock Linker and his family operate 5,000 dryland crop acres in a continuous crop rotation of winter wheat, feed barley, flax, oats, chickpeas, corn, alfalfa, and multi-species cover crops.

Over the last 5 to 10 years, the Linkers have transitioned to full continuous crop no-till farming, incorporated a disc drill and a stripper header, and added cattle grazing on cropland.

Brock started using a disc drill in 2011 and a stripper header in 2014. He currently uses a K-Hart Spyder 60-ft low disturbance double disc drill, a 36-ft stripper header for grain and flax harvest, and a 35-ft draper header for chickpea harvest. Prior to the conversion, they had a 40-ft Flexi Coil hoe drill and a 35-ft draper header. During this time, they were having problems with hair pinning at seeding, lack of moisture for re-cropping, and diseases in crops.

After switching to the disc drill and stripper header, Brock reduced his fuel usage at both seeding and harvest by 0.50 gal/ac for a total annual fuel savings of 1 gal/ac, or $3.40/ac. He also covers an additional 16 ac/hr at seeding, and 3.5 ac/hr at harvest, resulting in a total $0.62/ac annual savings in labor. Brock also eliminated using a roller after chickpea planting, saving about $5.30/ac in the chickpea year.

The Linkers can now seed earlier in the spring without waiting for the ground to dry out, and without more soil disturbance than necessary. Likewise, they can seed any crop into any type of residue without any field prep other than spraying (and sometimes eliminating spraying as well). This saves equipment wear and fuel, as well as saving the fields from unnecessary compaction or disturbance. The new equipment has increased their soil moisture and allowed them to move to continuous cropping and growing cover crop cocktails for grazing on cropland.

Brock says there are a few things to be mindful of when making the switch but believes the stripper header is worth it because it brings everything together. Disc drills work better with more residue and eliminate harrowing or tillage of any kind. Likewise, more residue protects the soil from the wind and sun. Continuous cropping is a great way to utilize the little moisture we get, but it requires a diverse crop rotation to prevent diseases and other pest issues. Sometimes when trying to grow multiple spring-seeded crops, things go wrong, and you might not have a perfect stand. With a disc drill you can go back and interseed thin areas or dead spots without disturbing the soil or the existing crop. The Linkers also note that the soil benefits will not be realized immediately but can take 5-7 years to take effect.

Low disturbance double disc drill used on Linker Farms.

Dave and Brock Linker with Marni Thompson, NRCS Soil Health Specialist during a water infiltration test. Rapid water infiltration helps to keep water in the soil where plants can use it rather than running off, potentially causing erosion.

Wendy and Korey Fauque – Sunburst, MT

Wendy and Korey Fauque.

The Fauques manage 4,500 acres of dryland wheat, barley, peas, and grazed cover crops and 1,000 acres of grazing land. Prior to 2012, they had a traditional winter wheat or barley-fallow rotation and then started adding peas to the rotation.

In 2012, they began to add even more diversity to the rotation and in 2018 eliminated fallow altogether. Their current three-year rotation is wheat-barley-peas (or other broadleaf). They market their own grass-fed beef, and intensively graze cover crops on cropland as well as rangeland. Over the past 10 years, the Fauques have reduced inputs including herbicide, fertilizer, and seed treatment. Recently they have been making their own compost extract and applying it at seeding.

In 2020, they bought a 50-ft Case single disc drill and 32-ft stripper header. Prior to 2020, they used a 40-ft Case hoe drill with a 40-ft draper header. The Fauques cropland is very rocky. As a result, they had thought a disc drill would not work well on their property. However they find the disc drill handles the rocks better than the hoe drill as it rolls right over the large rocks and brings fewer smaller rocks to the soil surface. As a result, they have eliminated using a roller after seeding a pulse crop, resulting in a $5.00 per acre saving during the pulse year.

Since changing their equipment, the Fauques have less weed issues due to increased residue acting as a mulch and have decreased their spray operations. With the addition of the stripper header, they also spend less money on diesel fuel at harvest, saving 0.5 gallon per acre, or $1.70 per acre annualy. The stripper header also saves time and labor cost, as well as less money on combine maintenance due to pushing less residue through the threshing machinery. The stripper stubble is typically 18-24 inches tall and provides greater snow catch, increased soil moisture and water holding capacity, decreased wind speeds and drying at the soil surface, and a more protective micro-climate at the soil surface for seedling emergence and survival.

One disadvantage of more residue left on the field is an increased risk of starting fires. However, the addition of rubber skid plates to the bottom of the stripper header has resolved that issue, but they are careful to slow their harvest speed in dry conditions. Korey talks more about managing fire risk in high residue systems in his video at https://www.youtube.com/watch?v=yznt3vkOFlg. On the positive side, they now have improved seed placement with the disc drill, and it seeds into the tall residue with no issues. They are very happy with the equipment change due to decreased input costs, increased profitability, and improved soil health.

Wendy Fauque with disc drill used for no-till seeding.

The disc drill rolls right over large rocks.

Eric Nielsen – Westby, MT

Eric Nielsen

Eric Nielsen farms about 5,000 dryland acres in a durum-pulse-durum-oilseed rotation. In 2010, he switched from a 41-ft John Deere hoe drill to a 60-ft John Deere 1895 single disc drill.

He made the switch to have better depth control and the ability to seed through any kind of residue. Another big difference is he had to use a rock picker every year with the hoe drill but hasn't needed it since switching to a disc drill as it doesn't dig up the rocks like a hoe drill.

Since converting to a disc drill, Eric spreads granular herbicide on the soil surface. Sunlight doesn't degrade the granular herbicide because of the amount of residue protecting it. No working or harrowing is necessary. He does caution others to pay attention to herbicide labels and to beware of any herbicides that might get tied up in the residue.

Eric started using a 42-ft stripper header in 2018 to harvest his durum crop. Prior to the stripper header, he was using a 45-ft draper header, which he still uses for pulse crop harvest. Eric was noticing issues with the disc-drill and seed-to-soil contact because of the amount of residue buildup on the soil. The purchase of a stripper header allowed him to seed through standing residue and not flat residue.

After switching to the disc drill and stripper header, Eric reduced his fuel usage at seeding by 0.15 gal/ac, and at harvest by 0.50 gal/ac for a total annual fuel savings of 0.65 gal/ac, or $2.21/ac. He also covers an additional 14 ac/hr at seeding and 6.5 ac/hr at harvest resulting in a total $0.69/ac annual savings in labor.

Since converting, Eric has noticed the biggest advantage is moisture retention. Stripper header stubble catches far more snow compared to fields harvested with a draper header. The snow also doesn't blow around and create drifts across the field. In addition, the increased residue reduces soil moisture evaporation. Residue is evenly spread across the field to catch rain drops where they fall. Eric also credits the stripper header/disc drill combination with providing protection for young seedlings, as the residue keeps them moist and prevents them from drying out and dying in drought years. In an area that only receives 12 inches of annual precipitation, catching and keeping any moisture received is incredibly important.

Eric has also noticed a big improvement in crop stand establishment when seeding into a field harvested with a stripper header and has reduced his canola seeding rate as a result. Eric has also noticed better weed control, which he credits to the minimal ground disturbance and the shading the stubble creates on the soil. He also sees more wildlife such as deer and upland game birds in fields with stripper stubble. He does note that hunters are not a fan of the tall stubble because they can't see the animals as easily, and their dogs struggle to walk in it.

For farmers wanting to make the switch, he advises getting a disc drill before getting a stripper header, because using a stripper header with a hoe drill is nearly impossible. He also advises being aware of crop variety heights and using shorter varieties that are more resistant to lodging. Eric says that switching to a disc drill and stripper header forces a farmer to change their mindset but it is worth it because of the moisture retention.

Eric Nielsen (right) discusses use of a stripper-header with Marni Thompson, NRCS Soil Health Specialist, (left).

4-B Farms, Earl, Kathy, Brady and Bailey Berntson – Medicine Lake , MT

Earl Berntson with sons Brady (left) and Bailey (right).

4-B Farms operates about 10,000 dryland acres in a durum-pulse-durum-oilseed rotation. They began using no-till disc drills in 2008 and stripper headers in 2013.

The operation currently uses two 60-ft Case IH Precision 500 single disc drills with 7.5 inch spacing, as well as two 32-ft Shelbourne stripper headers for harvesting wheat and flax. They also use two 40-ft draper headers to harvest peas, lentils, canola, and mustard. Prior to their conversion to disc drills, 4-B Farms used a 45-ft Flexi Coil hoe drill with 9-in spacing and a 35-ft draper header to harvest all crops.

They switched to a disc drill to reduce soil disturbance and increase soil structure. As they reduced soil disturbance, surface residue increased. In most cases this residue was very beneficial, as it conserved soil moisture and maintained cool ground temperatures during the summer months. However, after multiple years of heavy straw and residue from their durum crops, 4-B Farms began seeing problems with crop emergence and seed-to-soil contact when seeding in the spring due to the large amount of straw lying flat on the ground from the draper header.

In 2013, they switched to a stripper header to reduce hair-pinning and poor seed-to-soil contact, as well as help to reduce erosion from wind and water. Because the stripper header leaves residue standing verticallly and not lying horizontally on the soil surface, there are far fewer hair-pinning problems. Within the first two years of using the stripper header they began to see benefits, such as an increase in organic matter and a reduction in soil erosion from wind and rain. They have also noticed an increase in their soil water holding capacity and cooler ground temperatures during the summer months. On a hot summer day, their fields have a measured soil surface temperature of 80°F in the stripper stubble, while a neighbor's field with low stubble measured 121°F. The tall stubble left by the stripper header also catches more blowing snow during the winter months and provides weed suppression where the ground is covered by residue. The use of the stripper header also reduces wear and tear on the combine.

After switching to the disc drill and stripper header, 4-B Farms reduced their fuel usage at seeding by 0.25 gal/ac and at harvest by 0.50 gal/ac for a total annual fuel savings of 0.75 gal/ac, or $2.55/ac. They also cover an additional 25 ac/hr at seeding, and 9.5 ac/hr at harvest, resulting in a total $1.11/ac annual savings in labor.

After making the equipment changes, 4-B Farms found that the residue built up faster than it can be broken down if a diverse crop rotation is not implemented. As a result, they have recently introduced oilseed crops into their rotation. Overall, they have been very pleased with the results. Their stripper headers require little maintenance from season to season and the benefits they have seen greatly outweigh the expense of the purchase cost.

Tall stubble left after harvest is seen on the right in this photo.

Phil Davey – Columbus, MT

Phil Davey.

Phil Davey farms about 3,500 dryland acres of winter wheat, safflower, peas, and barley. Phil manages the operational side of the farm himself and hires two helpers at harvest.

He switched from a 40-ft hoe drill in 2012 and currently uses a John Deere 1890 single disc drill. He bought a 36-ft stripper header in 2019 and uses it for small grain harvest. He also has a 40-ft draper header for pea and safflower harvest. Prior to changing his equipment, he was having problems with yield consistency and soil moisture management. Drought pushed Phil to convert to a stripper header and he has had more consistent yields since then.

Since making the change, Phil has noticed several soil health improvements, including a steady rise in soil organic matter. Over the last 10 years most fields have gained about 1% organic matter. Soil moisture is also more plentiful and consistent, resulting in eliminating fallow and moving to a continuous crop rotation on most fields. Moving to continuous cropping has helped to reduce saline seeps on his property, making potential discharge areas more productive and profitable.

After switching to the disc drill and stripper header, Phil reduced his fuel usage at harvest by 0.85 gal/ac, or $2.90/ac. He also covers an additional 12.5 ac/hr at harvest, resulting in a $0.60/ac savings in labor. In addition, the stripper header allows Davey Farms to save about 33% of the separator hours on his combine compared with a draper header.

Phil says there are a few things to be mindful of when changing equipment, such as understanding your tolerance for economic risk and identifying your top money-making crop. Once you understand these things, converting to a stripper header and disc drill is well worth the risks.

Wheat is harvested using a stripper header.

Mitch and Jenny Auer – Broadview, MT

Mitch Auer.

Mitch and Jenny Auer operate about 8,000 acres in a dryland rotation of fallow-winter wheat-alfalfa-malt barley or spring wheat. The addition of 3 or 4 years of dryland alfalfa to the rotation has allowed for decreased labor costs, as they contract the harvest and resulting hay out to various neighbors.

The alfalfa has also decreased their N fertilizer use by up to 40%. Winter wheat following alfalfa needs no N fertilizer, as 135 lb N/ac is frequently available in the soil and is confirmed with soil testing. Wheat following alfalfa can have 16% protein, but does take a yield hit of about 4-5 bu/acre less due to soil moisture use of the alfalfa. Watch Conservation for the Future - Auer Farms, Broadview, Mont. to learn more about the Auer's dryland alfafa.

The Auers switched from a hoe drill to a disc drill in 2011, and currently use a 2019 K-Hart 56-ft double disc drill with 12-inch spacing. After switching to the disc drill, they were able to reduce fuel usage by 0.25 gal/ac at seeding, or $0.85/ac savings. They were also able to cover 15 more acres per hour, resulting in $0.22/ac in labor savings. Likewise, in 2015, they switched from hiring custom cutters to buying a combine with a 36-ft stripper header and doing harvest themselves. They switched to a stripper header to save the costs of custom cutting and to improve issues with yield consistency.

Mitch and Jenny have gained many positive benefits since upgrading their equipment. First, the two of them can be primary source of labor for most of the harvest season. Second, the tall stubble shades the ground and catches snow resulting in soil moisture savings. During the drought of 2021, most farmers saw devastating yield decreases, but the Auers had only a minor decrease in yields because of their stored soil moisture in the tall stubble. Mitch said, "the moisture on those fields saved us." They also notice that their very heavy clay soils are increasing in tilth and organic matter. Finally, and most importantly, is the time savings. The stripper header and disc drill are far more efficient with time and fuel. Mitch is the primary combine driver and can still make it home for dinner most nights, attend his kids' sports activities, and go on vacation.

The Auers say there are a few things to be mindful of when making the switch, such as avoiding a fallow year after a stripper header harvest to capitalize on the winter soil moisture storage right away. Also, after a year of fallow, the residue is still standing tall and upright in the field and can break off at the soil surface and blow away in a windstorm. It's best to run a drill through stripper stubble in the spring after a fall stripper header harvest to lay it flat on the ground to act as a mulch. Mitch also doesn't see much grain loss from the header itself. He says it's important to get the settings adjusted correctly to minimize any header loss. He also doesn't worry about any header grain loss that does occur, as the decreased annual capital cost and efficiency associated with the stripper header more than compensate for any minor grain losses.

Mitch recognizes that the initial cost for a stripper header and disc drill is high but believes it is worth it because of the increased soil moisture, time and labor savings, and improvements in soil quality. He says that the "the stripper header is the last piece of equipment that will ever leave my farm."

Mitch Auer explains the features of his disc drill.

Economic Analysis

Below are the ownership and operating partial budget cost comparisons between stripper and auger/draper headers and also between disc and hoe drills. Costs include a retail purchase estimate, field capacity, labor, and fuel. Maintenance costs were included for the headers but not for the drills, as disc-drill maintenance costs are highly variable depending on make and model. Other production factors such as yield and crop production operation sequence are not included in this discussion. All operating costs represent an average of the six producers interviewed and are only an estimate.

Also, the costs and benefits given here only represent those directly related to the machinery and do not include the conservation and soil health benefits of soil moisture savings, increased crop intensity, improved organic matter, water holding capacity and soil structure, and decreased erosion.

All monetized values are based on 2021 costs. During that time, interest rates on farm operating loans were low, with the USDA-Farm Service Agency's average interest rate at 1.75%. Cost per acre information is based on a 4,000-acre farm.

Header Ownership Costs

Stripper header.

Ownership costs were determined using the retail value of a new stripper and draper header from dealership estimates. Table 1 displays the estimated stripper and draper header ownership costs for a new header without trade-in or discounts. Most of the six producers surveyed purchased a used stripper header, with prices ranging between $30,000 and $91,000 from various years.

Table 1. Header Ownersip Costs and Comparisons.

Equipment	Size	List Price	Depreciation	Interest	TIH[1]	Total
			cost/ac/year			
Draper Header	45 feet	$114,300	$2.20	$0.30	$0.30	$2.80
Stripper Header	42 feet	$100,500	$2.00	$0.30	$0.30	$2.60

[1]*Taxes, insurance, and housing*

Header Operating Costs

All header operating costs (field capacity, labor, fuel, and maintenance) were determined using the actual information given by the six producers interviewed. Table 2 shows the average field capacity and labor requirement differences between the stripper and draper headers. On average, producers were able to cover 6.5 more acres per hour (11% more) and use 0.01 hours less of labor per acre per year with a stripper header than a draper header, or about 40 hours per year on a 4,000-acre farm. Montana agricultural equipment operator labor rates in 2021 were approximately $20.00 per hour (U.S. Bureau of Labor Statistics, 2022) resulting in a labor savings cost of $0.20 per acre/year.

Table 2. Average header field capacity and labor required.

Equipment	Field Capacity (acres/hour/year)	Labor Required (acres/hour/year)
Draper Header	23.5	0.043
Stripper Header	30.0	0.033
Difference	**(6.5)**	**0.01**

Diesel fuel consumption decreased for all producers with the use of a stripper header, with an average savings of 0.5 gallon per acre, or 44% (Table 3). At the 2021 average #2 diesel cost of $3.39/gal, this represents a savings of $1.70/ac/year.

Table 3. Average header fuel usage.

Equipment	Fuel Use (gallons/acre/year)
Draper Header	1.25
Stripper Header	0.75
Difference	**0.50**

Maintenance cost estimates for each header type are given in Table 4 and include maintenance of both the combine and the header, with the combine maintenance being the bulk of the cost. In producer interviews, the maintenance costs between the stripper header and the draper header varied widely, depending on combine age and parts. On average, the six producers interviewed reported a reduction in combine maintenance costs with the stripper header due to less material going through the threshing machinery.

One producer estimated annual combine maintenance costs between $3,000 - $5,000 with a draper header. However, with the stripper header, they can skip a year or two of maintenance due to low wear. For producers who use both a draper header and a stripper header on the same combine due to a diverse crop rotation, determining maintenance cost differences was not feasible. However, despite varied combine maintenance cost among the producers, the data showed a consistent maintenance cost reduction with the stripper header of $0.60 per acre/year.

Table 4. Average annual combine and header maintenance cost.

Equipment	Maintenance Cost ($/acre/year)
Draper Header	1.00
Stripper Header	0.40
Difference	**0.60**

Table 5 displays the total average annual monetized costs of a draper and stripper header, with a total estimated savings of $2.80/ac/year with the stripper header. On the average farm size of 4,000 acres used for this report, this savings pencils out to $11,200 annually when exclusively using a stripper header compared with exclusively using a draper header.

Table 5. Header total average annual ownership and operating cost comparison.

Equipment	Ownership Cost	Fuel	Labor	Maintenance	Total
	$/acre/year				
Draper Header	2.80	4.25	0.90	1.00	8.95
Stripper Header	2.50	2.55	0.70	0.40	6.15
Difference	**0.30**	**1.70**	**0.20**	**0.60**	**2.80**

Drill Ownership Costs

Double disc drill.

Single disc drill.

Drill ownership costs were determined using the retail value of a new hoe and disc drill from dealership estimates and operating costs were determined using the actual information given by the six producers interviewed. Table 6 displays the estimated disc drill ownership costs for a new drill without trade-in or any discounts. The six producers in this survey paid between $141,000 to $539,000 for a disc drill.

Table 6. Drill ownership costs and comparisons.

Equipment	Size	List Price	Depreciation	Interest	TIH[2]	Total
			cost/ac/year			
Hoe Drill	60 feet	$216,900	$3.25	$0.66	$0.57	$4.50
Disc Drill	56 feet	$225,900	$3.40	$0.70	$0.60	$4.70

[2]*Taxes, insurance, and housing*

Drill Operating Costs

All drill operating costs (field capacity, labor, and fuel) were determined using the actual information given by the 6 producers interviewed. Table 7 shows the field capacity and labor requirement differences between the hoe drill and disc drill. On average, producers were able to cover 6 more acres per hour and use 0.005 hours less of labor per acre per year with a disc drill than with a hoe drill. This is equivalent to saving 20 hours of labor per year on a 4,000-acre farm. Montana operator labor rates in 2021 were approximately $20.00 per hour (U.S. Bureau of Labor Statistics, 2022), resulting in a labor savings cost of $0.10 per acre.

Table 7. Average drill field capacity and labor comparison.

Equipment	Field Capacity (acres/hour)	Labor Required (hours/acre)
Hoe Drill	30	0.033
Disc Drill	36	0.028
Difference	**(6)**	**0.005**

Diesel fuel consumption decreased for all producers with the use of a disc drill, with an average savings of 0.5 gallon per acre (Table 8). At the 2021 average diesel cost of $3.39/gal, this represents a savings of $1.70/ac.

Table 8. Average drill fuel usage.

Equipment	Fuel Use (gallons/acre)
Hoe Drill	1.25
Disc Drill	0.75
Difference	**0.50**

No maintenance differences were calculated between the different drill types, as estimates were highly variable depending on age, make, and model of the drills.

Table 9 displays the total average annual monetized costs of a hoe drill and disc drill, with a total estimated savings of $1.60/ac/year with the disc drill. On the average farm size of 4,000 acres, that savings pencils out to $6,400 per year when exclusively using a disc drill rather than exclusively using a hoe drill.

Table 9. Total average annual drill ownership and operating cost comparison.

Equipment	Ownership Cost	Fuel	Labor	Total
	$/acre/year			
Hoe Drill	4.50	3.40	0.66	8.56
Disc Drill	4.70	1.70	0.56	6.96
Difference	**(0.20)**	**1.70**	**0.10**	**1.60**

Conclusion

Switching to a stripper header and disc drill from a draper header and hoe drill resulted in an average savings of $4.40 per acre/year for the six producers interviewed in this study. And while the initial investment is substantial, all producers interviewed believed that both the economic and soil health benefits were worth the investment in the long-term. All six producers saved money with decreased fuel, maintenance, and labor inputs. In addition to these calculated cost savings, these producers realized multiple soil health benefits that were not monetized in this analysis. Each producer spoke of the value of saving soil moisture and the ability to increase crop intensity. Keeping the soil covered with tall stubble from the stripper header and minimizing soil disturbance with a disc drill are two key components of a healthy dryland crop system that will build both economic and environmental resilience for future generations.

References

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All photos: USDA-NRCS.