



DIVERSIFYING THE CORN BELT: EXTENDED ROTATIONS

INTRODUCTION

Extended rotations incorporate one or more small grains, pulses, oilseeds, forages, or pasture crops into an annual corn-soybean rotation. Some small grains like oats or winter rye can also be grown as a spring forage or for cover crop seed, but crops planted strictly as cover crops are not considered an extended rotation. One common three-year rotation is corn-soybean-winter wheat. Additional examples of crop rotations are provided in **Table 1**.

BENEFITS OF EXTENDED ROTATIONS

Extended rotations provide a range of economic, agronomic, and environmental benefits. On-farm agronomic advantages can include improved soil health and reduced insect, weed, and disease pressure, either through reduced populations and/or increased natural control processes. Economic returns can include higher yields of corn and soybeans; increased net income with fewer inputs; and, depending on the availability of markets, diversified sources of farm income.¹⁻³

SOME ALTERNATIVE CROPS FOR EXTENDED ROTATIONS IN THE CORN BELT

Hay/Forage/Silage

- Pearl Millet
- Sorghum
- Sorghum-Sudangrass

Oilseeds

- Canola
- Sunflower

Pulses

- Dry beans
- Peas (field peas or dry peas)

Small Grains

- Barley
- Buckwheat
- Oats
- Rye
- Triticale
- Wheat

Off the farm, more diverse rotations can increase opportunities for new enterprises, such as processing plants and food businesses, based on the new crops grown. Off-farm environmental benefits can include reductions in erosion, nutrient runoff and leaching, greenhouse gas emissions, and fossil energy consumption.⁴⁻⁶

HOW EXTENDED ROTATIONS COMPLEMENT CORN-SOYBEAN SYSTEMS

Winter annuals, forages, and other small grains can provide alternate revenue opportunities. These crops use the same fields and often the same equipment as corn and soybeans and require some additional production knowledge and skills, as well as different timing for the growing season. For example, small grains are planted and harvested at different times than corn and soybeans, giving producers some reprieve on time and labor during peak operational demands, as some acres are devoted to other uses. This timing can be challenging to adapt initially, but advantages include:

- *the ability to more efficiently use farm labor and spread income throughout the year*
- *less intense, less risky operational demand during corn or soybean planting (since fewer acres are devoted to these summer annual row crops)*
- *spreading risk of exposure to extreme weather events*

Planting winter wheat, rye, or winter barley in fall can conflict with harvest in corn and soybeans, and during the spring and summer, other management conflicts may arise with fertilizer, herbicide, and fungicide applications in row crops. However, when these small grains are harvested in the summer, they provide an opportunity to plant a double crop of soybeans, sunflowers, or forage in more southern areas of the Corn Belt, seed cover crops earlier, apply manure, or tile fields during a time of year when installers might be less busy.

Forages include both annual and perennial options with a variety of possible planting dates (see **Table 1**). Annual forages can easily fit into yearly crop rotations while perennial forages often require a longer establishment period and multiple years of growth for financial viability.





additional harvest equipment (mowers, choppers, rakes, balers, etc.) and proximity to livestock operations.

LABOR REQUIREMENTS

Many corn and soybean farmers, given their uneven operational demand needs, are reliant on additional labor for short periods of time (e.g., spring planting, fall harvest). Seasonal part-time labor can be difficult to find, and high work demands on family members could result.

While more complex rotations might require more management, growing crops that are planted, sprayed, and harvested at different times of year means that labor and resources can be more evenly distributed throughout the year. Some farmers appreciate distributing work in this way, while others prefer to reserve vacation days such as the Fourth of July, when winter wheat is often ready for harvest.⁷

The increased labor demand from extended rotations can justify hiring additional full-time employees or seasonal help. If local labor is not available, the federal H-2A Temporary Agricultural Workers Program can allow farmers to hire international workers. For example, many row crop producers in the Corn Belt and Plains states have been hiring skilled operators from South Africa through the H-2A program. Many of these operators speak English and contribute their expertise from South African agriculture, which has elements similar to modern row cropping in the Corn Belt.

Extending corn and soybean rotations to include three or more crops can be done without hiring additional labor, but additional skills and overall management requirements are needed due to the increased complexity of the rotation. Still, many of the skills of growing corn and soybeans are transferable.



EQUIPMENT AND INFRASTRUCTURE

The type of equipment required will depend on which crops are included in the extended rotation. For small grains (e.g. oats, wheat, or rye), equipment used for tillage, seedbed preparation, or spraying in corn and soybean production is sufficient. A grain drill provides the best stand establishment for small grains; many farms already use one for cover crops or have a relic of past seeding methods for soybeans and other crops. A grain header used for soybeans can harvest small grains, some oilseeds like canola, and pulses that don't require swathing, but different concaves might be needed for the combine.

Wagons or trucks to transport crops to market are needed. While existing grain bins can be used, additional bins might be needed for storage. The crop can then be sold when the market price is higher or contract demand for later delivery, which often includes a price premium, can be met. Some crops destined for local or niche food-grade markets, e.g. corn sold directly to a local tortilla manufacturer, might require an on-farm or third-party grain cleaner.

When venturing into less common crops like pulses (e.g., spring peas) or oilseed sunflowers, some additional harvest equipment might be necessary, depending on factors like harvest conditions and crop varieties. For example, spring peas often require swathing and harvesting with a pickup header. Sunflowers are prone to shatter during harvest. These losses can be minimized with a sunflower combine header equipped with pans to catch the seeds that shatter from the sunflower head during harvest. Hay also requires

MARKET OPPORTUNITIES

While Midwestern markets for alternative row crops are not yet as abundant as corn and soybean markets, there are many options to earn revenue from crops in extended rotations. The right market and price depend on the crop, volume, and quality, as well as farmer's interest in and capacity for marketing. Quality considerations can include falling number, moisture content, thresholds for mycotoxins, oil content, and/or protein content.

With large volumes that meet buyers' quality specifications, a crop can be sold wholesale to elevators, brokers, or food manufacturers. Some elevators receive crops like winter wheat but often do not accept other small grains, pulses, oilseeds, and seed crops. Processors such as Grain Millers, Star of the West, and Puris purchase oats, barley, soft wheat, hard wheat, rye, triticale, flax, and edible peas directly from Corn Belt farmers. Some niche food-grade markets are not necessarily high volume and might require providing additional services to appeal to buyers. However, these niche markets can offer a substantial premium for additional handling by the farmer. For example, small processors or other end users might need the crop stored until they are ready to process it. The crop also might need to be cleaned and toted for small batch processing. If marketing relationships are established, investing in infrastructure to add value on-farm can provide good returns.

For farmers who want to capture more value from their products, direct sales can be a good option. Selling directly to local end users requires finding local markets and potentially cleaning or milling products on-farm. While not yet common, some integrated, high-management operations are beginning to purchase and install their own processing equipment to have more control over quality, reduce reliance on third parties, and improve margins. Breweries, distilleries, bakeries, and farmers markets are some options for successful sales. Direct sales require greater time investments in cleaning and processing, building relationships with buyers, and marketing products, but the premium can make the opportunity worthwhile.

For crops that do not meet quality standards for food-grade production, livestock markets may be a back-up option. Feed or bedding can be supplied to local livestock (e.g. poultry or cattle) or horse producers.

A significantly lower price can be expected in feed-grade markets, representing a financial risk if food-grade sales were planned. When starting out with a new crop, some farmers reduce risk by selling to feed markets, if possible, while becoming familiar with the food-grade quality specifications required by buyers.



CHALLENGES FOR EXTENDED ROTATIONS IN THE MIDWEST

Because of the dominance of corn and soybeans in the region, growing, processing, and marketing alternative crops comes with some challenges. Limited market access and low prices have tended to make these crops less lucrative than corn and soybeans. Alternative crops sometimes lack the same underlying support and investment as corn and soybeans, including crop insurance availability, breeding for improved varieties, equipment, widespread use in livestock rations, and access to information and technical support.

Alternative row crops might not have pre-made Individual Plans through the [USDA Risk Management Agency's Federal Crop Insurance Program](#) and will require a written agreement to be insured. However, it is possible to find ways to insure alternative row crops. Other programs such as [Whole-Farm Revenue Protection](#) insure all products in an operation under one policy based on the operation's previous reported revenue.⁸

The availability of suitable varieties and information can also be a challenge for extended rotations. For food-grade oats, dried peas, or similar crops, locally adapted varieties might not exist or could be difficult to find. These crops need additional plant breeding efforts. Similarly, practical information on production methods for extended rotations may be available but not tailored to current climate or location. In addition, equipment for alternative row crops may be outdated, difficult to obtain, or expensive.⁷

Personal knowledge gained by experience could take time to develop. Stepping outside of status quo farming practices when adding crop diversity can lead to questions from other farmers and members of the ag community. Answering these questions is an excellent opportunity to share the potential for risk management, diverse markets, soil health and water quality improvement, and more that can be gained in extending rotations for row crops. Consider seizing opportunities to potentially gain competitive advantages with additional crops.

OPPORTUNITIES FOR EXTENDED ROTATIONS IN THE MIDWEST

The increased demand for small grains and pulses provides an opportunity to serve interest in local brewing and artisan baking, as well as plant-based alternative foods.⁹ Processors are excited about locally sourced food and ingredients,¹⁰ nondairy milk,¹¹ low- or no-gluten flours,¹² and plant protein.¹³ For example, some millers pay two to three times the commodity price for local and regional grain.¹⁴ These small-scale niche markets can be essential for individual farms.

As cover crop use increases, demand for sources of cover crop seed grows. Cover crop suppliers may seek specific seed and varieties from local producers. Selling cover crop seed to companies or other farmers, as well as growing seed for personal use, can supplement farm income.¹⁵ Some cover crops like sunn hemp may not be feasible for seed production in the Corn Belt, but others like cereal rye, barley, buckwheat, and oats can be great rotation additions.

When selling seed directly to other farmers, be cautious of state and federal seed laws and protected seed variety restrictions. For more information, contact state seed regulation agencies (e.g., [Illinois Department of Agriculture](#), [Office of the Indiana State Chemist](#), [Iowa Department of Agriculture and Land Stewardship](#)).

Diversification can be achieved even on a small scale. One field at a time, a third crop can be incorporated into a corn-soybean program by rotating it through the farm each growing season. Cereal rye is commonly planted after corn harvest ahead of soybeans and can be grown for cover crop seed. The crop requires little to no post-harvest cleaning for bin-run seed or minimal cleaning with a barrel screen cleaner. Additionally, following the rye with a diverse cover crop mix adds even more diversity and rapid soil health improvements. By rotating cereal rye through fields over time, the farm sees an injection of diversity over time.

Small grains like wheat provide extra income through harvesting and selling straw alongside the grain.⁷ While straw might not be the main product of a small-grain planting, markets for straw exist for livestock production, horses, small farms, home gardens, and decorations. Harvesting straw removes nutrients and carbon that otherwise would benefit the soil, so consider practices like applying manure or planting mixed-species, high biomass cover crops to offset that removal. One option that has become more widespread is the use of alternative crops as a portion of livestock rations, such as hybrid rye in swine feed.¹⁶

Cost share for growing small grains is available to support extending rotations. Practical Farmers of Iowa offers a [small grains cost share program](#), which is available in several Midwestern states. The program delivers financial and technical support for raising a small grain with a cover crop. The University of Minnesota provides ecosystem service and risk management payments along with technical assistance, for planting winter annuals and perennial crops through the [Environmental and Economic Clusters of Opportunity \(EECO\) Implementation Program](#).

Some conservation districts also deliver cost-share for small grains through programs like the [Olmsted County \(Minnesota\) Groundwater Protection and Soil Health Program](#). The USDA Environmental Quality Incentives Program (EQIP) and the Conservation Stewardship Program (CSP) disperse funding and technical assistance for implementing conservation practices like planting cover crops, including small grains and field peas. EQIP and CSP program rules do not permit the crop to be harvested for grain but do allow for grazing in certain states under USDA guidance.

Another way to find the right financial or technical assistance is through the [Conservation Connector at connector.ag](#). This online platform from the Conservation Technology Information Center allows farmers, ranchers, and farm advisers to easily evaluate conservation incentive programs and connect with technical support in one place.

Innovation in extending rotations across the farm can provide many opportunities, whether experimenting with a new crop, improving soil health and water quality, or diversifying economic returns. There are several ways to extend rotations, and finding the right fit can be a rewarding process.

ADDITIONAL INFORMATION

There is a substantial amount of information and technical assistance available on alternative row crops. Land-grant universities in the Corn Belt provide basic information on small grain production, with most information on wheat. Nonprofit organizations have taken a major role in helping develop the production systems, infrastructure, and markets needed for alternative row crops to thrive. For example, Practical Farmers of Iowa (PFI) is a leader in research, information, one-on-one coaching, and peer-to-peer support for oats. Visit diversecornbelt.org/external-resources to access more resources.

REFERENCES

1. Davis, A.S., Hill, J.D., Chase, C.A., Johanns, A.M., Liebman, M., 2012. Increasing cropping system diversity balances productivity, profitability and environmental health. *PLoS One* 7, e47149. <https://doi.org/10.1371/journal.pone.0047149>.
2. Rosenzweig, S.T., Stromberger, M.E., Schipanski, M.E., 2018. Intensified dryland crop rotations support greater grain production with fewer inputs. *Agriculture, Ecosystems & Environment* 264, 63–72. <https://doi.org/10.1016/j.agee.2018.05.017>
3. Janovicek, K., Hooker, D., Weersink, A., Vyn, R., Deen, B., 2021. Corn and soybean yields and returns are greater in rotations with wheat. *Agronomy Journal* 113, 1691–1711. <https://doi.org/https://doi.org/10.1002/agj2.20605>
4. Hunt, N.D., Hill, J.D., Liebman, M., 2017. Reducing Freshwater Toxicity while Maintaining Weed Control, Profits, And Productivity: Effects of Increased Crop Rotation Diversity and Reduced Herbicide Usage. *Environ Sci Technol* 51, 1707–1717. <https://doi.org/10.1021/acs.est.6b04086>
5. Behnke, G.D., Zuber, S.M., Pittelkow, C.M., Nafziger, E.D., Villamil, M.B., 2018. Long-term crop rotation and tillage effects on soil greenhouse gas emissions and crop production in Illinois, USA. *Agriculture, Ecosystems & Environment* 261, 62–70. <https://doi.org/10.1016/j.agee.2018.03.007>
6. Hunt, N.D., Liebman, M., Thakrar, S.K., Hill, J.D., 2020. Fossil Energy Use, Climate Change Impacts, and Air Quality-Related Human Health Damages of Conventional and Diversified Cropping Systems in Iowa, USA. *Environ. Sci. Technol.* 54, 11002–11014. <https://doi.org/10.1021/acs.est.9b06929>
7. Asprooth, L., Krome, M., Hartman, A., McFarland, A., Galt, R., Prokopy, L., 2025. Our daily bread in the Heartland: Understanding and leveraging diversification to small grains in corn and soybean systems. *Journal of Soil and Water Conservation* 80, 116–143. <https://doi.org/10.1080/00224561.2025.2451000>
8. Hansen, K., 2021. From Seed to Secured: Crop Insurance for Small Grains. <https://www.cfra.org/sites/default/files/publications/from-seed-to-secured-online.pdf>
9. Mull, A., 2020. Americans Have Baked All the Flour Away. *The Atlantic*. URL <https://www.theatlantic.com/health/archive/2020/05/why-theres-no-flour-during-coronavirus/611527/>
10. Martinez, S., 2021. USDA ERS - Local Food Sales Continue to Grow Through a Variety of Marketing Channels. *Amber Waves*. <https://www.ers.usda.gov/amber-waves/2021/october/local-food-sales-continue-to-grow-through-a-variety-of-marketing-channels/>
11. Son, M., Lusk, J., 2023. An Analysis of U.S. Dairy and Non-Dairy Milk Demand (Working Paper). *Purdue University*.
12. Woome, J.S., Adedeji, A.A., 2021. Current applications of gluten-free grains – a review. *Critical Reviews in Food Science and Nutrition* 61, 14–24. <https://doi.org/10.1080/10408398.2020.1713724>.
13. Aschemann-Witzel, J., Gantriis, R.F., Fraga, P., Perez-Cueto, F.J.A., 2021. Plant-based food and protein trend from a business perspective: markets, consumers, and the challenges and opportunities in the future. *Critical Reviews in Food Science and Nutrition* 61, 3119–3128. <https://doi.org/10.1080/10408398.2020.1793730>
14. AGC, 2024. Strengthening the Midwest Grain Chain; Understanding Local and Regional Grain Preferences among Processors and End-Users. *Artisan Grain Collaborative*.
15. Martins, L.B., Rejesus, R.M., Reberg-Horton, C., Myers, R.L., 2021. Understanding the market for cover crop seeds in the United States: Background and potential policy directions. *Journal of Soil and Water Conservation* 76. <https://doi.org/10.2489/jswc.2021.0820a>
16. Practical Farmers of Iowa, 2020. Replacing Corn with Hybrid Rye in Feeder Pig Rations. <https://practicalfarmers.org/wp-content/uploads/2026/03/19.L.Hybrid-Rye-as-a-Swine-Feed.pdf>

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Table 1. Examples of extended rotations with documented use in the Corn Belt.

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Rotation type	Year 1				Year 2				Year 3				Year 4				Year 5				Year 6			
	Winter	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter	Spring	Summer	Fall
Fall-seeded small grain		Corn		Cover crop		Soybean		Small grain				Cover crop		Corn		Cover crop		Soybean						
Spring-seeded small grain		Corn		Cover crop		Soybean			Small grain			Cover crop		Corn		Cover crop		Soybean						
Pulse, oilseed & small grain		Corn		Cover crop		Spring peas		Small grain		Sunflower		Cover crop		Soybean		Cover crop		Corn						
Forage legume		Corn		Cover crop		Soybean			Oats + alfalfa															Corn
Oilseed & small grain		Corn		Cover crop		Soybean		Winter canola				Small grain		Dbi crop soybean				Corn						
Small grain with forage		Corn		Cover crop		Soybean		Small grain			Annual forage mix			Corn		Cover crop		Soybean						

Corn	Soybean	Small grain	Pulse	Oilseed	Forage / alfalfa	Cover crop / fallow
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