



ROOTS THAT HOLD, SEEDS THAT SELL: HOW FARMERS ARE RETHINKING WHAT FILLS THE FIELDS

Farmers have long used cover crops to protect soil between growing seasons, and today many are exploring new approaches that build on this practice to meet changing environmental and economic needs.

In Iowa and Minnesota, new approaches are emerging that build on the idea of keeping roots in the ground year-round. Some farmers are overlapping cash crops to strengthen soil and reduce flooding, while others are testing winter-hardy plants that protect fields and can also be harvested. These innovations—relay cropping, multi-cropping and planting winter-

hardy crops—show how cover crops are being adapted to provide more benefit to the land and the people who depend on it.

How can farmland not only produce crops, but also provide a wide range of benefits such as reducing flooding and improving water quality? This case study highlights two initiatives that explore this question.

THE AMERICAN FLOOD COALITION: Quantifying the flood reduction benefits of relay cropping in Iowa

The American Flood Coalition (AFC) is working with local farmers in Iowa to explore how a centuries-old agricultural practice called “relay cropping” can fight one of today’s most pressing challenges: flooding.

With half of U.S. land in agricultural production and 1 in 5 Americans living in rural areas, flooding can devastate agricultural land and communities downstream. AFC’s project explores how planting a second crop before the first is fully harvested – sometimes referred to as “multi-cropping” and “relay cropping” – can strengthen root systems, improve the soil’s ability to hold water and reduce flooding.

The approach is simple but powerful: Plant multiple crops to increase root density and the soil’s ability to hold more water. When multiple crops share a growing season, their combined root systems create a soil structure that can take in and retain more rainfall. This not only reduces runoff and erosion but also improves soil health and water quality by keeping nutrients and organic matter in place. Relay cropping can also offer biodiversity gains, more consistent crop yields and long-term economic opportunity – showing that what benefits ecosystems can also support farm economies.

Relay cropping has been used in some form for centuries – but there’s very little long-term data to quantify how effective it is when it comes to alleviating floodwaters. That’s something AFC is working to change, in close collaboration with farmers like Loren Steinlage of FLOLO Farms, and partners including the Iowa Flood Center and Northeast Iowa Resource Conservation & Development.

“This pilot project is one of the first to quantify the flood reduction benefits of relay cropping,” says Baker. “We measured how much additional water the soil can hold when crops overlap, building the evidence base for what farmers have seen anecdotally for years – that more roots in the soil means less water running off the land. The reality is we don’t have decades of data – so it’s a process of trying it out, monitoring it, and informing the next iteration over time. The process of measuring the outcome is extremely important.”

SLOWING WATER DOWN
AND STORING IT IS VITAL FOR
REDUCING FLOODING – AND
PLANTS ARE AN INCREDIBLY
EFFECTIVE WAY TO DO THAT.

“When you overlap crops – planting the next one before the first is harvested – you have more roots in the ground, and for longer,” says Anne Baker, chief program officer at AFC. “This overlap increases root density, which reduces erosion and helps the soil hold more water. Slowing water down and storing it is vital for reducing flooding – and plants are an incredibly effective way to do that.”



RELAY CROPPING CAN HELP REDUCE FLOODING DOWNSTREAM IN THE WATERSHED BY UP TO 30%.

Already, they've found some preliminary answers. According to AFC, relay cropping can reduce farm flooding, boost farm profits by \$50.90 per acre and improve soil health and water quality. But perhaps even more eye-catching is that AFC's latest research has found that relay cropping can help reduce flooding downstream in the watershed by up to 30%. That's in addition to reducing peak runoff during storm events, which means more water being absorbed into the ground where it falls, and less water spilling out over farmlands into homes and communities.

That number represents a real and vital impact. According to AFC, if farmers had been using these approaches during the devastating 2016 floods in Cedar Rapids, Iowa, they could have prevented up to 2.8 million gallons of water from rushing through Cedar Rapids every minute. Ultimately, more than 400 acres – and nearly 500 homes and

businesses – could have been further protected from the flooding. It's a powerful example that quantifies the benefits of approaches like relay cropping – not only for land management, but for protecting homes, livelihoods and entire neighborhoods.

THE FOREVER GREEN INITIATIVE: Replacing traditional cover crops with winter-hardy crops for harvest

AFC isn't the only organization working to boost multi-cropping in a way that supports farmers, communities and ecosystems alike. In Minnesota, the Forever Green Initiative is bringing together researchers and farmers to develop cover crops or winter-hardy crops that can also be harvested by farmers – giving them more opportunities to sell crops while also improving water quality and soil health.

"To most people and most farmers, a cover crop is something you plant, but you're not trying to harvest it. That's what distinguishes a cover crop from a cash crop," says Forever Green Initiative's Co-Director Mitch Hunter. "But, no harvest means no income. That's why we're developing winter-hardy crops that give all the benefits of cover crops and also have economic value."

The need is urgent. In Minnesota, adoption of traditional cover crops remains under 3%, largely because the learning curve and cost can sometimes limit short-term return. That's why Forever Green is developing a portfolio of 15 winter-hardy crops – like winter-hardy annuals and perennials – that grow in the off-season. They keep soil covered year-round and can be integrated into rotations with conventional crops. It's a regenerative, nature-based approach that provides both ecological benefits and economic incentives.

"IT'S TRYING TO RETURN TO A LANDSCAPE THAT IS MORE DIVERSE AND MORE LIKE NATURE".



One example is a winter annual oilseed crop that was considered a weed just a decade ago. Now it's being domesticated for commercial use, offering both environmental benefits and market potential. These new crops can reduce nutrient runoff, improve water quality and even provide pollinator habitat – all while fitting into existing agricultural systems.

Forever Green's work is rooted in a surprisingly simple idea: returning agriculture to a more natural rhythm.

"It's trying to return to a landscape that is more diverse and more like nature," says Director of Partnerships and Outreach Ann Kirby. "Bringing nature from the landscape into the field, and trying to make the field look more like the natural landscape than it has in the last 80 years."

Still, making this vision a reality is complex.

"We do a lot of work on plant breeding – making these crops that perform better for farmers – but then you have to get seed production going, bring farmers onto it, figure out the markets and overcome regulatory barriers," says Hunter. "It's a chain – and if the chain breaks at any point, you can't move forward."

That's why partnerships are crucial. Forever Green works with farmers, startups, established companies, state agencies and nonprofits to bring these crops from research plots into the real world.

"Everybody wants this to work," says Kirby. "Philanthropy, farmers, environmental NGOs, state agencies, industry. There's a lot of people rooting for us."