University of Minnesota Forever Green Initiative
Annual Progress Report to the Legislature

Per the requirements set forth in Minnesota Statute 3.197, the cost to prepare this report was $300.

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The Forever Green Initiative received $802,000 in AGREETT funding in FY25.

Abstract:
The Forever Green Initiative (FGI) at the University of Minnesota (U of M) is developing and improving winter-hardy annual and perennial crops that protect soil and water while driving new economic opportunities for growers, industry, and communities across Minnesota. By combining these novel crops with traditional annual crops, farmers can keep the soil covered all year round. This approach to farming with “continuous living cover” (CLC) can greatly enhance the efficiency and sustainability of Minnesota agriculture. Uniquely, FGI combines basic research with crop commercialization efforts, so that it can be profitable for farmers to produce these crops across rural Minnesota. This comprehensive approach moves new crops out of the lab and onto the landscape, where they can make a difference for farmers, the environment, industry, and society. The FGI portfolio includes over 15 crops (Figure 1), each supported by a multidisciplinary team that may include expertise in the areas of genomics, breeding, agronomics, natural resource sciences, food science, sociology, economics, and commercialization.

The AGREETT funding from the Legislature provides long-term stability for key FGI personnel, including crop breeders and staff leadership. In the past year, AGREETT support enabled four key breeding programs to continue making progress and also allowed the U of M to advertise the world’s first tenure-track faculty position in perennial grain breeding. AGREETT funding also supported FGI’s Co-Director and Director of Commercialization, Adoption, and Scaling in their efforts to advance FGI’s mission through strategy development, partnerships, fundraising, team development, and operational excellence.

Since AGREETT began supporting FGI in 2024, AGREETT-funded FGI staff have contributed to raising more than $4.3 million in philanthropic funds and an additional $13

million in state funds. In addition, Dr. Hunter led a proposal to advance winter camelina and pennycress crop development that was selected for $12.5 million in funding from the Department of Energy in late 2024. This award was subsequently paused and is still pending. Support from AGREETT and other State of Minnesota funding sources has allowed this work to continue, albeit on a smaller scale, illustrating that state funding is critically important to this research. In 2025, AGREETT-funded FGI staff have submitted applications for millions of dollars of additional philanthropic and federal support.

All AGREETT funds were provided directly to FGI; none were used for finance or other U of M administrative costs. However, two of the personnel covered by this funding, Hunter and Cureton, have administrative duties directly related to Forever Green operations, such as budgeting, project management, and grant program administration.

Figure 1. The Forever Green Initiative crop portfolio.

Objectives and Accomplishments:

1. **Advance perennial grain breeding and crop development.** As of May 2025, this funding is supporting Dr. Hannah Stoll, a postdoctoral researcher working under Dr. James Anderson. The former lead breeder, , Dr. Prabin Bajgain, left his

position with the University of Minnesota in January 2025. The U of M has advertised a tenure-track perennial grains breeding position to continue this work in the future, with a new hire expected to start in late 2026 or early 2027. Dr. Stoll is working on improvements to Kernza® intermediate wheatgrass (*Thinopyrum intermedium*), perennial cereal rye (*Secale cereale X strictum*), and other perennial cereal grain crops, which protect soil and water quality while providing highly nutritious grains as well as livestock forage. Most recent Kernza variety candidates show higher yield, larger seeds, reduced shatter, and improved free threshing—all traits under high demand by growers. UMN's second Kernza variety ('MN-Itasca") was approved for release in 2025. UMN's 9th Kernza breeding cycle is currently planted as of Fall 2025. Dr. Stoll is also connecting research with farmers through a participatory variety trial scheme where five Kernza® variety candidates were harvested and evaluated in a Minnesota farmer's field. For perennial cereal rye, Dr. Stoll continued the growth in this new program by examining DNA markers to select the best parent plants to improve the next cycle of the breeding program. Dr. Stoll has also submitted two federal grants requesting a total of $3.6M in federal funding for this work. In the last year, Dr. Stoll and Dr. Bajgain published 2 peer-reviewed papers, presented talks at two conferences, and participated in 2 field days and 2 outreach events. As there was a gap in personnel between Dr. Bajgain's departure and Dr. Stoll's hiring, funds for this position were also used to fund Colt Schiller-Olsen, the breeding programs' research technician.

2. **Advance winter oilseed breeding and crop development.** Dr. Julia Zhang has expanded her responsibilities to serve as the lead breeder on both domesticated pennycress (*Thlaspi arvense*) and winter camelina (*Camelina sativa*), both winter oilseed crops for Minnesota that can protect the soil while providing feedstock for low-carbon fuel and high-protein meal for animal feed. In 2025, Dr. Zhang expanded and improved both the pennycress and camelina breeding programs, created a full breeding pipeline for camelina, established and managed field experiments in multiple locations across Minnesota, led studies to advance understanding of the crops' biology and genetics, and initiated new research projects with private and public partners. In collaboration with Cargill, FGI's lead commercial partner on these crops, she is overseeing a 100X increase in the size of the camelina breeding program, which will ensure faster breeding progress. She also collaborated with the FGI oilseeds team and Cargill to strategically define target attributes of each crop and determine research directions. She organized a workshop with industry partners, presented at field days, gave talks and updates on the crops' status at multiple events and

meetings, and published two peer-reviewed papers. Dr. Zhang has also supervised, trained, and coached 5 oilseed crop technicians.

3. **Advance winter and spring pea breeding and crop development.** Dr. Steve Mulkey is the lead breeder on winter and spring pea (*Pisum sativum*), a key ingredient for the emerging plant-based protein market that also improves soil fertility and can cover the soil over the winter. Dr. Mulkey is rapidly growing this relatively young breeding program. In the past year, Dr. Mulkey oversaw the completion and harvesting of spring pea field trials in three locations, which included experiments on intercropping, sources of variation for pea protein, preliminary yield trials, and breeding line evaluations. In the fall, he oversaw the planting and initial data collection for similar field trials for winter pea in two locations. Dr. Mulkey completed the first year of a spring oat-pea intercropping pilot study with Dr. Kevin Smith, which shows great promise for both forage and grain production. Dr. Mulkey has continued to collaborate with the Cover Crop Breeding Network to obtain essential out-of-state survival data for pea breeding lines. Dr. Mulkey is also overseeing greenhouse and growth chamber projects to develop specialized genetic mapping populations, conduct controlled environment freeze tests, and generate new crosses. In November, he presented his work at the national CANVAS (Crop, Agronomy, and Soil Science Societies' Annual Research Symposia) meeting. Dr. Mulkey is mentoring a Ph.D. student, who is developing strong skills in bioinformatics that will benefit the pea breeding program in the future. Dr. Mulkey credits his FGI funding from AGREETT and other state sources with ensuring that the core breeding program is funded, despite a challenging research funding environment. He is currently dedicating roughly 10% of his time to pursuing additional funding to leverage these state funds. Finally, Dr. Mulkey is moving into a leadership role with the FGI breeding programs for perennial sunflower and hairy vetch, which expands the benefits to Minnesota from this AGREETT funding.

4. **Advance hybrid hazelnut breeding and crop development.** Dr. Lois Braun is the lead breeder on hybrid hazelnuts (*Corylus americana X avellana*), a high-value agroforestry crop that provides delicious nuts as well as wildlife habitat, carbon sequestration, and water quality benefits. Dr. Braun made exciting advances in the hybrid hazelnut breeding program in 2025, selecting 119 "keepers" from our 7-acre seedling planting at Rosemount, some of which will be parents for 2026 crosses. Her work on hazelnut "Joint Performance Trials" is almost complete, which will enable the program to select the strongest hazelnut varieties for Minnesota. This fall, the hazelnut program continued development of our network of Go-First Farms (GFF). GFFs are on-farm plantings of our best

germplasm in collaboration with private growers who are partnering to advance the hazelnut industry. We established additional plants at all three established GFFs and are currently vetting three prospective GFF hosts and a new nursery partner. Private nursery partners are breaking through the propagation bottleneck, which is the key to scaling up the program: 85 percent of the 3000 stem cuttings produced field-ready plants this summer, and next spring, the program expects to have over 4400 clones to plant. Dr. Braun conducted studies to develop management recommendations related to legume cover cropping, foliar boron sprays, and moisture requirements to better inform irrigation decisions. A large federal Specialty Crop Research Initiative (SCRI) grant that funded this work recently ended. Despite recent federal funding challenges, the hazelnut program and its partners are prepared to submit an application as soon as the SCRI program is available. This group also recently submitted an application for $1.7 million in funding to a private foundation. Dr. Braun hosted field stops for the annual Ag and Energy Field Day and the Agroforestry field school, and hosted a harvest party for the public at the Rosemount site.

5. **Provide overarching leadership and management capacity.**

   Dr. Mitch Hunter, FGI Co-Director, led major advances in scientific leadership, research, partnerships, and public engagement that strengthened Forever Green's impact and visibility. He continues to coordinate the oilseed R&D team and lead agronomic research, and he leads engagement with Cargill through a partnership advancing crop biology, breeding, agronomic research, commercial piloting, and policy development. He engaged extensively with State Legislators during the Session, hosting a tour and testifying in two hearings, and led the effort to host the inaugural Forever Green Forum, which brought together State leaders and hundreds of partners from multiple sectors to build support for FGI's mission. He also worked closely with the Forever Green Partnership, engaging in key State Government processes such as the update to the Climate Action Framework and the Nutrient Reduction Strategy. In the second half of 2025, Dr. Hunter oversaw the successful execution of the 2025 Forever Green Grant Program—a significant evolution in structure and process that aligned funding more tightly with strategic priorities while spurring cross-disciplinary collaboration and budgetary efficiency. He played a key role in the creation of a tenure-track perennial grains breeding position, strengthening scientific leadership and long-term stability in perennial grains breeding.

   Dr. Hunter spent significant time strengthening FGI's staff capacity and leadership structure. He hired and onboarded Claire Price, FGI's new R&D Program Manager, who leads the FGI Seminar Series, administers the Grant

Program, and supports core operations. He also initiated the search for a new FGI Co-Director to replace Nick Jordan upon his retirement in September 2026. Dr. Hunter continues to lead overall budgeting for FGI and contributes heavily to fundraising, hiring, and personnel management. He has played a leading role in designing a new framework for setting strategic goals and tracking progress against those goals, informed by the development status of individual crops along their path toward commercialization.

6. **Advance the commercialization, adoption, and scaling of FGI crops.** Colin Cureton, MS, is the Director of Commercialization, Adoption, and Scaling (CAS), a five person team focused on supporting farmer adoption and developing markets for FGI crops. Mr. Cureton provides management, strategy, and operational leadership in bridging new perennial and winter annual crops to the wide range of stakeholders involved in advancing their success on the landscape and in the market. He also provides program leadership for FGI, serving on the leadership team and the Executive Committee, and informing overall strategy. In 2025, Mr. Cureton launched the Winter Camelina One Million Acre Study (1MASS), which included the release of an RFP via public bidding process; rigorous review, selection and onboarding of a consulting team; holding two Partners' Circle meetings for +30 partners; convening monthly Core Team calls; and shepherding consultants toward early findings. He secured and administered $375,000 of funding to initiate this study. He has made significant advances in building commercial partnerships to advance CLC crops: he launched a new market development programs for small and medium-sized enterprises (SME program), developed a new program for large industry partners (CLC Market Builders program) to launch in early 2026, collaborated with Cargill and FGI's winter oilseeds team on winter camelina commercial piloting, engaged 30 food industry partners in a curated field day adjacent to the Forever Green Forum, and advanced FGI's partnership with General Mills, which included holding an all-day field day in collaboration with a farmer partner in Farmington. General Mills' subsequent announcement that they would quadruple their Kernza purchasing from MN Kernza distributors was a significant advancement. Mr. Cureton expanded FGI's innovative EECO program, which supports and de-risks farmer adoption of FGI crops, to 4,252 acres in the 2024-2025 growing season, largely attributable to increases in enrolled acres of winter-annual crops. He secured $75,000 in additional private foundation funds for EECO to complement State dollars. Mr. Cureton testified in two hearings to inform Legislators of the latest developments and needs in value chain and market development for CLC crops. He has provided stakeholder support for CLC crops through regularly fielding calls and inquiries from growers, industry, policymakers, and others. Under Mr.

Cureton's leadership, FGI's CAS team convened monthly Kernza and winter camelina TA providers calls, fielded inquiries, and grew collaboration with RSDP regions, Land Stewardship Project, Environmental Initiative, TransCap Initiative, and other groups. Mr. Cureton pursued additional funding opportunities through interfacing with various collaboratives and innovators. Mr. Cureton represented FGI's CAS work at multiple events and talks, including two FGI Seminars, the North America SAF Conference, Bridge2Food, the Regenerative Food Systems Investment Forum, a General Mills Field Day, and other events.