




Perennial Impact

2022 REPORT



We work for a future in which
humans flourish as members of
a thriving ecosphere.

Setting the Stage for Transformation



MESSAGE FROM THE PRESIDENT:

To set the stage for a perennial agriculture transformation that regenerates the planet's precious natural resources and moves away from the current paradigm that contributes to their degradation, **The Land Institute is building and solidifying structures and processes that seek to reconcile the human economy with Nature's economy starting with food.** Access to new genetic tools and technology, increased internal capacity, and newfound partnerships in plant breeding, genetics, and natural climate solution spaces are helping ask and answer key questions that will ultimately facilitate moving perennial grain crops from the research station to farmers' fields and peoples' plates.

While breeding efforts to improve yields, disease resistance, robust perenniality, and geographic adaptation in perennial grains are still underway, **The Land Institute is simultaneously working with producers, agroecologists, and food scientists to ensure that a diverse array of perennial grain crops have a clear pathway to agricultural land and markets.**

Once The Land Institute researchers and crop development teams reach these key milestones, **a foundation will be in place to incorporate perennial grains into the greater agriculture and food sectors to realize the benefits of truly regenerative, perennial polyculture systems.**

Rachel Stroer

PRESIDENT

The Land Institute



“If we don’t get sustainability in agriculture first, sustainability will not happen.”

WES JACKSON *Co-Founder & President Emeritus*



Key Milestones to Perennial Grain Success

- Perennial grains **must be robustly perennial**, surviving and producing a harvest for a minimum of three years.
- Perennial grains **must be high yielding**, producing similar abundance to annual grain counterparts.
- Perennial grains **must be safe to eat**, obtaining proper government approval for these new foods.
- Perennial grains crops should be **researched and regionally adapted** to grow in different geographies.
- Identify perennial grain **uses as food ingredients and whole foods**, including the potential for oil, protein, starch, fiber, and nutrients.
- Identify **economic and ecological uses of perennial grain beyond food**, including fodder, forage, conservation plantings, habitat, buffer zone water protection, cover cropping, and more.
- Perennial grain agriculture should be **widely recognized as a scientifically credible and viable climate solution**.
- Researchers, farmers, processors, and producers must **understand how to grow, harvest, and process** perennial grain crops.
- People must **know how to prepare and eat** perennial grain products at their tables.
- Researchers and producers **understand how to grow perennial grain crops in diverse polyculture mixtures** for maximum ecological benefits.
- Understand how to **grow more just and enduring human cultures** integrated with and sustained by diverse, perennial grain agroecosystems.

BUILDING CAPACITY to accelerate and scale the development of perennial grain crops and their diversified ecological, nutritional, and community benefits.

The Perennial Legume Program Accelerated Sainfoin Crop Development

The Perennial Legume Program accelerated the development of sainfoin, a promising new perennial grain legume food crop, by expanding its team and capabilities to include agronomic, food, and data science expertise. Evan Craine, Postdoctoral Research Fellow, Ty Dittmer, Research Agronomist, and Bo Meyering, Applications Developer, joined Brandon Schlautman, Lead Scientist, and Spencer Barriball, Research Technician, to make sainfoin a viable perennial grain crop for farmers and food producers.

The Land Institute is breeding new diverse perennial grain food crops adapted to grow in ecologically intensified mixtures that mimic natural systems,

including perennial cereals, legumes, and oilseeds. Sainfoin, a legume, originates in central Asia and

has been produced as a forage crop for centuries, benefitting livestock, native bees, and honeybees. Today, The Land Institute envisions a new use for sainfoin as food, with co-benefits to pollinators, livestock, and soil health from increased nitrogen stocks.

In partnership with the Crop Stewardship Program, the Perennial Legume Program expanded its research into food functionality, led by Evan Craine, to understand sainfoin's potential to enter the food product and ingredient market.

Sainfoin is notable for its value as both a source of plant protein and oil as well as a dual-purpose crop that can be used for food and forage. This research will characterize sainfoin's nutritional profile, explore similarities and differences with other food legumes, and demonstrate its potential as a delicious, nutritious, and safe-to-eat food.

The Land Institute also created a new data storage and sharing system to connect researchers and partners under the direction of Bo Meyering.

This new system, which will be helpful beyond the Perennial Legume Program, makes data, resources, and knowledge-sharing across networks of scientists and researchers more manageable and accessible, fostering collaboration and fueling the perennial agriculture transformation.

“We are looking forward to achieving two key milestones along our charted pathways to scale sainfoin as a perennial pulse crop in 2023.”

BRANDON SCHLAUTMAN
Lead Scientist, Perennial Legumes



“We are looking forward to achieving two key milestones along our charted pathways to scale sainfoin as a perennial pulse crop in 2023”, explains Brandon Schlautman. “Collecting the phenotype data needed to train a genomic prediction model that will allow us to accelerate sainfoin breeding progress in 2024 and beyond, along with submitting a dossier to the FDA to have sainfoin seeds and their co-products listed as a “Generally Regarded As Safe” (GRAS) ingredient, will help sainfoin make its way to consumers’ plates as a safe and nutritious food.”

The Crop Stewardship team is hopeful that sainfoin will achieve GRAS status by mid-2023, allowing the very first sainfoin products to enter food markets in the following years for consumers to taste. ▀

Interdisciplinary Projects Set the Stage for a New Generation of Perennial Grain Researchers

The Land Institute is building institutions and practices that broaden and scale the perennial grain agriculture research community and educate and inspire the next generation of perennial agriculture researchers. The Soil Ecology Program expanded its team and helped launch two large multi-institutional, five-year field experiments: The USDA-funded KernzaCAP grant, led by the University of Minnesota, and New Roots for Restoration – Biology Integration Institute, (BII) funded by the National Science Foundation, and led by The Danforth Center.

The interdisciplinary KernzaCAP grant is aimed at promoting collaboration between farmers, researchers, land grant universities, conservation, civil society, government, and private sector partners to fuel research, education, commercialization, and policy innovations to scale up Kernza® perennial grain, advance the environmental sustainability of food production, and demonstrate the viability of new perennial cropping systems as real economic opportunities for farmers and rural communities. This grant will also assist The Land Institute's

Civic Science project with integrating perennial grain agriculture and Kernza production into multiple educational, outreach, and support settings to support future partners, inform research priorities, and promote relevant policy for perennial grain production.

The Biology Integration Institute partnership will bridge research in restoration of natural grassland ecosystems with restoration of agricultural ecosystems, focusing on how plants balance critical activities belowground and aboveground based on soil type and plant community composition. BII establishes education and training, with intentional outreach designed with many points of entry and ready mobility across institutions. The partnership also supports younger scientists in developing integrated research projects, building a foundation for a new generation of perennial grain agriculture researchers.

As a result of these developments and the financial commitments from donors, the Soil Ecology program, led by Tim Crews, Chief Scientist, expanded to include Tomas Cassani, Post-Doctoral Researcher, Mercedes Santiago, Research Technician, and Claire Wineman, Post-Bacca-

laureate Researcher. They joined to assist Tim Crews, and Madeline Dubois, Research Technician, in field activities and data collection for ongoing soil ecology experiments. BII and KernzaCAP created new opportunities for the team to pursue education and mentorship relationships to help expand the Soil Ecology Program expertise and projects. The team is also engaging in sociocultural activities through collaboration with the Ecosphere Studies team led by Aubrey Streit Krug, which will equip them to connect their soil ecology work to the greater cultural significance of perennial grain agriculture.

In addition to these new collaborations, the Soil Ecology group continued to advance intercropping of perennial grains with legumes research in Salina, Kansas and at the Perennial Agriculture Project field station in Lawrence, Kansas. The group has made progress on developing cropping systems that rely exclusively on legume-based nitrogen fixation and demonstrate soil carbon accumulation and reduced greenhouse gas emissions. •



New Kernza Varieties

T*he Land Institute's Kernza Perennial Grain breeding program released four improved Kernza® seed varieties for use by growers. Breeders are working to make Kernza perennial grain a successful new crop by increasing harvestable yields to make the crop profitable for farmers and ultimately to achieve the goal of abundant human-edible food from perennial fields. •*



NEW TOOLS & KNOWLEDGE-SHARING

accelerate perennial grain domestication and crop improvement efforts.

DNA Technology Catalyzed Silflower Perennial Oilseed Domestication and Crop Development

New DNA tools allowed the Perennial Oilseed Program, in collaboration with long-time partners at HudsonAlpha, to sequence the large, complex genome of two wild silphium species—*Silphium integrifolium* (also called silflower) and *Silphium perfoliatum* (cup plant), to create reference genomes for both plants. By applying classic principles of selective breeding paired with modern technology in genetics and genomics, The Land Institute is developing long-lived non-gmo crops, like silflower, with ample yields of edible grain for their diversified ecological and nutritional benefits.

A genome map helps accelerate the de novo domestication of wild perennial plants, assisting researchers to maintain genetic diversity and “wild traits,” like deep roots and drought tolerance, while improving desirable agricultural traits like high yields. The creation of the genome map for intermediate wheatgrass, for example, along with advances in the speed and affordability of genomic testing, was key to the development of Kernza perennial grain, allowing researchers to significantly shorten Kernza variety development cycles from 3 years in 2008 to 6 months in 2022.

“Until recently, researchers had trouble sequencing the silphium genome because of its very large chromosomes. But with new technological advances in genomics, we have the first reference genomes for two silphium species,” says David Van Tassel, Lead Scientist for the Oilseed Program

at The Land Institute. “These reference genomes will help plant breeders understand their perennial grain potential as an edible oilseed food crop and speed development of this new perennial grain. We also hope to use genomic tools to monitor the presence of both beneficial and pathogenic microbes in plant samples and incorporate this information into our selective breeding programs.”

DNA “fingerprinting” of silphium plants will reduce the time researchers spend tracking traits like disease resistance and model development for important characteristics like seed size, yield, and harvestability. By pairing technological advancements in genetics with a holistic approach to diverse perennial grain agriculture, the Perennial Oilseed Program will continue to develop viable crops like silflower that can provide ecosystem services and edible oilseeds, equally considering people’s food needs and many of the globe’s pressing environmental issues. •





New Open-Source Software Innovation Created Mechanisms for Knowledge Sharing

Chase Stratton, Post-Doctoral Research Associate, along with colleagues from The Land Institute, partners at the Swedish University of Agricultural Sciences, Groupe ESA, and the USDA-ARS Center for Animal Health and Grain Research developed a computer software package for the statistical program “R” that can be accessed for free by researchers worldwide. **Researchers can use this package to identify large chemistry datasets in hours rather than weeks or months, as was previously required.**

This software will help researchers quickly measure and identify natural chemical compounds in diverse perennial grain plants that could be used in organic pest management, thus allowing them to deploy natural plant chemistry tactics to manage pests that limit perennial grain crop growth and agricultural production. The open-source nature of this package also contributes to The Land Institute’s goal of creating sharable tools that accelerate research and collaborations to develop a diverse array of perennial grain crops and cropping solutions. ▀



Genetic Tools Illuminated Pathogen-Driven Yield Declines in Silflower

Perennial crop yield improvements, identifying ideal growing regions, and tailoring crops to broad geographic ranges are essential to The Land Institute's effort to perennialize grain agriculture on farms and fields. In collaboration with Yaniv Brandvain, Associate Professor of Plant and Microbial Biology at the University of Minnesota, the Perennial Oilseed Program sequenced the genome of *Puccinia silphia*, the fungal rust species that causes a substantial yield decline in silflower. This research will also help

the Crop Protection Genetics team consisting of Kathryn Turner, Lead Scientist, and Yvonne Thompson, Research Technician, determine whether this pathogen reproduces sexually or asexually, which **will inform the level of disease resistance needed to protect silflower on fields in the long term.** The findings will help researchers learn where the pathogen is most diverse and ultimately aid in mapping potential growing regions for silflower by understanding the pathogen that limits its growth. •

PARTNERSHIPS & COLLABORATION

to advocate for
and scale perennial grain research with allies in the broader perennial community.

Ecosphere Studies Program Engaged Civic Scientists Across the U.S.

In the fall of 2021, the Ecosphere Studies Program launched its largest Civic Science project with a new perennial wheat initiative. **With more than 100 participants across the United States, the civic science community began its first perennial wheat growing season in March 2022.**

The Land Institute's Ecosphere Studies Program, led by Aubrey Streit Krug, Director of Ecosphere Studies, and assisted by Anna Andersson, Civic Science Research Technician, Claire Wineman and Lydia Nicholson, Post-Baccalaureate Re-

searchers, and Stan Cox, Ecosphere Studies Fellow, **explores what society might need to learn and remember if the ecological future of agriculture is to be perennial and diverse.** Civic science communities empower participants and researchers to build knowledge and relationships with each other and with perennial grains.

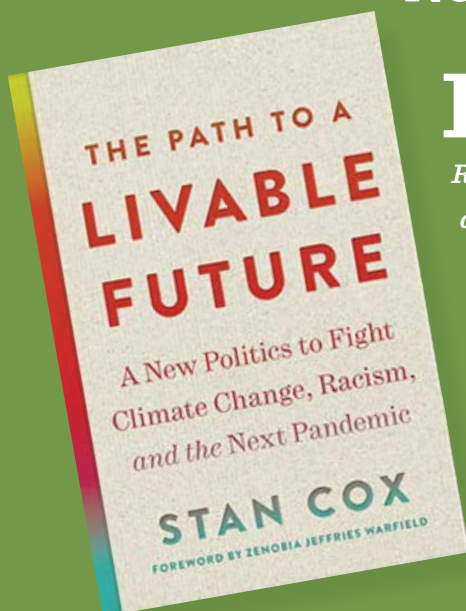
Civic scientists in the perennial wheat project collected data on the perenniality of The Land Institute's experimental wheat line in various locations. They observed plant growth and diseases in their plots and learned together in community with researchers through first-hand sensory experiences and new print and digital educational materials. Thanks to the valuable data, stories, and feedback that civic scientists and project advisors shared, The Land Institute is now testing and improving civic science to advance the science and culture of perennial grain crop development.

The perennial wheat civic science project is also helping inform The Land Institute's understanding of the barriers to broad and diverse participation in civic science research. It applies these lessons about accessibility and inclusion to the experimental design of future civic science projects with multiple perennial grain crops. ■





New Book Published by Stan Cox



In November 2021, Ecosphere Studies research fellow Stan Cox published *The Path to a Livable Future: A New Politics to Fight Climate Change, Racism, and the Next Pandemic*. This book provides a clear social perennial vision for transitioning to a sustainable society in which the resources to live a good life are available to all, not just a privileged few. Cox held a variety of seminars, webinars, and podcasts about the book and published excerpts in multiple news and media outlets. The book galvanizes public conversations and understanding of ecological limits and social values—the ecospheric context for the work at The Land Institute on diverse, perennial grain agriculture and educational efforts featuring agriculture in the context of the ecosphere.

Land Grant University Partnership Unlocked Nutritional Insights in Perennial Sorghum

Researchers developing perennial sorghum at The Land Institute uncovered new information about the grain's nutritional properties through collaboration with Woo Kyun Kim, Associate Professor of Poultry Science at the University of Georgia. The Perennial Sorghum Program at The Land Institute, led by Pheonah Nabukalu, Lead Scientist, is perennializing sorghum by hybridizing annual grain sorghum crossed with a wild perennial sorghum cousin, Johnsongrass.

Food functionality research is a critical step in perennial sorghum development. Annual grain sorghum is a staple food crop in flatbread, porridge, couscous, beer, and other products across Africa and South Asia. In the United States, producers increasingly use annual grain sorghum in gluten-free foods and beer.

When researchers compared three perennial sorghum lines with one annual grain sorghum line, they discovered that the perennial sorghum had significantly higher levels of crude protein, fat, and gross energy than the annual. They also found perennial grain sorghum lines had higher levels of the essential amino acids methionine, arginine, threonine, valine, tryptophan, and isoleucine. Perennial grain sorghum also had significantly higher nutrient levels of phosphorus, inositol hexaphosphate, magnesium, manganese, and zinc.

These findings indicate that perennial sorghum could be competitive with annual sorghum as food, food ingredient, and animal feed. At the current rate of development, the Crop Stewardship team anticipates that stable varieties of perennial sorghum will be released to growers in Asia and Africa in roughly ten years, with hopes that small-scale adoption will occur earlier, as witnessed with Kernza perennial grain. •

Perennial Wheat Tested Globally

The Perennial Wheat Program at The Land Institute dispersed fourteen new perennial wheat lines to research collaborators to conduct multi-location trials and evaluations in several countries. International collaborators included Matthew Newell in Australia, Alexey Morgunov in Kazakhstan, Christophe David in France, and Raja Ragupathy in Canada. In addition, US collaborators Leo Deiss at Ohio State University, Ginny Moore at Cornell University, and Jacob Jungers at the University of Minnesota engaged in the research.

The Land Institute's Perennial Wheat Program, led by Shuwen Wang, Lead Scientist, and Maya Kathrineberg, Research Technician, spearheaded the development of perennial wheat, making hybrid crosses of annual Durum winter wheat with Kernza perennial grain (intermediate wheat-grass). The perenniality of perennial wheat candidates has historically been the barrier to developing a robust and hardy crop. However, **these fourteen new perennial wheat lines have already shown promise, surviving and producing grain for two years at The Land Institute's research plots in Kansas.** They also demonstrated that the Perennial Wheat program had found an effective breeding approach to help achieve better perenniality in wheat hybrids.

Ultimately, these global multi-location trials will allow the Perennial Wheat Program and partner research institutions to gather geographic data on the wheat lines' perenniality and map potential prime locations where perennial wheat could survive and thrive. Once data collection is complete, researchers continue to make improvements to the robust perenniality of these lines, and yields are similar to those of annual wheat, the collective knowledge will enable The Land Institute's Crop Stewardship Program to start the process of moving perennial wheat from the research station onto farms and into new food products. •



PARTNERSHIPS & COLLABORATION



The Land Institute Joined US Natural Climate Solutions Coalition

In 2021, The Land Institute joined US Nature-4Climate (USN4C), a coalition of twenty-four organizations supporting farmers, ranchers, fisheries, forest owners, Latino leaders, Native American communities, outdoor recreation enthusiasts, and environmental and conservation groups. The coalition works to improve the health of America's agricultural lands, forests, rivers, and urban and coastal areas to absorb more carbon, fight climate change, provide wildlife habitat, and support healthy communities. USN4C ensures these places and stakeholders are important to the global strategy to combat climate change.

The Land Institute's new Communications Program, established in the fall of 2021, works to strengthen and broaden the role of The Land Institute as the leading voice in the perennial movement, advocate for a long-term perennial transformation of agriculture, and engage partners to tell shared stories to maximize collective impact. The Communications Program, led by

Tammy Kimbler, Director, stewards the USN4C coalition partnership.

The Land Institute's role in the USN4C coalition is to contribute potential, emerging climate adaptation and mitigation pathways through perennial grain agriculture. USN4C highlighted Kernza perennial grain stories in its science, policy, and public education content, exploring Kernza's development, potential as a climate solution, and the innovative community supporting it. The USN4C Decision-Makers Guide features long-rooted perennial crops as a viable climate pathway, educating US policymakers, businesses, and civil society to recognize perennial grain agriculture as a potential natural climate solution encompassing GHG reductions and carbon sequestration to meet climate goals. The partnership will also allow The Land Institute to engage in US and global climate spaces, including future UN Climate Change Conferences, like COP28.

New Human Resources Function

The Land Institute established a new Human Resources department in the Fall of 2021. Its goal is continually seeking process improvements that value employees and the planet. Last year, HR transitioned all human resources functions from paper-driven to entirely paperless digital. As the organization expands its workforce across the United States and eventually the world, it is critical to provide the best and most accessible experience to all employees, no matter their earthly location, while reducing carbon emissions and environmental waste, preventing deforestation, and increasing employee work-life balance and productivity.

*As of July 2022,
The Land Institute
had 74 employees
across 8 states
in the US*

Selected Publications

Researchers at The Land Institute released 28 publications over the past fiscal year. They also delivered 36 presentations, both virtually and in-person, across the United States and internationally for audiences in Canada, Kenya, Saudi Arabia, and Sweden. The dissemination of knowledge and information by these participants allowed The Land Institute to share innovative and integrative research infrastructure to enable and pursue perennial grain agriculture research locally and globally.

From leaf traits to agroecosystem functioning: effects of changing resource use strategy during silphium domestication on litter quality and domestication rate González-Paleo, L., Ravetta, D. and Van Tassel, D.L., 2022. *Plant and Soil*, 471(1), pp.655-667. <https://doi.org/10.1007/s11104-021-05224-0>

Gourmet grasslands: Harvesting a perennial future DeHaan, L. R., & Van Tassel, D. L., (2022). *One Earth*, 5(1), 14-17. <https://doi.org/10.1016/j.oneear.2021.12.012>

Re-imagining crop domestication in the era of high throughput phenomics Van Tassel, D. L., DeHaan, L. R., Diaz-Garcia, L., Hershberger, J., Rubin, M. J., Schlautman, B., Turner, M.K., & Miller, A. J., (2022). *Current Opinion in Plant Biology*, 65, 102150. <https://doi.org/10.1016/j.pbi.2021.102150>

Unraveling the genetic components of perennality: Toward breeding for perennial grains Kong, W. Q., Nabukalu, P., Cox, S., Johnston, R., Scanlon, M. J., Robertson, J. S., Goff, V. H., Pierce, G. J., Lemke, C., Compton, R., Reeves, J., & Paterson, A. H. (2022). *Plants*, People, Planet. <https://doi.org/10.1002/ppp3.10253>

Plant Breeding for Intercropping in Temperate Field Crop Systems: A Review Moore, V.M., Schlautman, B., Fei, S.Z., Roberts, L.M., Wolfe, M., Ryan, M.R., Wells, S. and Lorenz, A.J., 2022. *Frontiers in Plant Science*, 13. <https://doi.org/10.3389/fpls.2022.843065>

Assessing phenotyping diversity in silflower (*Silphium integrifolium* Michx.) to identify traits of interest for domestication Price, J.H., Van Tassel, D.L., Picasso, V.D. and Smith, K.P., 2022. *Crop Science*, 62(4), pp.1443-1460. <https://doi.org/10.1002/csc2.20748>

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Development of first linkage map for *Silphium integrifolium* (Asteraceae) enables identification of sporophytic self-incompatibility locus Price, J.H., Raduski, A.R., Brandvain, Y., Van Tassel, D.L. and Smith, K.P., 2022. *Heredity*, 128(5), pp.304-312. <https://doi.org/10.1038/s41437-022-00530-4>

Reimagining Democratic Governance for the Decline of Fossil Fuels Bozuwa, J., Burke, M., Cox, S. & Skandier, C.S., 2021. *Democratizing Energy*, 3. <https://ecpamericas.org/newsletters/making-energy-more-democratic/>

Prediction of regrowth and biomass of perennial sorghum using unoccupied aerial systems Nakasagga, S., Adak, A., Murray, S.C., Rooney, W.L., Hoffmann Jr, L., Wilde, S., Lindsey, R., Nabukalu, P. and Cox, S., *Crop Science*. <https://doi.org/10.1002/csc2.20758>

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Accelerated Domestication of New Crops: Yield is Key Luo, G., Najafi, J., Correia, P. M. P., Trinh, M. D. L., Chapman, E. A., Østerberg, J. T., Thomsen, H. C., Pedas, P. R., Larson, S., Gao, C., Poland, J., Knudsen, S., DeHaan, L., & Palmgren, M. (2022). *Plant and Cell Physiology*. <https://doi.org/10.1093/pcp/pcac065>

Selected Presentations

SEPTEMBER 2021

How Much Is Enough? Presented by Stan Cox | YES Magazine
Fall 2021 Issue Launch | VIRTUAL

NOVEMBER 2021

Ecosystem and Agronomic Services Provided by Perennial Herbaceous Crop Species Versus Prairie Mixtures Presented by Ebony Murrell | Tri Societies Conference, Kansas State University, Department of Entomology, Salt Lake City, Utah

Accelerated Domestication of Intermediate Wheatgrass as a Perennial Grain Presented by Lee DeHaan | Center for Desert Agriculture, King Abdullah University of Science and Technology | VIRTUAL

JANUARY 2022

Using Farming Practices to Improve Pest and Pathogen Management through Beneficial Fungi Presented by Ebony Murrell | Ontario Agricultural Conference | VIRTUAL

FEBRUARY 2022

Development of Perennial Grain Sorghum and Perennial Wheat at The Land Institute Presented by Stan Cox, Pheonah Nabukalu & Shuwen Wang | Sixth Biennial North Carolina State University Plant Breeding Symposium, Raleigh, North Carolina | VIRTUAL

Expanding the Definition of Ecological Intensification in Hopes That It May Deliver on High Expectations Presented by Tim Crews | Crop Production Ecology Seminar Series, Swedish University of Agricultural Sciences, Uppsala, Sweden

MARCH 2022

Potential of Perennial Grains for Native Bee Conservation and Honeybee Production Presented by Ebony Murrell | Kansas Honey Producers Association Meeting, Salina, Kansas

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*28 publications
& 36 presentations
throughout the year
allowed The Land
Institute to share
innovative perennial
grain research.*

By the Numbers

4,000

Kernza Acres
Growing in the US

2,400

Global News Articles
in 20+ Languages

105

Perennial Wheat
Civic Scientists

50

Global Partners
in 23 countries

28

Research Publications

38

University Partnerships
across 13 countries
(including US)

14


Perennial Wheat Lines
Testing Globally

6

Silphium Field Trials
in 5 US States
+ 2 Countries

4

Kernza Varieties
Released



**While the world around us
continues to unfold in unprecedented ways,
The Land Institute offers hope, rooted in science.**

Your impact is igniting a movement toward
the promise of perennial grains on a scale
equal to the enormity of the crises we face.

**Stay with us on this journey—
you are needed now more than ever.**



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