



Perennial Impact Report 2021

**3500 acres**

of Kernza® being grown in the United States

150 soil cores

at depths of 8 inches to 1 meter, taken at Kernza® + alfalfa biculture research plots

70+ civic science participants

observing silphium and sainfoin plants grown in their home places

35 pollinator species

including bees, butterflies, and moths identified on flowering silphium

30 research papers published

and 2 new books released by The Land Institute staff within the last 18 months

23 countries collaborating

to co-create and lead international efforts for The Land Institute

4 regions of Asia

including Vietnam, Myanmar, Cambodia, and Laos now growing perennial rice

1 new president

as Rachel Stroer is chosen to lead the bold vision for a perennial future

ABOUT THE LAND INSTITUTE

The Land Institute co-leads the global movement for perennial, diverse, truly regenerative agriculture at a scale that matches the enormity of the intertwined climate, water, and food security crises. The Land Institute's work, led by a team of plant breeders, and ecologists in multiple partnerships worldwide, is focused on developing perennial grains, pulses and oilseed bearing plants to be grown in ecologically intensified, diverse crop mixtures known as perennial polycultures. The Land Institute's goal is to create an agriculture system that mimics natural systems to produce ample food and reduce or eliminate the negative impacts of agriculture. Through transdisciplinary research and collaborations, The Land Institute builds learning communities to help society cross the threshold into diverse, perennial grain agricultures.

Success requires creativity, dedication, numbers, and range: The number of researchers and practitioners; the range of human cultural and geographic diversity; the number of field research sites; the range of research locations; the amount and distribution of financial resources dedicated to perennial grain crops around the globe will all determine how quickly and equitably perennial grain crops and the farming techniques needed to grow them can be developed.

The Land Institute is a nonprofit 501(c)(3) research and education organization funded by charitable contributions from individuals, organizations, and private foundations.

COVER: Lead scientist Shuwen Wang examines ripening experimental perennial wheat seed heads in a research field at The Land Institute where, through crossbreeding, we hope to develop a line of truly perennial wheat.

ALL IMAGES: © The Land Institute 2021



We find ourselves in a time of paradoxes. The urgent and intertwined global crises of climate, pandemic, and injustice demand our attention and immediate action. Yet, the promises and near-term solutions available fall dramatically short of what is required for us to live in a future that uses less yet provides more. The dominant social system isn't built to serve that future, and it is powerful. It's infused into our economy, which sustains our core needs, and it's part of our psychology, our very understanding of ourselves.

Creating a new future while being supported by systems we know must become irrelevant requires a courageous and consistent reckoning with these paradoxes. To effectively catalyze change in the world—toward an ecological and perennial agriculture sustaining humans within limits—requires that we change as an organization.

Propelled by the values and insight of our first 45 years as an organization and informed by the necessity and urgency to reconcile the human economy with Nature's economy, The Land Institute is undergoing a period of metamorphosis. This metamorphosis requires we hold the past and the future within a cocoon from which we hope to emerge joyfully energized for engagement, with the capacity to catalyze an ecological, perennial, and just revolution for agriculture and the society it sustains. If we are successful, by 2030, we will have inspired the (currently dominant) agro-industrial complex to turn toward the ecological, perennial imperative.

This past year, we learned valuable lessons about our metamorphosis within the paradox of a locally adapted and culturally inspired global movement. We took to our roots—embedded in our history and values—and intensified our interaction with place. We honed our virtual collaboration skills with our local, national, and international colleagues. Instead of traveling in space and time, we picked up the phone to call donors. We sent our friends tidings of hope in the form of perennial grain flour, honey, and recipes to enjoy in their home kitchens. In so many ways, we had a homecoming of the decentralized and sometimes distanced variety.

We made metamorphosis a theme. Our team is evolving, changing, expanding their roles, growing their awareness, and learning new ways to do and be. New staff members with unique talents and agility have joined to help us conjure a perennial reality aligned with our values. We established new organizational cultural patterns for listening, learning, and growth. Our systems, too, are changing to manage our current operations and organize more effectively to support and catalyze global expansion.

If this year's theme was metamorphosis, then next year's theme is movement, continued attention to capacity building, and diversifying our skills, while building a transdisciplinary, collaborative movement for the development of new perennial grain crops, ecologically intensified cropping systems, and social-perennial transformation.

We are proud of where we have been, and anticipative of our future. Neither would or will be possible without your attention, investment, support, and energy. Thank you for all you do to catalyze the transformation we all seek.

Rachel Stroer
PRESIDENT
The Land Institute

Organizational Highlights

The Land Institute Names New President

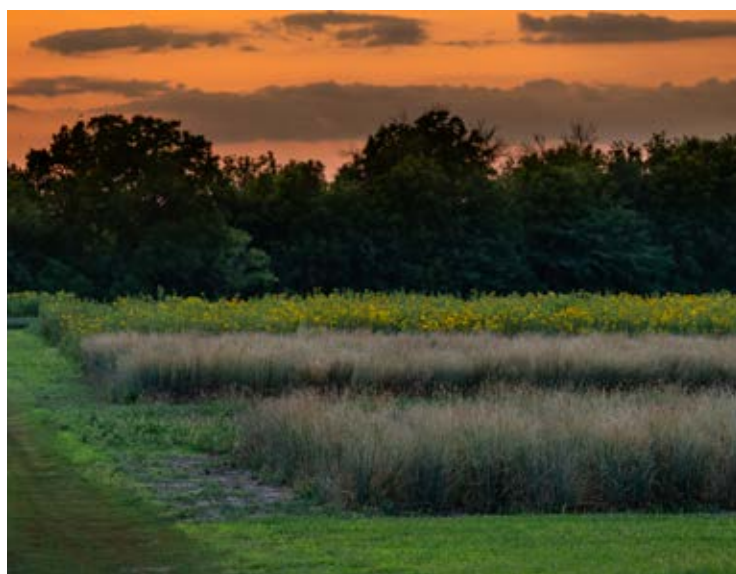
In April of 2021, Rachel Stroer was named the president of The Land Institute, the first woman president to lead the organization in its 45-year history. As only the third president of The Land Institute, Stroer carries forth the bold vision set by co-founder Wes Jackson, stewarded by the steady hand of Fred Iutzi, and manifested by the employees and friends of The Land Institute. Stroer has held various roles since she joined The Land Institute in 2015, most recently Chief Strategy Officer (CSO). She led a strategic plan to move The Land Institute into the vision that perennial grain crops can feed humanity and sequester carbon on a global scale.

"Our board is thrilled with the leadership, vision, and energy Rachel brings to the work of The Land Institute. She has been invaluable in broadening our work over the last six years, and we are excited to watch the organization grow under her leadership. The next chapter for The Land Institute is one of great promise and great challenges as we work to accelerate the adoption of perennial agriculture globally. We feel confident Rachel is the leader we need now," states Ken Levy-Church, former Board Chair.



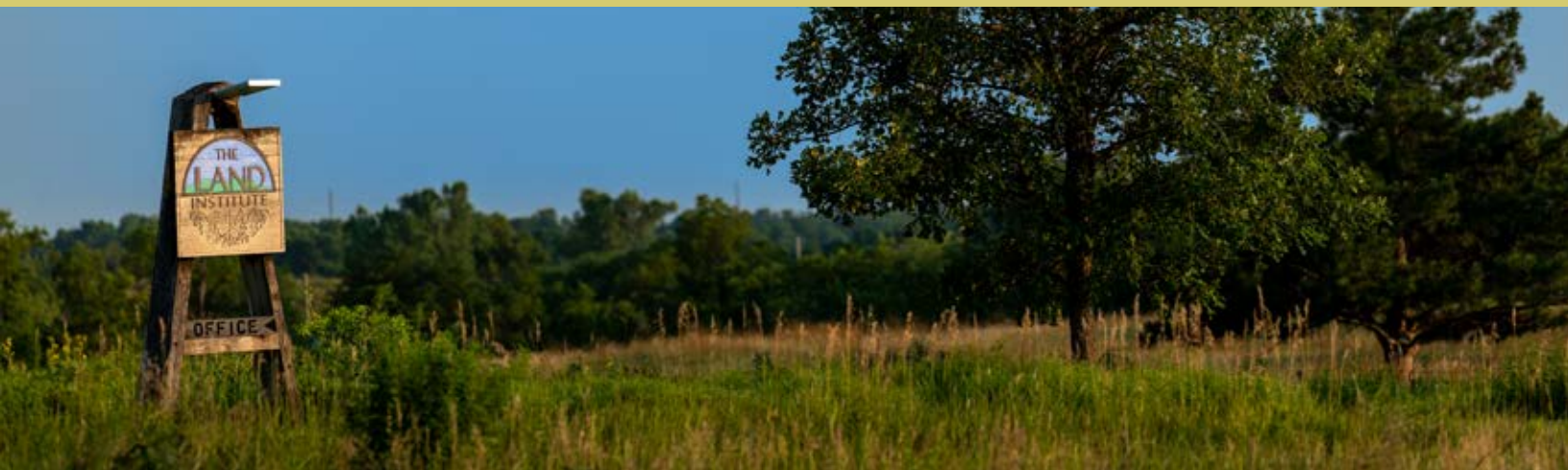
Perennial Crop Proof of Concept Validated by Wave of Government Grants

Over the last year, The Land Institute, in conjunction with our growing network of US and international research partners, was awarded 11 government grants for work directly related to the development and research of diverse perennial crop agroecosystems. The grant awards range from \$10,000 to \$10 million with timeframes from 1 year to 5 years. Granting organizations include USDA SAS CAP, ARS, SARE, NAFA, NIFA, OREI, and NCRS. Although private philanthropic giving will continue to be the primary source of unrestricted general operating funding for The Land Institute to maintain our independence, these restricted grants provide critical validation of our proof of concept that perennial crops can potentially reshape the future of agriculture. These grants are also an example of the significant role The Land Institute will continue to play in the future to lead and facilitate government grant acquisition as part of our strategy to expand and strengthen our network of global research collaborators and our impact around the world.



Igniting the Global Perennial Agriculture Movement

In December 2020, the Curt Bergfors Foundation awarded The Land Institute a \$1 million Food Planet Prize to ignite efforts to build a global movement for perennial agriculture. The prize provides a foundation for The Land Institute to collaboratively grow research, educational opportunities, network infrastructure, advocacy, and funding for perennial grain development on a global scale. Since December, The Land Institute has built capacity to support this effort by expanding the senior leadership team and launching professional development programs for all The Land Institute staff, including intercultural capacity building. While the Food Planet Prize anchors this effort, it will require continued growth and new investment over the coming years.



Organizational Learning for a Just Perennial Future

From our founding 45 years ago, we investigated how to live within ecological limits, exploring alternatives in education, sustainable living, and agriculture, all toward the end goal of reconciling the human economy with Nature's economy. Eventually, we focused on food and how we produce it as a transformative first step in this long-term vision, with diverse perennial grain agriculture as one of our early proofs of concept. As we move into the next 40 years, proof of concept in hand and inspired by our founding, we are advancing transdisciplinary research and education programs to help build the human communities required for a societal perennial transition. The work extends from our founding roots in central Kansas to emerging research and community hubs around the globe.

We are building our organizational culture and intercultural capacity to pursue this vision and embody our values through intentional and expanded collaboration and partnership. 2021 saw The Land Institute staff and board of directors engaged in diversity, equity, and inclusion training. Key staff participated in deliberate mentoring conversations with leaders in Indigenous agriculture. We built a budget for the current and next fiscal years that includes, for the first time, additional professional development funding to support staff growth. New grant projects will provide opportunities to deepen our learning. 2021 also marked the start of an FFAR-funded project with the University of Minnesota through which we are collaborating to study social sustainability in Kernza® pilot supply chains. In the USDA-funded Kernza®CAP, we helped develop a project race and equity framework.

Responding to the Climate Crisis, Racial Justice and Equity

As part of our goal to create a just perennial future, The Land Institute and its collaborators submitted public comments to the USDA in response to a series of Executive Orders from President Biden, including "Tackling the Climate Crisis at Home and Abroad," "Advancing Racial Equity and Support for Underserved Communities Through the Federal Government," and "America's Supply Chains." We collectively maintain that decisive action by the federal government is now warranted to accelerate perennial grain crop research and development by increasing public funding and stimulating private investment. We also maintain that we should concurrently leverage existing policies and programs and develop new strategies to sequester carbon, reduce greenhouse gas emissions, improve access to nutritious food, improve market opportunities, build supply chain infrastructure, and ensure resiliency to climate change through perennial grain adoption. Furthermore, we strongly encourage USDA competitive grant programs to set the example of requiring applicants to demonstrate how their projects will promote racial equity and work to remove systemic barriers to opportunity. Finally, furthering justice, equity, diversity, and inclusion are as important as yield improvements, resource efficiency, and job creation and must be recognized as such.

Global Engagement at the UN Food System Summit Side Event

The Land Institute hosted a Side Event at The Scientific Group for the UN Food Systems Summit in July with participation by colleagues at Birzeit University (Palestine), Lund University (Sweden), Yunnan University (China), and Swedish University of Agricultural Sciences (Sweden). The event, entitled "A Perennial Revolution of Agriculture – Is It Desirable, Possible, Imminent?" featured presentations and panels with our global partners discussing the development and benefits of new perennial grain crops, perennial polycultures, and the potential of perennial agriculture. Events like this illustrate the progress of our growing network of international collaborators and the addition of our combined expertise to the global conversation around food, agriculture, and climate.



Promising Research Developments with Perennial Wheat

This past year our perennial wheat research reached a critical next step in its development journey, with three of our perennial durum wheat hybrids surviving a full two years and yielding grain both years. This progress motivates us to extend our perennial wheat project beyond The Land Institute's Kansas home base. Coordinated research field trials will begin at eight locations across Colorado, Kansas, Minnesota, New Mexico, New York, Washington, and Wisconsin to evaluate yields and perenniality. In addition, in August 2021, our Civic Science program initiated a new project with 106 civic scientists distributed across 38 US states to help test the perenniality of wheat by growing plants from seed at a garden scale.

We look forward to the next big step of these perennial wheat lines surviving and producing grain yields for a full three years!

The Land Institute Board Changes:

The Land Institute welcomed **Funlola Otukoya** and **Eric Schlosser** to the Board of Directors.



Funlola is an Investment Analyst, Impact and Environmental, Social, and Governance (ESG) specialist at the McKnight Foundation. Before joining McKnight, he was the Africa Advisor at Concordia, a nonprofit focused on building social impact through cross-sector partnerships.

Previously, Funlola served as Investor Lead at CDP, an organization focused on ESG integration into the financial markets related to climate change, water scarcity, and soft-commodity deforestation. As Investor Lead, he worked with endowment funds, investment banks, private foundations, and impact investors, among others, to encourage S&P 500 disclosure on environmental matters and use that data for business decisions. He also launched a sustainable infrastructure financing tool for cities, states, and regions.



Eric is a writer and producer whose work has been published in dozens of countries, performed on stage, and adapted into films. His most recent book, *Command and Control* tells the story of America's effort to prevent nuclear weapons from being stolen, sabotaged, or detonated by

accident. It was a New York Times bestseller and a finalist for the 2014 Pulitzer Prize in History. His two other books, *Fast Food Nation*, which helped start a revolution in how Americans think about what they eat, and *Reefer Madness*, which looked at the nation's underground economy and the injustices caused by the war on drugs, were also New York Times bestsellers. His next book is about the American prison system. Schlosser was an executive producer of Richard Linklater's feature film *Fast Food Nation*, Paul Thomas Anderson's *There Will Be Blood*, the documentaries *Food Chains* and *Hanna Ranch*, and co-producer of the Oscar-nominated documentary *Food, Inc.* In addition, he was a producer of the documentary *Command and Control*, which was short-listed for an Oscar.



PROGRAM UPDATES

Perennial Crops

Kernza®

To accelerate progress in breeding varieties of intermediate wheatgrass in Kernza® production, we have used genomic selection techniques for the past five years. This technique has saved years of work in the field by using genetic markers on DNA from 2-week-old plants to predict the performance of plants as adults. This technique is similar to using genetic testing to predict disease susceptibility in humans. Along the way, results have indicated that this technique seems to be working, but it was hard to be certain. The gold standard test involves growing plants from many generations in the same field and comparing their performance. This year we were able to make that comparison for the first time. The data showed very convincingly that genomic selection allows us to make rapid improvements for all important traits, such as yield and seed size. Compared to traditional breeding, our rate of progress has at least doubled.

Since annual wheat already has all the traits we want in a domestic grain, except for perenniality, geneticists are attracted to the idea of making shortcuts in the domestication of intermediate wheatgrass by using genes for those traits such as big seed or short stature. But hybridizing wheat with wheatgrass is difficult. The resulting plants have random chromosomes and are poor performers. However, adding just a small portion of wheat DNA to intermediate wheatgrass could be very beneficial if it were the right portion. Through years of cross-pollinating and back crossing, we have developed a wide array of plants with a single wheat chromosome and all the wheatgrass chromosomes. We have now embarked on a collaborative project with a USDA geneticist based in Utah to identify the precise chromosomes in more than a thousand wheat/wheatgrass hybrid plants and to characterize those plants in the field. This work could produce an important breakthrough in the coming years!

Perennial Wheat

The perennial wheat research reached a milestone this year, with three durum wheat lines surviving two years and producing grain both years. Most plants made it through severe drought last summer through early fall and through frigid temperatures in February. However, fewer plants showed the potential of living into the third year.

A newer experiment demonstrated that those same three durum wheat lines became more perennial in a later-planting scenario, suggesting that a particular combination of environmental factors and agronomic management could greatly influence perenniality. Therefore, we are running two multi-location trials with ten newer durum wheat lines to find ways to push the level of perenniality to three or more years.



Perennial Oilseeds

At our breeding nursery, *Silphium integrifolium* of the Kansas population and hybrids, with out-of-state wild collections and other silphium species, were hit hard by fungal and viral diseases in 2021. While it's disappointing that the most improved "elite" lines were devastated or killed, hundreds of plants with wild backgrounds remained healthy due to our decision to aggressively diversify the genetics of the breeding population several years ago.

The uses of silphium continue to grow. At the breeding nursery, silphium provided abundant food resources to honeybees and their hives during the July "dearth" when few other crops or native plants were flowering. As a result, local beekeepers are requesting silphium seeds. Simultaneously, testing in Argentina and Kansas confirmed that silphium stems and leaves are very nutritious for livestock. We are currently collecting seeds from the most diverse and healthy plants to develop an improved "bee & beef" forage silphium for the central Great Plains. While this variety will not appear domesticated, with variable plant heights, flowering times, and seed sizes, it will serve as a valuable genetic reservoir for future breeders.

Different plants in the "bee & beef" population are currently being hand-pollinated to provide a set of related lines for testing in our exciting new Phenomic Selection project. Funded by the Foundation for Food and Agricultural Research, the project uses more affordable sensor technology to bypass the need to extract and sequence DNA for "fingerprinting" thousands of seedlings in breeding programs. Dr. Allison Miller of the Danforth Center in St. Louis, MO, directs this perennial crop project with scientists and collaborators from The Land Institute, Kansas State University, and INIFAP, a Mexican federal research agency.

Perennial Legumes

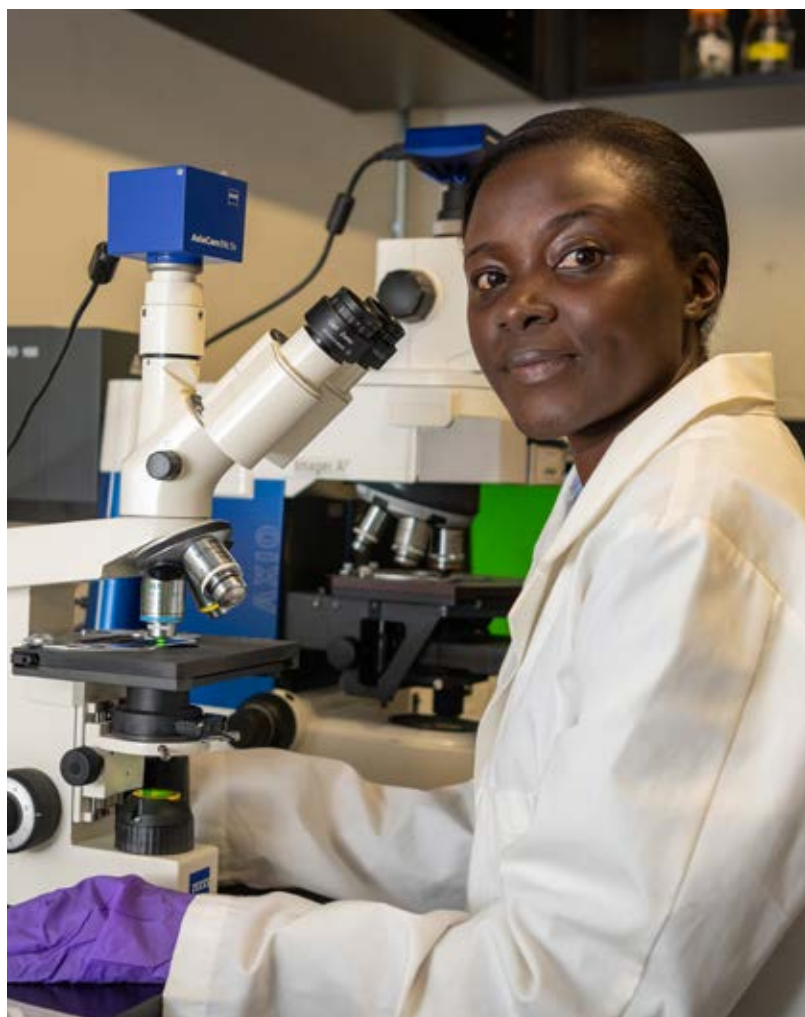
Our research in perennial groundcover (PGC) systems has expanded over the past year. This work pairs perennial legumes that provide ecosystem services (e.g., nitrogen fixation, weed suppression, erosion control) with other grain crops. We selected diploid kura clover plants from breeding trials that could serve as PGC for perennial grains like Kernza® and annual grains like corn. We also grew large quantities of kura clover seed to enable researchers at other institutions and farmers in Kansas, Iowa, and Nebraska to trial kura clover in their production systems. And we selected and crossed persistent, vigorous alfalfa plants from a trial where the alfalfa breeding lines were planted into a Kernza® perennial grain field.

We have continued to develop sainfoin as a perennial pulse crop by establishing new breeding nurseries in Montana, conducting nutritional and toxicology research, and establishing new relationships with sainfoin seed growers and commercial partners.



Perennial Sorghum

This year we discovered that diploid hybrids formed by crossing cultivated sorghum, *S. bicolor*, and *S. halepense*, offer the possibility of transitioning from breeding tetraploid to breeding diploid perennial sorghums of relatively low complexity. Therefore, it is imperative to understand the genetic basis of perenniality in diploid perennial sorghum. Our analysis of F3 diploid families for rhizome formation over the current growing season has identified several diploid families with rhizomes, thus making them perennial. In addition, there are several diploid families who have expressed rhizome development in one or both locations (Salina, Kansas, and Tifton, Georgia). We are also evaluating whether these families are perennial in Uganda. Next growing season, we will plant a selection of diploid F4 families for genotyping (the process of using DNA sequences to detect genetic variation) and phenotyping for perennial traits. This study aims to identify genomic regions associated with rhizomatousness in diploid perennial sorghum and develop diagnostic DNA markers for breeding purposes.





PROGRAM UPDATES

Agroecology

Crop Protection Genetics

The CPG team had a breakthrough in developing a greenhouse inoculation technique and screened 3600 silphium seedlings for their ability to resist rust infection. We compare the seedling's performance to withstanding rust in the greenhouse with those in the field in three locations. Soon we will see if the Silphium rust resistance protects against other species of pathogens.

In collaboration with Hanu Pappu, and his postdoc Romana Iftikhar at Washington State University, we learned there's a viral sequence in approximately 90% of our silphium plants. But this type of viral sequence does not generally harm the plants. Instead, there is likely a less common virus in the *Caulimoviridae* family that Hanu's group will try to recover through whole-genome sequencing.

We welcomed a new post-baccalaureate researcher, Leah Treffer, who maps *Fusarium* head blight resistance genes in Kernza, along with a new research assistant, former intern Maya Kathrineberg, who contributes significantly to every aspect of the program. We are also excited for our first technician, Yvonne Thompson, who will start in October. Finally, Angela Brekalo, who has become the world's leading expert on Silphium rust, will be departing at the end of the year to pursue graduate studies in agricultural systems, landscape agroecosystem change, and political economy.

Crop Protection Ecology

Post-doctorate Chase Stratton won a USDA-NIFA research fellowship. This 2-year grant will fund his research using public databases on plant genomics, plant chemistry, and beneficial fungi to select crop species that grow well with silphium, Kernza®, and alfalfa.

We have secured partnerships with Enel Green Power, US Solar, and Connexus Energy to study the potential of silphium plantings in solar fields as a pollinator crop for native pollinators and honeybees. As a result, we planted silphium seedlings in eight solar fields in Minnesota as part of a 3-year initiative.

We have established a collaboration between professors at Louisiana State University (Drs. Jong Ham and Michael Stout) and Dr. Fengyi Hu, director of the perennial rice program at Yunnan University, to study the ecological impacts of perennial rice in the United States. We shipped five rice lines to LSU. They are currently being grown in quarantine to test for bacterial pathogens. Any clean lines will be grown for seed to plant field trials in 1-2 years.

We have secured a collaboration with Dr. Ming-shun Chen, a USDA scientist specializing in wheat pests, to test our perennial wheat lines for resistance to Hessian fly, a common wheat pest.

We submitted five grant proposals to the USDA, FFAR, NSF, Forever Green, and Pacific Biosciences. In addition, we anticipate 2-3 more grant submissions in Sept-Dec to the David H. Smith Conservation Research Fellowship program and SARE.

Soil Ecology

Interest in intercropping Kernza with the forage legume alfalfa continues to expand. The roots of these two crops are very different and appear to be quite complementary given how well the two crops grow in close proximity. We recently completed a study at The Land Institute where Kernza and alfalfa grown together produced more consistent grain and biomass yields over five years than stands of pure Kernza. Interestingly, the Kernza-alfalfa plots produced almost twice the root biomass than pure Kernza planted at the same crop density. This finding and others made Kernza and alfalfa exciting perennial crops to include in a substantial new multi-institution initiative led by Allison Miller from the Danforth Center in St. Louis called “New Roots for Restoration Biology Integration Institute.” The project examines how wild perennial plant species, and different combinations of species, affect processes of ecological restoration, especially those that take place below ground, which is difficult to “see.” The project then extends the concept of ecological restoration to perennial agriculture, looking at how the soil ecosphere (roots, microbes, and physical properties) changes as crop species like Kernza and alfalfa replace annual crops such as wheat.

The ability of regenerative agricultural practices to sequester CO₂ from the atmosphere is significant but not sufficient to cancel out the CO₂ that originates from fossil fuel combustion. Thus, it is imperative that society directly address fossil fuel dependency. Yet the drawdown of atmospheric CO₂ that is likely achievable when annual croplands are converted to perennial grains could play a meaningful role in maintaining global temperatures below the critical 1.5-2.0 °C threshold identified in the 2015 IPCC Paris agreement. In a significant step to calibrate the potential of perennial grains to rebuild soil carbon, The Land Institute has teamed up with researchers at Colorado State to model soil carbon dynamics under Kernza. Post-doctoral researcher Yang Yi, working in the lab of Dr. Stephen Ogle at CSU, will spend most of the next two years building a robust model that can predict soil carbon accumulation rates across a wide range of soil types, as well as rates of nitrous oxide emissions, another potent greenhouse gas. Results from the model will be integrated into the USDA’s COMET-Farm greenhouse gas calculator tool designed for growers to estimate carbon credits.



Crop Stewardship

The Crop Stewardship program uses research on innovation, adoption, and scaling to get perennial grain crops from the research station onto farms and eaten by people at a scale worthy of their impact. In addition, we develop strategies to ensure the broader world is prepared to use and value these new crops and cropping systems.

This year, we welcome the first Crop Stewardship Technician, Sophia Skelly, as a full-time staff member who will help manage the Kernza® trademark and build a framework for including diversity and inclusion in the work of expanding perennial grain agriculture.



Ecosphere Studies

Ecosphere Studies shared foundational knowledge and narratives through accessible learning materials. Wes Jackson and collaborator Robert Jensen recorded the Podcast from the Prairie together and individually authored the books *Hogs Are Up: Stories of the Land with Digressions* and *The Restless and Relentless Mind of Wes Jackson: Searching for Sustainability*, respectively. Stan Cox wrote a book entitled *The Path to a Livable Future* and numerous essays on living within social and ecological limits, as well as presented a dozen webinars. The *Perennial Turn* by New Perennials Publishing reprinted essays by our team.

Aubrey Streit Krug worked with research resident Megan Gladbach to create a new educational framework that invites students and the public to understand perennial grains in the context of human communities, agroecosystems, and changing Earth systems. This “Kernza® in Context” framework was informed by interviews with teacher-researchers and stakeholders in year one of the five-year Kernza®CAP grant. The team will next build out and test educational modules based on the framework.

We tended and grew our research and learning network. A large, digital Ecosphere Studies gathering in July 2020 engaged the New Perennials Project community across hubs. Educator Emily Ryan joined us as Wes’ special assistant to help facilitate the exploration of a local educational project.

Civic Science

The Civic Science program within Ecosphere Studies fostered decentralized, experiential learning and research with perennial grains. Led by Aubrey Streit Krug in collaboration with The Land Institute scientists, we completed a successful 2020 growing season with the original silphium pilot cohort and newly started silphium ecotype conservation and sainfoin pilot communities. Our team engaged more than 70 active participants in around 18 states.

The original silphium pilot cohort demonstrated strong participant retention, and 20 people harvested seed heads for the first time. The Land Institute’s perennial oilseeds team found that with the help of our training materials, these volunteers were consistently able to identify outstanding plants in the field. This evidence suggests that participants in future, larger civic science communities will learn to collect high-quality samples and data useful for The Land Institute scientists.

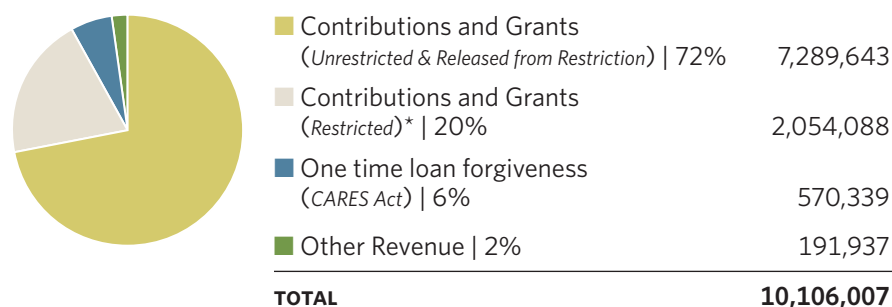
Anna Andersson joined Civic Science as a new research technician, and we deepened our collaboration with citizen science researchers at Colorado State University’s CitSci.org. Beginning in the spring 2021 growing season, we shifted our civic science communities to this platform. We also developed new print field guides to provide a handy reference for silphium and sainfoin civic scientists, pulling together guides for phenology, pollinator, pest and pathogen, and rust observations, plus harvest instructions.

Summary Statement of Financial Position

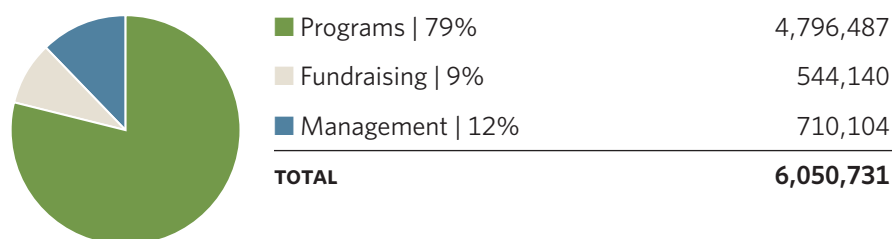
YEAR ENDED JUNE 30, 2021

	FY 2020	FY 2021
Assets	18,271,506	22,285,412
Liabilities	(1,265,162)	(1,223,792)
Net Assets	17,006,344	21,061,620

Revenue w/Management Adjustments



Expenses



*Restricted contributions and grants are for future years' project expenses.

LEADERSHIP

AS OF 6/30/21

Rachel Stroer PRESIDENT

Amy Cole DIRECTOR OF DEVELOPMENT,
CHIEF IMPACT OFFICER AS OF 7/12/2021

Tim Crews DIRECTOR OF ECOLOGICAL
INTENSIFICATION, CHIEF SCIENTIST AS OF
7/12/2021

Lee DeHaan DIRECTOR OF CROP IMPROVEMENT

Tessa Peters DIRECTOR OF CROP STEWARDSHIP

Aubrey Streit Krug DIRECTOR OF
ECOSPHERE STUDIES

Wes Jackson PRESIDENT EMERITUS

BOARD OF DIRECTORS

AS OF 6/30/21

Ken Levy-Church Sag Harbor, NY CHAIR

Julia Olmstead St. Paul, MN VICE CHAIR

Rachel Stroer Austin, TX PRESIDENT

Ruth Anne French-Hodson
Kansas City, MO TREASURER

Brian Donahue Weston, MA SECRETARY

Tiffany Durr McPherson, KS

Sam Evans Chicago, IL

Pete Ferrell Beaumont, KS

Jill Isenbarger Pelham, NY

Deborah Neher Burlington, VT

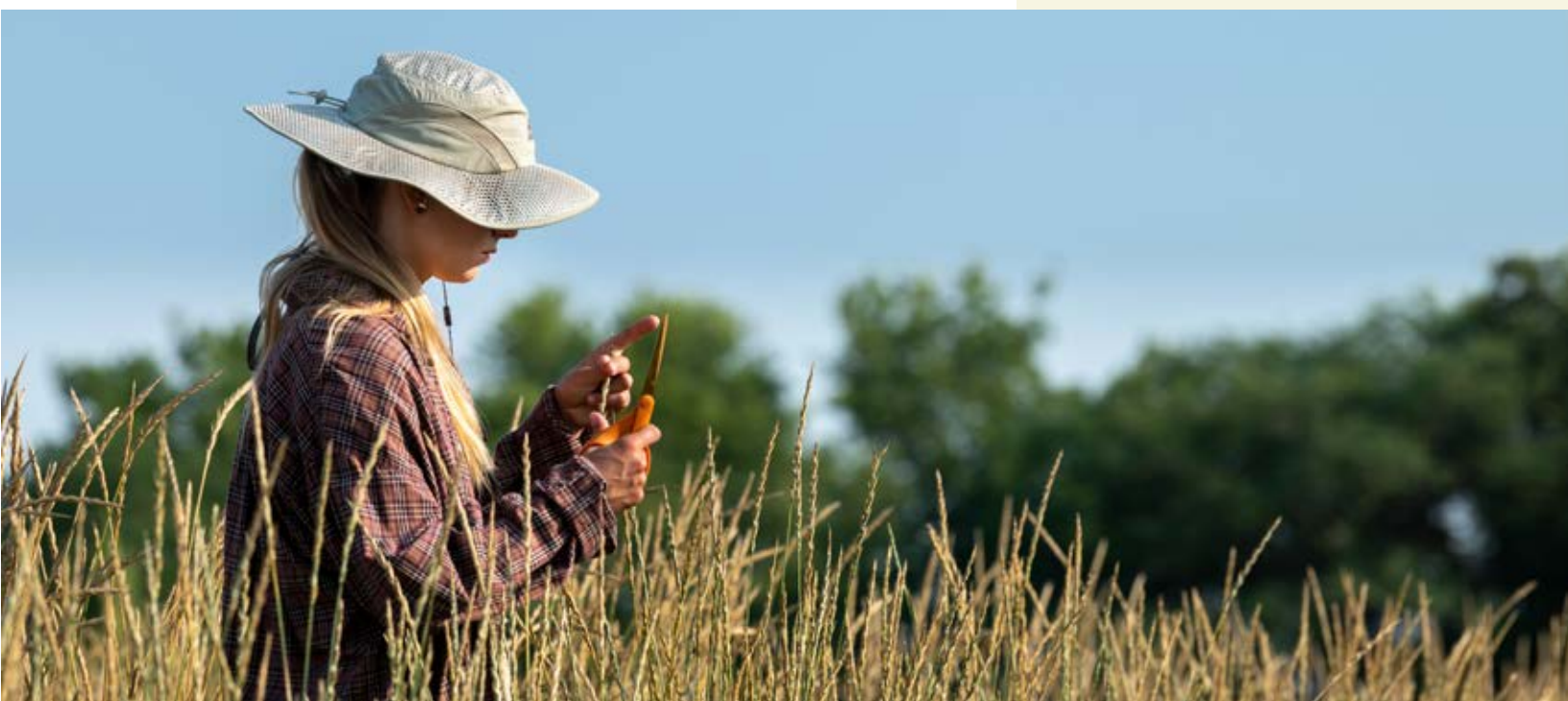
Lennart Olsson Lund, Sweden

Funlola Otukoya Minneapolis, MN

Ricardo Salvador Washington, DC

Corey Samuels Seattle, WA

Eric Schlosser Monterey, CA



Selected Publications and Presentations

Publications

Challenges and Opportunities in Managing Diseases in No-Till Farming Systems | Turner, M.K. | 2020 | *No-till Farming Systems for Sustainable Agriculture* (pp. 141-154). Springer, Cham. | [10.1007/978-3-030-46409-7_9](https://doi.org/10.1007/978-3-030-46409-7_9)

Mating compatibility and fertility studies in an herbaceous perennial Aster undergoing de novo domestication to enhance agroecosystems | Stephan Reinert, John H. Price, Brian C. Smart, Cloe S. Pogoda, Nolan C. Kane, David L. Van Tassel and Brent S. Hulke | 2020 | *Agronomy for Sustainable Development* 40, Article number: 27 | <https://doi.org/10.1007/s13593-020-00632-5>

An Aridamerican model for agriculture in a hotter, water scarce world | Nabhan, G. P., Riordan, E. C., Monti, L., Rea, A. M., Wilder, B. T., Ezcurra, E., Mabry, J. B., Aronson, J., Barron-Gafford, G. A., García, J. M., Búrquez, A., Crews, T. E., Mirocha, P., and Hodgson, W. C. | 2020 | *Plants, People, Planet* 2(6), pp. 627-639 | <https://doi.org/10.1002/ppp3.10129>

Cap and Adapt: Failsafe policy for the climate emergency | Edwards, L. and Cox, S. | 2020 | *Solutions* 11: 22-31 | https://www.researchgate.net/publication/339055627_Cap_and_Adapt_A_Failsafe_Approach_to_the_Climate_Emergency

Balancing Forage Production, Seed Yield, and Pest Management in the Perennial Sunflower *Silphium integrifolium* (Asteraceae) | Vilela, A.E., González-Paleo, L., Ravetta, D.A., Murrell, E.G. and Van Tassel, DL | 2020 | *Agronomy* 10(10), p.1471 | <https://doi.org/10.3390/agronomy10101471>

A social perennial vision: Transdisciplinary inquiry for the future of diverse, perennial grain agriculture | Streit Krug, A. and Tesdell, O. I. | 2020 | *Plants, People, Planet* 00, pp. 1-8 | <https://nph.onlinelibrary.wiley.com/doi/10.1002/ppp3.10175>

Seeding date affects seed and biomass yield of *Silphium integrifolium* Michx. (silflower) | Schiffner, S., Jungers, J.M., Van Tassel, D., Smith, K.P. and Sheaffer, C.C. | 2021 | *Native Plants Journal*, 22(1), pp.30-44 | <http://npj.uwpress.org/content/22/1/30.short>

Process-based analysis of *Thinopyrum intermedium* phenological development highlights the importance of dual induction for reproductive growth and agronomic performance | Duchene, O., Dumont, B., Cattani, D.J., Fagnant, L., Schlautman, B., DeHaan, L.R., Barriball, S., Jungers, J.M., Picasso, V.D., David, C. and Celette, F. | 2021 | *Agricultural and Forest Meteorology*, 301, p.108341 | <https://doi.org/10.1016/j.agrformet.2021.108341>

Genomic prediction enables rapid selection of high-performing genets in an intermediate wheatgrass breeding program | Crain, J., DeHaan, L. and Poland, J. | 2021 | *The Plant Genome*, p.e20080 | <https://access.onlinelibrary.wiley.com/doi/full/10.1002/tpg2.20080>

Perennial groundcovers: an emerging technology for soil conservation and the sustainable intensification of agriculture | Schlautman, B., Bartel, C., Diaz-Garcia, L., Fei, S., Flynn, S., Haramoto, E., Moore, K. and Raman, D.R. | 2021 | *Emerging Topics in Life Sciences* | <https://doi.org/10.1042/ETLS20200318>

Abiotic and biotic context dependency of perennial crop yield | McKenna, L. Koziol, J.D. Bever, T.E. Crews, and B. A. Sikes | 2021 | *PLOS ONE DOI* | 101371/journal.pone.0234546

Hogs Are Up: Stories of the Land, with Digressions | Jackson, W. and Jensen, R. (Forward) | 2021 | <https://kansaspress.ku.edu/978-0-7006-3059-2.html>

The Restless and Relentless Mind of Wes Jackson: Searching for Sustainability | Jensen, R. and Orr, D.W. (Forward) | 2021 | <https://kansaspress.ku.edu/978-0-7006-3055-4.html>



Presentations

FEBRUARY 2021

Opportunities for Resilience: Perennial Grains *Presented by Tessa Peters* | UCLA Institute for Society and Genetics; U Arkansas Sustainable Business; Oregon State Careers in Plant Breeding; University of Wyoming Agroecology Capstone | VIRTUAL

Land Use, Carbon and Regenerative Agriculture *Presented by Rachel Stroer & Tim Crews* | Top Producer Summit, Sponsored by Farm Journal | VIRTUAL

APRIL 2021

Healing Land & Community *Presented by Aubrey Streit Krug & Liz Carlisle* | Colorado Grain School | VIRTUAL

New Roots for Ecological Intensification *Presented by Tim Crews* | Crop and Soil Science Graduate Student's Association Spring Seminar, Washington State University, Pullman | VIRTUAL

The Kernza Perennial Grain Journey *Presented by Lee DeHaan* | The Gateway Research Organization Annual General Meeting, Westlock, AB, Canada | VIRTUAL

MAY 2021

Perennial Grains: A Promising Strategy for Employing Roots to Deliver Ecosystem Services in Agriculture *Presented by Tim Crews* | International Society of Root Research Biannual Meeting Keynote, University of Missouri | VIRTUAL

JULY 2021

A Perennial Revolution of Agriculture—Is It Desirable, Possible, Imminent? *Presented by with T. Crews, L. Olsson, P. Nabukalu, F. Hu, A. Westerburgh, A. Streit Krug and O. Tesdell* | UN Food System Summit 2021 Side Event Webinar | VIRTUAL



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

We are committed to the bold yet responsible vision of transforming agriculture perennially and are honored to be on this journey with you. Your dedication, advocacy, and donations have supported perennial grain advancement in local neighborhoods and across the global community. This work connects long-term solutions with the urgency of human necessity, helping develop an agricultural system that can produce ample food, reduce, or eliminate impacts from the disruptions and dependencies of industrial agriculture, and inform cultural change through education.

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.



2440 E. Water Well Road
Salina, KS 67401
(785) 823-5376
info@landinstitute.org

Stay Engaged!

-  landinstitute.org
-  [@natureasmeasure](https://twitter.com/natureasmeasure)
-  [/TheLandInstitute](https://www.facebook.com/TheLandInstitute)
-  [The Land Institute](https://www.youtube.com/TheLandInstitute)
-  [@thelandinstitute](https://www.instagram.com/thelandinstitute)

SUBSCRIBE TO ENEWS

Get the Scoop! Sign up on the home page of our website.

GET THE LAND REPORT

The Land Report magazine is published tri-annually and mailed to donors who contribute a minimum of \$50 per year.

SAVE THE DATE

Prairie Festival

September 23-25, 2022

Featuring some of the world's most compelling authors, thinkers, artists, and advocates focused on agriculture, the environment, science, sustainability, and social and environmental justice.