

Recommendations for research and support institutions from interviews with Kernza® perennial grain early adopters

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Introduction

This analysis and set of recommendations are based on Kernza growers' and other value chain actors' perspectives about what has been helpful and appreciated about institutional support for Kernza adopters (Part 1), and what they raised as missing and needed, or even negative, in their relationships with institutional support (Part 2). This is followed by a reflection on the role of institutional mediation in Kernza (Part 3). By institutional support, we mean the work of the universities and nonprofit organizations leading Kernza research, development, adoption, commercialization, value chain coordination and scaling efforts, and the ways that work is in engagement with and supports Kernza adopters.

This report is based on 63¹ interviews conducted in 2022 and 2023 with people who had begun working with Kernza to varied extents across value chain roles, predominantly in Minnesota and

¹The sample included 19 growers and 44 people through the rest of the supply chain (primarily small and mid-sized businesses across all roles from seed to processing to milling to culinary, brewing/distilling, baking and consumer packaged goods end uses and retail, with the inclusion of a representative from 4 larger company partners). A total of 102 growers and value chain businesses were identified in 2022-2023 in the study area as having worked with or currently working with Kernza, and each were contacted at least twice to invite interview participation. Of those contacted, 63 were interviewed. For value chain businesses, the owner, a manager and/or a key representative working with Kernza was interviewed.

Kansas. The research and support institutions they refer to are primarily University of Minnesota/Forever Green Initiative and The Land Institute (the key large institutions developing and scaling Kernza in their states), though this analysis is also inclusive of other important organizations and partners. Unless otherwise stated, “Kernza adopters” in this report includes both growers and other value chain businesses, and these farms and businesses had been and are working with Kernza to varying extents.²

Reflection on the responsibility and accountability of the research and support institutions to the early Kernza adopters on the ground, a form of social sustainability in crop development and scaling, is the focus of this report. For some growers and other value chain actors, their participation in the research was motivated by a strong desire, and a clear expectation, for their experiences and thoughts to be shared back with UMN/Forever Green, The Land Institute, and other support organizations and partners.

Since these interviews took place a few years ago, we recognize they may not best represent the set of people working with Kernza in 2026 or their present concerns as things change. They do capture an important timeframe in early adoption and value chain coordination for Kernza in the Midwest. We also recognize that work has evolved between 2023 and today in these areas of support. We suggest these recommendations be used in reflection on whether and how institutional support efforts since 2023 have advanced areas that Kernza adopters reported as valuable and helpful, and/or started to address any missing or negative aspects they raised. This document can also be a reference for Forever Green, The Land Institute, partners, and the Kernza Peer Strategy Teams as they work toward where to go from here. We hope for this type of research and feedback to be an ongoing dialogue with growers and other value chain actors, and we invite reflection on how to maintain and build on this type of research in the future, as well as improve upon the research design and methods.

This document is organized into three sections:

1. Part 1. What is most appreciated about the support and culture so far? (p. 3)
2. Part 2. What has been missing, needed, or negative so far? (p. 6)
3. Part 3. Reflection on the role of institutional mediation in Kernza. (p. 24)

This research was funded by the Foundation for Food & Agriculture Research and carried out by Dr. Amy Teller as part of a larger project on the social sustainability of Kernza supply chains,

²The sample included value chain businesses who were actively and routinely working with Kernza at the time and/or selling a Kernza product at the time of the interview (28) and those who had previously worked with it through a trial they had finished or paused, a grain sample they received, or an event (16). At the time, the growers in the sample had Kernza planted on anywhere between 1 to 6 acre trial plots, and up to 25-30% of their total acres, though most had between 4-11% of their acres in Kernza. 44% of the 63 participants began to work with Kernza in 2019 and before, and 56% first entered Kernza work from 2020 to 2023. Most common starting years were between 2018 and 2021, and just 6 interviewees had worked with Kernza before 2017. While all growers, seed sellers, and processors interviewed were licensed to work with Kernza, or sub-licensed through Sustain-A-Grain, we did not restrict the sample for other value chain businesses based on whether they were licensees or not. See [Appendix on Sample Characteristics](#) for more information about the growers and value chain businesses.

within a grant titled “Scaling New Crops for Sustainable Water Management: Building Supply Chains” (PI: Dr. Nicholas Jordan, University of Minnesota). This specific product was compiled in collaboration with Kernza®CAP: AFRI Sustainable Agricultural Systems Coordinated Agricultural Program (SAS-CAP) grant no. 2020-68012-31934 from the USDA National Institute of Food and Agriculture for Kernza® perennial grain (<https://kernza.org/kernzacap/>).

Part 1. What is most appreciated about the support and culture so far?

Based on what Kernza adopters identified as most helpful, valuable and appreciated about the forms of institutional support and culture they had encountered so far across all areas of Kernza work, support institutions could continue with and build upon the following:

- **Hosting field days and other place-based Kernza events**
 - Events drawing people from across the value chain to attend, or hosted at middle-of-the-value-chain businesses like processors and mills, were noted as valuable. They reported wanting to support and learn more about these middle roles. When people in different roles across the value chain show up, that makes Kernza scaling feel more possible – for example, a grower or seed business might learn some market demand does exist.
 - These events help people in different value chain roles (including growers) to meet, realize how they need each other, and notice how people in other roles are also going through challenges. This can make scaling Kernza feel more possible, by seeing how people across the value chain are showing up, creating camaraderie in the challenge across roles rather than reinforcing assumptions or resentment for who has it easier and harder, and can contribute to a form of de-risking the value chain through relationships.
- **Organizing recipe testing groups with end user businesses**
 - These help with creativity, countering difficulties that can compound together like both the high price and the learning process with a novel grain, and brainstorming and having conversations with people who share the interest.
- **Transparency and honesty with adopters about where things are at with Kernza, including openly sharing what is and is not known as knowledge is built**
- **Making demonstrable, iterative improvements at the same time in both crop development and relationship management with the Kernza adopters**
- **Providing a public place to look for clear information on Kernza’s environmental benefits as the research continues**
- **Doing what is possible and trying to put mechanisms in place to protect and avoid crashing the market**

- **Providing new networks and collaborations to join for farmers who are not raising corn and soy and are left outside those networks and relationships**
- **Adding new spaces to talk about diversity, equity, inclusion, and justice, and institutional staff showing up as partners in this**
- **Keeping up [Kernza.org](https://kernza.org) as a “reservoir of information”**
- **Being paid for participation in research, conferences, projects, and testing groups**
 - Some do and some do not expect or need this, but all appreciated this effort.
- **Feeling that their participation in the research goes toward the greater good**
 - Ex: A grower likes that the data and knowledge he provides on Kernza is going to help move the whole thing forward. Conversely, when he provides information on projects with agribusiness, he does not know if his information is going to help, only that it becomes their property.
- **Building a slow, deliberate culture and approach to perennial and Continuous Living Cover (CLC) transition and innovation**
 - Multiple people recited the Wes Jackson quote, “If your life’s work can be accomplished in your lifetime, you’re not thinking big enough.”
 - They observed the following demonstrations of this: careful approaches to new models, recognition that nothing is a silver bullet, people involved being grounded enough in history to not repeat green revolution mistakes – specifically a lack of responsiveness to real situations or awareness of potential unintended consequences, deliberately bringing in people and brands, not a “hurry up quick fix” that will collapse, recognizing the effort is working with natural and botanical processes that cannot be cranked out, the ability to reflect and recognize and fix issues, and building for the long haul.
- **Maintaining and enhancing the more unique characteristics of the Kernza network**
 - The breadth of people and sectors involved, not only the plant breeders and farmers typical for agriculture projects
 - Value systems underpin actions, e.g., cooperative values, caring about land, resources, and people
 - Inclusive of different types of farming operations and a big tent
 - The cultural knowledge base of grain traditions and grain infrastructure

Developing and scaling a novel perennial crop is difficult work. These responses reflect valuable impacts and accomplishments in how the effort has been experienced and perceived so far. In light of these responses, we recommend that support institutions study whether Kernza or other perennial grain adopters continue to experience any of these positive aspects of crop development and scaling, stemming from the institutions’ work and culture and the researchers and staff, or if any are lost, or if additional beneficial aspects emerge, as research,

commercialization, and scaling continue. Also, we recommend investigating whether these forms of appreciation and support are experienced across adopters, or if specific groups of adopters do or do not experience them.

The social impacts of building close relationships between Kernza adopters and institutional staff and researchers

The relationships that support institutions have built with Kernza adopters are themselves something to maintain and invest in. Many, though not all, Kernza early adopters at farms and in the value chain have formed new relationships through Kernza.³ Among those who specifically reported making a new relationship with researchers and staff at support institutions, a recurring benefit was greater access to and understanding of agricultural science and research. These relationships made crop research more tangible and meaningful, in part by giving adopters greater insight into how research is conducted. Below are paraphrased examples of how Kernza adopters described this:

- I trust the science and knowledge.
- It's stimulating, so I don't get bored.
- Being invited to things the scientists do like seminars.
- Learning from area experts and people with long-term thinking is invigorating.
- Seeing how good the researchers are at what they do.
- Exposure to a new area of research or knowledge, including new-to-them aspects of grains, genetics, crop domestication, how value chains work and are built, and the differences in the adaptations and survival strategies of annual and perennial plants and how to consider that in management.
- Building a stronger holistic perspective, a better understanding of what the goals for Kernza are, and everything that goes into working on it.
- New insight into large publicly funded projects and research grants, what they are, and the chance to learn about or be part of them for the first time.

Two specific grower stories:

- Kernza was their first time opening up their land for test plots, experiments, and data collection with any outside institution. Now they see researchers come by, know what the experiments are studying, and hear about what the researchers are learning.
- A relationship with a staff person at UMN gave a grower a new understanding of Forever Green, as opposed to the organization being a black box, including seeing inside to the dynamics, decision-makers, and pressure points, giving him a sense that he is now able to reach in.

³45 out of 63, or a bit over two-thirds, of growers and other value chain actors in the interview sample had made at least one new relationship through Kernza work, such as with someone in their own industry, in a different industry or a university, nonprofit or public agency staff member or researcher. This is more common among growers than among people through the rest of the value chain. Only 2 growers had not met someone new through Kernza, while 16 in other value chain roles had not.

This pulling back of the curtain on institutionalized science and crop development – a space that is historically and currently less accessible or known to those outside of it – is a socially beneficial aspect of Kernza development and adoption, so far, that has stemmed from close relationships between people at the institutions and Kernza adopters.⁴ Based on this, we recommend tracking whether these types of relationships continue beyond the early adoption phase, variation in whether and how adopters experience this, and what further impacts this relationship-building and learning might have for action and change.

Part 2. What has been missing, needed, or negative so far?

What supports do Kernza adopters most need and in what ways could relationships be improved upon? Below are recommendations for what support institutions could do, or do differently, based on Kernza adopters' feedback. Projects, funding, and hiring have been devoted to some of these areas in the two or so years since research interviews were completed, making this a tool for recognizing iterative growth and responsiveness, as well.

These recommendations are organized into four categories:

- Products and Markets (p.7)
- Stakeholder Engagement and Education - Extension, Policy, Education (p. 12)
- Cross-Sector Uptake - broad based, values and DEIJ⁵ across areas (p. 16)
- Agroecosystems and Breeding (p. 21)

These categories align with the focus areas of the Kernza Peer Strategy Teams, which were formed to build on collaborations started under KernzaCAP (a multi-sector, USDA-NIFA-funded project to advance Kernza).

First, relevant to all categories, Kernza adopters raised the following areas as having gaps in staff capacity at the research and support institutions:

- People who better understand business, and at different scales
- Perennial grain technical assistance and extension-like resources specifically for small-scale farmers
- Kernza agronomists who can do field visits in each state, and have the knowledge of a grower with some years of Kernza experience under their belt

⁴This research did not focus on the institutional staff and researcher actors, and therefore it can not speak to whether bi-directional learning is occurring through these relationships, meaning whether and how people working in the institutions are also learning and experiencing shifts in ways of thinking through these relationships. This other direction of the relationship, and how it might be changing the institutionalized science and crop development, is also worth investigating.

⁵Diversity, Equity, Inclusion, Justice

- Staff who focus on land access, succession, and transition, and more social and economic issues, and can dialogue with farmers, other organizations, businesses and students on these topics
- More relationship management capacity, including improving support, communication, and relationships with growers and value chain businesses

Products and Markets

On this topic, Kernza adopters most commonly raised how institutional support is focused on growers and less on the rest of the value chain, such as middle and end use roles. They recognize this issue is not unique to Kernza, and often occurs in sustainable food and agriculture work. Nevertheless, not feeling support or engagement down the value chain made some businesses less interested in continuing to work with Kernza after a trial. **These are potential ways they suggested supporting the whole value chain:**

- **More R&D (i.e., chemistry, specs, extract, nutritional characteristics, and processes across Kernza use forms) for end uses like brewing, distilling, milling, baking**
 - Specific areas raised as needed and under-researched at the time: shelf life and storage for Kernza grain and flour (especially since it does not move quickly yet); and grain quality analysis.
- **Develop cost-share programs with small and mid-scale businesses through the rest of the value chain, in addition to with growers**
- **Marketing and educational materials for outlets like the brewery taproom, grocery retail, food service (across ages/institution types), and B to B (business to business) customers**
- **Learn about and tap into existing knowledge-sharing industry groups and spaces, including conferences for craft brewing and distilling**
 - Ideas for craft brewing and distilling conferences included working to create a Kernza category in contests, giving out trial size amounts, and inviting brewers or distillers that have used Kernza already to give talks.
- **Work more with institutional food service partners**
 - Working with institutional buyers would reach a large and “captive” audience, support prep and design of recipes on a very different scale, and drive demand and cultural change at the same time, and at scale.
- **Make Kernza more available through the venues where end users typically get their supplies, so ordering Kernza is not an additional task**
 - Venues may include brewing ingredient ordering systems, CPG ingredient suppliers, and Minnesota’s grocery cooperatives (including bulk).

- **Bakeries raised specific ways to support Kernza use in the baking industry:**
 - Support perennial grain test bakeries, especially if the intention is for Kernza to work in bread and bread flour.
 - Host workshops for bakers so they can feel Kernza doughs at different percentages without investing the money themselves, and can have in-person discussions with other Kernza bakers and test bakery staff.
 - Be aware of how different home baking is from commercial baking.
 - Involve instructor pastry chefs and help them work perennial grain into their teaching, so early career commercial bakers are learning this upfront.
- **Share the list of licensed Kernza distributors and retailers and the forms available**
 - End users at the time often did not know if, where, or in what form Kernza was available for sourcing after trials.
 - Some interviewees thought Kernza was not available commercially outside trials.
- **Improve skills and practices in communicating with and bringing in businesses, especially small businesses. Small and mid-sized business owners reported the following types of negative interactions with support institutions and their staff and representatives:**
 - Did not receive clarity about how businesses can participate in and benefit from pilot programs, versus what they need to pursue on their own
 - Felt a lack of experience at institutions in how to carry out interactions with businesses and small food producers who make things from the crops, and/or less of an interest in learning from how a small business makes things work
 - Assumptions and expectations that they will be available to do any events and promotion, sometimes without adequate communication, understanding of their work and their time, or compensation
 - Felt their type of business or industry was not a priority for making connections, or perceiving that it was not wanted for them to buy or work with Kernza
- **Identify, convene and/or lightly support emerging coalitions of small business buyers**
 - Some smaller businesses are building partnerships or communities of practice for buying and using Kernza on their own. Identifying and supporting these partnerships to grow could be a place for the support institutions to help. Together these businesses feel they could do more to lift up and move Kernza than they can alone, and also potentially cost-save and share knowledge, about and beyond Kernza.
 - However, many were also unaware of anyone working with Kernza near them geographically or in their industry, even though other businesses were.
- **Helpful areas that they suggested small grants could cover:**

- Travel and events: Funding for businesses and growers to host Kernza field days, for travel to promote Kernza products or share experiences at these types of events, and for covering the cost of Kernza to use in products to promote at events or conferences.
- Owner's and/or staff's time: Funding support for some hours of their own time or to allocate staff time to devote to Kernza recipe development, learning, and incorporation into recipes and practices. They identified time costs and Kernza's high ingredient costs as two compounding barriers to using Kernza after a trial, and alleviating the cost of the time and staff capacity investment could help with that.

Growers also asked for more attention to their “back end,” not just production, through business and economic decision-making support, including:

- Help with pricing for producers as they come to market with their product, such as what is appropriate for direct sales, farmers' markets, and grocery, and how to do that work.
- Support with organizational development, cooperative and business planning, and other back end marketing work, as they reported giving as much or often more time to these aspects as to working with Kernza in the field.
- Keep in mind that some growers do want to step more into these organizational, business or cooperative planning and marketing pieces, and they are enjoying learning, or they bring skills and experience in these areas, while others do not want to have to do this work.

The remaining points are diversity, equity, inclusion, justice, belonging and values topics that Kernza adopters raised regarding products and markets:

- **Connect with potential-Kernza-user businesses that are similar to businesses that have been successful with Kernza so far, *and* also proactively identify and support potential-Kernza-user businesses that do not fit the profile demographically or geographically**
 - To expand accessibility of working with Kernza, consider putting together a package of complimentary product to trial for both businesses that fit the profile of who's been successful with Kernza, based on what's working on the supply and market sides, *and* also for businesses who do not fit that initial profile, including BIPOC-owned (Black, Indigenous, and People of Color) and -serving businesses. If any of these businesses are interested in being more engaged, work with them on sharing back data, such as collecting feedback regarding their experience trialing Kernza, what their goals are, and how Kernza does or does not advance those goals.
- **Establish transparent labeling practices for the % inclusion rate of Kernza in products to equitably navigate varied inclusion rates and Perennial Percent**

- This recommendation was raised by the adopters as a potential way to address concerns and reservations about low/1% Kernza inclusion rates (such as [Perennial Percent](#)), and to fairly allow for a range of inclusion rates in the market, hopefully without adding barriers.
- They suggested more dialogue about the topic of labeling and inclusion rates, and raised the following ideas:
 - Establish a minimum inclusion rate to label a product as “Kernza beer” or “Kernza bread.” Be transparent about what this is based on and try to arrive at this fairly across business sizes and product types. (They tended to converge around 15% as a minimum inclusion rate for notable Kernza use).
 - Require that the % Kernza in the grain bill be clearly on the label for all products that use Kernza (e.g., 20% Kernza bread or 20% of the grain in this bread is Kernza).
 - Recognize that beer or cereal with 1% Kernza should not appear to be the same product as one containing 25% Kernza, nor should they compete on flavor or price. Some participants tied this recommendation to ensuring equity across business sizes; for example, if a pattern emerges in which larger companies tend to use 1% Kernza while smaller makers use 25% Kernza.
- Proceed with awareness that complex negative and supportive views exist among Kernza adopters on the Perennial Percent approach (or 1-2% inclusion rate) to market and move more Kernza. Listen to and take input from businesses across types and industries and other stakeholders on this scaling approach.
- **Do not assume or promote that end users can or will pass the higher cost of Kernza onto their customers as the way to make the high price work**
 - This idea can be off-putting to them, especially in regards to their relationships with their customers. They are often already charging as much as they can or would like to for products like bread, pasta, and beer, and believe that these are products that cannot be highly expensive and should be as accessible as possible.
- **Further transparent dialogue and work on Kernza pricing**
 - Many growers see an opportunity with Kernza to be price makers and to achieve and maintain a just price. Many value chain businesses also see and support this vision, seeing Kernza as an opportunity to shift away from dynamics in which growers bear substantial risk while capturing relatively little value. At the same time, not all Kernza adopters believe that a crop can work in the market when the price is driven by growers. Adopters expressed interest in further transparent discussion in this area, including the following recommendations:

- Cultivate more open and transparent dialogue about the pricing of Kernza. Adopters raised that an equitable price is not just about the price itself, but also about the open and transparent dialogue around it, in which growers have a voice in the dialogue and decision-making. Within this, efforts should be made to keep open to questions about Kernza's price, as end users or buyers feel that efforts to better understand the price are sometimes interpreted as them trying to hammer down the price at the expense of growers.
 - Work toward understanding across the value chain of the costs at each step, and have communication and dialogue about these costs, inclusive of growers, processors, and buyers/end users. If Kernza's price is going to be high, why? What price do growers need, and what costs is the price covering for growers? What does it cost them to license, plant, harvest, clean, and market Kernza? Does the price include the value of ecological benefits or not? Where can costs be reduced post-harvest? Perennials seem in theory like they should lower input costs for growers, which confuses end users about such a high price. Discussing these questions could help some buyers with understanding and supporting a higher price.
 - Support finding ways to improve efficiency or lower costs along all the steps, to the extent possible, to help reduce the price of Kernza to be affordable for more people and businesses, while maintaining fair prices and pay to people doing the work along the way.
- **Be aware that who takes on the risk for a novel grain has led to stalemates in early value chains – e.g., between millers and bakers – as both roles do not think they should be the ones upfront on the high cost of a novel grain**
 - Support to navigate this stuck point of who takes on or shares this economic risk could be helpful to smooth early value chains. For example, a baker may not be used to committing to pay the value of the grain earlier before it is milled.
 - A couple of small businesses mentioned feeling they are being asked by the Kernza network to take on amounts of \$10,000-\$30,000 in grain that are very high for them.
 - Millers were much more willing to contract mill Kernza for others, than to add a Kernza product line at the time.
 - **When promoting or highlighting Kernza growers, businesses, and products in various contexts, avoid featuring the same actors, knowledge and perspectives**
 - People reported seeing others who they think do work similar to themselves being seen and featured more often, and these perceived patterns can intersect with privileged and marginalized identities in these spaces. They believe there are distinct roles for everyone.

- **Improve communication about Kernza licensing, especially with end users, and ensure licensing is not too complicated or a barrier to potential adopters**
 - People experienced with licensing, especially in farm, seed, and processing roles, said Kernza felt similar to other license applications, such as with agribusiness, for other small grains, seed, or to handle certified products. It was not new or difficult. They suggested continuing to keep it as simple and user-friendly as possible.
 - End user businesses were most confused about the license. They said things like: chefs are ignoring Kernza because of the legal stuff, and that the license is a deterrent for some people. Some interviewees did not know they could buy Kernza after a trial, and thought it was copyrighted and inaccessible. Others didn't understand why they would need a license to buy Kernza, and to recipe-develop and experiment, and heard they would need to put the trademark on the packaging if they use and sell it. This led to hesitations to work with Kernza, even though they actually did not need a license at their scale. Below are some examples of specific responses demonstrating confusion or hesitation about license requirements:
 - Retailer: A grocery cooperative selling packaged Kernza thought they could not make and sell prepared foods with Kernza at the store without a license.
 - Small end user: "I'm licensed but only because I slipped through working with UMN, without that I wouldn't have pursued it. I don't know much about it or how long it lasts, and I hear about licensing issues with who can [use Kernza] and how and when."
 - Grower: "For a lot of our other products, if a buyer wants to buy it, I can sell it to them, and I pay the royalties to the Land Institute, where then, the buyer had to get licensing, and all these things. And it was just very cumbersome. I don't even want to think about the time that I spent during winter months, talking to buyers, and then they never bought."
 - They asked for communication about how The Land Institute thinks about the license; a better understanding of the impacts and importance of using a license for people working with Kernza on the ground; and clarification around the aspects of licensing that can be turn-offs.

Stakeholder Engagement and Education - Extension, Policy, Education

- **Ensure clarity in whose role (the adopter farm or business, or the support institution or organization) it is to follow up after a Kernza trial and how, and improve clarity and communication with growers during onboarding and throughout the steps involved**

- Bakers, brewers, and growers mentioned losing contact with staff and researchers after a trial and not knowing why, or if, how, or with whom to follow-up or give their feedback on Kernza.
- Improve clarity and communication in the grower onboarding process and after, including alerting them about changes to grain testing and scheduling, and providing updates on where their lot of grain and seed are. Some growers had never learned what happened to their Kernza post-cleaning.
- **Communicate such that growers know their participation in research is valued and data can be useful no matter how the experiment ends up going**
 - During on-farm research collaborations, growers can sometimes feel that they have let researchers and the project down, if things go wrong on their end, like if the plot does not succeed.
- **Provide support for or formalize more optional ways for Kernza adopters to share their experiential knowledge**
 - Just over one-third (N=22 of 59) of small and mid-sized Kernza adopters reported they had done one or more of the following: shared knowledge they built through working with Kernza back with others in their industry or in another industry/value chain role; collaborative R&D with another Kernza adopter; and/or shared information back with or co-directionally with the research institutions. These practices are happening with Kernza, but also could be improved.
 - Some adopters who have not shared any of their Kernza knowledge said they have learned something new about brewing with Kernza, planting and spacing Kernza, or other things about how they have adjusted their practices to grow or work with Kernza, which they would like to be able to suggest to others. But, they reported that they do not have or know of ways to share what they are learning.
 - Growers said peer technical assistance calls have shifted more into marketing and away from agronomy, reducing opportunities for peer knowledge sharing on management.
 - Some adopters said things like, “No, I have not shared anything, they don’t ask me questions.” and “No one has ever asked us for feedback.”
 - A baker mentioned that if they could be in relationship with farmers and breeding teams about how Kernza is working in bread, they could see themselves working more with Kernza – if there was a way to be in these interesting relationships, and especially if their knowledge shareback was invited, and compensated.
 - Businesses are navigating the balance in a values-rooted value chain of wanting to share what they learn, while also not wanting to be outcompeted by someone larger. In other words, they are balancing supporting the broader mission, while also wanting to protect and value what they have built. Some are very willing to help anyone not make the same mistakes, and others are concerned about equitable knowledge-sharing and outcomes.

- **Be aware that different types of industries have different knowledge cultures and Kernza is entering into those. For example:**
 - Baking is a culture with less knowledge sharing, and more protection of individual bakery knowledge. Bakers reported that they do more sharing with Kernza than is typical in their industry, and that getting bakeries talking together about Kernza could even be an avenue to help bakeries share more knowledge about other issues in the industry beyond Kernza, that could perhaps also help with equity issues and help more bakeries survive. In other words, Kernza could be an opportunity to shift baking knowledge culture in more open or equitable ways. At the same time, knowledge-sharing about Kernza faces these existing cultural barriers in baking.
 - Brewing, on the other hand, is a culture of more open sharing. However, some brewers reported that Kernza brewing projects and early Kernza brewers have been less open and transparent than usual, that information about how the earliest breweries worked with Kernza was not available or felt “behind a corporate wall,” and it’s been harder to reach brewers to talk about Kernza projects than they typically experience in their industry, which was off-putting to them. They attributed this perhaps to outside entities/non-brewers being involved.
- **Engage in more state and federal policy and Farm Bill advocacy**
 - Continue to support, learn from, and build on new incentive and cost-share programs for growers like in Minnesota and advances in federal policy.
 - Gaps in state-level funding and policy support for growers and value chain businesses in other states, compared with Minnesota, were often raised.
 - Join broader coalitions to fight against existing commodity subsidies, which many adopters believe are a main barrier to Kernza’s eventual scaling and success.
 - Some growers are against incentives and subsidies, and would prefer Kernza markets stand on their own, but they also recognize that prices work for other crops because of subsidies, and that public support may be needed initially.
- **Consider what works and does not about existing federal programs, as part of the work to get Kernza integrated and recognized within those**
 - Some growers support the integration of Kernza with federal agriculture programs (i.e., conservation and crop insurance), but some also have concerns. Two mentioned problems they have had with conservation programs – they would rather just grow something like Kernza than be tied up with these again – and three mentioned how federal programs often do not include small, diverse rotation, and under-represented farmers and their needs. Integrating Kernza into these programs alone will not change their concerns with conservation programs or inequitable access to these programs.

- **Work toward more ways of funding and supporting regional value chain infrastructure, processing steps, entrepreneurship through the value chain, and workforce development in these areas**
 - Capital and financing for this is hard to find, as is labor for processing roles.
 - People in these roles so far have sometimes worked without salaries or been self-funded, and this may not be sustainable to continue.
 - Processing was also flagged as presenting potential opportunities for collaboration with Indigenous communities' needs, workforce, and expertise.
- **Invest more in building “regional triangles”: connections among producers, the research institution, and the regional food/beverage industry**
- **Create more ways to be in community**
 - Some asked for more opportunities to talk casually with less structure, make personal connections, and to have uncomfortable conversations.
- **Be more open to and aware of peoples' varied communication practices**
 - Not so email heavy - do emails, but also do more.
 - Keep track of the best ways to reach each person.
- **Consider ways to pay researchers and staff for their time doing relationship management with adopters**
 - Adopters raised examples of staff and researchers making themselves very available for communication when it is not part of their jobs or time allocation.
- **Support adopters in engagement with media**
 - They get asked to do interviews because of Kernza, in ways they do not for anything else, sometimes continuing years after they produced a Kernza item.
 - This can be exciting, put them on the map, and give them a platform to talk about what they care about, sometimes beyond Kernza too, but it also raises concerns, like whether they will get the facts wrong on Kernza or someone will spin their story for an agenda.
 - Ensure they have media prep support or a way to access this type of support, if they want it, including current talking points on Kernza.
- **Engage with buyers on how to build caring and respectful relationships with growers, if they are not accustomed to this type of relational value chain**
 - This might include how to respect farmers' time, boundaries, and schedules; how to do the reciprocal work of purchasing; to repair the negative relationships; care more; and manage inventory in this type of system.

Cross-sector Uptake

- **Bring in land transition as integral to the mission and the work's continuity by partnering with existing organizations**
 - Adopters raised land transition as receiving a lack of attention at research institutions.
 - Grower: "We would not be on the land at our size now experimenting with perennial crops, if we had not received help from the Land Stewardship Project to take over in a well thought out way [...] And if our land is nice and green in our generation, and the next one plows it under, and it turns into rows of corn, that kind of takes the 'forever' out of it."
 - Learn about what grower-partners' plans for land transition are and how their thinking and planning is going and engage in dialogue on this topic.
 - Partner with organizations who work with new farmers, transition land, help with access and equitable financing, and support older growers into retirement and mentorship.
 - Tap into "increasing interest in land back and restorative justice among people who have land" (grower quote), including among some Kernza growers.
 - Do not try to bring this fully in-house at the university (not its role) or replicate what existing organizations already do, but make this a part of internal expertise, teaching, and the story/vision, including lifting up models in the network.
 - Work with land trusts and conservation organizations that are using land transition as an opportunity to diversify both farmer access and cropping systems, such as combining land access programming with opportunities, resources and incentives related to growing perennial/diversified crops.
 - Create (or utilize if one exists) a database of landowners who use continuous living cover (CLC) and/or perennial crops and practices, including what they are willing to do with their land, and farmers without land access who want to do CLC/perennial agriculture.
- **Focus more on both economic viability and social outcomes**
 - Adopters across roles raised how work on Kernza so far has been primarily in agronomic, technical and environmental areas, and framed in these ways. The grower-generated social aspects of the "perennial promise" of Kernza for farms and rural communities have received less attention. At the same time, some said that the effort has focused more on "feel good stuff," but making it work financially with markets and buyers is part of achieving the associated perennial, ecological, and social benefits. However, they also recognize that the people, social aspects, and relationships are crucial to developing value chains.
 - Example quotes on the gap in social and economic dimensions:

- “Consumers don’t know what carbon sequestration and regenerative mean. It’s been way too technical so far. I think if we focused on the social aspect, getting to know the Kernza farmers, how it helps them, putting a human aspect behind it, that could be better.”
 - The framing is “95% environmental, and then price, but that could be how we’ve framed Kernza so far through sustainability.”
 - “Our definition of regenerative agriculture includes strengthening community resilience, and that is specifically talking about farmer communities, rural communities. And so, it just strengthens the case, really, for why we should continue to support Kernza, even if it's more expensive, right? It just adds that additional element of the many co-benefits. If you could actually show [changes in social and economic outcomes for Kernza growers and their communities] that would be really powerful, and really help the case.”
 - “I have not heard any story around the economic, social, or farmer fairness pieces with Kernza.”
- **Learn from their reactions to the Kernza Stewards’ Alliance (KSA) initial planning process**, including:
 - Felt perplexed by the KSA planning; did not understand the organization or their potential role
 - Got an info drop that looked like it required a lot of input and bandwidth
 - Initial invite seemed very quick and also very involved
 - But they care about building this: “the way KSA is thinking about maintaining integrity with Kernza as it scales, is really unique and interesting, alternative structures for championing a crop”
 - They also like the idea of a lobbying or interest group specifically for perennial crops as more come along; could be very influential and possibly linked to KSA
- **Build solidarity with growers and value chain businesses on how to define and pursue diversity, equity, inclusion, and justice (DEIJ) work through or alongside Kernza development, adoption, and scaling**
 - Observe the skillsets and expertise Kernza adopters bring in these areas, such as whether or not Kernza could work well for beginning/emerging farmers; how to build alternative business models like cooperatives, run employee-owned or values-based businesses in industries where this is not common; and how Kernza intersects with existing social movements the adopters know about or work within. Below are two examples from this point:
 - Value chain example: an existing movement goal to support and highlight beer recipes led by BIPOC/LGBTQ+ brewers could align with goal for Kernza beer recipe work developed by and for broader audiences

- Grower example: an existing goal to ensure that knowledge on how to repair agricultural equipment and machinery is passed on and not lost with their generation, and that younger farmers can start up without such high equipment and repair costs, could be moved forward through peer-knowledge sharing workshops on equipment repairs and adjustments, which could both support Kernza growers as they start and be a space for this knowledge-sharing around equipment and machinery (on this alignment, a grower further noted that Kernza can be farmed with older equipment, and Kernza growers are multigenerational and have greater interest in learning new practices over buying things)
- Support a grower-partner's, value chain partner's, or overlapping movement organization's DEIJ project or efforts without that being tied directly to specific Kernza impacts.
- Listen to and support grower knowledge and agency about who Kernza is for. Their perspectives are nuanced and split, for example:
 - Half of the growers raised specific ideas about how Kernza could be a supportive opportunity and a good crop tool for beginning, young, and/or emerging farmers, and that anyone should be able to decide whether Kernza is for them when presented with the information about it.
 - Half of the growers reported that Kernza is the best fit for farmers already established and familiar with growing small grains and grasses.
- Observe what have been barriers for linking Kernza work with company partners' DEIJ work so far. For example:
 - Grain in North America is typically not a focus of their socially responsible sourcing or DEIJ work. These efforts tend to focus on crops for which growers are mostly Black and Brown, and production is located in the Global South, such as cocoa or mango, or also in the U.S. South, such as rice, and in some cases, grain in Europe, rather than grains grown primarily by White farmers domestically in the U.S. Midwest.
 - Kernza growers are smaller and often "one-man-shows" without employees at this point, so the social aspects of existing certifications like Regenerative Organic (ROC) that only verify employed labor treatment (i.e., living wage, hours, shade, water) do not apply well to Kernza today.⁶
 - Kernza adopters did report interest within companies and from their buyers and customers about representation of and economic benefits going to farmers of color and LGBTQ+ farmers, as well as interest in beneficial economic and social outcomes in rural communities. However, they had not yet seen any overlaps between these buyer interests and

⁶Some Kernza growers and value chain businesses do have employees. Small and mid-sized farms and businesses can be sites of problems for labor treatment, not just large farms and businesses.

their interest in Kernza, which could be an effect of how Kernza is communicated (environmental benefits story).

- Recognize that, overall, early adopter growers and businesses in Minnesota and Kansas support DEIJ work as part of Kernza's adoption and scaling.⁷⁸
 - 27 (of 63) expressed being firmly invested in equitable scaling of Kernza as a priority and shared clear connections and areas for progress between Kernza's rollout and diversity, equity, inclusion, and justice work.⁹
 - 4 (of 63) raised concerns about DEIJ in general, disagreed about DEIJ being brought into Kernza, and/or shared criticism toward this topic.
 - 32 (of 63) expressed some support for equitable scaling, but not as a top priority, for example, saying something like, "we should probably be doing some of that." They agreed overall with wanting to see Kernza roll out responsibly and equitably, but did not know what that would mean or how to do it exactly.
- At the same time, only 4 of 63 (all MN, 3 value chain and 1 grower) brought up racial and social justice, equity, and inclusion in response to what an ideal grain value chain could look like and how Kernza value chains could work better for people than existing supply chains do. DEIJ is not at the very core of the effort for most early adopters, but early on, Kernza did attract people for whom it is.
 - The connections these four people, who are deeply focused on this piece, made between DEIJ and Kernza include: Kernza as a tool to amplify reparative work with BIPOC communities and the work of BIPOC communities; making sure that Black and Indigenous farmers be a focus in Kernza's adoption; and making sure that these groups have a loud voice and representation in scaling; that this agricultural transformation that Kernza is part of is BIPOC and women-led; and that the network is doing anything in our power not to shut people out of opportunity in perennial grain supply chains.

⁷⁸This data was collected in 2022-2023, very early in the national trend of backtracking support for DEIJ, following the increase in attention nationally, and especially in Minnesota, to racial justice in 2020. This data was also collected early in the building out of the Emerging Farmers' Office in the Minnesota Department of Agriculture, and before more recent changes in Minnesota state policies and programs, like reversing efforts to directly support farmers of color by redefining "emerging farmer" to be broader and/or dropping that category in programs. Perspectives on DEIJ may have shifted between data collection and the present moment.

⁸The interviewer was intentionally inconsistent in the language and framing of this topic with each interviewee. Given that this was a first encounter, and that one goal of the research was to build relationships toward social sustainability, the intention was to listen and speak about these topics through the language and ideas each participant brought and to meet them where they are, while also in some way signalling in the conversation that the Kernza institutional actors value DEIJ and are working on this. The interviewer did not always use the terms diversity, equity, justice, and inclusion, or mention race and/or gender inequities specifically, but used the interviewee's terminology or spoke to the topic more broadly, such as "farmers who did not inherit family land."

⁹This response consistently came from across Minnesota and Kansas, but it varied by other factors. Nearly all participants from brewing and culinary industries reported this highest level of investment in DEIJ work. Organic growers and people who began to work with Kernza earlier (2019 and before) reported this more often than non-organic growers and people who started in 2020 or later.

- Similarly, a small but notable portion – 3 growers (all MN) and 5 value chain businesses – raised equity and justice as key to how they think Kernza could move forward the vision they have for their farms and businesses. This does not mean that Kernza had definitively moved their equity and justice visions or efforts forward, but they saw the connections.
 - Value chain businesses: They see their work and Kernza as both part of a story of small businesses and farmers working together in formation. They see Kernza as a tool for BIPOC and women-led movements to transform farmland, which they see themselves and their end use business as part of, as well. They see Kernza's possible steward-ownership structure as historical, hopeful and complementary to what their business does and the roles they see for themselves. They believe Kernza has been a reason to raise and think about how to incorporate values-based or non-bottom line commitments into their business model. They have an employee-owned business and are looking to stay true to those values as a way to success, which is a match with Kernza's collective ownership and marketing approaches.
 - Growers: They see Kernza as able to move forward their visions to be more involved in policy development and build the voice and influence that growers (though not yet specifically emerging growers) have in decision-making. They see how Kernza could create a new space in grain production with more possible opportunity for them and their colleagues who are immigrant farmers and farmers of color, even though this is not where they traditionally are found or seen. Being involved in the Kernza network is one way into leveraging their land and their farming operation to support communities that have been historically harmed by extractive agriculture and under-resourced.
- **Pay attention to what participation in institutional and informal DEIJ work with Kernza has been like for them so far**
 - Just 5 of the 63 adopters mentioned their participation in Kernza institutionalized working groups for equity. Commonly, those adopters reported that while DEIJ is important to their personal and business values, they do not yet see the things they are thinking and learning about in those spaces affecting their Kernza work, seeping into their day-to-day activities, or leading to actionable things that influence what they do.
 - Three adopters who are people of color raised additional forms of translational, bridging, and cultural work they are doing for Kernza and CLC/perennial transition, and for DEIJ, informally. They mentioned roles that they take on in the space that no one else raised in the same way, as well as an additional need to be well-informed Kernza communicators.
 - Institutional staff should pay attention to this. How are they doing in these roles? How much extra time of theirs is this taking? Is this Kernza work an

extension of a role they want to be in and feel aligned and satisfied doing? Can they be true to themselves in this role? Is this role a negative experience? What do they need?

Agroecosystems and breeding

- **Most growers reported they are getting planting, advising, and technical support, and feel there is good background work on agronomics. However, they often also reported that they lacked information on at least one issue, or that sometimes it is not easy to find and learn best practices information. On technical assistance, growers said they would like:**
 - More farmer to farmer anecdotal information to be in management recommendations.
 - Peer to peer grower knowledge sharing can fill in some of the institutional staff/extension gaps, if it's supported by the organizations.
 - One or more dedicated Kernza agronomists in each state, and someone who can do boots on the ground type on-farm field visits a couple times a year, ideally sharing what a producer might know after a couple of years with Kernza, with the experience to tackle what is different about it from a grower perspective.
 - Getting Kernza onto the apps they use for applications and timing for other crops.
- **Be aware that growers have to bring down high expectations and standards they have for themselves and their processes and products to work with Kernza, and this is uncomfortable**
 - Kernza can be their first experience having grain rejected for quality. That can be emotionally difficult, in addition to not being able to market it.
 - The layered experiences of “having half the grain cleaned out” (the high post-harvest and cleanout losses for Kernza) and then “the rest did not pass spec” can pile up for growers. Could these steps be approached differently?
- **Kernza adopters suggested that breeding and agronomy research may have a role to play in reducing costs of Kernza production, cleaning, and processing, as part of work to lower the price, without cutting costs and while maintaining fair pay and prices for growers**
- **Avoid Kernza's rollout feeling like a continuation or replication of a pattern that the university or university scientists push one grain variety on growers**
 - Maybe growers, mills, and bakeries do not like using that grain and do not want to be told to use it, and pushing one specific grain is not the overall vision.
- **Dual-use is an important factor for Kernza adoption, but do not assume that all farmers interested in growing Kernza are interested in or able to explore dual-use**

management and grazing; be careful of centering this system as the entire story or a silver bullet

- While dual-use is a common way Kernza fits into growers' visions for their operations, they may not have fencing or access to grazers, or they may prefer to follow a plant-based, non-animal agriculture regenerative system with perennial grain for human consumption.
- At the time, all Kansas growers in the sample had grazed their Kernza, while only a couple in Minnesota had, though some sold it for hay locally.
- **Avoid strict rules on minimum acreage or production amount to participate and plant Kernza**
 - They said things like (paraphrased): Kernza is high value, so you don't need to plant a lot, and it can work with lower acreage and on various types of plots. It is better not to rule anything out or exclude, and avoid only going with the types of farming you know. Why can't someone contribute one acre or 50 pounds if that's what they have, if it's good and tested? Additional direct quotes on this:
 - "I understand that you want somebody to take your product that knows what they're doing, but the acreage part seems silly to me. And it feels like it started off on the wrong foot then, because of that." - Value chain
 - "I don't want it to evolve into a direction where you are given a minimum to grow. I could see them saying, 'Well, it's too much to - like, you can't grow an acre, or you have to have 500 pounds to sell to us, and not 100 pounds,' you know?" - Grower
 - At the same time, some growers and value chain actors think that Kernza doesn't make sense on less than 20-50 acres for grain and seed production.
- **Be aware of which environmental benefits matter most to or are perceived by the Kernza adopters, which may or may not overlap with how these are talked about in the research, policy, and nonprofit spaces, or what scientists know the most about so far¹⁰**

¹⁰The full set of environmental benefits interviewees raised without prompting were (in most to least common ordering): soil health, deep roots/root mass in ground, water quality, climate mitigation and adaptation, water conservation, wildlife habitat, animal biodiversity, and pollinators. For the most part, no differences emerged in how growers with organic and conventional management practices talked about the sets of environmental benefits. The exception was water quality, which was mentioned more by conventional growers, which could reflect the prevalence of water quality as a topic bringing people into Kernza in Minnesota and/or these growers could be more concerned with tools to mitigate the impacts of agriculture on waterways. All types of growers in Minnesota and Kansas mentioned between one and four categories of environmental benefits, suggesting that most see more than one benefit, holistic suites of benefits, and/or interconnections across ecological benefits. Growers and value chain businesses who began working with Kernza earlier (2019 and before) brought up water quality more often, while those who entered later (2020 to 2023) more often spoke about soil and climate, suggesting the environmental concerns that bring people into Kernza may be broadening into soil and climate more recently, and/or that the adopters who have been involved the longest either have always seen or have come to see water quality as the core benefit. Root mass and depth was raised consistently regardless of when they entered and how long they have been working with Kernza.

- In Kansas and Minnesota, soil health (including improved soil quality, organic matter, soil biodiversity, stemming soil erosion, sequestering nutrients, deep roots and the role of keeping root mass in the ground, and reduced or no tillage) was the most important environmental benefit, observed and/or expected, for growers.
- Water quality was raised about half as often as soil health in the sample overall, and was entirely specific to Minnesota.
- Growers spoke more to climate adaptation potential (sometimes in terms of how they imagined Kernza could help them during drought, heavy rainfall, or the shifting seasonality and shorter or less predictable planting windows), while value chain businesses in middle roles (i.e., processing, marketing; not growers or end users) were most interested in climate mitigation potential.
- **Growers' perspectives (at least in MN & KS) on Kernza agronomy were most divergent and least consistent, based on the experiences they shared so far, for the two topics below, which could be further communicated about and investigated, along with growers in different places and systems**
 - Is Kernza more drought tolerant compared with their other crops or is it not?
 - Is Kernza a helpful weed management tool or does it add to weed problems?
- **Take into account what Kernza replaced in rotation and why growers placed it where they did on their farms**
 - For most growers in Minnesota and Kansas, Kernza went in after corn or soy, or it went on after wheat in a plot that would have been corn or soy next in the rotation. In a couple of cases each, Kernza also went into a plot after alfalfa, oats, a small grain like rye or triticale, turf grass seed or an annual forage grass, or land under perennial pasture released from EQIP or NRCS.
 - Reasons they placed Kernza where they did within the farm:
 - Logistics for cattle movement
 - Simply timing of wherever it fit into rotation or wherever was rotating out
 - On a hill or slope or a challenging terraced area
 - Replacing a 7-8 year perennial grazing stand that went bad
 - Near the road, so it is visible (not what everyone is doing or wants to do, of course, but growers might also want to display a novel crop)
 - Plot that already rotates between small grains and corn
 - Sandy soil
 - In an area that was out of hand with weeds to attempt weed control

- The EECO program incentive to plant on a plot that was within well-head protection zone (the EECO program was not what led them to plant Kernza at all but it factored into where they planted)

Part 3. Reflection on the role of institutional mediation in Kernza.

When asked whether early adopters have had any negative experiences in interaction¹¹ while working with Kernza, 18 of the 57 who spoke to this point reported that they had. Their reported negative experiences did include interactions with the support institutions, and people who are staff and representatives of these institutions. Their suggestions for what could be adjusted to improve these relationships and to avoid similar future negative experiences are integrated across the recommendations above.

Negative interactions in emerging crop adoption and relationships with support institutions cannot always be prevented. A deeper question is whether Kernza adopters feel they have a mechanism or a relationship through which they can raise an issue, be heard, and resolve it when these things arise. Below are some findings on this point:

- In two cases, Sustain-A-Grain and Agricultural Utilization Research Institute-AURI served a mediating role for value chain businesses, such as improving upon negative previous experiences in the value chain and affirming value chain actors' perceived strange experiences. They may have been able to intermediate for businesses in ways TLI and Forever Green could not.
- Growers often reported relying upon another grower or their direct lines to key individuals to resolve issues. While direct relationships are acting to fill needs to resolve issues, mechanisms for this kind of support might be missing for growers who are not the most connected, or not in a position to reach out directly to the growers who are. Also, if the network were to lose the individual growers who do problem-solving and communication for others, this mechanism is at risk.
- Other growers said they did not see mechanisms to resolve issues.
 - Grower: Kernza lacks spaces that feel safe for talking between growers who have differences in their understandings on inequities tied to grain agriculture.
 - Grower: Sharing issues is difficult because they worry about coming off as negative in this emerging space with so much enthusiasm. Also, the organization they could turn to for support is the same one they needed help navigating an issue with. This second point flags that during early adoption, when support relationships and value chain relationships overlap and are carried out by the

¹¹This is specifically about negative interactions with individuals or organizations, not negative experiences with things like crop production or market failures.

same actors, this can put growers and other value chain actors in a bind when an issue arises.

Some asked for less mediation, specifically in value chain relationships, from the support institutions, instead allowing space for value chain actors to interact more directly without intermediation, and to have chances to meet more people in their role and other roles in the production and value chain, rather than meeting primarily institutional staff and researchers.

- Some said they would prefer relatively less institutional mediation in emerging Kernza relationships than what they have encountered so far. More mediation can create potential for misunderstandings and negative experiences, including a sense that Kernza might not be for them, or reinforce that people with more connection and access do better.
- A value chain business reported that the relationships and mechanisms to confront issues are there for when a big enough problem arises, but usually there does not need to be a resolution of small disagreements on the path Kernza is taking.

However, people joining the Kernza value chains may not trust each other. This can stem from and reinforce existing power dynamics, practices, and assumptions. For example:

- Growers might perceive a partner company's commitment to sustainability as "just green marketing" and observe practices that reinforce that impression.
- Buyers might doubt the integrity and practices of growers related to their environmental management practices (i.e., organic or non-organic) and also observe in biased ways that reinforce this.
- They value both competition and collaboration or learning together in varied ways and are perceiving if or how others value these similarly or differently in early adoption and value chain development.
- They sometimes observe people at Kernza events who they perceive do not share their values or visions for Kernza, which can affect how they feel about the overall project.

Institutions do have a role to play in ensuring that growers and other value chain actors can get to know each other if they want to, and learn about others involved, their motivations, their discoveries, and their shared challenges.

- For example, one end user reported that, at least for them, the spaces and conversations have been created and are there to learn about others' needs and perspectives on getting into Kernza, which does help to overcome early suspicions about others' motivations being too different from theirs.

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Appendix on Sample Characteristics

Growers

There were 19 growers in the sample, located throughout Minnesota and Kansas. Farm sizes ranged from less than 50 acres up to 3,500 acres, and the majority of growers both owned and rented land. Most inherited at least some family land, and in some cases purchased more, while four did not inherit land and accessed it themselves. For those who were renting at the time of the interviews, their contracts had varied time frames but were generally shorter term, including year-to-year, annual auto-renewing, two-year, and five-year. 12 of the 19 growers had sold at least some of their Kernza for grain, a couple had sold for seed, and 10 had used the Kernza for grazing, hay or straw (more in Kansas than in Minnesota). About two-thirds of the Minnesota growers used organic management practices on the farm overall, while one-third used conventional practices. In Kansas, all used conventional practices, except for one farmer with transitional plots, though all conventional growers mentioned practices including cover cropping, low-till, no-till and/or regenerative. About half of growers were between 30-45 years old, and about half were older than 45 (with the oldest in their 80s), making the sample relatively young compared with the average farmer in the United States. Some of the growers were running the farm with two generations of decision-makers, while others had recently transitioned the farm to the younger generation. The growers typically had co-owners or partners in the farm and were making decisions with others (usually 1-3 others, but can be more), though a handful were sole proprietors. Most often these partners were family members (spouses, parents, siblings, in-laws, uncles), but they were also neighbors, friends, collaborators, and farming partners they had not known previously. Nearly all growers had another source of income besides the farm, though three did not. An additional two were retired from their non-farm jobs.

Value chain businesses

The 44 value chain actors interviewed (specifically an owner, a manager and/or a key representative working with Kernza from the business) were distributed across brewing, distilling, culinary, baking, consumer packaged goods, processing, seed, milling, retail, grocery and marketing industries. Most of the small and mid-scale businesses (40 out of the 44 participants) working with Kernza through the value chain had one business and one location. However, some had a second location, and two were part of a larger umbrella of business with 3 to 6 establishments. Most commonly (60%) these businesses were owner-run, had a few part-time staff, or had fewer than 20 employees; another notable portion (30%) had between 20 and 80 staff members; and a handful had between 80 and 250 employees. Among those who were selling or had sold or distributed a Kernza product, 10 operated only or mostly with on-site sales, 9 had a reach within their metro area, 6 reached statewide or across a multistate region (up to 5 states), and 9 sold nationally or had an online sales and distribution option for shipping anywhere. Four large companies or multinationals that had sourced grain or worked with sample grain from Minnesota or Kansas growers, distributors and/or research institutions, were represented in the interview sample by an employee who had been involved in the company's work with Kernza.