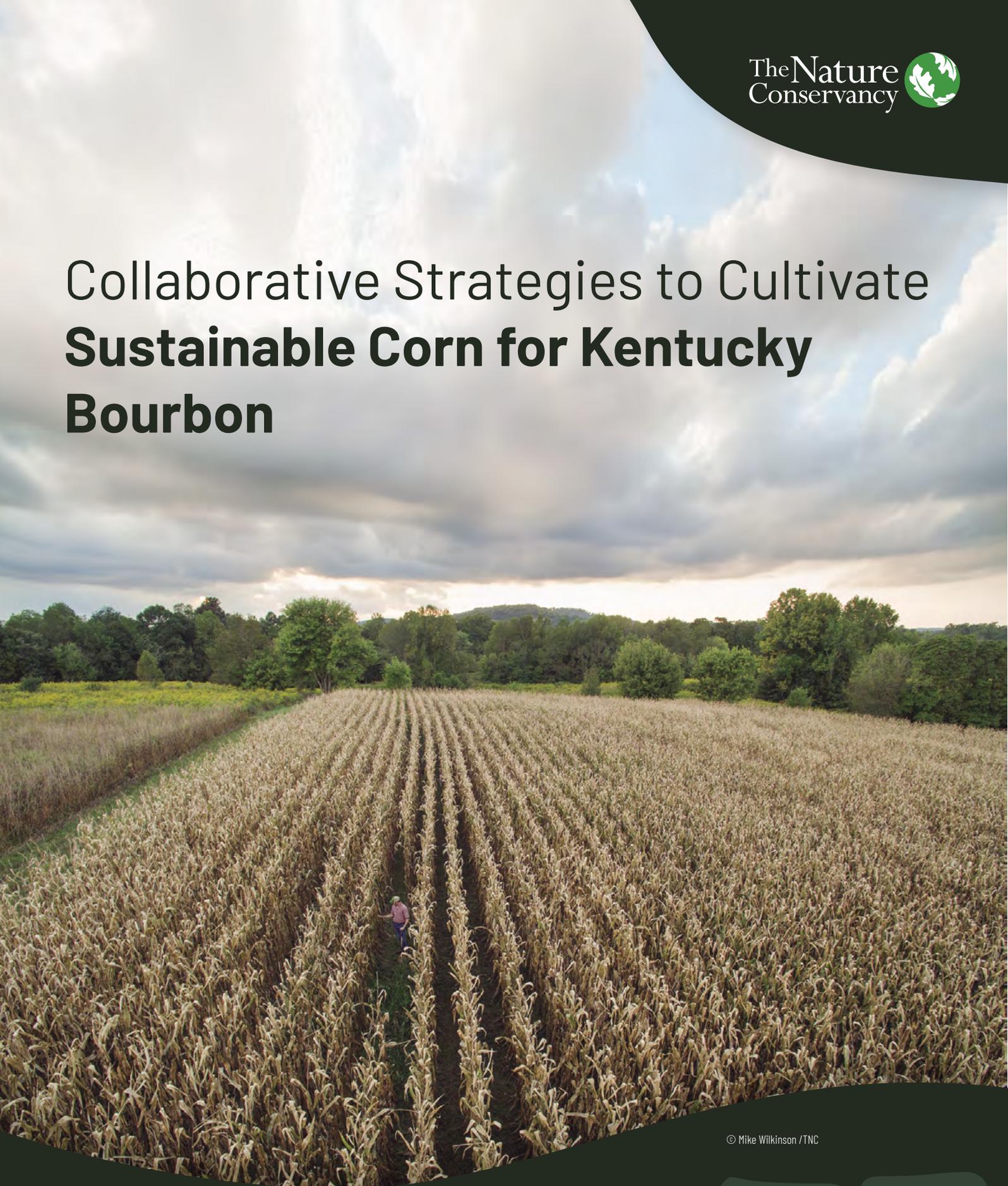


Collaborative Strategies to Cultivate Sustainable Corn for Kentucky Bourbon



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EXECUTIVE SUMMARY



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Kentucky bourbon is a notable spirit due to its geographic production, cultural value, and success as an industry both locally and globally. As the industry grew, it increased its local sourcing of agricultural inputs, creating an opportunity to showcase the distinctive growing characteristics of the corn used in bourbon production and to address decarbonization across the industry. As a clear example, much of Kentucky's corn is produced on highly erodible land, which has significantly driven the adoption of no-till agriculture over the past decades to mitigate soil erosion risks. Within the Kentucky region where bourbon is produced, both large and small distillery operations share their sourcing area, many times relying on the same farms to procure their main ingredient, corn. This determines that most of these businesses' interests and objectives intersect on the ground, which offers a distinctive context for collaborative action. The larger distilleries and their parent companies have set ambitious climate mitigation commitments. Consequently, the bourbon-sourcing region in Kentucky presents a unique opportunity to accomplish these goals through the decarbonization of corn production due to a high level of sourcing traceability and the broader interest from the Kentucky bourbon value chain to address this challenge. Complementary to the decarbonization goals of the larger companies, the smaller distilleries view sustainability as a product differentiation opportunity and a potential cost-saving mechanism, which is driving their eagerness to pilot and try new procurement strategies. In summary, due to the overlap in sourcing regions, the high level of traceability, ongoing sustainability efforts, and the private sector's ambitious climate goals, the Kentucky bourbon industry is well-positioned to collectively tackle the decarbonization of corn production and increase its supply chain resilience.



The Kentucky bourbon industry is poised to successfully decarbonize its value chain:

- Parent companies representing a large percentage of bourbon production have similar, aggressive goals for greenhouse gas (GHG) reduction, no conversion commodities, and other sustainability goals.
- The bourbon industry sources its corn from a very defined, overlapping geography, which means that opportunities and challenges for decarbonizing the corn supply chain are shared.
- The industry is large enough globally and important enough locally to make focused and coordinated efforts around decarbonization in a relatively small sourcing geography feasible, scalable, and impactful.
- The very low raw material cost of corn in bourbon means that a high ROI for decarbonization and sustainability efforts is very possible and could be passed along at a very nominal cost to the consumer.
- On-farm practices that achieve GHG reduction have a high probability of also contributing to the long-term productivity of Kentucky farms and the long-term viability of local corn sourcing for Kentucky bourbon.

This white paper aims to answer the question, “What are the key barriers and opportunities for decarbonizing Kentucky corn used in bourbon production?” An analysis was conducted to address this topic, relying on a desktop literature review as its foundation. The type of materials reviewed included academic literature, publicly available data, and industry reports. To confirm and complement our initial findings from the literature review, we held interviews with key industry stakeholders and other actors supporting the bourbon supply chain. This group of interviewees included farmers, extension agents, distilleries representatives, researchers, people in academia, state and federal government officers, and members of industry associations, among others. This comprehensive analysis enabled the creation of key recommendations for the bourbon industry that will facilitate the effective decarbonization of Kentucky corn used in bourbon production.

Underpinning the specific recommendations included in this document, there is an overarching strategy focused on collaborative action and collective financing across the industry. If the industry were to undertake the recommendations of this white paper, one of the first steps should be to establish a pre-competitive home for this strategy and dedicate funding and personnel to lead the formalization of this effort, creating a shared vision across the supply chain, and developing a concrete action plan that includes discrete objectives, expected milestones, and a feasible timeline. Each recommendation of this strategy could be impactful on its own. However, when implemented together with full industry support, the reach of these efforts will be enhanced by mobilizing all the available resources to tackle the underlying challenges for an effective decarbonization of Kentucky corn production.

KEY RECOMMENDATIONS:



Improve Communication Between Companies and Farmers

The interviews with farmers revealed a high level of interest in better understanding the types of targets companies have set and the contributions of farming activities to the emissions profile of the bourbon being produced. Farmers are interested in learning how the adoption of regenerative practices would affect the greenhouse gas emissions a company is reporting. In addition, the stakeholder interviews revealed that distilleries and companies are not always familiar with the local realities of farming. An increased understanding of farmers' decision-making processes, their economic realities, and the prevalent production practices can lead to more productive conversations and better-designed and implemented programs to address producers' main resource concerns that also mitigate their activities' climate impact.

The industrywide effort, as well as individual companies, should focus on more frequent, clear, and transparent communication with the farmers who are part of their supply chain. In addition to clearer communication with farmers, sustainability professionals at distilleries should familiarize themselves with the unique ecoregional context and production characteristics that produce Kentucky corn. Through an enhanced understanding of Kentucky agriculture and improved communication with farmers, companies will be able to identify concrete pathways to not only achieve company-level sustainability goals but also to better relay the current and future successes of the local farming community.



Enhance Farmer Assistance

Increased adoption of conservation practices on farms will only be successful to the extent that it aligns with the interests of farmers and landowners. This means that the barriers to adopting these practices must be thoroughly understood so that effective solutions can be developed and implemented. Given the high level of adoption of certain conservation practices, like no-till, enhanced assistance for farmers will be critical to address the technical, financial, and social barriers to testing and scaling new practices that improve their productivity and resilience. The programmatic solutions needed to overcome these barriers will require new ideas and flexibility.

To enhance the industry's uptake of on-farm conservation practices, we suggest the following forms of support:

1. **Financial:** More flexible and responsive cost share programs or "hybrid" incentive structures where farmers are paid a flat amount per practice and an additional amount based on the measured field-level outcomes.



2. **Technical:** Technical challenges (including logistical/capacity bottlenecks) represent a readily identified but under-addressed hurdle. Improved methods, innovative equipment, and outsourcing of conservation as a service may all be part of the solution and will require the expertise and resources of universities, farm groups, trusted advisors, and agricultural retailers.
3. **Social:** Meaningful engagement with farmers and landowners to deeply understand conservation adoption barriers is a foundational step to identifying the most impactful opportunities for farmer assistance and the highest ROI on dollars supporting conservation. Understanding these challenges through expansive, open, and honest interviews, focus groups, and surveys will be essential to understanding the social elements of conservation practice adoption. Part of this exploration should also include gaining an understanding of the potential for establishing farmer-to-farmer peer learning networks, which could offer great value tackling technical challenges, providing a sense of collective action, and developing a supporting social system.



Support Critical Research

The bourbon industry has an opportunity to invest in and work with researchers,

governmental institutions, and third-party service providers to address key research gaps that will help advance the decarbonization of Kentucky corn. This analysis revealed that there was not a high level of agreement regarding the emissions associated with producing corn in Kentucky, nor on how these emissions contribute to the overall carbon footprint linked to a bottle of bourbon.

In a collaborative and transparent effort, the industry should align on the critical research questions that need to be prioritized and co-invest in better understanding the challenges and potential solutions to these issues. Some examples of key knowledge gaps that emerged through our analysis as potential research investment opportunities are:

1. Up-to-date life cycle analysis - the industry can collectively identify key decarbonization areas to prioritize. It's likely that corn will result as an emissions hot spot, but without a published scientific LCA, creating consensus and action may be more difficult.
2. Refinement of the tools and methodologies to more effectively and regularly assess the adoption rates of conservation agriculture practices within the key bourbon-sourcing counties and the corresponding emissions associated with these practices.
3. Analysis of the carbon benefits associated with the implementation of more innovative conservation practices (beyond no-till and cover cropping) that may further decarbonize Kentucky corn.
4. Research to better understand the land use change dynamics in the key



bourbon-sourcing counties, enhancing land conversion tracking data, identifying key land use change drivers in the past decades, and assessing the potential risks and associated impact scenarios of a further loss of native habitats and perennial crops (e.g., pastureland) in Kentucky.

5. Better understanding and quantifying the cost of erosion through lost soil productivity.

In Kentucky, there are multiple opportunities to partner with universities, governmental institutions and third-party service providers to investigate research questions and disseminate the findings of the research to advance collective learning.



Drive a Strategic Business Case Development

To further support and increase investments in corn decarbonization efforts by the bourbon value chain, there is an opportunity to develop business cases to better understand the benefits, costs, and risks associated with the recommendations in this white paper. The bourbon value chain will benefit from exploring business cases at both the company and the industry scale level, analyzing how collective action can address the priority opportunities to mitigate climate change and adapt to its impact.

From our conversations with stakeholders, we identified initial business transformation and adaptation opportunities that should be explored by the industry:

1. An identified opportunity relates to bridging the gap between sustainability and procurement teams. From the interviews with distillery representatives, it was evident that the sustainability staff often worked independently of the procurement and other operational teams. Many times,

directives from leadership and objectives for each unit seemed not to be aligned. The bourbon distilleries (or the coalition) should develop a business case as to why integrating sustainability across the industry's operations is critical for the sustainability of the supply chain. Once this is presented to the companies' leadership (i.e., the C-Suites) and recognized as the best path forward, businesses can start adjusting their internal organizational structure to reflect the incorporation of sustainability into their decision making processes.

2. The impact of implementing new regenerative practices in an agricultural system will vary across regions and, mainly, the agronomic and technological starting point of the farmers in that area. As a result, locally relevant financial information about conservation practices is required for farmers to make informed management decisions, especially as they consider enrollment in private ecosystem services payment mechanisms. The industry has the opportunity to develop a business case for particular management practices relevant to Kentucky farmers and share this information to increase their adoption.
3. The Kentucky bourbon industry faces significant financial risks due to its reliance on natural resources and ecosystem services, with disruptions from climate change and resource depletion impacting agricultural supply chains operations, costs, and revenues. To address these risks, the industry can leverage frameworks like the Task Force on Climate-related Financial Disclosures (TCFD) and the Natural Capital Protocol to assess, price, and disclose nature-related risks and opportunities. This white paper recommends that bourbon companies investigate and

further develop their ability to incorporate natural capital into decision-making. To do this, the bourbon companies can use scenario analysis to quantify the price of inaction, evaluate how sustainability efforts can boost brand value and market capitalization, and improve resource efficiency to lower costs and enhance productivity.

4. The cost of corn in bourbon is very small, typically representing only about 1% of the retail price of a \$25 bottle of bourbon. This small cost represents an opportunity for the bourbon industry to invest in decarbonization efforts to enhance farmer assistance and support critical research. Hypothetically, every additional dollar that the bourbon industry invests per bushel of corn used could be passed along at the retail point of sale for only 4.5 cents per bottle, given the above 1% assumption. Particularly if the industry were to act in unison in such a commitment to support decarbonization, risk would be well mitigated, and the investment would represent a tremendous return on investment (ROI) towards sustainability goals.



Foster Cross Industry Collaboration and Advance Policy Initiatives

The opportunities for decarbonization and collective action identified in this white paper were developed for the bourbon industry but have a viable application for other industries looking to decarbonize their corn supply chain and engage in collective action. The other industries sourcing corn in Kentucky include animal feed, ethanol, and food production. The bourbon industry should co-identify shared research questions, policies, and sourcing regions to identify shared challenges and areas

of opportunity to work with other industries sourcing Kentucky corn.

An example of this approach is the White Oak Resilience Act, which establishes a voluntary and collaborative group of public, private and non-governmental organizations (NGOs) to coordinate the restoration of white oaks in the United States. This initiative directly mentions research gaps, outreach to landowners, and the creation of policy options to improve the quality and quantity of white oak nurseries.

The bourbon industry should stay current on evolving decarbonization opportunities and developments in the other sectors that are sourcing corn from Kentucky. This white paper recommends doing this by:

1. Collaborating and coordinating on state and federal policy initiatives with other industries,
2. Investigating opportunities to collaborate with on-farm conservation opportunities and
3. Identifying shared challenges and research questions with other industries.



Conclusion

In summary, by investing in a collaborative approach that supports research efforts and promotes regenerative and innovative practices, the bourbon industry can lead the way toward a more sustainable future, showcasing how dedication to environmental stewardship can coexist with economic prosperity. New ideas, tools, and partnerships will be needed to reach the high levels of conservation required for a system to meet today's greenhouse gas reduction goals and be sustainable for future generations.