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Whiskey, Wheat, and Wyoming: The Neolithic Brand Story

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As Extension professionals, we struggle with ways to enhance incomes and create jobs in rural locations. Let's face it, economic development is hard. The traditional agricultural research model has agronomists looking for new crops for a region, then conducting research into their suitability. The economics of production and marketing are sometimes afterthoughts or side products in this process.

The Neolithic brand story uses a translational research approach to invert this model by making products that are in demand from a crop that might be grown in a region and then working to build a niche industry and supply chain. This has the effect of extending university involvement deeper into the process while enhancing incomes and creating jobs. In essence, this is a vertically integrated research and economic development demonstration initiative. It is a long, slow process full of challenges.

Translational research, as a subset of applied research, has its roots in biomedical research. Its goal is converting basic research into applied results for the benefit of society. That is, taking ideas tested in the lab and moving them to the commercial space—not just commercialization, but commercialization in an academic setting. It is sometimes referred to as "bench to bedside" research. It is something of a buzzword these days.

The story of Neolithic brand, so far, is the story of innovation and entrepreneurship and how we are meeting the challenges and creating value in Wyoming's rural economy. Over the past quarter-century, one of the authors has worked on several projects that used the traditional agricultural research model. One of them, camelina, lasted for 8 years. During that time, emphasis for the use of the crop shifted from biodiesel to several other alternative niche uses, one of which was a nutritional supplement for horses. In the end, it was a product looking for a market that was never found. The economics of scale were just never there.

That experience made us think deeper about the types of crops we study to make sure that when farmers ask that all important question—"Where's the market?"—at a field day event, we have an answer. For Neolithic brand, the idea came while traveling with students in France in 2015. One of us purchased a cookbook on Middle Ages cooking in the bookstore at one of the chateaux we visited (De Montmollin, 2015). The word épeutre was not in my French dictionary; a little bit of research came up with the translation: spelt.

It took a couple of years of thinking and digging around to come up with a research idea that eventually became what was known as the Wyoming First-Grains Project. The basic idea is that emmer wheat and spelt are similar enough to wheat that farmers in the region have the know-how and do not need any additional equipment to grow them. As grains, they fit into rotation under irrigation. So, here are rotational crops that can be easily grown and under the right conditions have the potential to provide premium returns. If only it were so easy.

Another aspect of this research is that if we are truly translating what we know into long-term benefits to society, then the project must continue on after the initial construction of the supply chain. To do that, we cannot expect the public sector to continually subsidize this effort. The results must be self-sustaining, that is, profitable in their own right. In other words, we must have a business model to support this.

Premium Products

When thinking about adopting a new crop, markets are as important as the ability to grow the crop. And growing just another commodity in a high, dry state a long way from markets, like Wyoming, would not be a particularly good choice in and of itself. What is needed is a premium crop that can command a premium price. The question is how to differentiate the product enough to keep it from becoming just another commodity.

The answer is through quality and unique value-added products. To build on quality, you need a brand and you need a story. We started with a brand. The name

Figure 1. The Neolithic Brand "petroglyph sun" Trademark

"Neolithic" reflects the place of these grains as some of the first plants domesticated by humans (Zohary, 2012) along with the "petroglyph sun" logo (Figure 1). We also started referring to these grains as "first grains" instead of "ancient grains" to reflect their importance to humans and get away from other specialty crops that are often mistakenly referred to as "ancient grains" on the internet.

Two marketing slogans: "One step away from wild" and "Lately have you felt like you need a little spelt?" were developed (Figure 2). The logo and the two slogans have been trademarked through the U.S. Patent Office and are wholly owned by the University of Wyoming. They are currently being used commercially.

Quality needs to start with the grain itself, the way that it is grown and processed. Challenges appeared right away. To begin with, emmer wheat and spelt are both considered "wheat" by the USDA. As such, they are not eligible for specialty crop grants. That designation extends to the state level as well. Instead, we received Hatch funding (2018–2022) from the University of Wyoming (UW) Agricultural Experiment Station to work on the project.

The largest issue, however, has been that these grains are what are called "hulled" grains because they are not free threshing like modern grains. (It was the Romans who first developed free-threshing wheat varieties.) When we began, there was no nonorganic dehulling capacity in Wyoming. Our original thought was to contract the cleaning and dehulling so as to save the cost of infrastructure. However, the nearest nonorganic dehulling capacity was 300 miles away. Organic producers were not willing to clean and dehull these grains, even if we paid them the cost to clean their mills afterwards. This was due to concerns about keeping their organic certification.

The problem was solved with a $50,000 grant from the UW Institute for Innovation and Entrepreneurship. With this money, we purchased a centrifugal dehuller capable of handling 1 million pounds annually and had it installed at the Research and Extension Center in Powell, Wyoming. This turned out to be a fortuitous choice since Powell is located in Wyoming's Big Horn Basin, an area known for its malt barley production. As such, all of the acreage is spring cultivated and under irrigation, which makes our crop choice a good alternative for malt barley contracts. Additionally, irrigation water comes from the Shoshone River, which drains the Yellowstone Plateau. There is a great story here about clean water, and who has not heard of Yellowstone?

Flood irrigation is still used on many farms in the region. Flood irrigation is not as water efficient as modern sprinkler irrigation, but keeping the grain heads dry, as in ancient times, helps inhibit rust (a fungus) in the grain. Plus, gravity water delivery reduces the carbon footprint of the entire process. All of this adds to our marketing story.

Processing Missteps

The technical issues of growing the crop were just the beginning. Since these crops appear similar to wheat, we expected that malting would be a similar process as well. Malting has turned out to be the thorniest issue of all and key to the whole process. Our first malting partner used a modern malting method with a steep tank. Water content of the grain is key to successful malting, and we discovered that these grains have very different requirements relative to modern wheat. The result was clogged piping that took hours to disassemble and clean. The malter was able to produce good-quality malt, but with a considerable time and labor penalty. After that experience, we decided to part company amicably and search for a new malting method.

Figure 2. Neolithic Brand's Trademarked Marketing Slogans.

Our second attempt at malting was an even more spectacular failure. This malter used the Saladin box method, where grain is put into the box and malted in situ without being transferred via piping. This seemed like a vast improvement. However, due to the sensitivity of these grains to moisture content, the result was 10,000 pounds of mush that required extra labor and air tools to chisel out and clean up.

This was a humbling experience for both us and the malter. Yet what it showed was the experimental nature of the project. Most farmers would not have the time or inclination to go to the lengths needed to solve these problems. Some within our university community have voiced concerns that we are not doing research, that this is a commercial demonstration project and not worthy of university support. That may have merit from a basic research perspective. However, from a translational research perspective, we are solving problems and putting the results to work in a beneficial way for society. There are no patents here (yet), and most of what has been accomplished is conceptual, organizational, and logistical, along with some trial-and-error know-how. And, as a land grant institution, part of our dual mission is economic development with service to the state. From this perspective, building a supply chain and niche industry falls squarely within the scope of legitimate university activity.

This is where our role as agricultural research professionals comes into play. At the university level, we can call upon the knowledge of many different disciplines to solve problems that arise and to try and come up with innovative solutions. The result has benefits not only for our project and university constituents but demonstrates our business acumen to our stakeholders as well.

Products

Growing and processing presented challenges of their own, but coming up with marketable products presented additional challenges that dictated overall changes as the project evolved. We settled on growing emmer wheat and spelt early on. Originally, einkorn was included because it was the earliest domesticated crop species (Zohary, 2012). However, einkorn turned out to be low-yielding and uneconomic to grow. Our focus would be on the wholesale market. Retailing small packages for home use would lead to expensive packaging and machinery, and more importantly, open us up to food safety issues. This is because according to Food and Drug Administration rules, grain is an "agricultural product" until it reaches the mill (or malt house) and then it becomes a "food product" where food safety regulations apply.

All this led to these two first grains, which are among the earliest plants domesticated by humans, becoming our products. Barley was also domesticated very early but has low market value other than for malt for beer. Barley production is highly concentrated for the brewing industry. The decision was made not to enter that market. We planned to sell our grains for specialty malts (called "adjuncts" in the industry) for craft brewing and for use as flour for bakeries and restaurants.

We quickly discovered that many restaurants do very little on-premise baking. On-premise baking is concentrated at the higher end of the restaurant sector. Flour production is also highly concentrated. One company alone produces about one-third of all U.S. flour. Unless or until we have a marketing and distribution agreement with one of the large restaurant supply companies, flour production alone would make for a difficult business model.

From a malting perspective, at the time the project began, there were 28 craft breweries in Wyoming. The plan was to give samples, get feedback, and adjust our products from there. Samples were given out to several craft brewers in Wyoming, but no feedback was ever received. Widening the circle, there are about 350 craft breweries in Colorado, but by that time, we determined that giving out samples seemed like a waste of time and money as those we gave to did not appear to value a "free" product.

Then the pandemic hit. Everything came to a halt. We could not travel. Nobody was working. People started baking at home and going online for healthier ingredients. Flour for home breadmaking was one of those products. Interest in our grains picked up. We made our first sale in August 2020 to a bakery in eastern Wyoming. After that, a few more orders trickled in over the months. The breakthrough came with a cold call to a baker at a small mill and coffee shop in Boulder, Colorado. The baker was interested in emmer wheat, but one of us took along a sack of spelt to show the range of our products at that first meeting. Upon seeing the

quality and cleanliness of our spelt, he immediately ordered a pallet. That opened the door to tons of product being sold. They are still our best customer for spelt for flour.

The community of bakers, brewers, and distillers is small, and this led to a call from a distiller in Longmont, Colorado. Distilling had not been on the radar in our original project design. We thought that the market was too small and too difficult to enter. However, when the call came in, we were able to pivot towards this new opportunity. Being able to pivot has been one of the hallmarks of this project. This inherent flexibility has allowed us to shift direction and embrace opportunities over time without changing the project goals.

The result is that our distilling partner currently has three 50-gallon barrels of whiskey aging. The first barrel of a "straight" (aged a minimum of 2 years in oak) all-emmer whiskey will soon be bottled. This will be a unique product, the only all-emmer straight whiskey that we could find in the world. Grain for whiskey is now our major focus.

Upon reflection, we probably should have pursued distilling earlier. Distilling has one of those rare qualities among agricultural products in that the value-added product actually appreciates in value (in the barrel) the longer you store it.

Legal Issues

In the beginning, legal obstacles from the University of Wyoming were one of our greatest challenges. At the time, the university did not want us to be involved with alcohol production. Several times in the past 6 years, we have been called before senior administrators or legal counsel to explain the project's connection with alcoholic beverage production. In truth, we never intended to produce alcohol, just the ingredients used to make it. Production will be what we call "by-branded." That is, the distiller will brand the final product and give us credit for our ingredients with a small logo label on the side. The distiller will retain overall branding control of the product. The distiller will also pay a licensing fee. The university will have two revenue streams from this, selling grain and malt to the distiller and licensing fees. The original idea was to keep the university at arm's length from alcoholic beverage production but retain credit (and receive revenue) for the quality products used in its production.

This is in contrast to what is commonly referred to as "co-branding" where brands share equal billing on the product and share branding and marketing control of the product. The university's perspective on alcohol changed in 2023. By then, most institutions in neighboring states had university branded beers. Now there is a UW beer and there may soon be a university branded whiskey (from a different distiller, a more affordable version, not related to this project). Times change.

The idea here is that Neolithic brand is about quality ingredients for quality products. These are not mass-market products but niche products that command premium prices. This helps us keep supply manageable while we grow and keep the products from becoming commoditized too early.

A New Model for Agricultural Research

Finding a market and finding a crop to fit that market has been done before. However, what is rarely done is not just finding the market and the crop but building the supply chain and the business around it to shepherd the crop along. This takes time and resources. This is where our translational model comes into play. University research models tend to be built around short-term, 3-to 5-year projects, not the 8 to 10 years it takes to build businesses and niche industries. However, if universities are to really make a difference in rural communities, they will likely have to get more deeply involved in the business world and stay longer to see positive results.

This is a change that not all in our colleagues are comfortable with. And yet, as our economy changes and demographics shift (fewer students) this may be a way forward for public institutions to stay more relevant, attract students, and make connections and partners in the business world.

Lessons Learned

There are many lessons for entrepreneurs from this experience. Distilling it down, here are three important ones to share:

1. *You can't be a one-trick pony*. Entrepreneurs must know a little about everything, from being a farmer to an economist, a marketer, or a lawyer. The entrepreneur needs to wear many hats. You cannot be good in just one area.

2. *You have to keep the supply chain taut*. A supply chain is more than just linkages. Each link has its own unique needs. Making the connection is just a start. The entrepreneur needs to be constantly jumping between the links making sure that the process is going smoothly in every step. Just like a bicycle chain, the supply chain needs to be taut, or things will start slipping.

3. *Matching supply and demand*. All too often—especially in agriculture, where high volume–low margin products are involved—there is a temptation to overproduce. Matching supply and demand can be tough, because you cannot sell what you do not have. However, being stuck with a bin full of an expensive crop that cannot be sold is just as bad. We have been lucky in that regard because we had the only dehuller in the region. We have been able to control the supply and not overproduce. When we were not selling, we did not grow.

Going Forward

Every link in the supply chain has been proven with process and product. The first barrel of by-branded whiskey will soon be bottled. It has been aging in the barrel for 2 years. A barrel of all-spelt whiskey will follow within a few months, and a barrel of raw-wheat whiskey later in 2025. Our malting partner has just malted 10 tons of emmer wheat using their Saladin box, having perfected the technique from the previous attempt. This key step opens doors to new products. We harvested 25 acres of emmer wheat in the fall of 2024, enough to keep the whiskey still running for another 2 years. Going forward, we are looking for opportunities with other distillers for other types of distilled spirits and a line of malts for craft brewers.

We are also looking for educational products going forward. As production increases, we would like to do more research into these grains from a nutritional perspective, particularly looking at what we suspect are different protein structures.

Additionally, since these are hulled grains, about 45%–50% of the field weight is hulls, currently a waste product. We would like to be able to do research to find marketable uses for the hulls as feed or fertilizer.

Longer term, where does this project go? Does it continue as a wholly owned university brand? Or is it spun off as a standalone company, or is the intellectual property and know-how sold off to become part of another enterprise? These are questions for the future. The end goal, as from the beginning, is creating jobs and enhancing incomes in Wyoming's rural economy. We are proud to be part of starting to do just that. Down the road, growing the business will still present challenges, but we have our foot in the door now.

For More Information

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