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## Issues and Implications of New Conversations Around Meat Supply in the West

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### Abstract

The onset of COVID-19 resulted in the disruption of many supply chains, mainly caused by impacts to labor, transportation, and declining market demand. The meat industry experienced some of the most significant supply chain impacts due to the current structure of the meat processing industry. Meat processing is a highly consolidated industry with production lines designed and dedicated to specific end consumers. This organizational structure contributed to livestock backlogs, leading to decreased production, consumer meat shortages, and increased consumer prices. As a result, many states are examining their existing meat supply chain to determine the feasibility of establishing local processing plants. This paper will present responses from states to meat supply interruptions, results from a meat processing facility feasibility study, and results from a survey of Nevada and Utah residents conducted during the summer of 2020 which captures consumer preferences for locally raised ground beef.

### Introduction

Coronavirus Disease 2019 (COVID-19) highlighted the vulnerability in our meat supply chain, with production falling by over 40% for pork, 30% for beef, and 15% for chicken in the spring of 2020, within weeks of the declaration of the nation's pandemic status (Reiley, 2020a, b; McDougal, 2020). As larger harvest and processing facilities restricted hours, implemented social distancing measures, or even shut down, output slowed, and ranchers were forced to consider other options, including diverting livestock to

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approved small to mid-sized facilities. The resulting bottleneck highlighted the need for increased capacity and resiliency in the supply chain. To address this, several states earmarked Coronavirus Aid, Relief, and Economic Security (CARES) Act funds to assist meat processing facilities with infrastructure expansion and COVID-related expenditures.

While local plants lack the economies of scale that support lower consumer prices, regional plants may increase the resiliency of local foodsheds and food security. Because local processors must charge higher prices to cover costs, examining market demand and regional regulations are essential components of determining feasibility. Several studies have focused on aspects of local meat consumer preference and willingness to pay for local and primal cuts, but not for local ground beef, a highly-demanded, at-home meat product. Also, while USDA has set federal standards for certification and movement of meat between states, often vast differences exist in the structure of state inspection services. Utah has several levels of state inspection, including the Talmage Aiken program which permits meat to be sold across state lines with a USDA certification using a conforming state inspection program. This provides processors with more flexibility to expand to other markets. Nevada, in contrast, has passed legislation to allow custom processing (harvesting owned animals for personal use), but no state-level inspection program exists which allows intra- or interstate retail sales.

This paper will present responses from states to meat supply interruptions, results from a meat processing facility feasibility study, and results from a survey of Nevada and Utah residents conducted during the summer of 2020 that captures consumer preferences for local ground beef.

### **Responses from States to Meat Supply Interruptions**

The resulting bottleneck in meat supply from the pandemic highlighted the need for increased capacity and resiliency in the supply chain. Several states used CARES Act funds to assist meat processing facilities with infrastructure expansion and COVID-related expenditures to address this. A table summarizing these responses can be found in *Potential for Growth in Local Processing and Sales of Utah Beef* (Ward et al. 2020). These included partial or complete funding to increase worker safety and training and increase the harvest and processing capacity. Programs also provided funding to help facilities implement facility upgrades allowing them to participate in a federal or federal-equivalent inspection.

The Utah Department of Agriculture and Food (UDAF) implemented a “Temporary Grant of Inspection,” which was good for a period of 90 days and allowed qualifying

custom-exempt establishments with worthy kill floors the ability to market their product wholesale and retail within the state of Utah (Ward et al. 2020). (Note: custom-exempt is only approved for private, noncommercial use.) Those plants that participated were then able to supply their processed meat to restaurants and grocery stores within Utah. Additional requirements for these plants to participate were:

- Provide a written sanitation program approved by the state
- Develop a hazard analysis and critical control points (HACCP)
- Program must be approved by the state
- Develop a written recall program approved by the state
- Submit labels for approval by the state.

Nevada does not have a formalized meat inspection program within the state. All meat intended for commercial sale, whether retail or wholesale, must be processed under USDA inspection. But the state recently passed legislation to establish a custom slaughter program, and administrative rules are under development by the Nevada Department of Agriculture. A Nevada Extension team received a CARES Act grant (NDA, \$249,052.58) through the Nevada Department of Agriculture for equipment infrastructure for a mobile USDA/custom slaughter unit and to build business development plans for entrepreneurs wanting to start a new business slaughtering and processing livestock in Nevada. The long-term Extension objective is to create a Nevada slaughter and processing infrastructure and build a workforce development program for local butchers.

The need to assist very small to small meat processing establishments is also recognized at the national level. The American Rescue Plan Act of 2021, H.R. 1319, signed into law on March 11, 2021, includes funding for investing in infrastructure and retooling support for food processors to build resiliency in the food supply. The Requiring Assistance to Meat Processors for Upgrading Plants (RAMP-UP) Act (H.R. 7490; S. 4298) would provide funding to certain small-scale meat processors to upgrade facilities so they meet USDA standards. For plants that meet this target within 36 months, the funds would not need to be repaid. The Processing Revival and Intrastate Meat Exemption (PRIME) Act (H.R. 2859; S. 1620) would allow custom exempt products to be sold in intrastate commerce. Sales options would include direct-to-consumer outlets, to restaurants, and through in-state grocery stores.

### **Complex Regulatory Structures and Hurdles to Local Meat Processing**

While some of the effects of the meat supply chain disruptions were experienced in all states, there are important differences in the types of meat establishment inspections each state conducts. The Food Safety Inspection Service (FSIS) branch of the USDA

conducts inspections of meat establishments in all 50 states and territories and oversees cooperative agreements with states that choose to participate in “same as” or “equal to” inspections. All meat sold through retail or wholesale channels must be inspected under a federal or state program, while privately-owned animals can be processed for personal use at custom-exempt establishments (Table 1). These programs require a trained inspector to be present during all harvest and processing, but this cost is not transferred to the business unless these activities occur outside of regular business hours (i.e., weekends, swing or graveyard shifts, and holidays).

**Table 1. Comparison of Meat Inspection Program(s) in Utah and Nevada.**

Inspection Program	State Participation		Sales Restrictions	Requirements for State Participation
	Utah	Nevada		
Federal Inspection			None	<ul style="list-style-type: none"> <li>• Not applicable – conducted by USDA Food Safety Inspection Service</li> </ul>
State-federal Inspection	Yes	No	Intrastate only, wholesale or retail	<ul style="list-style-type: none"> <li>• aka State Cooperative Inspection or Meat Poultry Inspection (MPI) Program (9 CFR §321.1)</li> <li>• State inspection “at least equal to” USDA</li> <li>• Utah is one of 27 participating states</li> </ul>
Federal-state Inspection	Yes	No	None	<ul style="list-style-type: none"> <li>• aka Talmadge-Aiken (TA) Cooperative Inspection Program (9 CFR §321.2)</li> <li>• State must participate in approved MPI</li> <li>• Federal inspection conducted by State inspector – “same as” USDA</li> <li>• Utah is one of 9 states with TA facilities</li> </ul>
Cooperative Interstate Shipment Program	No <sup>1</sup>	No	None	<ul style="list-style-type: none"> <li>• aka CIS Program (9 CFR §321.3 and §332)</li> <li>• State must participate in approved MPI</li> <li>• Federal inspection conducted by State inspector – “same as” USDA</li> <li>• Only facilities with 25 or fewer employees</li> <li>• 8 states participate</li> </ul>
Custom Exempt	Yes	Yes <sup>2</sup>	Cannot be sold, donated, or otherwise enter commerce	<ul style="list-style-type: none"> <li>• Slaughter-for-fee for owner of animal (9 CFR §303.1)</li> <li>• Inspection agency and framework depends on the other activities that are conducted by the establishment</li> </ul>

<sup>1</sup> Utah Department of Agriculture and Food opted to continue participation in Talmadge-Aiken program.

<sup>2</sup> Nevada Department of Agriculture is developing rules to implement NRS 583.454, Custom Processing Establishment (SB390; 2019).

Utah and Nevada represent two extremes in terms of participation in cooperative programs; Utah participates in multiple programs, while Nevada participates in none. These differences impact the ability of states to respond to conditions seen during the COVID-19 pandemic. As explained in the previous section, Utah was able to adapt by expanding some of their existing inspection programs. On the other hand, Nevada struggled to adapt since new policies and inspection programs had to be created.

Most states administer some type of custom-exempt program, where owners can have animals harvested for a fee in an inspected facility. Custom-exempt products cannot enter intra- or interstate commerce. New ventures in beef processing must understand the regulatory structure and hurdles in their state. Opportunities that exist in some states may not work in another.

### **Local Processing of Beef**

Various meat processing feasibility studies have been conducted. Focusing on the Intermountain West, the most recent research in this area was completed in 2014. A study done that year in Montana used 250 head per day (Bitz et al., 2014), and a study in the same year completed in Idaho primarily focused on a smaller scale operation processing more than 8,000 head per year (Saul et al., 2014). These more recent studies join a small body of literature that is mostly more than ten years old (Curtis et al., 2006 and 2008; Yorgey, 2008; Schahczenski, 2009). In general, because of economies of scale and the consolidation of the meat processing industry, it can be difficult for smaller plants to be successful.

A recent study in Utah looked at the feasibility of having a very small-scale meat processing plant (750 head per year) as a way of increasing the meat supply chain resiliency. If very small-scale plants can be feasible, it would allow for plants in smaller, more rural areas of the state. The pandemic highlighted limitations in having only a few larger plants, with each one servicing several states. When something happens at one or more of a limited number of processing facilities, the effects can be extreme. The Utah study estimated that it would require about \$1.4 million investment to get started (e.g., building, equipment). It assumed an existing site with water lines and utility hookups to the property. Table 2 provides an overview of an enterprise budget for a very small-scale plant. A detailed budget is available in the referenced study. It should be noted that the budget was developed for a single shift. No work was done on the effects of including additional shifts or using overtime to increase capacity. The budget shows over \$116,000 net income before tax for a combination of selling retail cuts wholesale and doing custom harvesting and processing. The retail cuts are sold at an average of \$6.50 per pound to grocery stores. That price assumed a 30% price premium

and a 30% margin at retail, resulting in a retail price of \$9.28 per pound. It assumed that fed cattle were purchased at \$115 per cwt. There was an 8% return on investment. The range of both wholesale prices and net income for a very small-scale plant can be seen in Table 3.

This budget shows possibility to be profitable for a very small-scale plant to operate. However, profitability depends upon positioning the meat as a premium product and operating the plant efficiently. For this study, custom processing is used as a way to defray the cost of labor and overhead and also smooth out production. This allows the plant to operate at a higher capacity and makes the operation more profitable. Such a business does not come without risk. The same study examined additional scenarios where the price varied and created a tool to allow customization of the budget and analysis.

**Table 2. Summary Enterprise Budget for Very Small-Scale Processing Plant in Utah with 675 Head of Cattle (90% Capacity of 750 Head Facility)<sup>3</sup>**

			Wholesale		Custom
	Total	Percent	Per Head	Per Pound	Per Head
<b>Sales</b>	<b>\$ 1,132,875</b>	<b>100%</b>	<b>\$ 2,275</b>	<b>\$ 6.50</b>	<b>\$ 485</b>
<b>Cost of Goods Sold</b>					
Animals	\$ 672,750	59%	\$ 1,495	\$ 4.27	
Marketing & Distribution	\$ 31,500	3%	\$ 70	\$ 0.20	
Labor	\$ 155,480	14%	\$ 230	\$ 0.66	\$ 230
Supplies/inputs	\$28,658	3%	\$ 42	\$ 0.12	\$ 42
<b>Total Cost of Goods Sold</b>	<b>\$ 888,388</b>	<b>78%</b>	<b>\$ 1,838</b>	<b>\$ 5.25</b>	<b>\$ 273</b>
<b>Gross Income</b>	<b>\$ 244,487</b>	<b>22%</b>	<b>\$ 437.20</b>	<b>\$ 1.25</b>	<b>\$ 212</b>
Overhead	\$128,268	11%	\$ 190	\$ 0.54	\$ 190
<b>Net Income</b>	<b>\$ 116,219</b>	<b>10%</b>	<b>\$ 247</b>	<b>\$ 0.71</b>	<b>\$ 22</b>
Tax	\$ 40,677	4%	\$ 86.51	\$ 0.25	\$ 7.76
<b>Net Income After Tax</b>	<b>\$ 75,542</b>	<b>7%</b>	<b>\$ 160.66</b>	<b>\$ 0.46</b>	<b>\$ 14.41</b>

<sup>3</sup>100% capacity is 500 head processed wholesale and 250 head custom processed. This budget assumed 90% capacity with 450 wholesale and 225 custom.

Source: Ward, R., K. Allen, H. Davis, and A. Whyte. "Potential For Growth In Local Processing and Sales of Utah Beef" Utah State University. December 2020. <https://extension.usu.edu/apec/agribusiness-food/Beef-Processing-Report-FINAL-webversion-small.pdf>

**Table 3. Wholesale Price and Net Income Estimation of Very Small-Scale Processing Plant in Utah<sup>4</sup>**

	Avg retail prices		20% premium		30% premium		40% Premium	
<b>Retail price</b>	\$ 5.74	\$ 8.52	\$ 6.89	\$ 10.22	\$ 7.46	\$ 11.08	\$ 8.04	\$ 11.93
% margin retail	<b>Wholesale prices</b>							
40%	\$ 3.44	\$ 5.11	\$ 4.13	\$ 6.13	\$ 4.48	\$ 6.65	\$ 4.82	\$ 7.16
30%	\$ 4.02	\$ 5.96	\$ 4.82	\$ 7.16	\$ 5.22	\$ 7.75	\$ 5.63	\$ 8.35
20%	\$ 4.59	\$ 6.82	\$ 5.51	\$ 8.18	\$ 5.97	\$ 8.86	\$ 6.43	\$ 9.54
% margin retail	<b>Estimated net income for various wholesale prices at 100% capacity<sup>5</sup></b>							
40%	\$ (370,956)	\$ (79,056)	\$ (250,416)	\$ 99,864	\$ (190,146)	\$ 189,324	\$ (129,876)	\$ 278,784
30%	\$ (270,506)	\$ 70,044	\$ (129,876)	\$ 278,784	\$ (59,561)	\$ 383,154	\$ 10,754	\$ 487,524
20%	\$ (170,056)	\$ 219,144	\$ (9,336)	\$ 457,704	\$ 71,024	\$ 576,984	\$ 151,384	\$ 696,264
% margin retail	<b>Estimated net income for various wholesale prices at 90% capacity</b>							
40%	\$ (365,101)	\$ (102,391)	\$ (256,615)	\$ 58,637	\$ (202,372)	\$ 139,151	\$ (148,129)	\$ 219,665
30%	\$ (274,696)	\$ 31,799	\$ (148,129)	\$ 219,665	\$ (84,846)	\$ 313,598	\$ (21,562)	\$ 407,531
20%	\$ (184,291)	\$ 165,989	\$ (39,643)	\$ 380,693	\$ 32,681	\$ 488,045	\$ 105,005	\$ 595,397
% margin retail	<b>Estimated net income for various wholesale prices at 80% capacity</b>							
40%	\$ (359,246)	\$ (125,726)	\$ (262,814)	\$ 17,410	\$ (214,598)	\$ 88,978	\$ (166,382)	\$ 160,546
30%	\$ (278,886)	\$ (6,446)	\$ (166,382)	\$ 160,546	\$ (110,130)	\$ 244,042	\$ (53,878)	\$ 327,538
20%	\$ (198,526)	\$ 112,834	\$ (69,950)	\$ 303,682	\$ (5,662)	\$ 399,106	\$ 58,626	\$ 494,530

<sup>4</sup>Note: The estimated net income is a pre-tax profit estimation. Typically, owner(s) would need to pay self-employment and income tax on the profits. However, the rates would vary, and losses could be used to reduce tax obligations from other income.

<sup>5</sup>100% capacity is 500 head processed wholesale and 250 head custom processed. 90% capacity is 450 wholesale and 225 custom with 400 head wholesale and 200 custom for 80% capacity.

Source: Ward, R., K. Allen, H. Davis, and A. Whyte. "Potential For Growth In Local Processing and Sales of Utah Beef" Utah State University. December 2020. <https://extension.usu.edu/apec/agribusiness-food/Beef-Processing-Report-FINAL-webversion-small.pdf>

### Consumer Demand for Local Meat

As discussed above, adding extra capacity to the meat supply chain through more local sales and smaller processing plants would require consumers to pay a premium. Studies have found that U.S. consumers strongly prefer U.S. produced steaks over imported Canadian or Australian steaks (Lim et al. 2013), and consumers are willing to pay a premium for steak and ground beef labeled as "U.S. Certified" (Loureiro and Umberger 2003). Within the U.S., studies have found consumers prefer locally raised meat over non-locally raised meat. When analyzing the beef market in Tennessee, a few studies found consumers and restaurants were willing to pay more for beef that carried a Tennessee label or was considered Tennessee Certified Beef than beef without these labels (Dobbs et al. 2016; Merritt et al. 2018; McKay et al. 2019). Chang et al. (2013) found South Dakota farmer's market consumers were willing to pay a premium for locally produced ribeye steaks. These steaks were viewed by consumers as having a higher quality in terms of color and juiciness. Telligman et al. (2017) found Alabama consumers consider locally produced beef as healthier due to an assumed lack of hormones or chemicals and more desirable feeding practices but did not view the local beef as safer or more environmentally friendly.



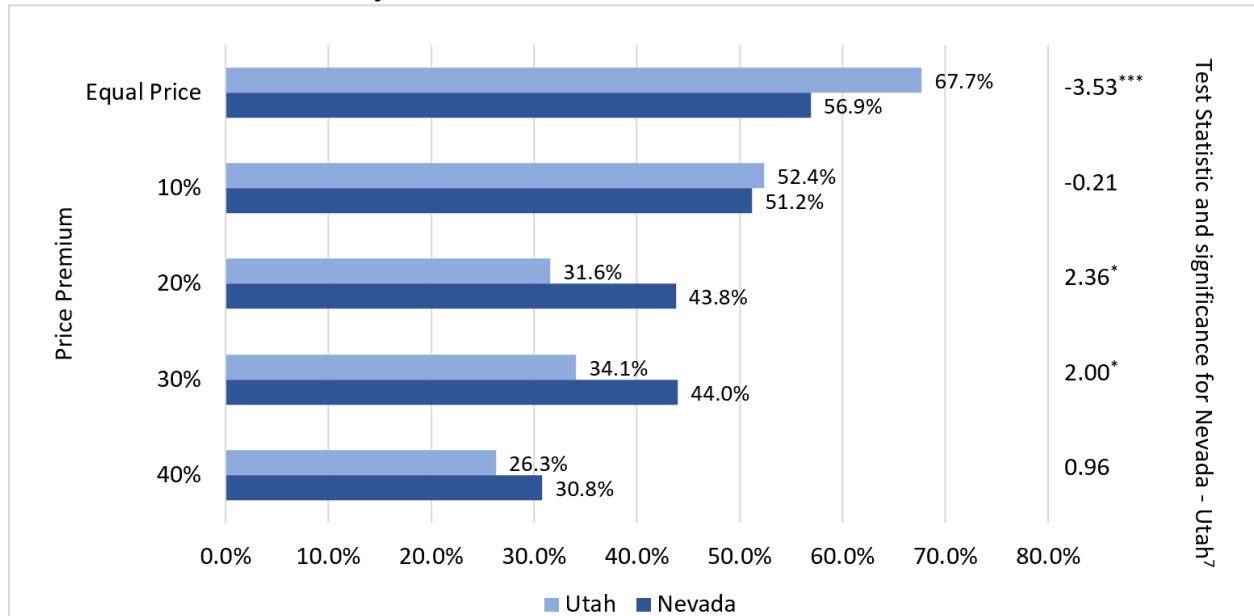
Recently, the authors completed a survey looking at consumer preferences for local beef in Utah and Nevada. Detailed results can be found in Lacy et al. (2021). In Utah, 42% of respondents had purchased meat or produce directly from a local producer, while only 28% had in Nevada, and of all respondents, 65% had never purchased meat directly from a local farmer. Of those respondents, only 30% said that price was a concern, though they believed it was cheaper to purchase meat from their regular retailer.

Many of the survey participants were willing to pay a premium for locally raised ground beef (Figure 1).<sup>7</sup> At an equal price, about two-thirds of Utah respondents would prefer locally raised ground beef while only about half of Nevada respondents reported the same. However, Nevada respondents showed less price-sensitivity than the Utah respondents as they were willing to pay for locally raised ground beef at higher markups. These results highlight the need to understand the local market and that there are differences in various regions.

Location and convenience are also important aspects in looking at increasing sales of local beef. Ward et al. (2021) also showed that supermarkets were by far the preferred outlet when purchasing local meat. Quality of the food was the most influential factor in determining where to shop, both pre- and post-COVID-19. Cleanliness and price increased in importance post-COVID-19, however over half of the respondents listed price as either the most influential or very influential in determining where to shop both pre- and post-COVID-19. This indicates that while consumers exist who are willing to pay more for local meat, many are very price-sensitive, and not all consumers will pay premiums intrinsic to locally raised meat. Care should be taken in how to position the product and understand consumer preferences.

<sup>7</sup> Respondents were asked a series of hypothetical willingness-to-pay questions for various price premiums (10, 20, 30, 40 or 50%) for locally raised ground beef. At these price premiums, participants were asked if they would prefer locally raised ground beef or non-locally raised ground beef. To reduce starting point bias, participants were randomly assigned a starting price premium and would move up or down based on their selected preference. See Lacy et al (2021) for an in-depth description of the survey.

**Figure 1. Participant Preference for Locally Raised Ground Beef at Various Price Premiums vs. Non-Locally Raised Ground Beef**



<sup>7</sup> Z-tests were calculated to test if the proportion of customers willing to purchase locally raised ground beef are significantly different for Nevada and Utah. The p-value ranges for these tests are denoted with stars next to the test statistic: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . Additionally, hypothesis tests were conducted to determine if the increased proportion of participants willing to pay a 30% premium compared to a 20% premium was statistically significant. We found the proportions were not statistically different even at the 10% significance level.

### Implications and Conclusions

Overall, there is potential growth for local beef processing and sales. Consumers desire local beef products, and a significant portion are willing to pay a premium for it. However, consumer preference trends vary by location, and it is important to understand local markets and consumer preferences. Notably, the consumer demand was based on stated preferences rather than revealed preferences. Generally, stated preferences may be slightly lower than revealed ones (Carson et al. 1996). Even when a consumer states they would buy local beef products, their decision may change when actively making the purchase.

A very small-scale meat processing facility may be feasible but would require that beef be sold and positioned as a premium product. This works for niche products and could be combined with other quality characteristics, such as grass-fed, organic, natural, etc. Smaller processing plants in regional areas can increase the resiliency of the meat supply in the West and provide the potential for ranchers to develop additional revenue streams.

One of the issues impacting feasibility is the lack of awareness of local meat product availability and the desire for convenience. State programs such as Utah's Own or Nevada Grown might be used to help build consumer awareness and visibility. Small-scale processing operations often cannot afford to have full-time brand managers and could benefit from associations, cooperatives, or other partnerships to help build the brand and spread the cost.

The overall meat supply chain was built and refined on the concept of economies of scale and fairly tight margins. With the pandemic highlighting limitations of that concept, there is increasing interest in having a more resilient supply chain with additional smaller operations. Additionally, the production and marketing of niche products that can command higher prices would be a beneficial strategy to offset the diseconomies of scale experienced by these smaller operations. The work highlighted in this paper would support that premise. Opportunities exist to improve the resiliency of the meat supply chain in the West, but it will require consumers who are willing to pay premiums for local and quality characteristics.

Programs which can defray the cost of renovations needed for a higher-level meat inspection or to help with capital needs is a possible mechanism to encourage additional smaller operations that could improve supply chain resiliency.

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