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Slaughter and Processing Options and Issues for Locally Sourced Meat

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Abstract

Demand for locally sourced meats has increased in recent years, although it remains a small share of total demand. This report evaluates the availability of slaughter and processing facilities for local meat production and the extent to which these may constrain or support growth in demand for locally sourced meats. Types, number, location, and other salient characteristics of slaughter and processing facilities are outlined by State. Further disaggregation of facilities by capacity and annual volume by species also provides information on slaughter and processing options for local meat producer-marketers. Findings suggest that access to Federal or State-inspected slaughter and processing facilities is limited in some parts of the country. In addition, alternative small-scale slaughter and processing facilities may not be economically feasible in all areas due to a lack of consistent throughput. Alternative methods for slaughter and processing geared toward local markets—such as the use of mobile slaughter units (MSUs) and local and regional market aggregators—can help meet some of the need for increased slaughter and processing capacity in localized areas and enable the growth of small livestock producers marketing product to consumers in their region or community. However, growth in small-scale slaughter and processing facilities depends on whether producers in need of these services can provide enough throughput, for enough of the year, and pay a high enough fee for the services to make such facilities economically viable. This, in turn, depends on the strength of consumer demand for local meats in the coming years.

Keywords: livestock, slaughter, cattle, hogs, poultry, niche, local, production, mobile slaughter units

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Introduction

Demand for locally sourced products has increased in recent years. Although the share of total U.S. agricultural products sold through local food markets is small (direct-to-consumer sales accounted for 0.4 percent of total agricultural sales in 2007), it continues to develop. According to the 2007 Census of Agriculture, direct-to-consumer marketing amounted to \$1.2 billion in current dollar sales in 2007, compared with \$551 million in 1997, a growth of 118 percent.¹

The percentage of livestock operations selling product directly to consumers or retailers is much smaller than that for other agricultural products. In 2007, only 6.9 percent of livestock operations participated in direct sales, compared with 44.1 percent of all vegetable and melon farms (Martinez et al., 2010). Among farms that sell locally produced food products—including local sales through intermediated channels—sales to the local level account for 65 percent of gross farm sales for fruit, vegetable, and nut farms, on average, but only 37 percent for livestock and field crop farms (Low and Vogel, 2011).

Limited slaughter and processing capacity is often cited—particularly by producers—as a key barrier to marketing their meat and poultry locally. This report provides some context for that claim by evaluating slaughter and processing capacity and options available to livestock producers selling into local markets. Economic and other tradeoffs of various options for animal slaughter also are explored.

First, we use national-level data to describe the current structure of the U.S. meat slaughter and processing industry, identifying the following:

- Differences among facility types, including federally inspected (FI), State-inspected (SI), Talmadge-Aiken (TA), and custom-exempt;
- Slaughter plant numbers and locations by facility type compared to volumes of beef and pork production, by State;
- Percentage of animals slaughtered in FI facilities in the United States by plant size;
- Number of FI plants in operation by plant capacity size;
- Geographic areas with few or no small-scale, inspected beef, pork, and poultry slaughter facilities.

After presenting these data, we consider their implications for local meat production. The majority of livestock in the United States are processed at a relatively small number of large-volume FI plants. However, these plants, even if conveniently located, are essentially unavailable to local meat processors due to mismatches in scale, services, and business models. Two different kinds of approaches to improving access to slaughter and processing for local markets are also discussed: mobile slaughter units and aggregation. Finally, some of the challenges and obstacles to meat producers seeking entry to or expansion in local markets are evaluated.

¹The 2007 numbers are the most recent available from the Census of Agriculture, which is conducted every 5 years by USDA's National Agricultural Statistics Service; the 2007 results became available in early 2009. The 2012 census is currently ongoing.

Characteristics of the “Local” Livestock Product Market

The number of livestock farms selling to local markets may be relatively small, but consumer interest in how meat is produced, how animals are raised and slaughtered, and the particular diet fed to livestock has attracted a great deal of attention. This trend is evident in the increasing market share of alternatively produced livestock products. For example, despite generally declining per capita consumption of meats, beef produced in alternative production systems—natural, certified organic (grain-fed or otherwise), and grass/forage-fed (“fed” or finished)—makes up about 3 percent of the U.S. beef market and has grown at a combined rate of about 20 percent per year for several years, according to the Irish Food Board/Bord Bia (FeedInfo News Service, 2010). Consumers who buy local meats generally place a higher importance on either real or perceived differences in product relating to quality, animal welfare, nutrition value, and/or environmental implications from production, etc. (Martinez et al., 2010). Locally marketed meat products usually encompasses particular attributes pertaining to production system type (i.e., certified organic, “grass-fed,” grass-finished, “natural,” etc.²), and some consumers are willing to pay premiums for such real or perceived product differences. But, for a premium to translate into producer profit, the product price must also be high enough to absorb the costs associated with the production program and supply chain, including processing.³

Definitions of “local” vary by regions, companies, consumers, and marketing channels. In the 2008 Food, Conservation, and Energy Act (2008 Farm Act), the U.S. Congress adopted the definition of locally produced food as being transported “less than 400 miles from its origin, or within the State in which it is produced.” Recent research has distinguished two general types of local food sales: direct-to-consumer and intermediated, i.e., farmers’ sales to local retail, restaurant, and regional distribution outlets, which means that a local food system may lie within a small town or cover a broader, even interstate, region (Martinez et al., 2010; Low and Vogel, 2011).

Similarly, the “local meat sector” is quite variable in the scale of its production, supply chains, and marketing outlets. Local meat can be as direct and simple as a producer selling a single animal to a neighbor. It can be much more complex, with a set of producers raising animals in a certain designated production system, for a local meat brand that is marketed fresh and on a year-round basis, to restaurants, retailers, and food service. These are just two examples; variations within locally sourced livestock and meat products are also reflected in the type of slaughter and processing facility utilized. The type, scale, and regulatory status of available facilities have important implications for how local meats can be marketed.

²Some of the nuances in alternative production systems, including “grass-fed,” grass-finished, “natural,” and certified organic, are explored in *Live-stock, Dairy, & Poultry Outlook* June and July 2010 special articles, *Grass and Grain Beef Production Systems* and *Alternative Beef Production Systems—What’s In A Name?* available at: <http://www.ers.usda.gov/publications/ldp/2010/06Jun/ldpm192.pdf> <http://www.ers.usda.gov/publications/ldp/2010/07Jul/ldpm193.pdf>

³This report does not address the scientific basis or legitimacy of environmental, nutritional, or other attributes consumers may associate with alternative production systems. Several studies do address issues of energy and transportation costs for local products. Capper, Cady, and Bauman (2009) show that there is no guarantee that local foods use less fossil fuels in production or transportation per product unit or are produced and transported in a more environmentally sustainable way per unit. King et al., (2010) show that mid-scale supply chains for local meat products operate more efficiently than smaller ones, while delivering product of similar value.

Regulations and Types of Inspection in U.S. Livestock Slaughter and Processing

All meat and poultry produced for retail in the United States must come from animals that are slaughtered and processed under continuous inspection, meaning that every animal is inspected before and after slaughter. There are three basic categories of inspection:

- Meat from animals slaughtered and processed under Federal inspection (FI) can be sold interstate;
- Meat from animals slaughtered and processed under State inspection is limited to intrastate commerce, unless the State and facility participates in the Cooperative Interstate Shipment Program (see box, “Cooperative Interstate Shipment Program for State-Inspected Meat and Poultry);
- Talmadge-Aiken (TA) plants are slaughter establishments that are inspected by State employees acting as agents for USDA’s Food Safety and Inspection Service (FSIS). When it benefits the public interest, FSIS can enter into an agreement with a State agency to have State employees conduct meat, poultry, or egg products inspection or other regulatory activities on behalf of FSIS. The product from a TA plant can move interstate. TA is only active in nine States.

Both Federal and State-inspected slaughter facilities follow the same food safety procedures and guidelines, including that plants operate under Hazard Analysis Critical Control Points (HACCP) regulations. State programs must enforce requirements “at least equal to” those imposed under the Federal Meat Inspection Act (FMIA) and the Poultry Products Inspection Act (PPIA), or those established under the Federal system and administered by FSIS (USDA/FSIS, 2008).⁴

The primary difference between the two inspection programs is the restriction of State-inspected meat to intrastate commerce. Only 27 States have retained their State-level red meat inspection programs and 25 have retained both red meat and poultry inspection programs. Although States are reimbursed up to 50 percent of the cost of their inspection programs, the decision to give up a State-inspection program is often due to costs savings (USDA/FSIS, 2011).⁵ In recent years, a number of States have restarted State inspection programs or are considering doing so with the goal of increasing access to processing.

To illustrate the relative size of each system, in 2010, 98 percent of total cattle slaughter, 99 percent of hog slaughter, 88 percent of lamb and sheep slaughter, and more than 99 percent of poultry slaughter were done under Federal inspection (USDA/NASS^a, 2011; USDA/NASS^b, 2011).

If slaughtered and processed under State or Federal inspection, local meat can be sold just like conventional meat, packaged as retail cuts, to individuals at farmers’ markets or at farm stands, and in retail cuts or as subprimal cuts (intermediate-sized cuts that are sized between a primal cut and a portion-sized cut) to restaurants, retailers, and food service.

⁴FSIS regulations and policies for the Federal Meat and Poultry Products Inspection Acts are available at: http://www.fsis.usda.gov/regulations_&_policies/regulations_directives_&_notices/index.asp.

⁵A list of States with State inspection programs is available at: http://www.fsis.usda.gov/regulations_&_policies/Listing_of_Participating_States/index.asp.

Cooperative Interstate Shipment Program for State-Inspected Meat and Poultry

In July 2011, USDA's Food Safety and Inspection Service (FSIS) began implementing the Cooperative Interstate Shipment Program, which is intended to expand the market for meat and poultry that is produced in smaller State-inspected slaughter and processing facilities. State-inspected establishments that participate in the program must comply with all Federal standards under the Federal Meat Inspection Act (FMIA) and the Poultry Products Inspection Act (PPIA). Only State-inspected facilities with 25 or fewer employees are eligible for this program. Inspection is carried out by designated State personnel who have been trained in the enforcement of FMIA, PPIA, and Humane Methods of Slaughter Act (HMSA), as well as Hazard Analysis and Critical Control Points (HACCP) inspection procedures. Meat and poultry products inspected under the program bear the official USDA mark of Federal inspection. FSIS provides oversight and enforcement of the program. The law requires that FSIS reimburse the participating States for at least 60 percent of their eligible costs related to inspection. The final rule for the Interstate Shipment of State-Inspected Meat and Poultry Products program can be accessed at: http://www.fsis.usda.gov/regulations_&_policies/Interim_&_Final_Rules/index.asp.

To participate, the State must first have a cooperative State meat or poultry inspection (MPI) program. Three States with State-level meat inspection programs—Ohio, Wisconsin, and North Dakota—are moving ahead with the program (out of 27 States that have State-level inspection), and Indiana is also considering participating. Ohio is slated to be the first program participant and will have 16 plants in the program. State-inspected plants participating in the Cooperative Interstate Shipment Program may exit

the program and revert again to State inspection, but re-entry into the program requires a waiting period of 1 year. Plants that voluntarily leave the Cooperative Interstate Shipment Program that are interested in participating in the program again must reapply for selection into the program.

Such a cooperative program will expand the marketing options available to producers who patronize the participating State-inspected facilities. However, for States in which there is no State inspection program, or for establishments in States that do not adopt this program, there is still a viable option for selling products across State lines: converting to Federal inspection, which may be just as practical as participating in the new program. Given that the only qualified State-inspected facilities that are eligible to participate are those that employ 25 or fewer employees on average, applying for the Cooperative Interstate Shipment Program may be problematic if the facility intends to expand its operation at any time in the near future.

All State facilities are required to operate in a manner that is "at least equal to" the Federal standard, and State programs seeking to operate under the proposed rule must provide the same inspection services as the Federal Government using software, forms, and laboratory techniques that are the same as those used under the Federal program (USDA/FSIS, 2011). The Cooperative Interstate Shipment Program may alleviate some of the processing constraints on meat and poultry processors by expanding the market for small processors, giving them the opportunity to market their product to a larger interstate and international consumer base. However, if a greater number of small processing facilities apply for Federal inspection instead, the result may be the same.

Exemptions

There are several exemptions to the inspection requirement for both red meat and poultry, all of which are useful for local markets, especially but not exclusively for direct-to-consumer products.

Custom Exemption

The FMIA exempts from inspection animals that are slaughtered and processed for the household use of the owner, his/her family, employees, and nonpaying guests. Livestock producers legally can use this exemption

to sell a whole, half, or quarter share of a live animal for “freezer meat.” If the whole animal is sold before slaughter (“on the hoof”), it can be slaughtered and processed for the new owner(s) at a custom-exempt facility. The consumer (as the new owner of the animal) pays the processor directly for slaughtering the animal.⁶ The meat must not enter commerce and must meet certain labeling requirements. The custom-exempt slaughter establishment must meet specified regulatory requirements promulgated under the FMIA and the PPIA, including humane handling and sanitation requirements. Neither a Federal nor State inspector is required to examine the animals and carcasses during slaughter or processing at a custom-exempt facility. However, Federal and State food safety personnel do review custom-exempt operations at least annually for compliance with recordkeeping and sanitation requirements. The custom exemption does not allow a farmer to raise an animal “on contract” for a consumer and perform the slaughter himself, unless the farmer has his own custom-exempt slaughter and processing facility that meets Federal requirements.

“On the hoof” sales of wholes, halves, and quarters minimizes marketing costs and resolves many inventory management issues for producers, since meat is marketed in volume and all animal cuts are sold together (Thiboumery and Lorentz, 2009). This also may allow a customer to obtain a lower per-pound price for the product than when buying the same type of meat by the cut in a retail setting. Selling carcass portions also makes it easier for producers to market the traditionally hard-to-sell cuts of the animal with which U.S. consumers are less familiar, such as shank meat, belly, brisket, or shoulder cuts. Shoulder cuts are also known as “picnics.” The customer, however, must have the required freezer capacity available and be willing to prepare cuts from the whole animal. This is not ideal for individuals interested in only certain popular retail cuts.

Poultry Exemptions

Small-scale poultry producers, depending on the State where they farm, can usually qualify for one of several exemptions to process and sell a certain number of birds per year. Two commonly used exemptions are the producer-grower 1,000-birds (per year) limit, usually for on-the-farm sales, and the producer-grower 20,000-birds (per year) limit, usually allowed for retail sales. However, not all States allow these exemptions, and producers in States that do allow them almost always face additional State requirements such as building and sanitation rules, including annual facility inspections, which vary widely by State.

⁶Nonamenable species (e.g., buffalo, rabbit, reindeer, elk, deer, antelope) can also be slaughtered at custom-exempt facilities.

U.S. Livestock Slaughter Capacity and Infrastructure

An evaluation of the current structure of the U.S. meat slaughter and processing industry provides a better understanding of current capacity and possible challenges local meat producers face.

Plant Numbers and Locations

The number of slaughter plants has decreased in recent years. In 2010 there were 841 FI slaughter plants in the United States, down from 910 in 2001. According to the NASS annual *Livestock Slaughter* report, 632 of the FI slaughter plants operating in 2010 slaughtered cattle, 611 slaughtered hogs, and 506 slaughtered sheep or lambs. According to the NASS *Poultry Slaughter* report, approximately 310 plants slaughtered poultry under Federal inspection in 2010.

Geographic areas with the highest number of FI slaughter facilities include the Midwest, California, the Pacific Northwest, Texas, and States along the Eastern seaboard (fig. 1). Much of the beef and pork production in the United States occurs in the Midwest and Southern Plains States, which have a high number of FI slaughter plants. Larger capacity plants are often located in these higher production States to accommodate the slaughter volumes. Interestingly, some States that have very low levels of meat production have numerous FI slaughter plants in their States. Examples include Pennsylvania and New York. The explanation for this might be twofold:

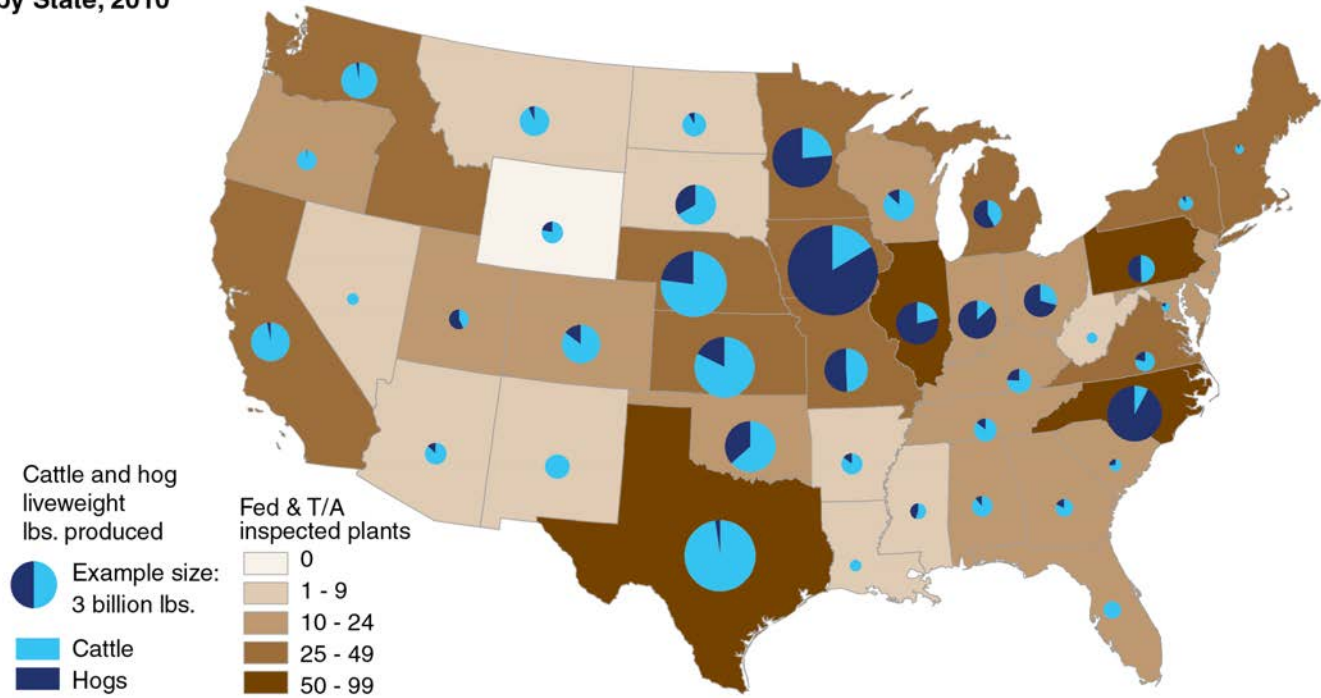
1. The structure of the cattle sector could be partly responsible for the numbers of packers. States with a large number of small dairy or cow/calf operations may see a larger number of small packers in response to the supply of cull animals.
2. There has been a much stronger tradition of small butcher shops and value-added processors in those States than in other areas of the country, and many of these facilities are still in operation. The smaller slaughter plants—primarily working with small-scale producers in the area—may also cater to metropolitan consumers in the region where they or the producers market product across State lines.

In States that have maintained their “equal to” (Federal) inspection programs, livestock production tends to play a major role in agricultural production and is a more integral part of the local or regional economy (fig. 2). In-State demand for processing services may be large enough that a processor need not apply for Federal inspection but still operate an economically viable enterprise. States in the Midwest, Southern Plains, and a few States along the East Coast are examples of this.

Although FSIS data are not complete for custom-exempt slaughter plants, a large number of such plants appear to be located in northern Midwestern States, down into the southern mid-region of the United States (fig. 3). A possible explanation for the density of custom-exempt slaughter facilities in these States may be that these States typically have: 1) greater opportunities

Figure 1

Number of federally inspected and Talmadge-Aiken livestock slaughter plants and meat production by State, 2010

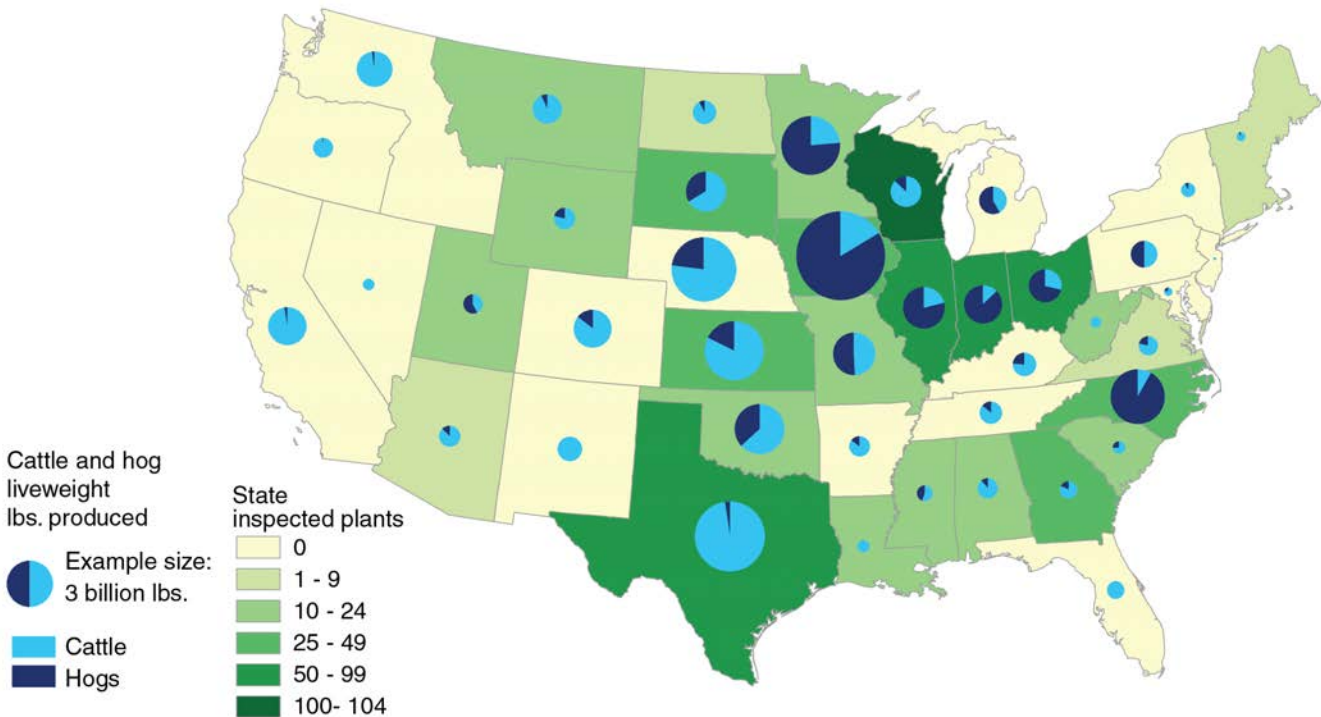


Note: NASS and/or FSIS data are not disaggregated for certain State groupings: Washington and Idaho; Maine, New Hampshire, Vermont, Massachusetts, Connecticut, and Rhode Island; and Delaware and Maryland.

Source: USDA, Economic Research Service calculations using data provided by USDA, National Agricultural Statistics Service *Livestock Slaughter Annual Summary*, 2010 and USDA, Food Safety and Inspection Service.

Figure 2

Number of State-inspected livestock slaughter plants and meat production by State, 2010

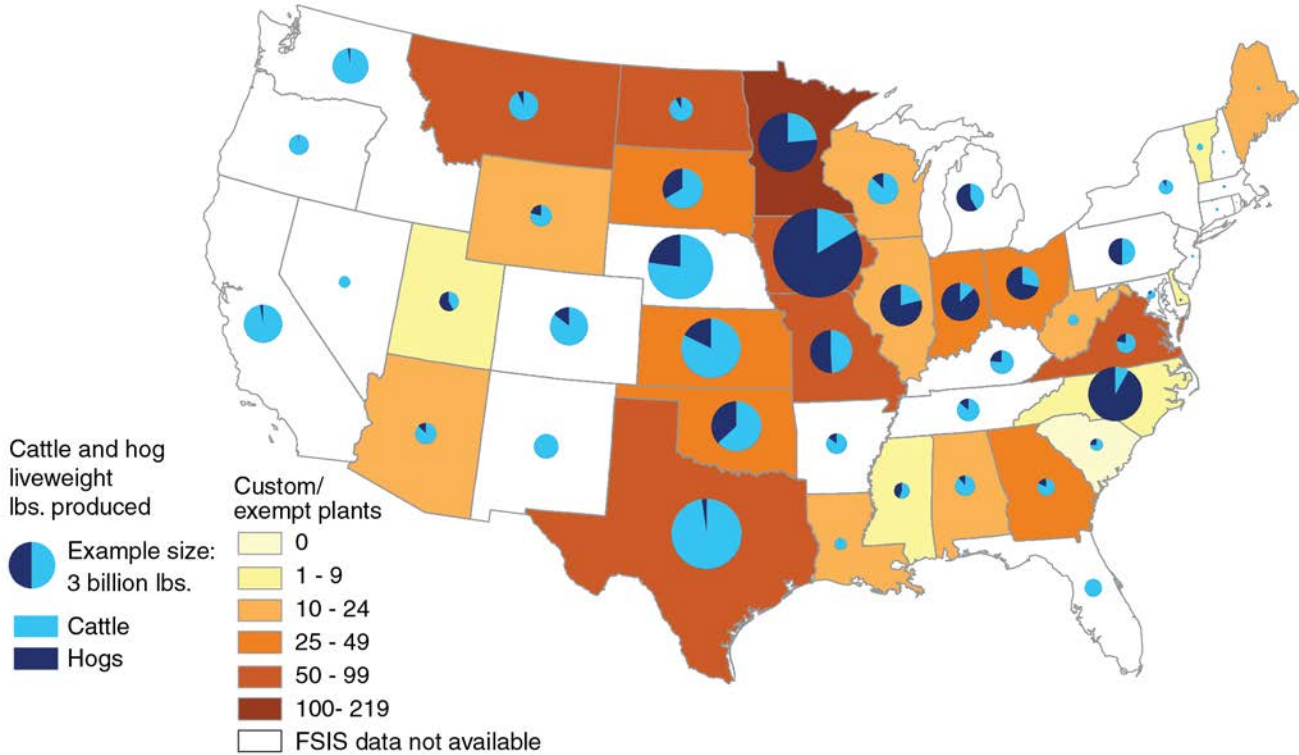


Note: FSIS data are not disaggregated for certain State groupings: Washington and Idaho; Maine, New Hampshire, Vermont, Massachusetts, Connecticut, and Rhode Island; and Delaware and Maryland.

Source: USDA, Economic Research Service calculations using data provided by USDA, Food Safety and Inspection Service, and USDA, National Agricultural Statistics Service.

Figure 3

Number of custom-exempt livestock slaughter plants and meat production by State, 2010



Note: FSIS does not carry custom/exempt slaughter plant data on the 21 continental States that do not maintain their State Inspection programs. NASS production data are not disaggregated for Washington and Idaho. Rhode Island production data are not to scale but were enlarged so as to be visible.

Source: USDA, Economic Research Service calculations using data provided by USDA, Food Safety and Inspection Service, and USDA, National Agricultural Statistics Service.

for hunting, therefore higher demand for game processing; and 2) a consumer base that may have closer relationships with producers, as well as historically a stronger tradition of small butcher shops and value-added processors. Consumers in these States may have more opportunities to purchase animals directly from producers for butchering at a custom-exempt processing facility.

Both consolidation and attrition have occurred in the livestock slaughter sector over the last decade. However, it is unknown whether those plants no longer in operation did or could have handled meats for local markets. The lack of slaughter facilities may not always be the limiting factor for local production; quality retail cutting may be a greater challenge in some areas for local marketers. Retail cutting is more labor intensive and therefore more costly.

Plant Size and Slaughter Volume

Identifying volumes of meat production by slaughter plant size gives an indication of the processing environment in which local meat producers operate. Plants that process the majority of livestock in the United States are often high-volume, technology-intensive operations and are almost exclusively federally inspected. According to USDA/NASS, a small number of plants account for the majority of cattle, hog, and sheep or lamb slaughter. For cattle, 14 plants account for the majority (greater than 55 percent) of U.S. slaughter. Twelve plants account for the majority of hog slaughter, and

4 plants account for the majority of sheep or lamb slaughter.⁷ Additionally, many of these plants are owned by a small number of companies. In many cases, larger processors are vertically integrated and also serve as the retailer or brand-name wholesaler. The majority of slaughter facilities in the United States are small and, all together, account for a minority share of total U.S. livestock slaughter.⁸

As an indication of the number of relatively small cattle slaughter facilities, in 2010, 87 percent of FI slaughter plants each slaughtered fewer than 10,000 head of cattle annually, and 11 percent of the plants each slaughtered between 10,000 and 999,999 head of cattle that year (table 1). Plants that each slaughtered over a million head annually only comprise 2 percent of the total number of U.S. slaughter facilities. The hog slaughter industry is similarly structured: 82 percent of FI slaughter plants each slaughtered fewer than 10,000 head of hogs annually, a little over 14 percent of the establishments each slaughtered between 10,000 and 999,999 hogs a year, and a little over 4 percent of the hog slaughter facilities each slaughtered more than 1 million head annually (table 2).

On average among FI slaughter facilities over the last 10 years, just over 1 percent of cattle were slaughtered in plants that process fewer than 10,000 head of cattle per year, just under 44 percent are slaughtered in plants that process 10,000 to fewer than 1 million head of cattle per year, and 55 percent are slaughtered in plants that process 1 million or more head per year (fig. 4). For hogs, in the past 10 years, on average, less than 1 percent are slaughtered in plants that process under than 10,000 head per year, more than 10 percent are slaughtered in plants that process 10,000 to under 1 million head, and, just over 89 percent of hogs are processed in plants that slaughter 1 million or more head per year (fig. 5).

⁷Yearly data on numbers of FI poultry plants and their sizes are unavailable because of potential confidentiality infringements due to the small number of FI poultry plants in operation.

⁸In this section, small slaughter establishments are considered to be those that process fewer than 10,000 head of livestock annually, medium ones process 10,000-999,999 head annually, and large ones process 1 million head or more annually. However, FSIS categorizes slaughter plants by size based on number of employees: very small establishments have fewer than 10 employees, small establishments have 10 or more employees but fewer than 500, and large establishments have 500 or more employees.

Table 1
Number of federally inspected cattle slaughter establishments by plant size¹

Size	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Small	633	614	597	606	576	558	545	546	551	549
Medium	75	77	77	70	68	64	67	70	68	69
Large	15	15	15	13	13	14	14	14	14	14

¹In this study, small slaughter establishments are considered to be those that slaughter 1-9,999 head of cattle a year, medium—10,000-999,999 head of cattle a year, and large—1,000,000 or more head a year.

Source: USDA, National Agricultural Statistics Service.

Table 2
Number of federally inspected hog slaughter establishments by plant size¹

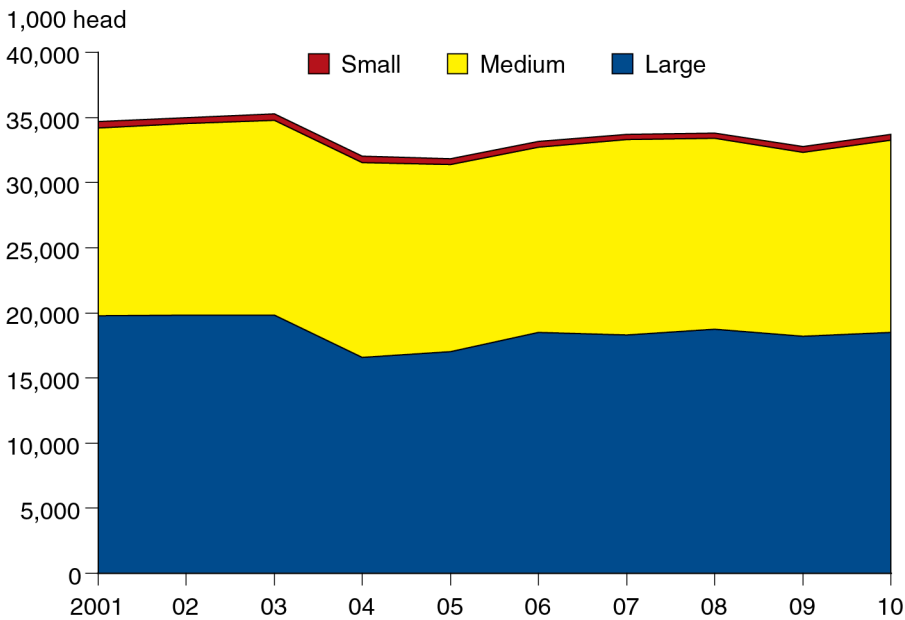
Size	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Small	578	562	538	542	510	498	501	501	500	501
Medium	91	92	96	94	92	88	90	89	88	83
Large	30	29	28	28	28	28	27	28	27	27

¹In this study, small slaughter establishments are considered to be those that slaughter 1-9,999 hogs a year, medium—10,000-999,999 hogs a year, and large—1,000,000 or more hogs a year.

Source: USDA, National Agricultural Statistics Service.

Although total U.S. slaughter plant numbers have consolidated in the past decade, total numbers of livestock slaughtered have only slightly declined for cattle (-2.8 percent) and have increased for hogs (13.6 percent) over the same time period. Among small-sized plants, the number of livestock slaughtered from 2001 to 2010 has decreased by 12.5 percent for cattle and decreased 10.1 percent for hogs. As tables 1 and 2 show, the total number of small-scale livestock slaughter facilities has declined over the past 10 years, as have slaughter volumes at small-sized plants—the same facilities in which local producers typically process livestock. No time series data are available for poultry slaughter establishments, but data at a snapshot in time have been provided for comparison purposes (table 3). These data lend evidence to support the discussion that there are, to some extent, supply side constraints for local meats. These data should not be construed as demonstrating a lack of demand for local meats which, particularly in regard to direct-to-consumer sales, has been increasing in recent years (USDA/NASS, Census of Agriculture, 2007).

Figure 4
Number of FI cattle slaughtered by plant size¹

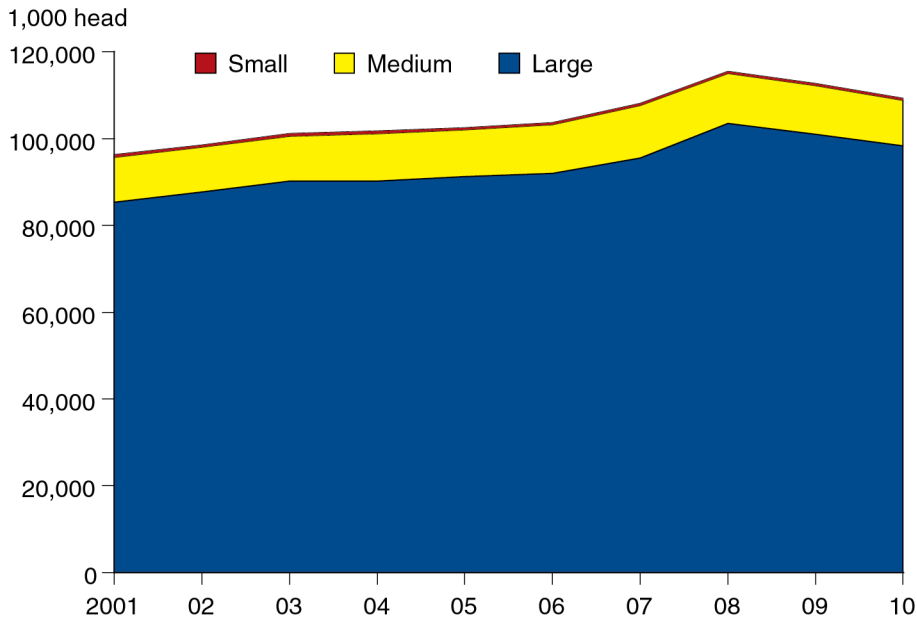


¹Small slaughter establishments slaughter 1-9,999 head of cattle a year, medium slaughter establishments—10,000-999,999 head of cattle a year, and large slaughter establishments—1 million or more head a year.

Source: USDA, National Agricultural Statistics Service.

Figure 5

Number of FI hogs slaughtered by plant size¹



¹Small slaughter establishments slaughter 1-9,999 hogs a year, medium slaughter establishments—10,000-999,999 hogs a year, and large slaughter establishments—1 million or more head a year.

Source: USDA, National Agricultural Statistics Service.

Table 3

Number of federally inspected poultry slaughter establishments by plant size¹

Size	Number ²	Percent
Very small	38	17.3
Small	47	21.4
Large	127	57.7
Not available	8	3.6
Total	220	100.0

¹For poultry, very small slaughter establishments are considered to be those that have less than 10 employees, small— 10-499 employees, and large—500 or more employees.

²For poultry slaughter establishments, data for only a snapshot in time are available. The dates 10/1/2011 to 3/28/2012 were arbitrarily chosen to present a general sense of distribution of poultry slaughter establishment sizes.

Source: USDA, National Agricultural Statistics Service.

Geographic Distribution of Small-Scale Slaughter Facilities

In 2009, USDA's Rural Development agency identified areas in the United States where small livestock and poultry operations are concentrated and where there is a lack of small slaughter establishments in their vicinity (both federally and State-inspected). Small and very small slaughter establishments are defined as having less than 500 employees. Livestock/poultry operations are considered to be small if the annual income from livestock sales is \$250,000 or less and are identified based on the 2007 Census of Agriculture. Figures 6-8 depict areas where there is a gap in small-scale slaughter establishments relative to numbers of livestock operations. The maps (figs. 6, 7, and 8) indicate where counties are located that contain: 1) a number of small producers equal to or greater than the approximate median for that species per county, and 2) there is no slaughter plant.⁹

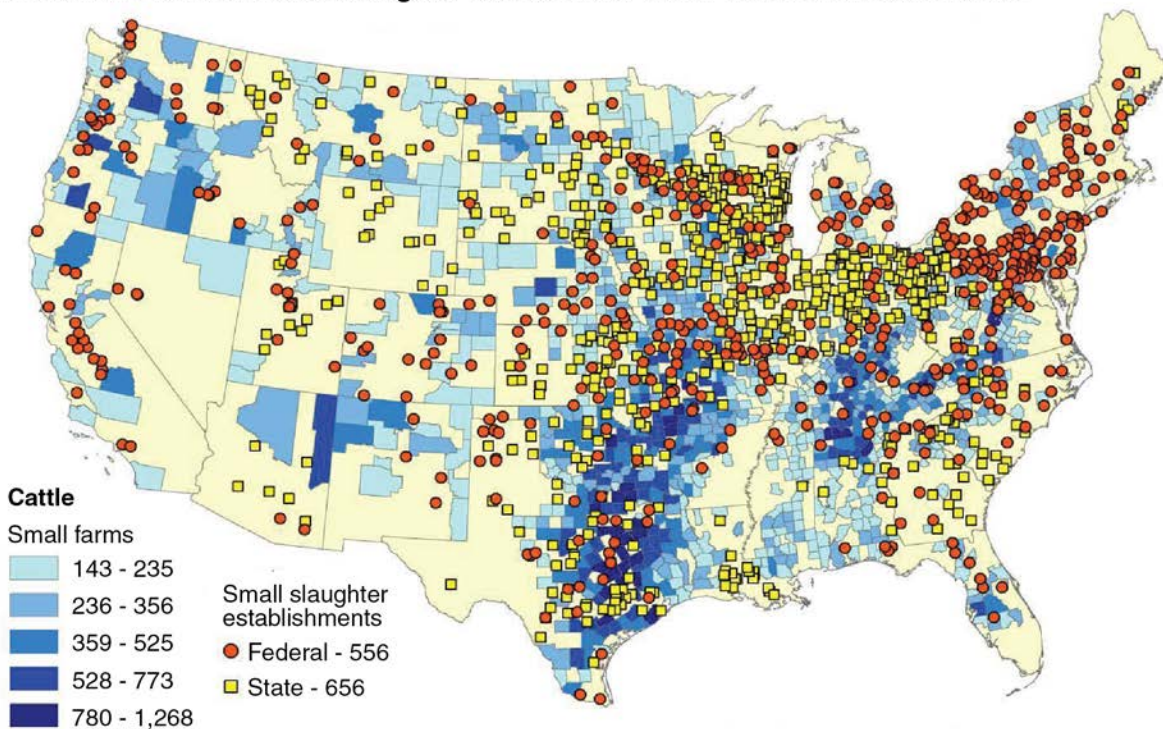
For cattle, lack of small slaughter facilities in relation to large numbers of small farms is evident across central Texas and into Oklahoma, Arkansas, and Missouri; areas of the Southeast along the Appalachian Mountains; and numerous counties in the West (Arizona, Washington, Oregon) (fig. 6).

Concentrations of small hog operations in areas lacking small slaughter facilities are located in some areas of Washington, Oregon, California, and

⁹The median level of small producers per county in the United States is 143 for cattle, 11 for hogs, and 4 for chickens.

Figure 6

Counties with no small cattle slaughter facilities and 143 or more small cattle farms¹



¹143 is the median number of U.S. cattle farms per U.S. county. Small slaughter establishments are defined as having less than 500 employees. Small livestock/poultry farms are defined as having \$250,000 or less in annual income from livestock sales.

Note: Alaska and Hawaii are not shown as they have no counties with 143 or more small cattle farms and no small cattle slaughter facilities.

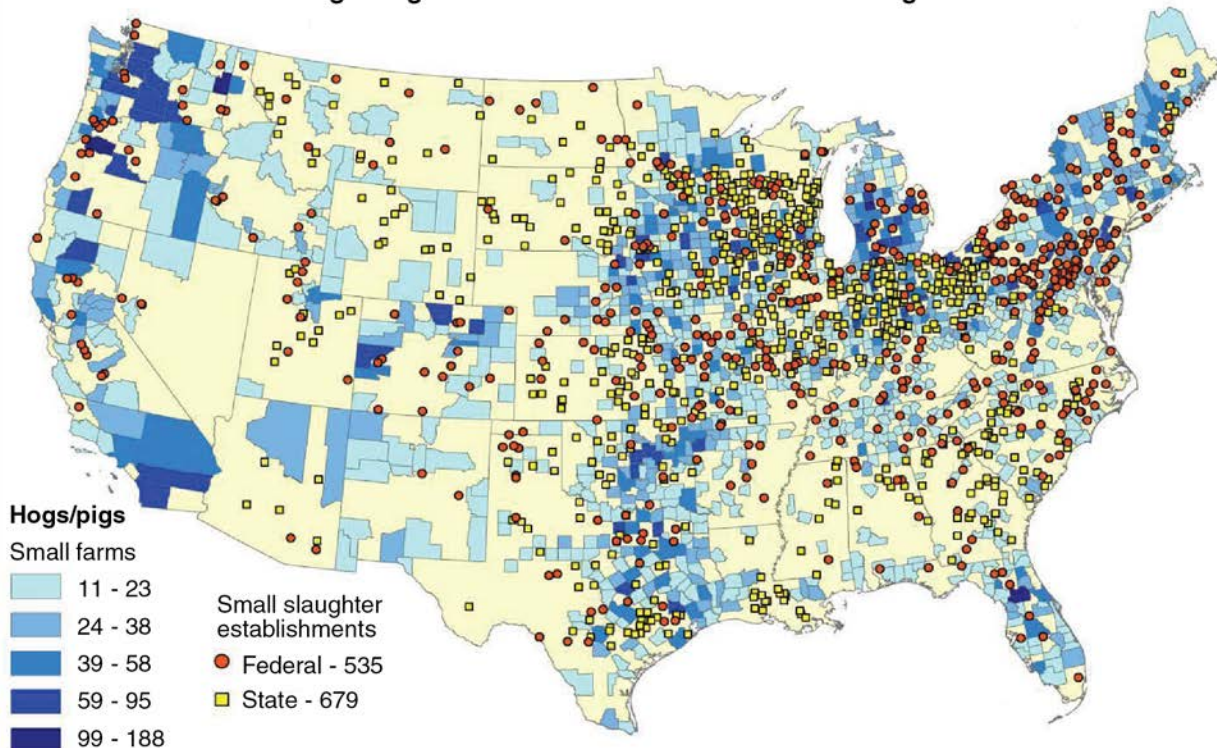
Source: USDA, Food Safety and Inspection Service (FSIS). Farm size is based on the 2007 Census of Agriculture, conducted by USDA, National Agricultural Statistics Service. Slaughter establishment data are for 2010 from USDA/FSIS.

Colorado (fig. 7). Although there are numerous small slaughter facilities throughout the Midwest, there are many counties in Minnesota, Wisconsin, and Michigan, as well as in Oklahoma and Texas, with relatively high numbers of small hog farms but no small slaughter facilities. In New York and many of the New England States, where there are few State-inspection programs, counties with concentrations of small hog operations and no small slaughter facility are apparent. However, interest in local marketing among small hog operations may not be enough to sustain a small facility.

Counties where there are larger numbers of small poultry farms and no small slaughter facilities are primarily situated in the upper northeast quadrant of the United States as well as Minnesota-Wisconsin-Michigan, and the Pacific Northwest (fig. 8). As over 99 percent of the total U.S. slaughter for any species of poultry is under FI, and considering that most poultry production is under contract with a larger integrator, it is not surprising that there are few small, inspected poultry slaughter establishments. This is somewhat alleviated by the fact that in many States, small poultry producers can process their own birds for retail sale under one of the Federal poultry processing exemptions. Yet as noted earlier, State-level regulations can be more restrictive; also, the largest exempt operation allowed is 20,000 birds per year; to process and sell more than that requires State or Federal inspection.

Figure 7

Counties with no small hog slaughter facilities and 11 or more small hog farms¹



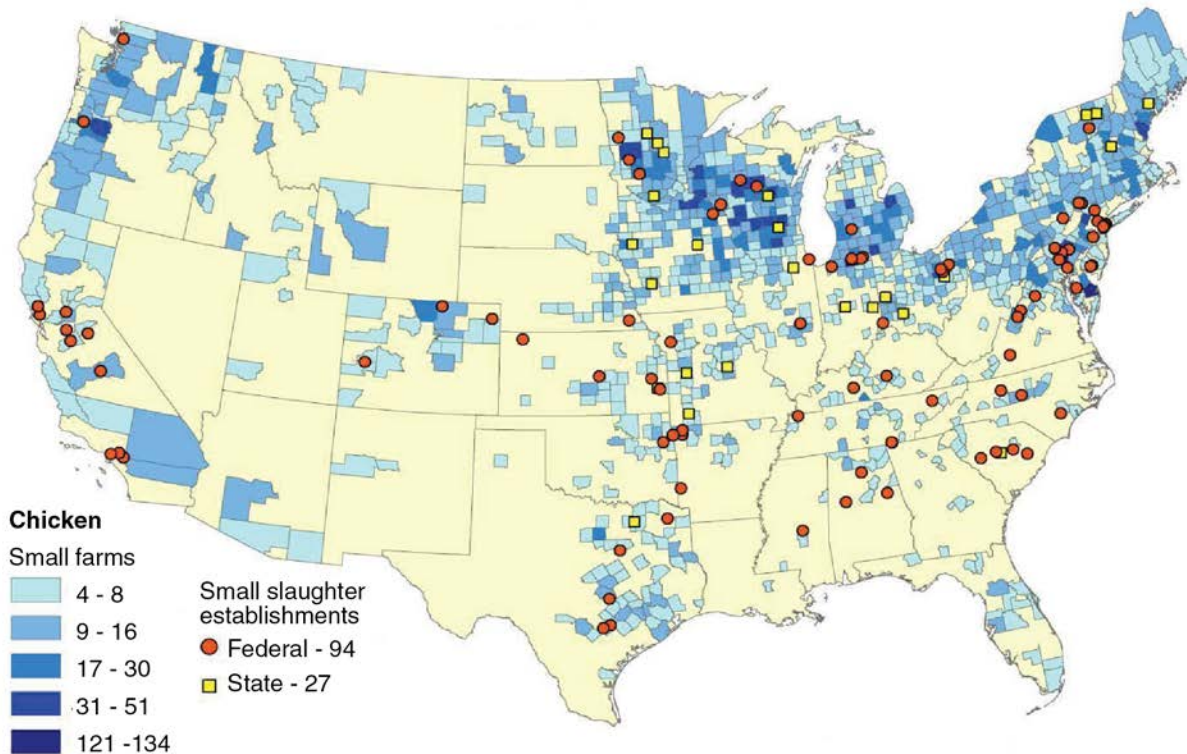
¹11 is the median number of U.S. hog farms per U.S. county. Small slaughter establishments are defined as having less than 500 employees. Small livestock/poultry farms are defined as having \$250,000 or less in annual income from livestock sales.

Note: Hawaii is not shown as it has no counties with 11 or more small hog farms and no small hog slaughter facilities. Anchorage County and the Kenai Peninsula in Alaska both have 11 - 23 small hog farms and no small hog slaughter facility.

Source: USDA, Food Safety and Inspection Service (FSIS). Farm size is based on the 2007 Census of Agriculture, conducted by USDA, National Agricultural Statistics Service. Slaughter establishment data are for 2010 from USDA/FSIS.

Figure 8

Counties with no small chicken slaughter facilities and 4 or more small chicken farms¹⁴



¹⁴ is the median number of U.S. chicken farms per U.S. county. Small slaughter establishments are defined as having less than 500 employees. Small livestock/poultry farms are defined as having \$250,000 or less in annual income from livestock sales.

Note: Hawaii County, Hawaii and Anchorage County, Alaska both have 4 or more small chicken farms and no small chicken slaughter facilities.

Source: USDA, Food Safety and Inspection Service (FSIS). Farm size is based on the 2007 Census of Agriculture, conducted by USDA, National Agricultural Statistics Service. Slaughter establishment data are for 2010 from USDA/FSIS.

Implications of the Data

Many producers marketing directly to local outlets typically have smaller operations, raising fewer animals than larger operations that sell into conventional, commodity markets. These small, locally focused producers can perceive a lack of local slaughter capacity as a major impediment to the vitality and profitability of their operations. Lack of nearby slaughter facilities can create logistical impediments to animal slaughter, particularly in being able to transport animals/meat to and from the slaughter plant in a financially practical way.

The data reviewed above confirm that most inspected plants are small and process only a small amount of U.S. livestock, but access to inspected processing facilities of the appropriate scale is uneven across the country for small producers—those more likely to sell meat and poultry into local markets. It is important to note, however, that the presence of small livestock operations does not necessarily indicate demand for inspected processing. Many small livestock farmers and ranchers may not wish to participate in local markets. There may be a perception that there is demand for a small slaughter establishment in a particular area, but this could be due to a misperception between perceived and real demand. Furthermore, even if real demand appears to exist in a county, that demand may not be sufficient

for a small slaughter establishment to be viable. There may not be enough producers willing to process enough animals at a high enough price to support the fixed and operational costs, especially for labor and equipment, of even a small facility.

A recent capacity assessment of New England's large animal slaughter facilities revealed there to be sufficient infrastructure to slaughter most of the livestock produced in that region, but only a relatively small percentage of the existing capacity was being utilized. Lewis and Peters (2011) found a lack of processing (cut-and-wrap) facilities, however, to be a pressing constraint. Primary constraints faced by existing slaughterhouses in New England, for example, were a shortage of skilled labor and the seasonality of the livestock industry, which has periods of very high and low demand. While it is true that there are fewer small, inspected slaughter and processing plants operating now than in the past, it is not clear how many new facilities the local meat sector can support.

Further, processors often cite a lack of consistent supply as a reason that they are unwilling to undertake the financial risks of expansion in areas with smaller producers. As noted above, the largest processors don't handle livestock from smaller, independent producers on a fee-for-service basis because of a mismatch of scale, business model, and services. Thus, in cases where there is a larger slaughter plant located conveniently near numerous small-scale producers, slaughtering livestock at the facility may not be feasible. The largest slaughter plants are most commonly vertically integrated and also serve as the brand-name wholesaler. Thus, they do not provide a fee-for-service rate to any independent producer, large or small. Smaller producers are often unable to achieve uniformity across animal size and number because they typically can't capture economies of scale by pooling larger lots of uniformly sized animals together. Larger slaughter facilities also cite biosecurity issues (infectious disease transmission, traceability, etc.) that might arise from accepting product from small-scale producers. For example, larger producers are more likely to follow strict biosecurity protocol whereas many smaller producers do not have the resources or organizational capacity to enforce such a plan (e.g., Crutchfield et al., 1997). Many larger plants who might consider working with small livestock producers won't find it financially feasible to break the carcass down further than subprimal cuts. Large plants that do retail cutting typically sell the product under their own label. If they were to process small batches of custom product, they would find it labor-intensive and a potential conflict of interest.

Given the mismatch between smaller producers and larger plants, many individual producers marketing their meat via niche marketing arrangements must rely on smaller facilities, wherever they are located. Many producers may prefer to use a smaller slaughter and processing facility not only to keep in line with the local foods systems concept but also because a smaller plant is likely to be more flexible in satisfying the producer's individual processing requests. Some potential strategies include the use of mobile slaughter units and the development of local and regional market aggregators.

Mobile Slaughter Units

In response to demand for additional processing capacity for local meats, existing facilities have adjusted and expanded, new facilities have been built, and new facility configurations have been developed, including inspected mobile slaughter units (MSUs). A mobile slaughter unit is defined by FSIS as “a self-contained slaughter facility that can travel from site to site.” While MSUs have grown in number in recent years, there still are very few. MSUs are suitable for use by small-scale livestock and poultry producers who are situated in remote or sparsely populated areas where there is no access to a slaughter facility and where getting their animals to such a facility would be prohibitively expensive, particularly in transportation costs.

When a MSU is used, animals do not have to be transported to a slaughter facility, but instead the Federal inspector travels with a mobile unit that has appointments at either individual farms or local central gathering points where animals are slaughtered on site. Transportation costs are shifted from the producer to the MSU. Therefore the fee charged by the MSU must be structured so that the MSU can absorb those costs. Red-meat MSUs can typically slaughter 5-10 head of cattle, 10-25 hogs, or 10-40 sheep per day, though the total may be limited by cooler space on the unit. Red-meat MSUs can also only slaughter for two consecutive days, after which they must return to a cut-and-wrap facility to offload the carcasses. Mobile poultry processing units have a slaughter capacity of up to 500 birds per day. There are currently 10 inspected red-meat units and at minimum 9 poultry MSUs in operation in the United States (Niche Meat Processor Assistance Network, 2011). All but one of the red-meat MSUs operate under Federal inspection; the other is State-inspected. All but one the poultry MSUs operate under one of the poultry processing exemptions; the other is State-inspected. It is not yet clear how many of these MSUs are profitable or at least breaking even; the lower upfront and operating costs of poultry MSUs may make them a little more financially viable than their red-meat counterparts. The capital investment for MSU construction tends to be lower than for a small, fixed slaughter facility and, as opposed to a typical fixed facility, MSUs typically face less resistance from municipalities and community members.¹⁰

Requirements for mobile slaughter units for red meats are different than those for poultry. Beef carcasses, for example, need an adequately sized cooler to keep them properly chilled during transport back to the cut-and-wrap facility. Slaughtered poultry can be put in a cooler at the farm where the MSU is used. Mobile slaughter units also require a cut-and-wrap facility for breaking the carcasses and fabricating them into packaged cuts. Large equipment is necessary to handle larger carcasses that can be up to half a ton. The slaughter operation must also handle animal byproducts, which add up to a sizable volume. Animal byproducts (edible offal and inedible offal, hides and skins, blood, fats, and tallows) include all parts of a live animal that are not part of the dressed carcass. Some States allow on-site composting of offal while others do not. Offal constitutes an estimated 30 percent of the live-weight of a hog and about 44 percent of the liveweight of cattle according to industry averages (Marti, Johnson, and Mathews, 2011).¹¹

¹⁰The FSIS mobile slaughter unit compliance guide is available online at: http://www.fsis.usda.gov/PDF/Compliance_Guide_Mobile_Slaughter.pdf. For more information on MSUs, including regulatory compliance information, costs of operation, case studies, and videos of the MSU slaughter process visit the Niche Meat Processor Assistance Network, sponsored in part by USDA, at <http://www.extension.org/pages/19234/mobile-slaughterprocessing-units/>.

¹¹The specific byproduct levels may vary for niche market producers due to varying production methods. Industry dressed-weight averages, as a percentage of live weight, are 60 percent for cattle and 75 percent for hogs. Hides have value even in small numbers and can be sold.

Although MSUs can enable the growth of small livestock producers marketing product directly to consumers or into other marketing channels, there are also disadvantages, often in the form of lost efficiencies. Slaughter costs per pound using a MSU are higher than they would be at a larger, fixed facility, since economies of scale, or the ability to spread resource costs (such as labor, overhead, or transportation) over a larger product volume, are lost. Consequently, more inputs are required per pound of meat produced and marketed.

MSUs may not only have fewer animals but also fewer pounds of meat per animal over which to spread their fixed and operating costs. For example, it is fairly common for local beef to also be grass-fed and -finished. Grass-finished beef carcasses may be on average 145 pounds lighter than conventional, grain-finished carcasses (Bennett et al., 1995). Additionally, offal from the animal is commonly a revenue source for larger slaughter facilities: inedible offal is transported under some arrangement either to a rendering/tanning facility for further processing. Edible offal can be further processed at the slaughter facility itself, or sold to a different processor, for use in pet foods, processed meats or variety meats products (Marti, Johnson, and Mathews, 2011). MSUs, like other small plants, often forgo some of all of the revenue normally recovered from byproduct sales under typical slaughter arrangements; the MSU may also incur additional expenses for proper disposal.

Biosecurity issues may also pose a risk with MSUs. A potential danger for the farm, from a biosecurity standpoint, might occur if animals from other farms were transported to the host farm and slaughtered and then waste materials from those animals were being disposed of on the host farm. However, the extensive cleaning and disinfecting required by the MSU's Standard Sanitation Operating Procedures (SSOP) and HACCP procedures greatly reduces the risk of cross-farm contamination. It should be no more likely that disease spread would occur from the MSU moving from one farm to the next than the risk associated with any other vehicle that visits multiple farms, such as a feed truck.

Other Strategies: Local and Regional Aggregation

New configurations of physical infrastructure, such as MSUs, may be helpful in some circumstances in bringing more local meat to market. Slaughter is not the only constraint. In some regions, producers have access to inspected slaughter but have difficulty finding inspected cutting and packaging services of the desired quality. In such cases, if existing facilities cannot adapt, a cut-and-wrap facility that focuses on the needs of local marketers may be warranted.

Yet if the goal is to satisfy consumer demand for local meat by increasing volumes of local meats in local markets, other strategies on the production and marketing side may be important. For example, aggregation is proving useful: producers who raise animals to the same set of protocols (e.g., for a specific local/regional brand) can collectively provide a small- or mid-scale processor with more steady, year-round business. These brands may be formal cooperatives that producers co-own or independent companies run by a marketer who identifies and sources from co-suppliers on a "commodity-plus" pricing system.

However they are structured, these kinds of scaled-up enterprises are valuable to small- and mid-scale processors, because they can become “anchor” customers, assuring a regular proportion of business and revenue. Both processors and their customers can benefit from economies of scale, particularly with regard to collection and sales of byproducts, as well as with efficiencies gained from using the same cutting instructions for larger batches of carcasses. Steady, consistent throughput can give processors the financial base needed to keep and cultivate a skilled workforce year-round, to invest in facility and equipment upgrades, and generally be available for local producers.

MSUs, aggregation, and additional innovations and strategies to improve access to processing for local meats, including those specific to processors and those related to the broader supply chain, will be discussed in a future ERS report.

Outlook and Conclusions

Although small in absolute volume, sales of foods sold via direct-to-consumer marketing have more than doubled over the last decade (USDA/NASS, 2007 Census of Agriculture). However, direct-to-consumer and intermediated sales of livestock products have not grown as rapidly as other food categories, despite apparent demand. Local producers continue to perceive a lack of local slaughter capacity as a hindrance in trying to meet growing demand. At the same time, small processors cite a lack of throughput: they need enough predictable, year-round business to keep skilled workers and expensive equipment utilized.

Currently, the vast majority of livestock and poultry slaughter in the United States is done in a relatively small number of very large facilities. The industry has continued the trend of plant consolidation and growth among larger capacity operations. Slaughtering animals at smaller State-inspected plants can also limit the marketing potential and expansion of local producers since they are restricted to intra-State commerce. As of June 2012, no States yet participate in the Cooperative Interstate Shipment Program, which would allow shipments across State lines. Three States, Ohio, Wisconsin, and North Dakota, are in various stages of development and training to be eligible to participate in the program.

Regions of the United States that seem particularly deficient in local slaughter capacity are Texas, Oklahoma, Arkansas, Missouri, around the Appalachian Mountains, and scattered counties throughout the West, in the case of beef; the west coast, Colorado, the northern Midwest States, parts of Oklahoma and Texas, and many of the New England States in the case of pork; and the upper northeast quadrant of the United States as well as the Upper Midwest and the Pacific Northwest in the case of poultry. However, it is important to note that these apparent spatial gaps do not necessarily indicate that small slaughter facilities are warranted or would be economically viable in those regions.

New methods for animal slaughter and processing geared toward local markets, for example, mobile slaughter units (MSUs), can help meet some of the need for increased slaughter capacity in localized areas and enable the growth of small livestock producers marketing products to consumers in their region or community. Although MSUs may provide an opportunity for producers marketing locally sourced meat products, their small scale can also compromise the cost-effectiveness of the slaughter process, since more inputs are required per animal relative to larger fixed slaughter plants. Given the current slaughter capacity and the number of units in operation now, the extent to which MSUs can facilitate growth in local markets may be marginal in the short term.

Limited access to Federal and State-inspected slaughter facilities continues to be challenging for locally marketed livestock and meat products in some parts of the United States. However, growth in small-scale slaughter, cut-and-wrap, and processing facilities depends on whether producers in need of these services can provide enough throughput, for enough of the year, and pay a high enough fee for the services to make such facilities economically viable.

The small-scale characteristics of operations that produce, slaughter, and process locally sourced meat and livestock products inhibit the producer's and processor's ability to benefit from economies of scale. Innovations along the supply chain, such as more efficient distribution for local foods, including meat, and strategies to reduce high margin requirements from retailers would likely facilitate marketing. These innovations and others are in development and currently functioning in some regions of the United States. But expansion of the local meat sector will continue to depend on the willingness of consumers to pay premiums high enough to absorb the costs associated with the particular production program, processing, and the remainder of the supply chain. Consequently, the ability of this market to grow depends on the sector's capacity to broaden its consumer base in order to generate more consumer demand. This in turn depends on public perceptions about the value of local meat.

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