Assessing Maryland’s Cattle Slaughter Capacity: 
An Examination of Analysis Methods for Agricultural Data

BACKGROUND

In an attempt to boost regional economies and ensure greater food security, some in the food sector are working to examine the viability of regional food systems. As part of this inquiry, some researchers have started to assess the capacity of states or regions to meet their own food needs, including the slaughter and processing of livestock raised in the area.

This analysis examines the geographic distribution of cattle production and slaughter facilities within Maryland as a means of assessing state-level slaughter capacity for farmers who are selling their beef regionally. The analysis was conducted at the request of Johns Hopkins Center for a Livable Future and is based off a similar assessment by Columbia’s Urban Design Lab (UDL).

METHODOLOGY

To assess the capacity of Maryland slaughter facilities to service cattle farms selling within the state, network analysis was performed using point location for the 17 cattle slaughter facilities, road data and point locations for 189 cattle farms that sell their beef in MD. Thirty and sixty minute drive time service areas were created around each slaughter facility (time selection based on the UDL analysis). A buffer map was also created with 15, 30, 45 and 60-mile break points to demonstrate the importance of conducting drive time as opposed to Euclidean distance service area analysis when determining coverage of a business.

For those farms not within the one hour service area, a network analysis was performed to show the shortest driving route (by time) from each farm to the closest slaughter facility. Median centers were also produced for these farms (one in the southern counties and one on the Eastern Shore) to determine the point representing shortest Euclidean distance to all farms in the service area. These calculations can be used for assessing aggregation strategies for farms outside the service areas.

A series of maps were created to show the distribution of beef cattle across the state by county using three different categories (cow/calf inventory, cattle on feed and cattle sold for slaughter). This data was gathered from the 2007 National Agricultural Census (NASS) and is not comprehensive for each county.

BEEF CATTLE IN MARYLAND

SLAUGHTER CAPACITY ASSESSMENT

DATA LIMITATIONS

- Farm-level data
  Geospatial analysis of farm production in the United States is challenging because of limited data availability. Due to privacy concerns, there is no farm-level data through NASS and counties with small levels of production also typically lack data. This poses a challenge for accurately representing the density of cattle production.

- Alternative livestock systems
  Assessing the production levels and slaughter capacity for alternative livestock systems poses another limitation for analysis. NASS collects data on cattle raised on feed (mostly in feedlots), but does not track numbers for cattle raised on pasture. This makes determining how well slaughter facilities are serving grass-fed producers challenging.

- Tracking cattle numbers
  Following the path of cattle through the production chain is difficult. NASS provides numbers for cow/calf operations, which are much higher in MD than cattle on feed or cattle sold for slaughter. This suggests many more cows are born in MD than are brought to full weight and slaughtered in state. Many cows born in MD are likely sent to other states in the Northeast or Midwest for backgrounding, finishing and slaughter. Given the gap between the number of cattle slaughtered yearly by the MD facilities and the number sold for slaughter, it is safe to assume that many of the cows slaughtered in MD facilities are from other states.

CONCLUSIONS

The drive time analysis demonstrated that there are 10 southern and Eastern Shore counties in the state either partially or entirely outside any of the one-hour service areas for cattle slaughter facilities. While the bulk of cattle production (based on 2007 NASS data) is in the northern part of the state, where most of the slaughter facilities are, there are still significant areas of cattle production that lack adequate proximity to facilities.

According to slaughterhouse managers in the state, the problem is not one of capacity to handle the number of Maryland cattle slaughtered in state (Table 1), but rather an issue of proximity to services. Instead of putting in additional facilities, it would make more sense to aggregate transportation of cattle from farms outside of service areas (using median center and closest facility calculations) so as to reduce drive time.

The summary for drive time analysis (Table 2) shows that the minimum average drive time to each slaughter facility ranges from 70-219 minutes. The three facilities with the shortest average drive time are also the facilities with the largest capacity, suggesting that they are well located to service many of the farms used in this analysis. Two of the three slaughterhouses found in the closest facility analysis are also the facilities with by far the largest capacity in the state, which means they would likely be the best suited for taking on additional clients.

Finally, to more accurately assess Maryland’s capacity to process grass-fed livestock produced within the state, more research should be done to assess production levels and slaughter and processing needs of small to mid-sized farms.