Who’s Got Beef? Spatial and Temporal Vulnerabilities in the Regional Self-Reliance of Grazing Land in the Beef-Belt, USA.
Tori Wong | UEP 294 | Fall 2017

FEEDING U.S. BEEF
Regional self-reliance (RSR) measures the capacity of a region’s agricultural production to meet its consumption needs. RSR is particularly important in the U.S. livestock sector, where production systems have become increasingly geographically concentrated in addition to the corporate consolidation that characterizes the sector.

BEEF PRODUCTION IN THE U.S. IS BIJCUCATED: THE U.S. BREEDING HERD IS PRIMARILY GRAZING-BASED (AND THEREFORE DIRECTLY LINKED TO A SPECIFIC LOCATE), WHILE THE FINISHING PHASE IS BASED IN FEED YARDS WHICH RELY ON CONCENTRATED SOURCES OF ENERGETIC AND PROTEIN LIKE CORN AND SOY, WHICH CAN BE TRANSPORTED AT RELATIVELY LOW COST.

METHODS
To estimate regional production and consumption needs, spreadsheets were created to organize temporal county data on: 1. Land area of pasture and grazing lands, 2. Yield outputs of major feed producing per acre of land, and 3. Population estimates of each stage of beef cow between 2002 and 2017. These data were then combined with cattle feed demand estimates through each stage of the breeding phase of the lifecycle as reported by a livestock feed needs model developed by Peters et al. 2014.

For this study, RSR represents a measure of total crop output and land area for pasture and grazing divided by aggregate beef livestock feed demand in the area of interest, expressed as an average or proportion.

RESULTS AND DISCUSSION
Based on the data available, this map and analysis found that no counties in the Beef-Belt are currently meeting 100% of their cattle grazing needs. Since acres of pasture and grazing lands are attached to a fixed location and can’t be shipped, low production rates and supply disruptions (like extreme weather) can’t be remedied with imports of land area.

Cattle may be walked or transported short distances to neighboring pasture for grazing, but rental rates for this type of land in the Beef-Belt are extremely volatile, varying year to year depending on weather conditions and demand. Renting pasture remains a high risk for ranchers, therefore, it is preferable to meet all feed needs on local land.

In this analysis, vulnerability indices are identified as those that consistently meet only a low average of the region's cattle's feed needs and are consistently surrounded by other counties meeting a low percentage of needs in the 15 year time period of interest. This map identifies two clusters of counties between 2002 and 2017 that have been consistently been at high risk of supply chain vulnerabilities:

1. Donley, Briscoe, Casor, Gray, Hemphill, Wheeler, Armstrong Counties in TX.
2. Clark and Meade in Kansas and Beaver in OK.

The map below summarizes the location categories of the Local Outlier Analysis:

CONCLUSION AND LIMITATIONS
One possible explanation for the overall low RSR of pasture and grazing land in the Beef-Belt is that farmers often graze cattle on lands where crops are previously harvested. USDA does not record data on this kind of dual-use land, so these lands may have been categorized as cropland rather than pasture and grazing land in the Census of Agriculture data that was used in this analysis. Because of other limitations in the data, many assumptions were made. It is assumed that all pastureland in the Beef-Belt is used to feed cattle, when actually, a number of other grazing livestock may also be competing for land-use.

In the Census of Agriculture, some production data is withheld to avoid disclosing information on individual farms. This data limitation occurred in 19 of the 55 counties for pasture and grazing land area, and 10 of the 55 counties for cattle inventories. As a proxy for estimating yield outputs in these counties, the total number of farms in the cross-county-aggregated region was multiplied by the average state yield for the specific crop (average state yield = total quantity of crop in state / total number of crop farms in state as reported in the Census). More accurate data on land area and cattle productivity would likely alter the results of this analysis.

SOURCES

Prepared in collaboration with USDA/ERS.

LITERATURE SOURCES:

[References and data sources are cited here.]

Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy.

Tufts University.