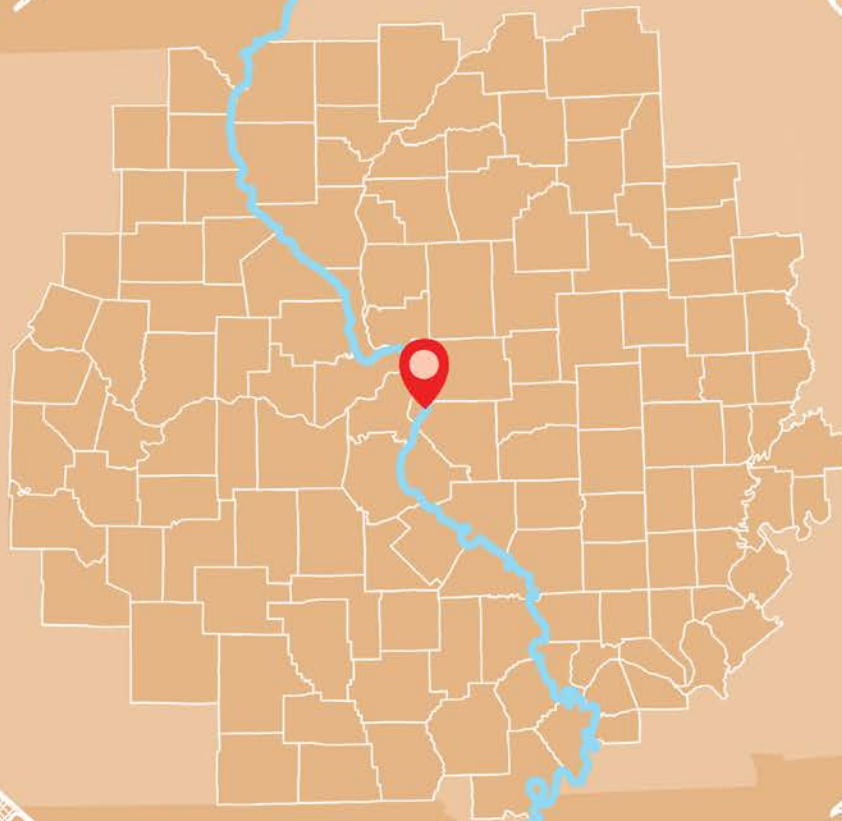


MISSOURI COALITION FOR THE ENVIRONMENT

SAINT LOUIS REGIONAL



FOOD STUDY

2019

The Missouri Coalition for the Environment is grateful for the valuable support of its many individual and foundation donors who make our work possible. Thank you.

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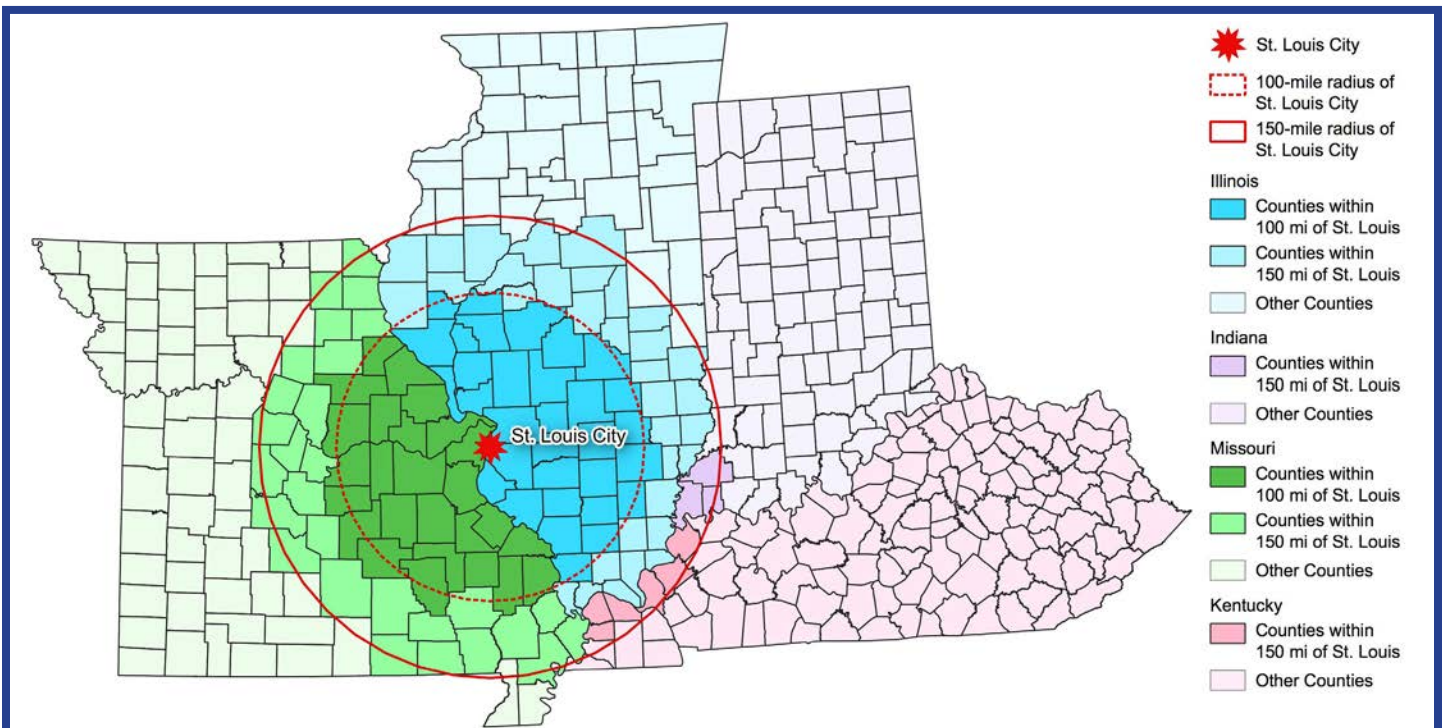
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CHAPTER 1

The People of the St. Louis Regional Foodshed: Population, Location, and Employment

The St. Louis Regional Foodshed spans the 150-mile radius of St. Louis City which produces much of the food directly feeding our region. The Foodshed radius encompasses 129 counties across four states¹—Missouri, Illinois, Indiana, and Kentucky—and has

been expanded from the 100-mile radius used in Missouri Coalition for the Environment's (MCE) previous Foodshed study to better understand the relationship between our land, our environment, our food, our health, and our economy within our region.



MAP 1-1

ST. LOUIS REGIONAL FOODSHED RADIUS EXPANSION, 2019

In 2017, over 6 million individuals lived within the St. Louis Regional Foodshed.²

The “urban core” of the region contains the Missouri counties of St. Louis City, St. Louis County, St. Charles, and Jefferson, and the Illinois counties of Monroe, St. Clair, and Madison. These urban core counties are home to 37% of the Foodshed’s population.

The St. Louis Regional Foodshed contributed 89,902 farms³ to the food

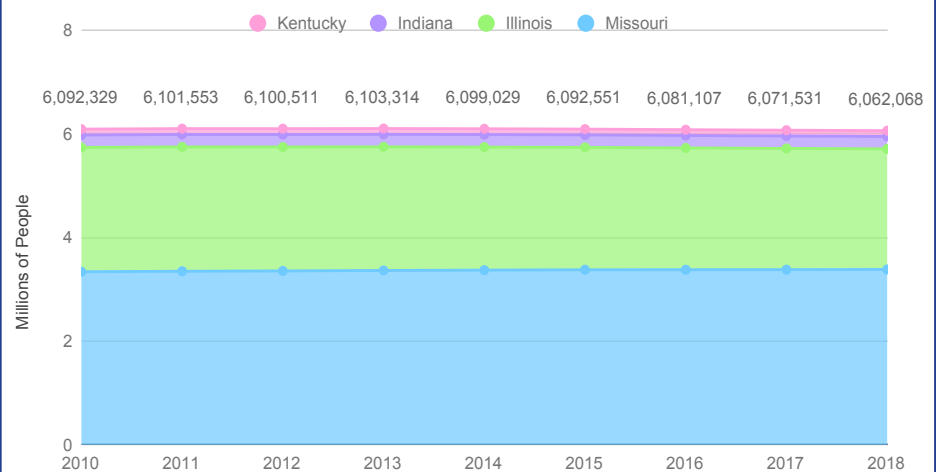


FIGURE 1-1

FOODSHED POPULATION, 2010-2018*

*Only includes data from state counties within St. Louis Regional Foodshed

system in 2017. A decrease in the number of farms from 92,333 in 2012 to 89,902 in 2017 has also resulted in a decrease in farm labor. With 50,230 people hired as farm labor in 2017,⁴ the drop in hired farm labor from 2012 was not large enough to negate all growth from 2007. Therefore, as Figure 1-2 shows, the number of hired people as farm labor is still higher than 2007 levels.

For a region that identifies with agriculture, less than 1% of the workforce was hired in the sector.

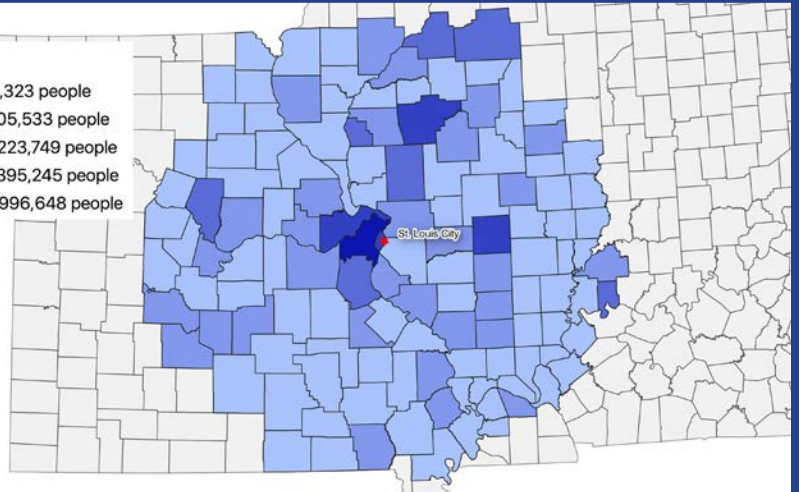
Although only a small portion of the population is directly employed in the agriculture production sector, every individual spends dollars on food which have an economic impact in our region. Money spent on food, or “food dollars,” is increasingly spent on food away from home, rather than food bought to prepare at home.⁵ This trend has ramifications, including food dollars leaving our region and impacting sectors intertwined with the agriculture industry.

For a greater portion of the food dollar to go directly to farmers who produce our food, consumers must buy more locally-grown products. This has other benefits as well—fresh foods usually taste better, have more nutrients, and leave a smaller ecological footprint than those that travel thousands of miles to reach your table.

By analyzing the health, economic, and agricultural trends within our foodshed, we hope to inspire readers to ask more questions about what we eat and how we can improve our nutritional status.

Population

- 3,935 - 30,323 people
- 30,323 - 105,533 people
- 105,533 - 223,749 people
- 223,749 - 395,245 people
- 395,245 - 996,648 people



MAP 1-2
FOODSHED POPULATION, 2017

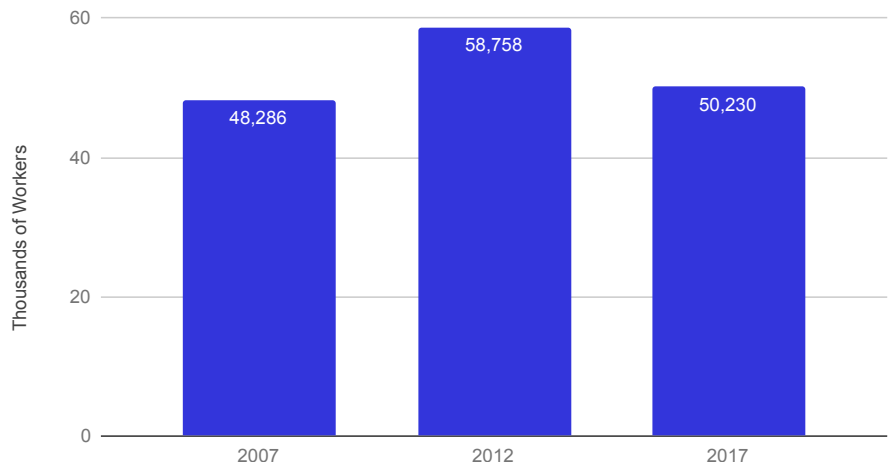
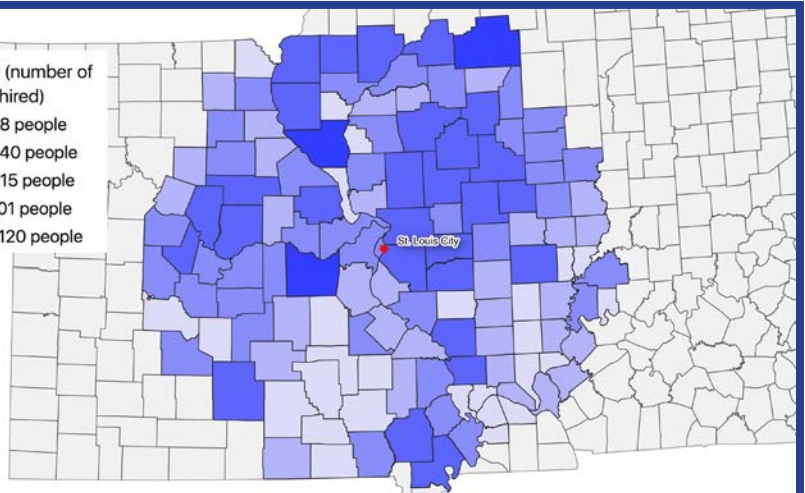


FIGURE 1-2
FOODSHED HIRED FARM LABOR, 2007-2017

Farm Labor (number of individuals hired)

- 49 - 208 people
- 208 - 340 people
- 340 - 515 people
- 515 - 801 people
- 801 - 1,120 people



MAP 1-3
FOODSHED HIRED FARM LABOR, 2017

CHAPTER 2

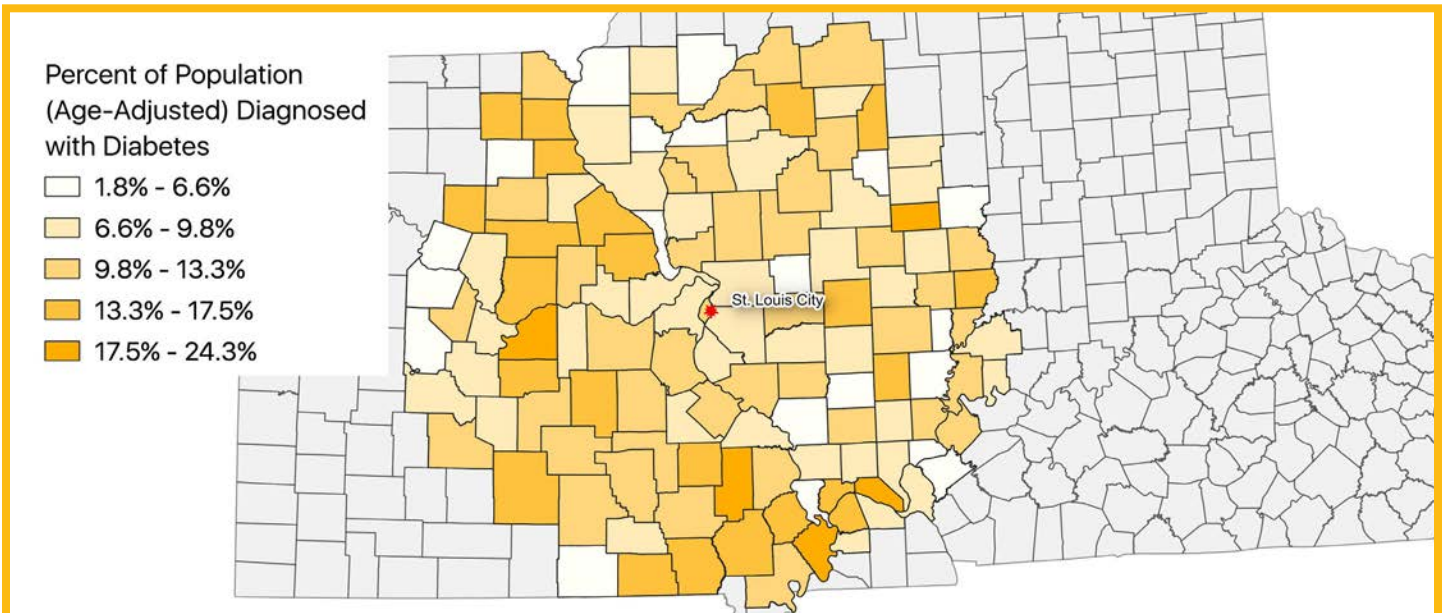
What We Eat and Our Health

Diet is an important determination of overall health, and diseases such as diabetes and obesity often indicate unhealthy eating patterns.

Of the states in which there are foodshed counties, Missouri had the highest rates of obesity (33.18%) and diabetes (11.45%), while Illinois had the lowest obesity rate (29.57%) and Kentucky had the lowest diabetes rate (9.70%).

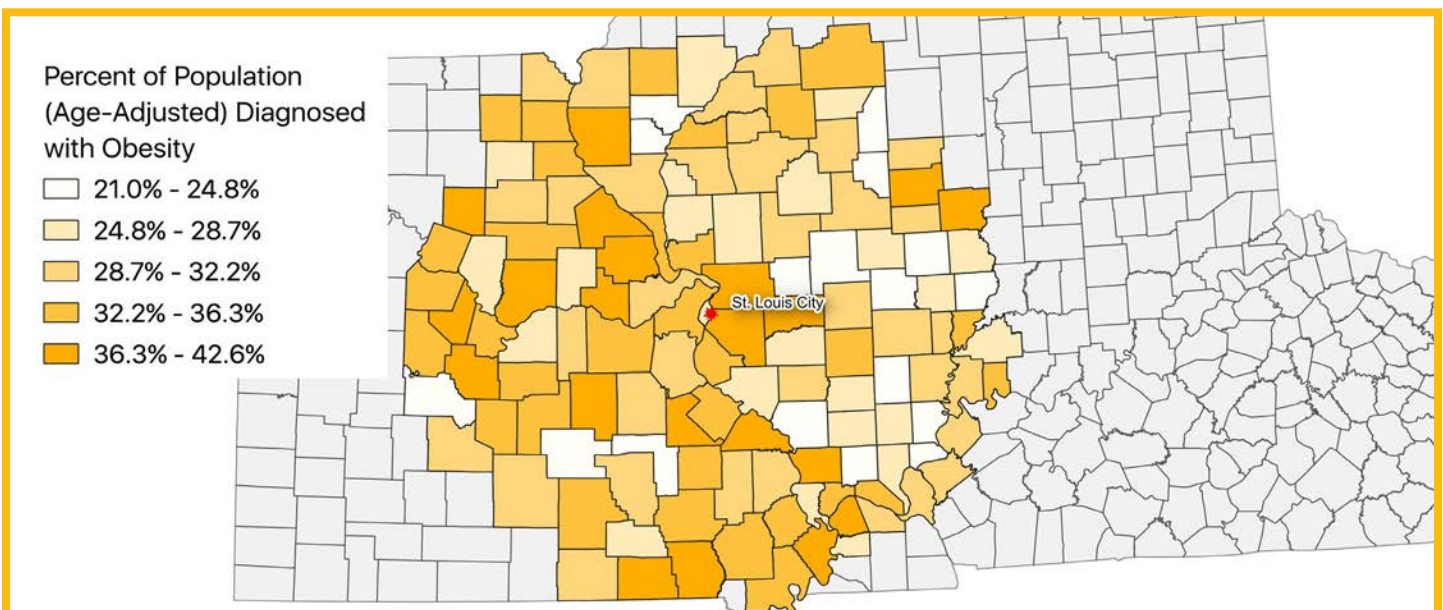
Diabetes and obesity as indicators of health are also important to analyze spatially and cross-sectionally to assess whether certain groups of people are unfairly affected. These health issues largely affect populations who do not have adequate access to fresh food. People that live in areas of our Foodshed that do not have grocery

In 2016, 10.5% of the Foodshed's adult population was diabetic and 31.2% was obese.⁶



MAP 2-1

FOODSHED ADULT DIABETES RATES, 2016



MAP 2-2

FOODSHED ADULT OBESITY RATES, 2016

stores selling fresh food are likely unable to buy fresh food as frequently, especially when accessible transportation is unavailable.

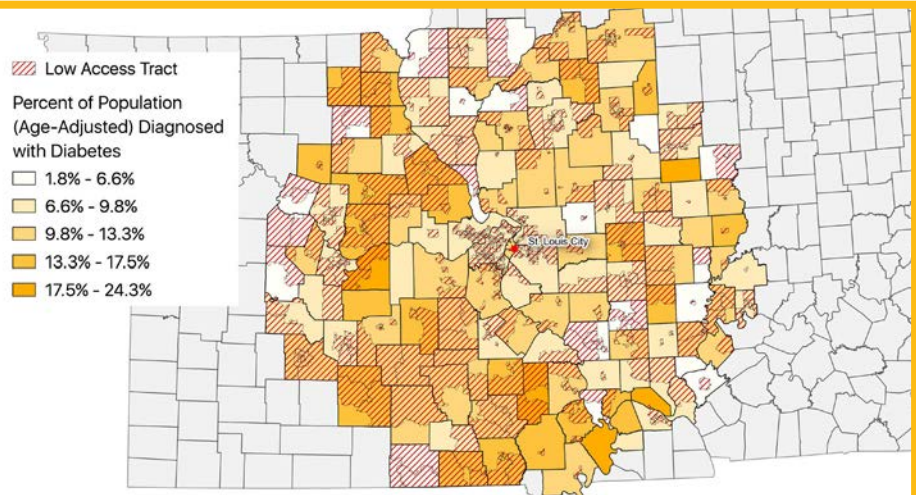
Areas classified as “low access to food” have either 500 individuals or over 33% of the population with low access to food at one mile for urban areas and 10 miles for rural areas.⁷ Maps 2-3 and 2-4 show the overlap between diabetes or obesity and low access census tracts. Analysis of the data shows that higher rates of both diabetes and obesity have positive correlations with tracts classified as low access.

Food insecurity is another measure of indicating our Foodshed’s health that is assessed by asking individuals to report the quality, variety, desirability, and other qualities of their diet.⁸ Insecurity is defined by “lack of access, at times, to enough food for an active, healthy life for all household members and limited or uncertain availability of nutritionally adequate foods.”⁹ Feeding America’s Map the Meal Gap helpfully provides data on food insecurity for each county across the country—in 2017, it was estimated that 12.7% of the nation was food insecure.¹⁰

Our Foodshed’s food insecurity was higher than the national average, with about 13.4% of the population being food insecure in 2017.¹¹

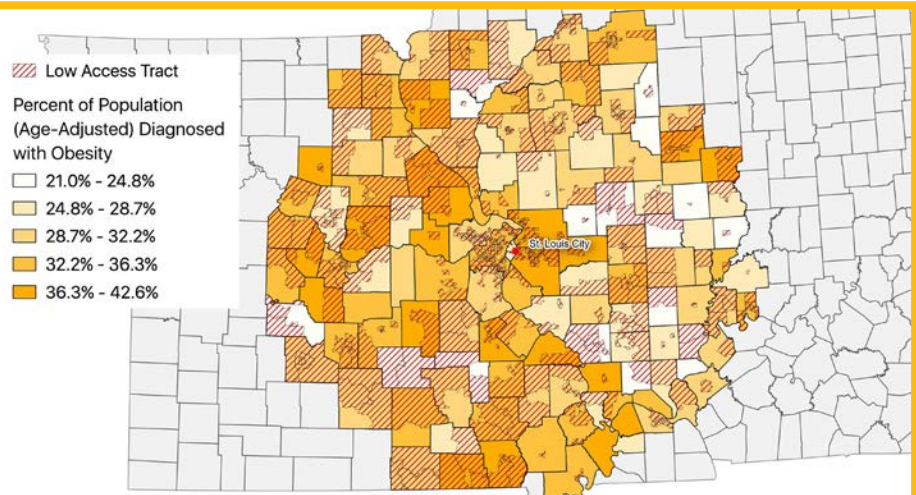
The Kentucky counties included in our Foodshed had the highest rates of food insecurity on average, while Illinois had the lowest. Map 2-5 shows counties by food insecurity rates.

Furthermore, Map the Meal Gap breaks the food insecurity data into income bands. The thresholds that are the percentages of the federally established poverty line designate income bands and dictate whether individuals and families qualify for food assistance programs such as the Supplemental Nutrition Assistance Program (SNAP). Although the threshold for SNAP eligibility is mostly consistent across the St. Louis Regional Foodshed, individual states can and have increased



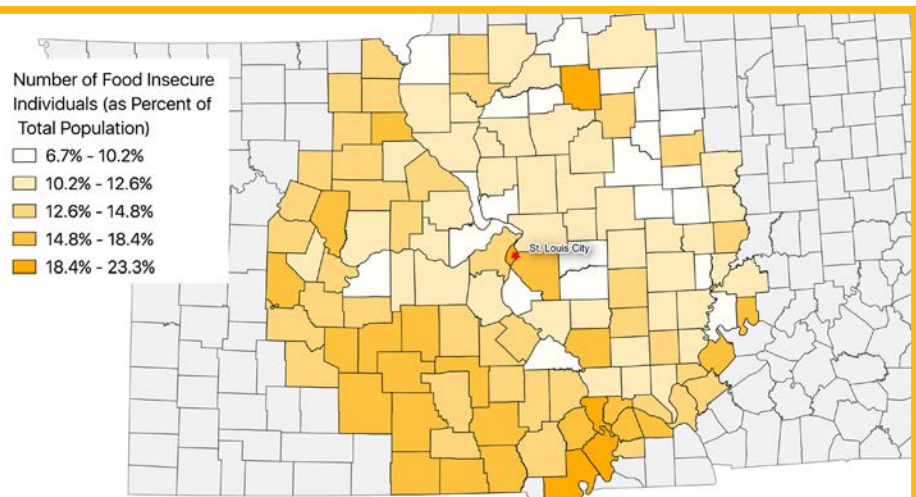
MAP 2-3

FOODSHED ADULT DIABETES RATES AND LOW ACCESS CENSUS TRACTS, 2016



MAP 2-4

FOODSHED ADULT OBESITY RATES AND LOW ACCESS CENSUS TRACTS, 2016



MAP 2-5

FOODSHED FOOD INSECURITY RATES, 2017

their SNAP thresholds. Illinois is one of these states—while Missouri, Indiana, and Kentucky's low threshold (or maximum income level for SNAP) is 130% poverty, Illinois's low threshold is 165% poverty. This means that Illinois' eligibility for SNAP is more strict than the other three states. For all states in our Foodshed, the high threshold that determines eligibility for other assistance programs is 185% poverty.¹² Figure 2-1 shows food insecure persons by state according to these thresholds.

Although the total number of food insecure individuals has decreased nationally from 12.3% to 11.8%¹³ and our Foodshed is following this trend, the majority of food insecure people in our Foodshed are low-income individuals below the low threshold.

In 2017, 53.2% of food insecure persons in our Foodshed were below the low income threshold.¹⁴

While the absolute number of food insecure individuals are decreasing in each income band, the number of food insecure individuals in between the low and high thresholds are decreasing faster than the numbers of individuals both below the low threshold and above the high threshold. This means a greater proportion of total

food insecure individuals are below the low income threshold, and this is particularly concerning for individuals below the low threshold because it leaves them the most vulnerable to dietary and health problems. Since an individual's level of income directly affects the amount of disposable funds available for groceries as well as vehicle access, this compounds the ability to make healthy food choices as explained below.

Census tracts that are categorized as low income and low access to supermarkets are sometimes referred to as "food deserts." However, MCE prefers to call these "low income, low access (LILA) communities".¹⁵

Within our Foodshed, 503 of 1,587 census tracts were classified as low income, low access (LILA) communities in 2015.¹⁶

These LILA communities are the most concerning areas of the Foodshed in terms of food access—the people living here not only lack access to healthy food, but also are more likely to lack the resources needed to obtain healthy food, such as time, transportation, and money. When there are this many barriers to consumption of the recommended servings of food groups, health issues such as diabetes and obesity result.

The USDA's Economic Research Service found that relying on small grocery stores and convenience stores for fresh foods—as opposed to larger grocery stores with more robust offerings—resulted in lower nutritional value.¹⁷ This indicates that even if individuals in LILA communities shop for fresh foods wherever they are locally available, they may still be deprived of all of the nutritional benefits that access to larger grocery stores can provide.

In addition to being low-income, populations that live in areas of limited food access census tracts are often disproportionately marginalized populations. Map 2-6 shows low income, low access community census tracts over the percentage of the population composed of minorities, which includes Black or African American, Asian, Native Hawaiian and Other Pacific Islander, American Indian

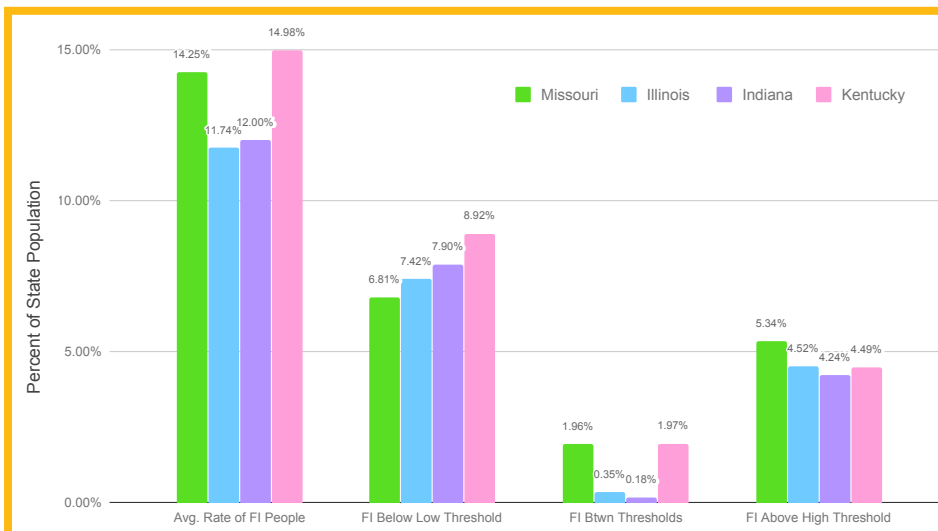


FIGURE 2-1
FOOD INSECURITY AS AVERAGE PERCENTAGE
OF POPULATION BY STATE, 2017

*Only includes data from state counties
within St. Louis Regional Foodshed

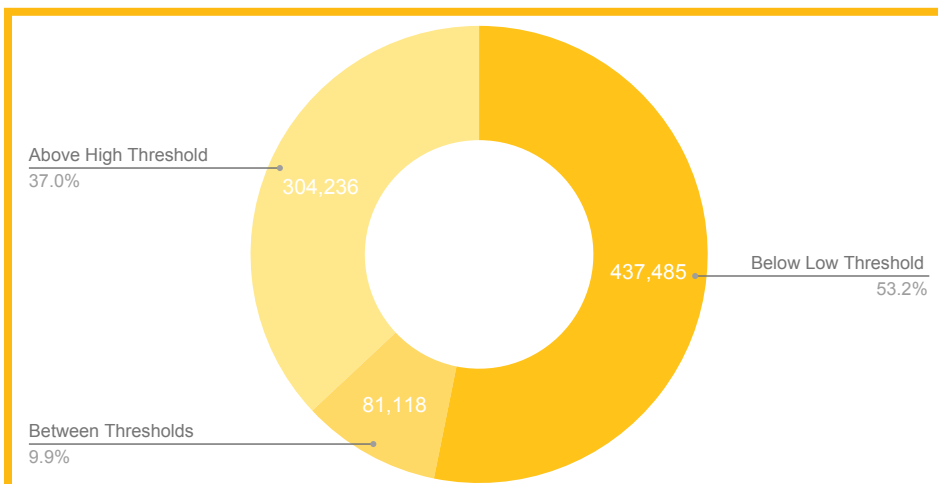


FIGURE 2-2
FOOD INSECURE PEOPLE IN FOODSHED BY INCOME BANDS, 2017

and Alaska Native, Hispanic or Latino, and other/multi-racial populations.

After regressing LILA community census tracts on minority populations, results show that there is a statistically significant relationship between the two variables.

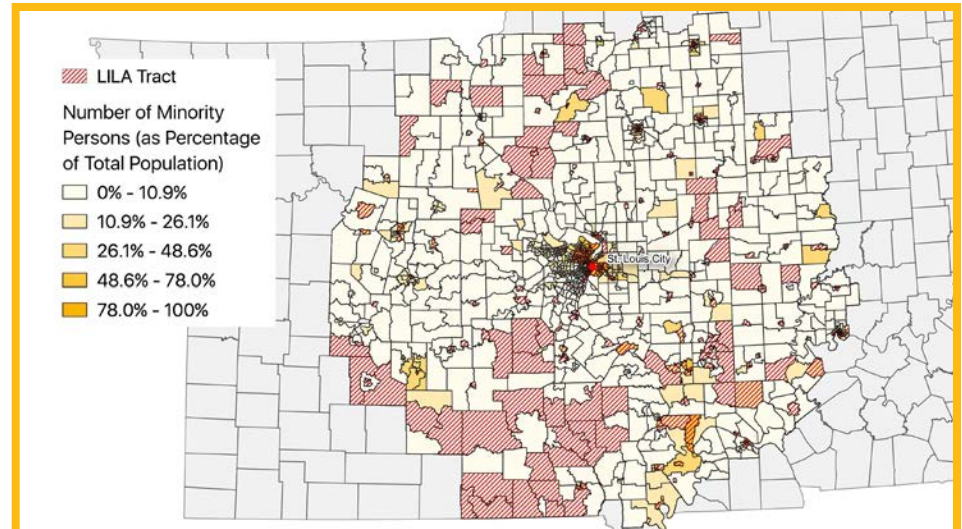
If a census tract is flagged as a low income, low access community, the minority population is on average 22% higher.

Before we can solve our Foodshed's dietary health as a whole, we must work towards alleviating the disproportionate burden on minority populations. Missouri Coalition for the Environment is participating in work to accomplish this goal.

The increasing trend of diabetes and obesity is evidence that nutritional needs in the St. Louis Regional Foodshed are not being well-met. This is having detrimental effects on the population, especially those populations who are marginalized. In order to remedy this problem, we must open grocery stores and other alternative healthy food retail locations in LILA community tracts, increase community-supported agriculture (CSA) programs where grocery stores are unavailable, and encourage stores to source their fresh foods locally to maximize nutrition intake and local economic benefits for our food system. Some examples of existing alternative healthy food retail programs within our Foodshed include the [City Greens Market](#), [Link Market](#), and [MetroMarket](#).

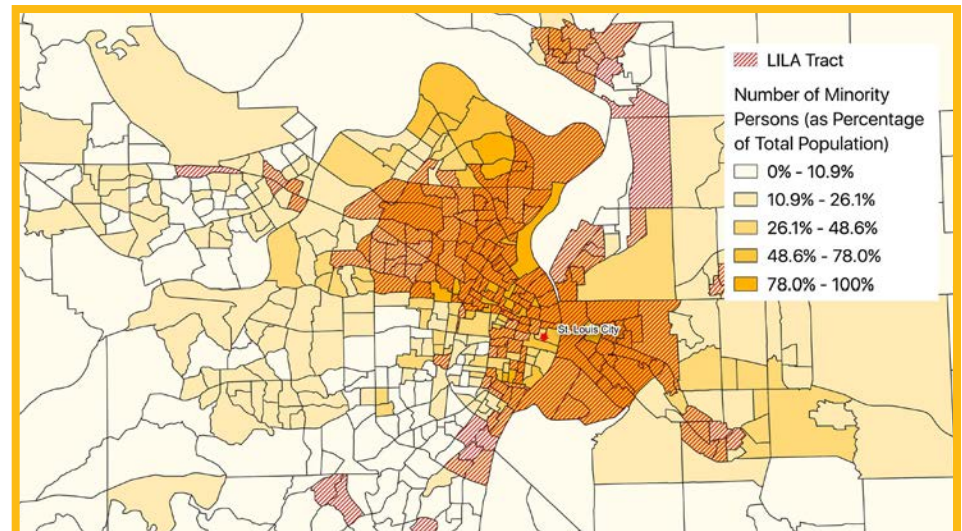
However, making fresh food more available to populations currently lacking is not the sole answer to the problem. One study illustrated that even when presented with healthier options, people need policy nudges such as economic incentives and disincentives as well as education on the benefits of more nutritious foods in order to convince them to buy it.¹⁸

Even when fresh food is available, it becomes a less attractive option because of its perceived higher price point, incentivizing individuals and their families to buy cheaper convenience foods and



MAP 2-6

FOODSHED MINORITY POPULATION & LIMITED FOOD ACCESS TRACTS, 2015



MAP 2-7

MINORITY POPULATION & LIMITED FOOD ACCESS TRACTS, DETAIL, 2015

meals from restaurants in place of fresh food that can be prepared at home. In addition to price, other variables that influence healthy food intake are the hours of operation of healthy food stores, education about how to prepare healthy foods, and more.

In addition to making healthy foods available, they also need to be made accessible.

Many local organizations within our

Foodshed work to increase accessibility by leading community workshops on how to cook fresh produce, expanding operation hours for those who can only shop after work, starting community gardens open to community members, and more.

Another important point to emphasize in addressing our Foodshed's dietary habits is that adopting a healthier diet does not have to cost more; the USDA's Economic Research Service found that people can improve their diet significantly by simply redistributing their budget.¹⁹ Rather than buying snacks and meals at events and restaurants away from home, people can save money and calories by choosing to buy food from the grocery store to be prepared at home.

CHAPTER 3

The Food Economy

Expenditure, Food Dollars, and Farm Income

Food is a necessity on which St. Louis Regional Foodshed residents spend a lot of money.

In 2017, the Foodshed's six million residents spent an estimated \$30.5 billion on food.²⁰

This estimate was extrapolated from the national per capita increase in expenditure on food depicted in Figure 3-1 in nominal dollars.

The increase in food expenditure is largely driven by a growth in expenditure on food away from home at restaurants and other events. This trend could be a cause for concern as the gap between expenditure on food at home and food away from home continues to grow, resulting in nutrition and health effects as well as impacting sectors of food production.

Money spent on food is distributed among the many industries involved with delivering food from the ground where it is grown or raised to the individuals that consume it.

For each dollar spent on food, the farmers and ranchers producing the initial goods received only 7.8 cents in 2017.²¹

Figure 3-2 shows that the farm production share has been declining slightly over the past several years. However, slight increases in the farm production share around 2002-2003 and from 2009-2013 have somewhat neutralized recent decreases to maintain levels of the share of farm production only slightly below 1995 levels.

The recent decrease in food dollar share for farm production is consistent with the simultaneous decrease in food dollar share of most of the other sectors of the food industry, shown in Figure 3-3. Meanwhile, the food services' share of the food dollar has rapidly increased. This can perhaps be attributed to increase in spending on food away from home rather than food bought to be prepared at home. Buying food prepared away from home at restaurant establishments, meal delivery services, and

more incurs additional costs for services provided. For example, although it may be more convenient to use a service like UberEats, a high premium is added to your meal to cover the costs of preparing the food in a restaurant, delivery via the driver, and the fees added by the organization itself, Uber, to make money from the product.

Buying food away from home means food must go through more middlemen before it gets to your table, resulting in less money

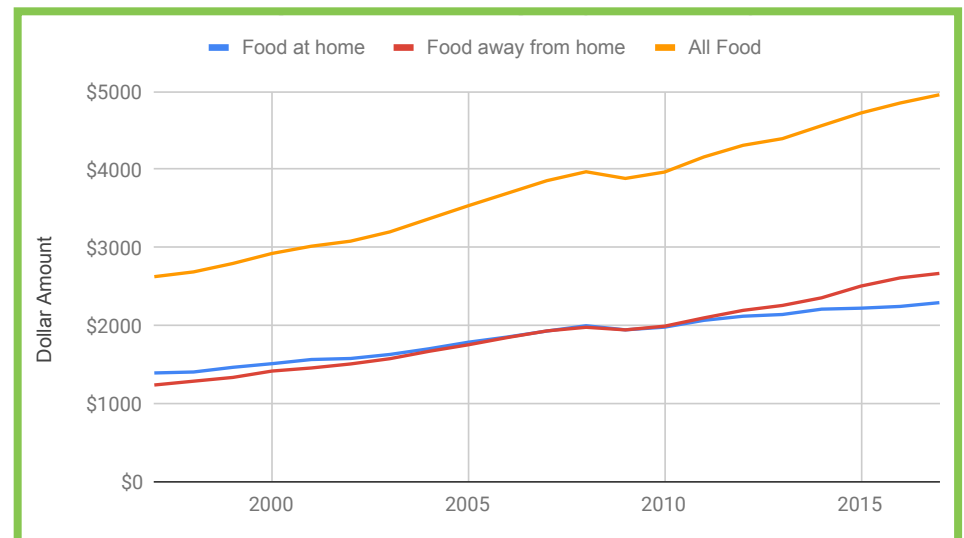


FIGURE 3-1

NATIONAL NOMINAL FOOD EXPENDITURE PER CAPITA, 1997-2017

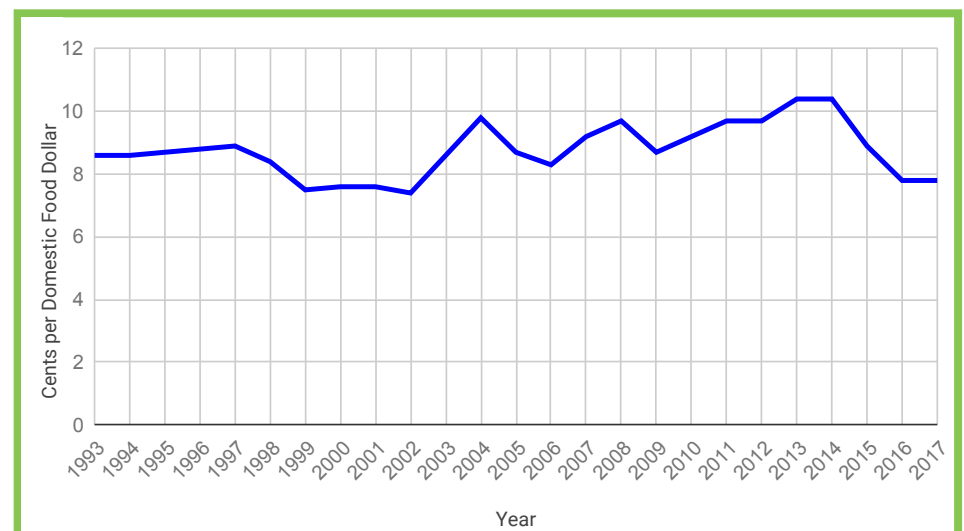


FIGURE 3-2

NATIONAL NOMINAL SHARE OF FOOD DOLLAR FOR FARM PRODUCTION SECTOR, 1993-2017

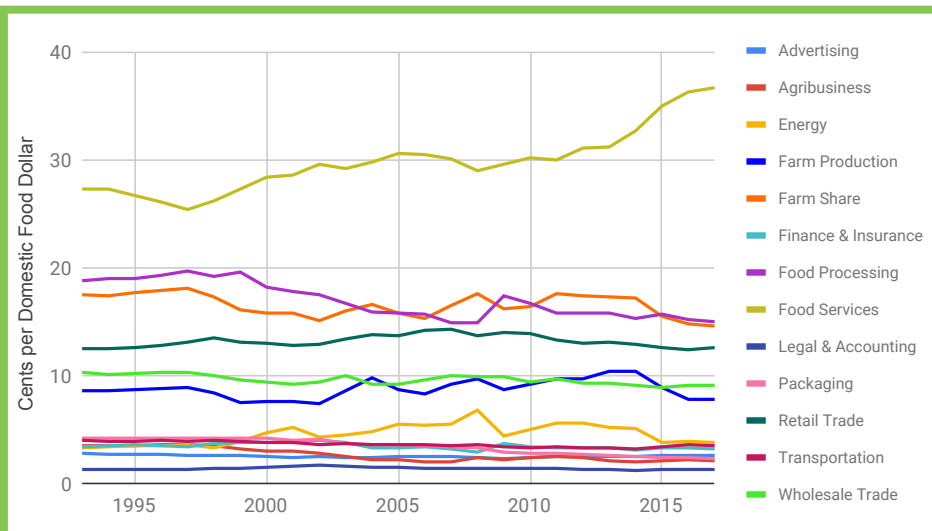


FIGURE 3-3

NATIONAL SHARE OF FOOD DOLLAR ACROSS SECTORS, 1993-2017

going directly to farmers.

In addition to buying more food from local farmers when preparing meals at home, residents of the Foodshed should show their support for local produce by frequenting restaurants that source from local farmers. Patrons should also encourage their favorite restaurants to source locally, thereby allowing more of the Foodshed's food dollars to be in the hands of farmers.

Our foodshed focuses on producing commodity crops like corn, soybeans, and wheat.

Since a large portion of our land is used to grow these commodity crops, we import much of our fruits and vegetables from other states and countries across the globe. This, again, adds to the cost of food; not only is an additional monetary cost added for transportation and any tariffs or taxes collected for importing the goods, but there is also an additional social cost incurred as transporting food from thousands of miles away requires fossil fuel use that pollutes the environment.

While our Foodshed depends on imports for fresh fruits and vegetables, it also produces a large quantity of agricultural products that are exported to other states and countries to generate income for the local economy. Although import and export data is not available for individual counties, the USDA Economic Research Service's data shows that Missouri and Illinois—the two states with counties contributing the majority of our Foodshed's production—are major exporters of soybeans, corn, feeds and other feed grains, pork, soybean meal, and processed grain products. Illinois was the third highest agricultural exporter in the United States in 2017.²²

In order to mitigate the monetary and environmental costs of importing fresh food and to increase the share of the

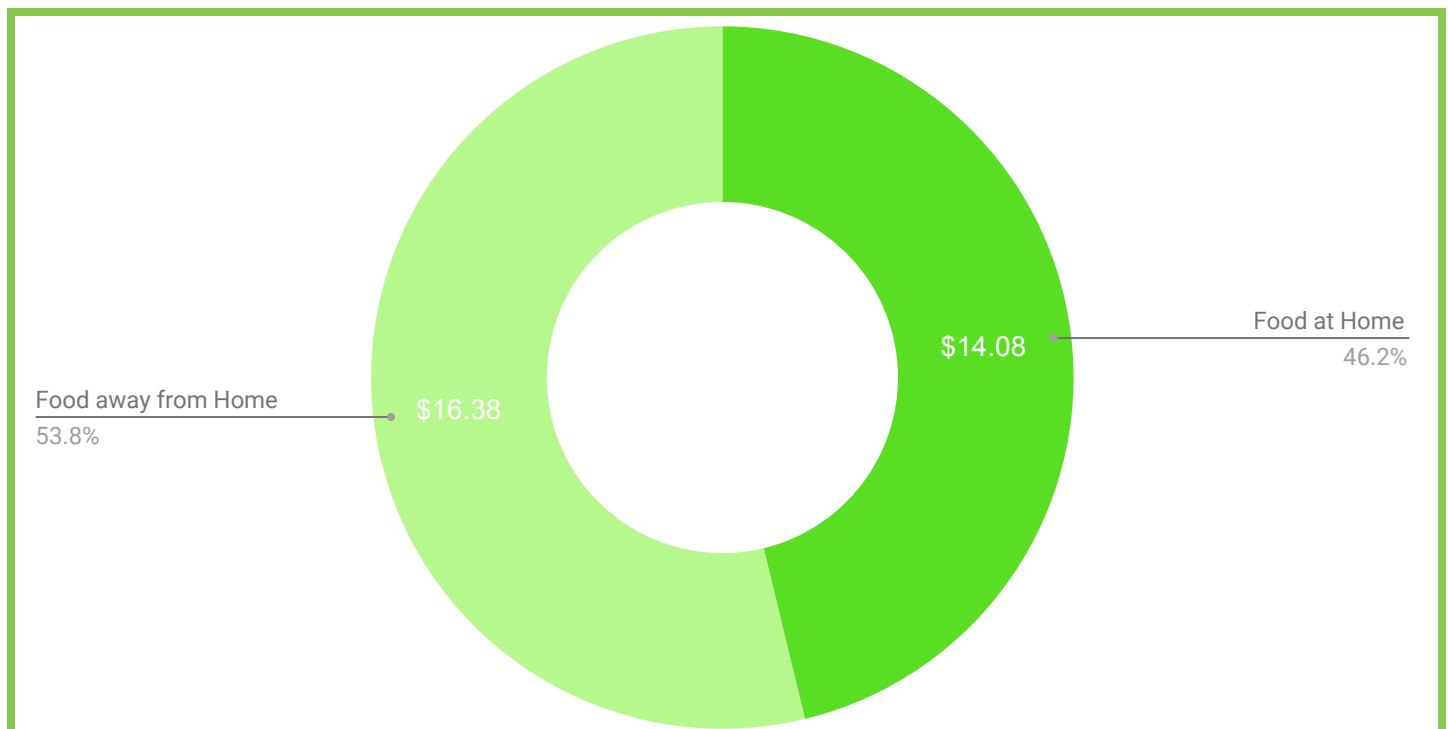


FIGURE 3-4

TOTAL ESTIMATED NOMINAL FOODSHED FOOD EXPENDITURE, BILLIONS OF DOLLARS, 2017

food dollar going directly to farmers in our Foodshed, the population needs to consume more local food. This would not only be better for the environment and the St. Louis Regional Foodshed's health, but it would also stimulate our local economy. With a greater portion of the food dollar being paid to the sectors most directly involved in the local food system, more individuals can be employed in the region.

Another essential component of the farm economy is the income received by farmers in our Foodshed. Analyzing whether the net income of farm operations is increasing and where the majority of the agricultural income is located within the region helps us understand 1) our farms' economic health, 2) where in our Foodshed is successfully producing the most agricultural product, and 3) where there is the most opportunity for improvement.

Figure 3-5 compares average net income and median net income of farm operations over the past 10 years in our Foodshed. While the average net income summarizes the overall operations relatively well, comparing it to the median shows the influence that large farms can have.²³ For example, the huge difference between the average and median net incomes in 2012 show that half of the farm operations that year had a net income of less than \$26,144, and the other half had a net income of more than \$26,144. However, one or more operations with a net income of greater than \$26,144 had net incomes so large, that they skewed the average much higher than the median value.

In 2017, average net income of Foodshed farm operations was \$52,297, and median net income was \$41,642.²⁴

The smaller difference between average and median net incomes in 2017 compared to 2012 numbers suggests that most farm operations are receiving higher net incomes and there are possibly fewer

operations receiving large net incomes skewing the data.

Figure 3-6 shows the breakdown of average net income of farm operations by state. Indiana farm operations have consistently received the highest average net income, while Missouri farm operations receive the lowest by a large margin. All states show that average net income of farm operations is increasing, which is promising for the local food economy.

Income of farm operations is an important measure by which we can categorize farms. Analysis of these categories has shown that there is a national trend towards large farms consolidating into even larger

operations and small farms increasing in number. However, farms within a medium income range are disappearing—because mid-sized farmers rely on their farm as a primary source of income (unlike small farmers, who receive income from off-farm sources²⁵), and it is difficult to compete with the global corporations that run large farms, mid-sized farms are put out of business. This results in a loss of regional farms that supply institutions such as restaurants, retailers, distributors, and more.²⁶

Another way to categorize farms is by farm size—we will look at farm size, number of operations, and land practices in the next chapter.

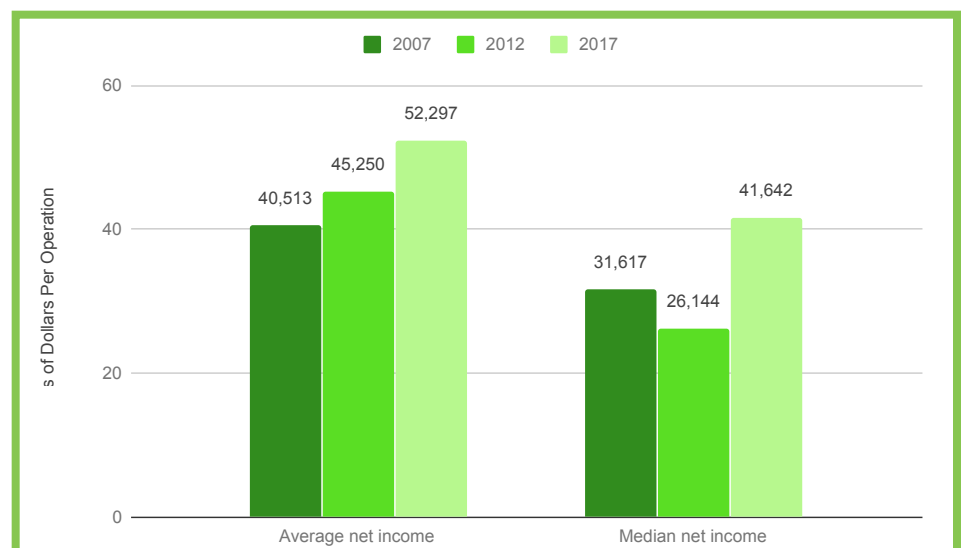


FIGURE 3-5

NET INCOME OF FOODSHED FARM OPERATIONS, 2007-2017

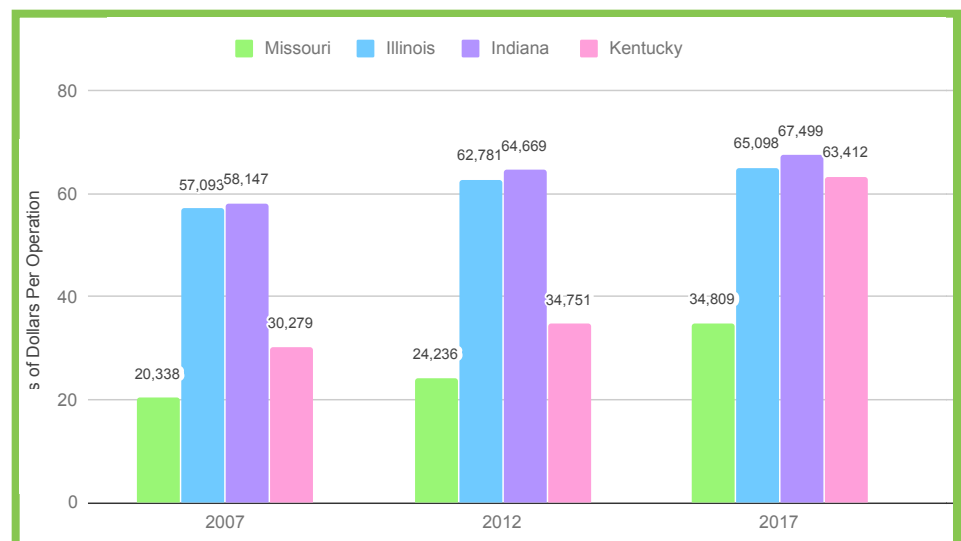


FIGURE 3-6

AVERAGE NET INCOME OF FOODSHED FARM OPERATIONS BY STATE, 2007-2017*

*Only includes data from state counties within St. Louis Regional Foodshed

CHAPTER 4

Land

Land in Farms, Farm Operations, and Land Practices

The St. Louis Regional Foodshed covers 43,922,003 acres of land, much of which is dedicated to farming and agricultural operations.

In 2017, there were 87,885 farms operating within the St. Louis Regional Foodshed.²⁷

This statistic marks a decrease in the number of operations in the Foodshed, with 92,333 operations accounted for in 2012. Illinois and Missouri continue to contribute the largest number of farms in 2017, with 44,645 farm operations in Illinois and 39,535 farm operations in Missouri.²⁸

The counties with the most farm operations were Callaway County, MO (1,438) and Franklin County, MO (1,818).²⁹

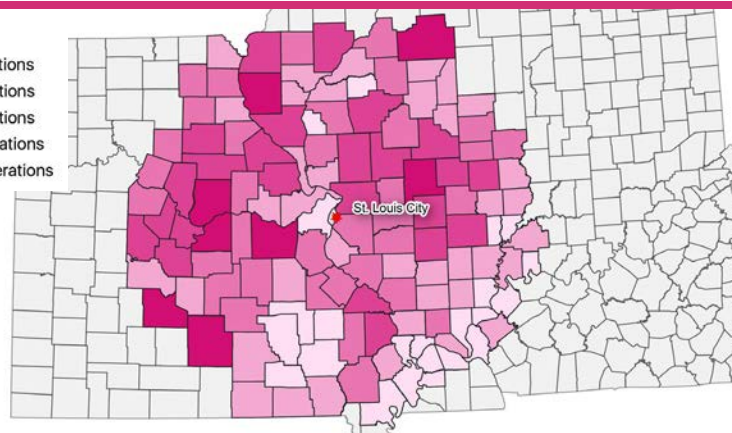
The number of farm operations across the Foodshed are depicted in Map 4-1. Although the map shows no data for St. Louis City, urban farms have increased in recent years.³⁰

In 2017, the average size of farms in our Foodshed was 359 acres, and the median size of farms was 108 acres. Figure 4-2 shows that most farms in the Foodshed are mid-sized, between 50 to 499 acres.³¹ However, in comparison to past years, there are fewer farms in this mid-sized range and more small farms from 1-49 acres and more large farms that are 500 acres or more.

We previously discussed farms in the mid-range income levels disappearing; the consequences are also applicable

Farm Operations

- 126 - 386 operations
- 386 - 610 operations
- 610 - 883 operations
- 883 - 1,197 operations
- 1,197 - 1,818 operations



MAP 4-1

NUMBER OF FARM OPERATIONS IN FOODSHED, 2017

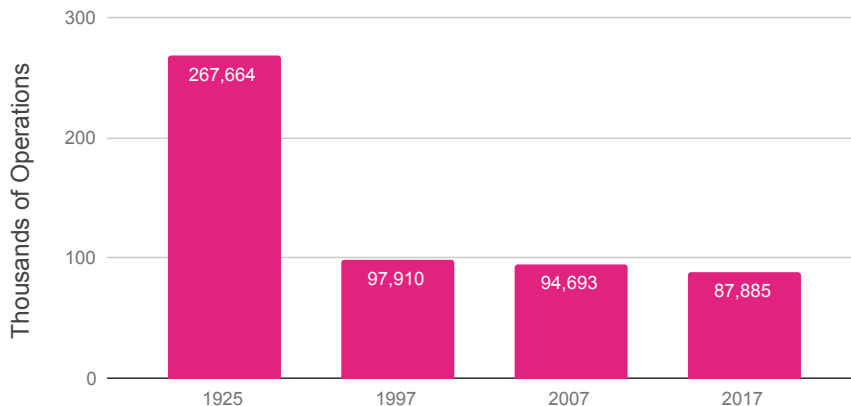


FIGURE 4-1

NUMBER OF FARM OPERATIONS IN FOODSHED, 1925-2017

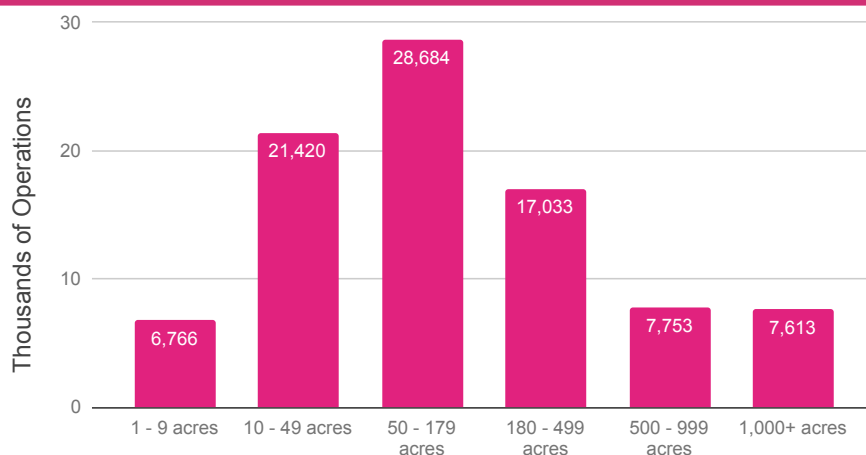


FIGURE 4-2

NUMBER OF FARM OPERATIONS BY FARM SIZE, 2017

here, with the disappearance of mid-acreage farms. Without mid-sized farms that can deliver goods to people in the region, small farms will be unable to provide fresh food for everyone while large farms—which often grow commodity crops—have more national and global outlooks rather than feeding the people.

Therefore, maintaining mid-sized farm needs to be strongly encouraged either through growth of small farms or diversification of large farms. This can be accomplished through agricultural

policies incentivizing diverse, specialty crop production or programs that teach small farmers how to expand their practices and help them grow. In addition, small and mid-sized farming operations need support through development of farm product delivery, distribution, and aggregation. For Foodshed farms to be healthy for the environment and for people, they must have technical and financial assistance and government incentives to grow crops without chemicals and to raise animals on pasture without growth promotants.

Farm operations cover a wide expanse of the total land in our Foodshed.

**Approximately
28,946,378 acres,
or 65.9%, of our
Foodshed land is
considered “land in
farms”.³²**

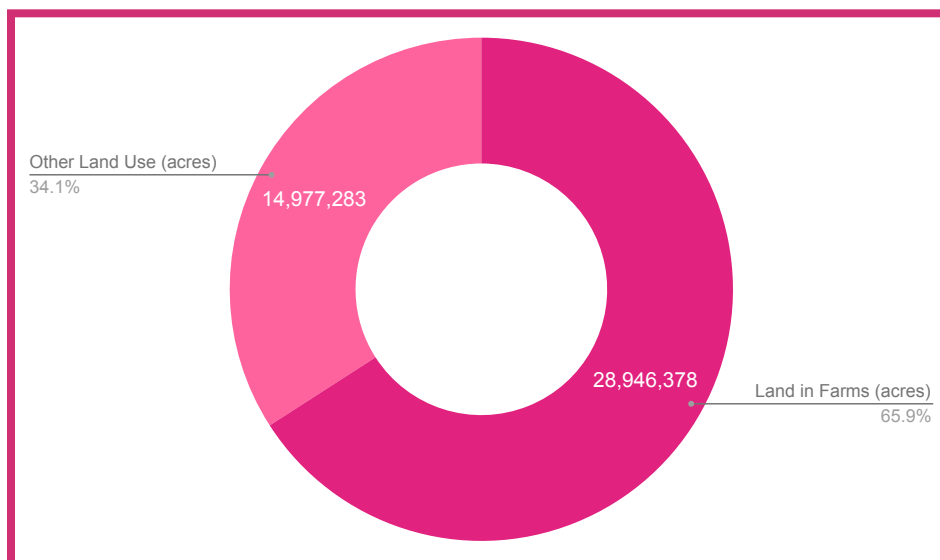


FIGURE 4-3
LAND IN FARMS ACRES AS PROPORTION OF TOTAL FOODSHED LAND, 2017

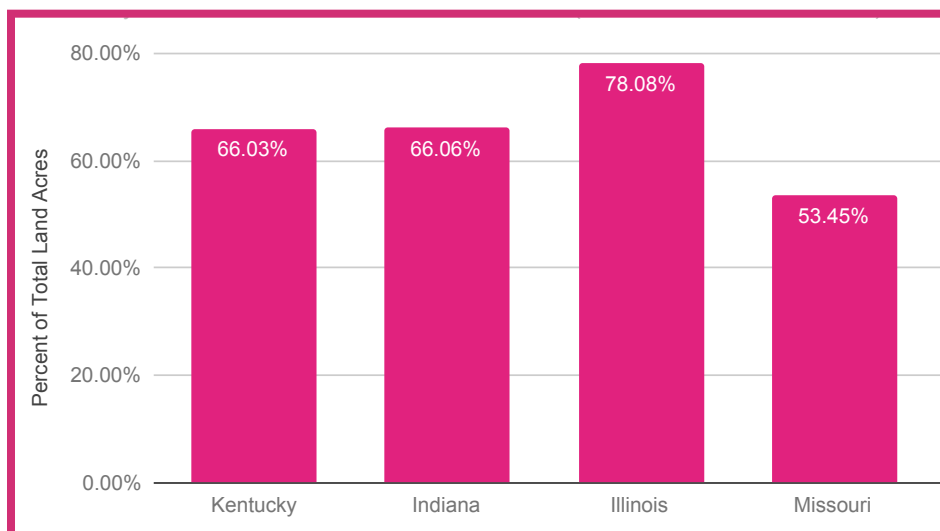


FIGURE 4-4
LAND IN FARMS AS PERCENT OF TOTAL LAND
BY STATE, 2017*

*Only includes data from state counties
within St. Louis Regional Foodshed

The USDA defines “land in farms” as “agricultural land used for crops, pasture, or grazing...it also includes woodland and wasteland.”³³ The Foodshed counties in Illinois have the highest percentage of their total land area as land in farms at 78.08%, and the Foodshed counties in Missouri have the lowest percentage at 53.45%. Figure 4-4 shows the comparison between all four states in the Foodshed for land in farms as the percentage of total land in 2017.

Total Foodshed acreage held as land in farms decreased from 29,306,619 acres to 28,946,378 acres.³⁴ While land in farms acreage decreased from 2012 to 2017 in Missouri, Indiana, and Kentucky, land in farms acreage increased in Illinois by about 2% in the same span of time.

**Illinois’s growth
in land in farms
increased its share
of the Foodshed’s
total land in farms
to 56.5% with
16,301,209 acres.**

Since only six counties in Kentucky and three counties in Indiana are included in our Foodshed, they have very small shares of the Foodshed’s total land in farms. Kentucky contributed 718,693 acres and Indiana contributed 478,052 acres.

Figure 4-5 on the next page shows farmland use as proportions of total Foodshed land in farms. The USDA Census of Agriculture divides land in farms into cropland, pastureland, woodland, and other uses.

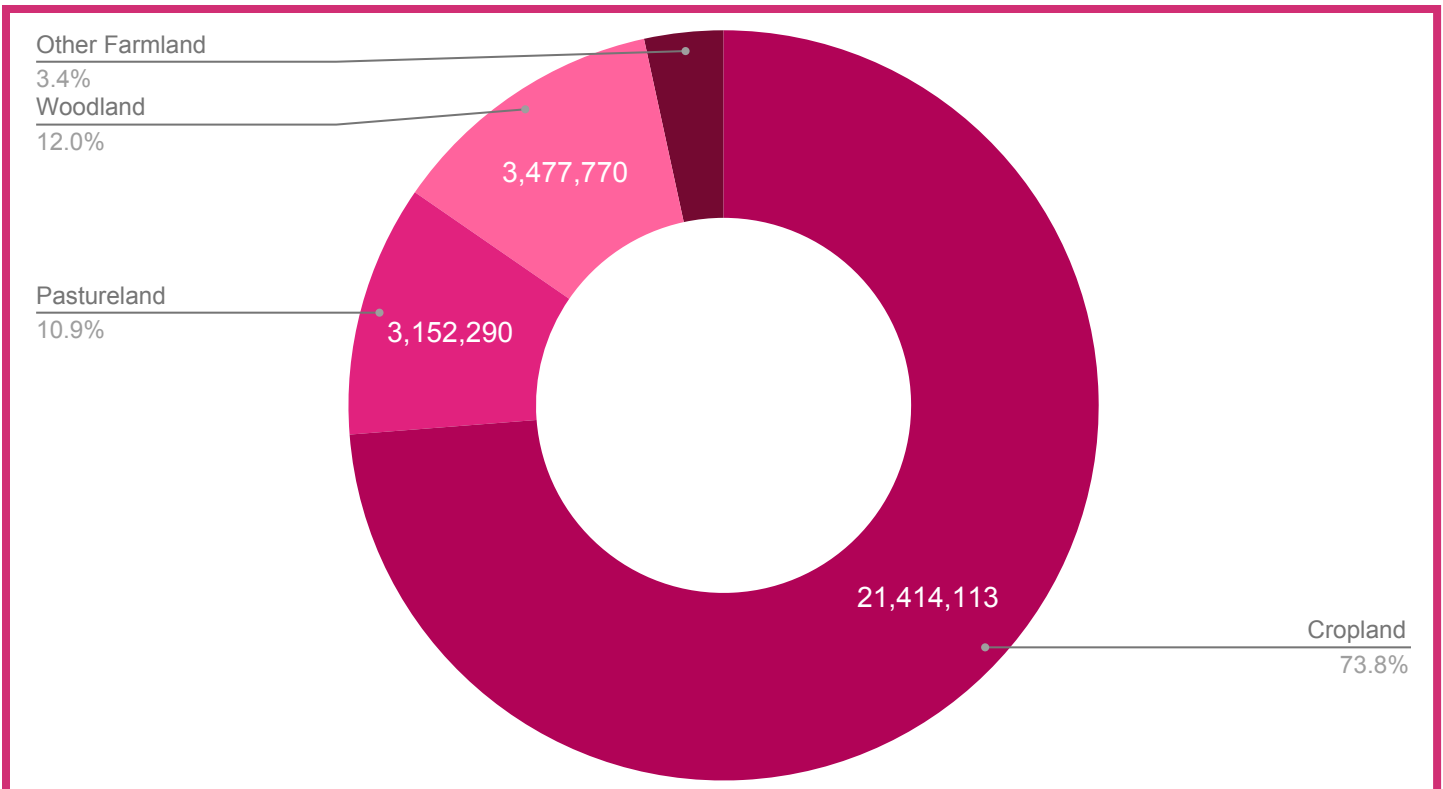


FIGURE 4-5

LAND IN FARMS ACRES BY STATE AS PROPORTION OF TOTAL FOODSHED LAND IN FARMS, 2017*

The largest portion of farmland consists of cropland, which covered 21,414,113 acres in our Foodshed in 2017.³⁵

Map 4-2 shows cropland acreage across the Foodshed. The majority of our Foodshed's cropland is concentrated in Illinois.

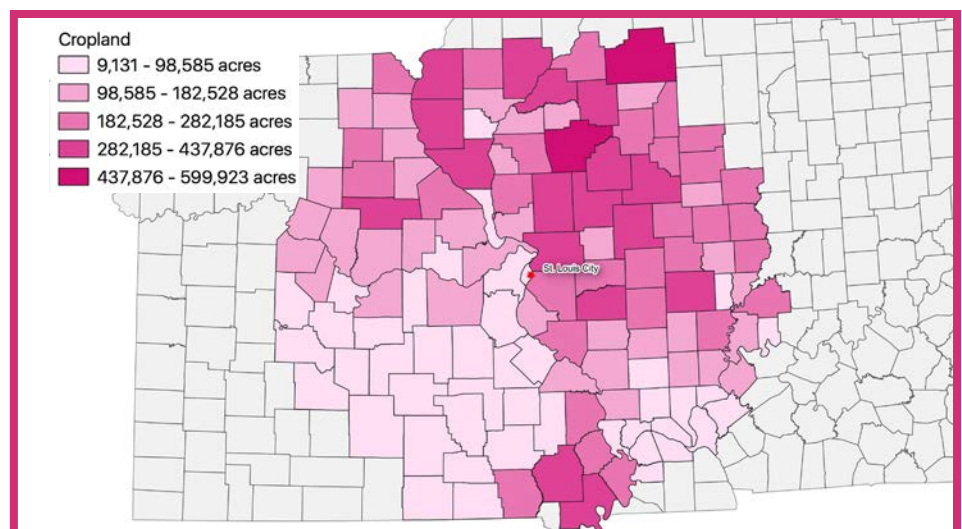
Illinois counties contributes 14,112,542 acres to Foodshed cropland; this is 86.6% of Illinois counties' total land in farms.

Meanwhile, in 2017, Missouri counties had 6,349,636 acres of cropland (55.9% of MO counties' land in farms), Kentucky counties had 512,627 acres of cropland (71.3% of KY counties' land in farms), and Indiana counties had 439,408 acres of cropland (91.9% of IN counties' land in farms).³⁶

For soil health and higher water quality, not all cropland can be used to grow crops throughout the year. Cropland may

be abandoned, in fallow, idle or used for cover crops, or used for soil improvement. Cropland should lay fallow periodically in a planting cycle in order to allow soil to regain its nutrients, which improves the quality of the crops grown on the land.

Figure 4-6 on the next page shows the number of acres of total cropland and harvested cropland from 2007 to 2012 in our Foodshed. Over time, the percentage



MAP 4-2

FOODSHED CROPLAND ACRES, 2017

of cropland harvested has increased, indicating that less land is laying fallow or idle, growing cover crops, or being used for soil improvement. In fact, the USDA used to report on acres laying fallow in the Census but now does not. This follows the national trend of intensification of agriculture—land is used more rigorously to grow crops in an effort to maximize outputs. With

intensification, more cropland is being used to harvest products at any given point, and less is laying fallow, depriving the land of the rest it needs to regain soil nutrients. When intensified, soil quality degrades, causing a vicious cycle of increased fertilizer use on the land and a large risk of water pollution from water runoff into surface water and seepage into groundwater.

Figure 4-7 shows that in 2017, 92% of our Foodshed's cropland was harvested.³⁷

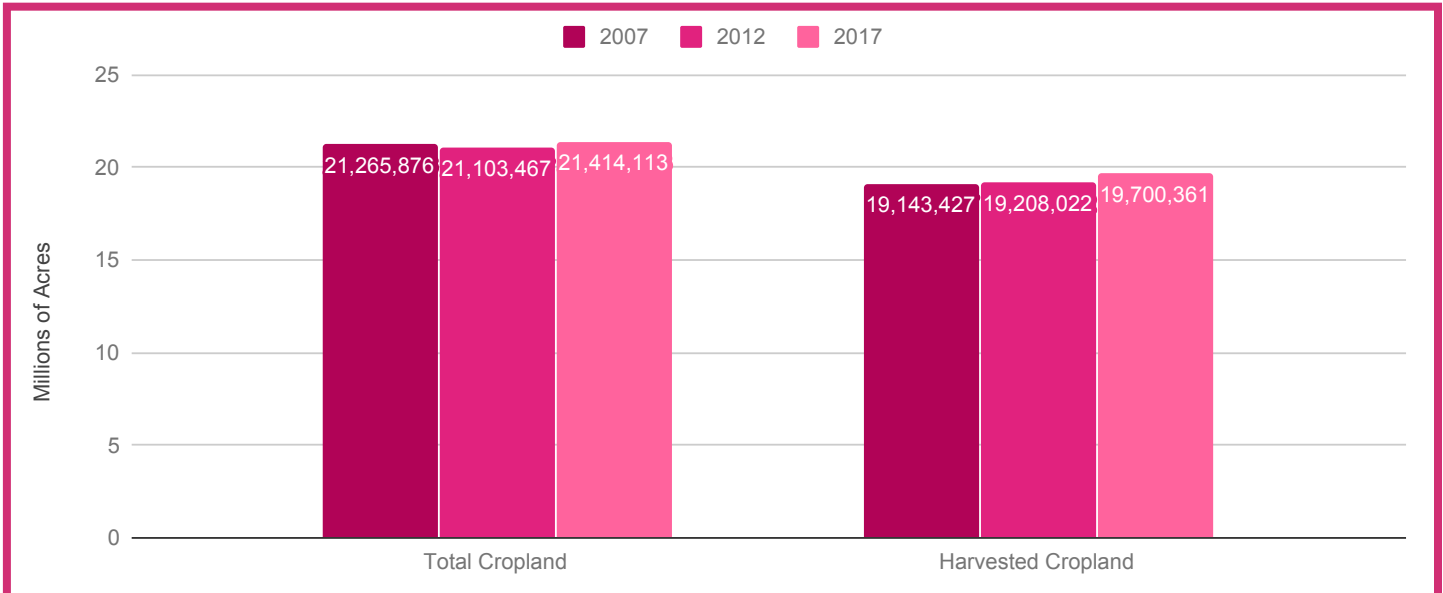


FIGURE 4-6

FOODSHED TOTAL AND HARVESTED CROPLAND ACREAGE, 2007-2017

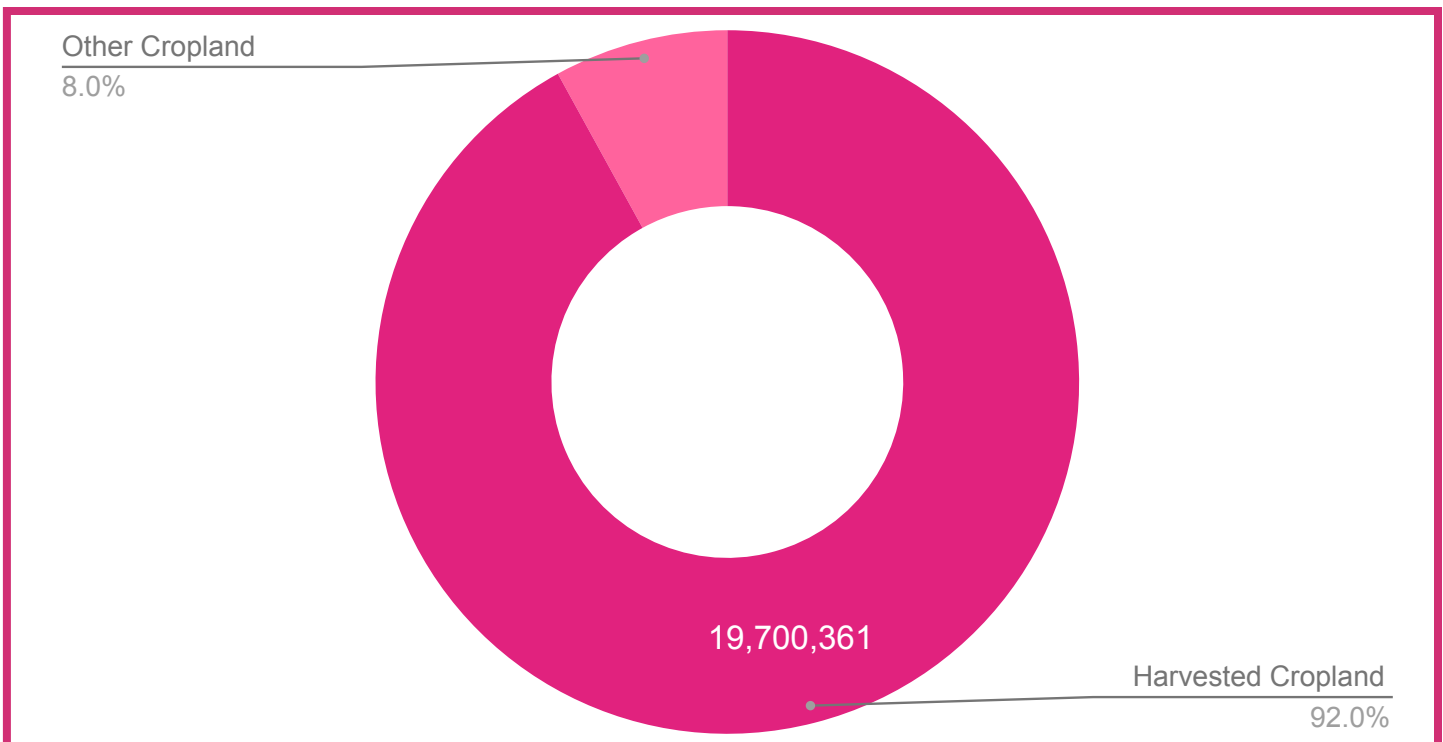
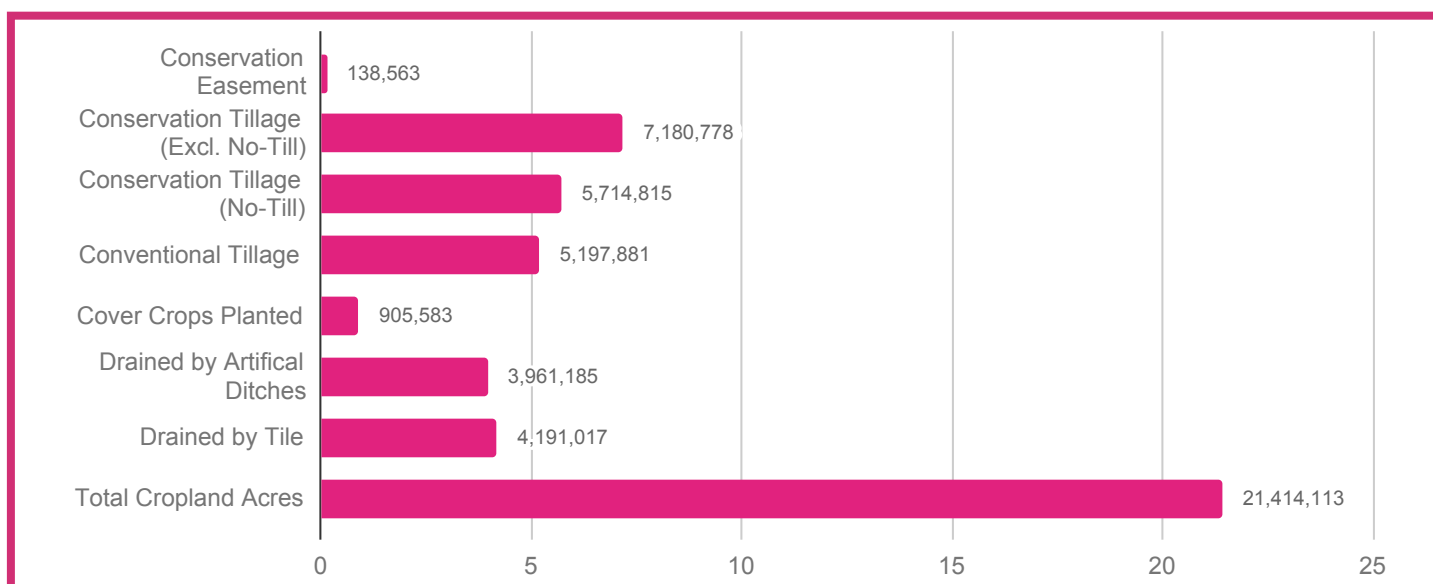
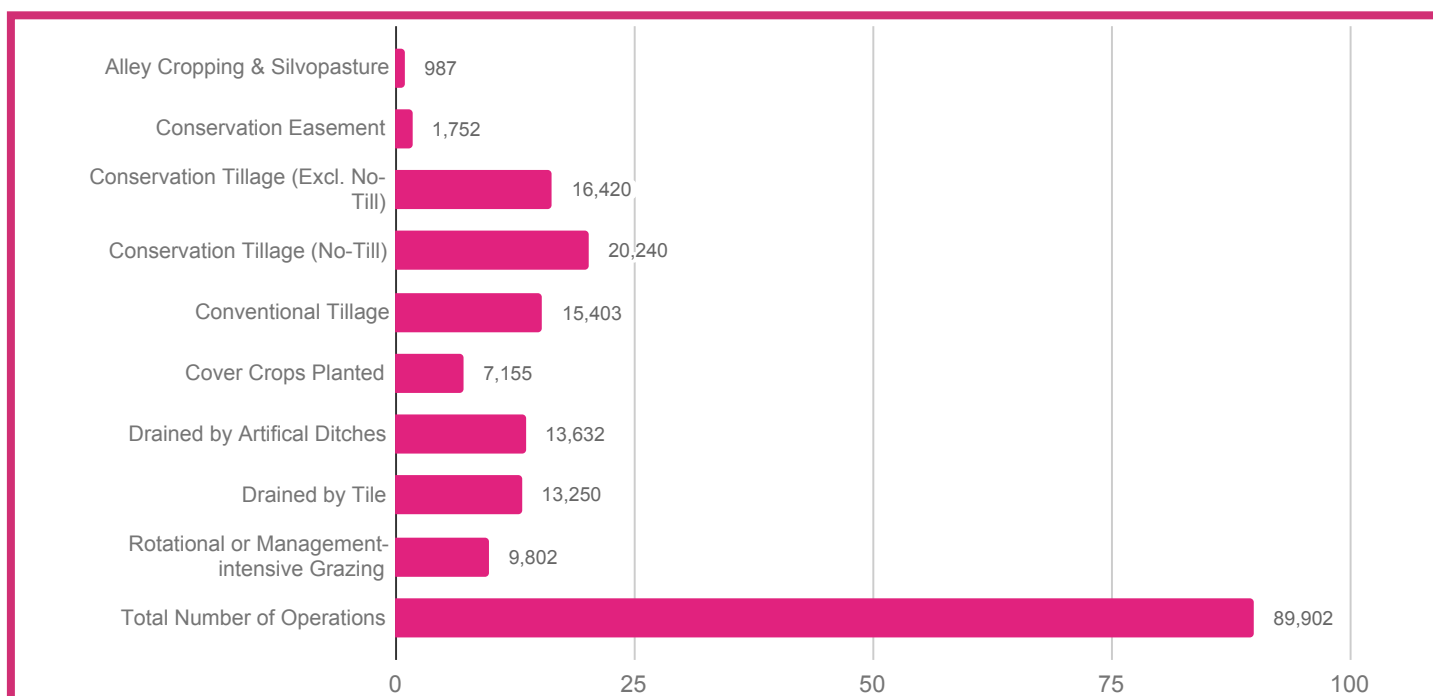


FIGURE 4-7

HARVESTED CROPLAND AS PERCENTAGE OF TOTAL FOODSHED CROPLAND ACRES, 2017

**FIGURE 4-8**

FOODSHED CROPLAND LAND USE PRACTICES BY ACREAGE, 2017

**FIGURE 4-9**

FOODSHED CROPLAND LAND USE PRACTICES BY NUMBER OF OPERATIONS, 2017

Harvested cropland was 91% of all cropland in 2012 and was 90% of all cropland in 2007.

Cropland that is not harvested includes “cropland on which all crops failed or were abandoned, cropland in summer fallow, cropland idle or used for cover crops or soil improvement but not harvested and not pastured or grazed, or other pasture and grazing land that could have been used for crops without additional improvements.”³⁸

Cropland can be managed in many different ways, some of which are more sustainable than others. Figure 4-8 depicts Foodshed cropland practices by acreage. These practices include conservation easement, conservation tillage (excluding no-till), conservation tillage (no-till), planting cover crops, draining by artificial ditches, and draining by tile.

Figure 4-9 shows the same cropland land use practices by the number of

farm operations in the Foodshed that employ those practices. It also includes alley cropping³⁹ and silvopasture⁴⁰ and rotational or management-intensive grazing.⁴¹

Since farms were allowed to attribute multiple land use practices to their acres of land and to their operation as a whole, the individual land use practices in terms of acreages and operations do not add up to their respective totals.

The most popular land use practice is no-till with 20,240 farms using it, but other types of conservation tillage (excl. no-till) cover the most land with 7,180,778 acres.⁴²

Reducing disturbance of soil with no-till and other conservation tillage practices is much more beneficial both to farmers and to the environment in comparison to conventional tillage. It is promising that conservation tillage numbers are higher than conventional tillage, and we hope to see the gap between the two widen over the next five years.

Cover crops are planted to help protect soil from erosion and have numerous other benefits for farmers. While the number of

operations planting cover crops is relatively low, it is the most common land practice for which farmers ask the government for conservation money. This indicates that farmers know that there is value in planting cover crops, but without a high enough financial incentive and support from the government, farmers will not plant cover crops.

Draining by tiles and artificial ditches are both practices detrimental to the environment. They increase non-point source pollution by removing excess surface water from fields and adding the mix of fertilizers, pesticides, and other chemicals to local waterways.

In addition to managing water and fertilizer runoff through land practices, it is also important for operations to manage their land use with respect to raising livestock.

Figure 4-10 illustrates the change over time in each state for the number of farm operations using rotational or management intensive grazing practices. This practice is the only land use practice that has been consistently tracked in the USDA's Census of Agriculture over the past ten years, and it has declined significantly in

each state in the Foodshed from 2007 to 2017. The trend indicates—similar to the data concerning harvested cropland—that fewer acres are being allowed to rest and recover, stripping the land of its nutrients and forage growth to leave it vulnerable to erosion and land degradation.

Our Foodshed's land in farms may be decreasing, but its agricultural practices are being intensified to the detriment of its soil and overall environmental health. In order to better protect our land, there needs to be policy change that incentivizes mid-sized farms and an increased use of conservation land use practices.

Missouri Coalition for the Environment is working to promote farm operations within the St. Louis Regional Foodshed that use conservation practices on cropland and rotate their grazing animals through the [Known and Grown STL](#) program.

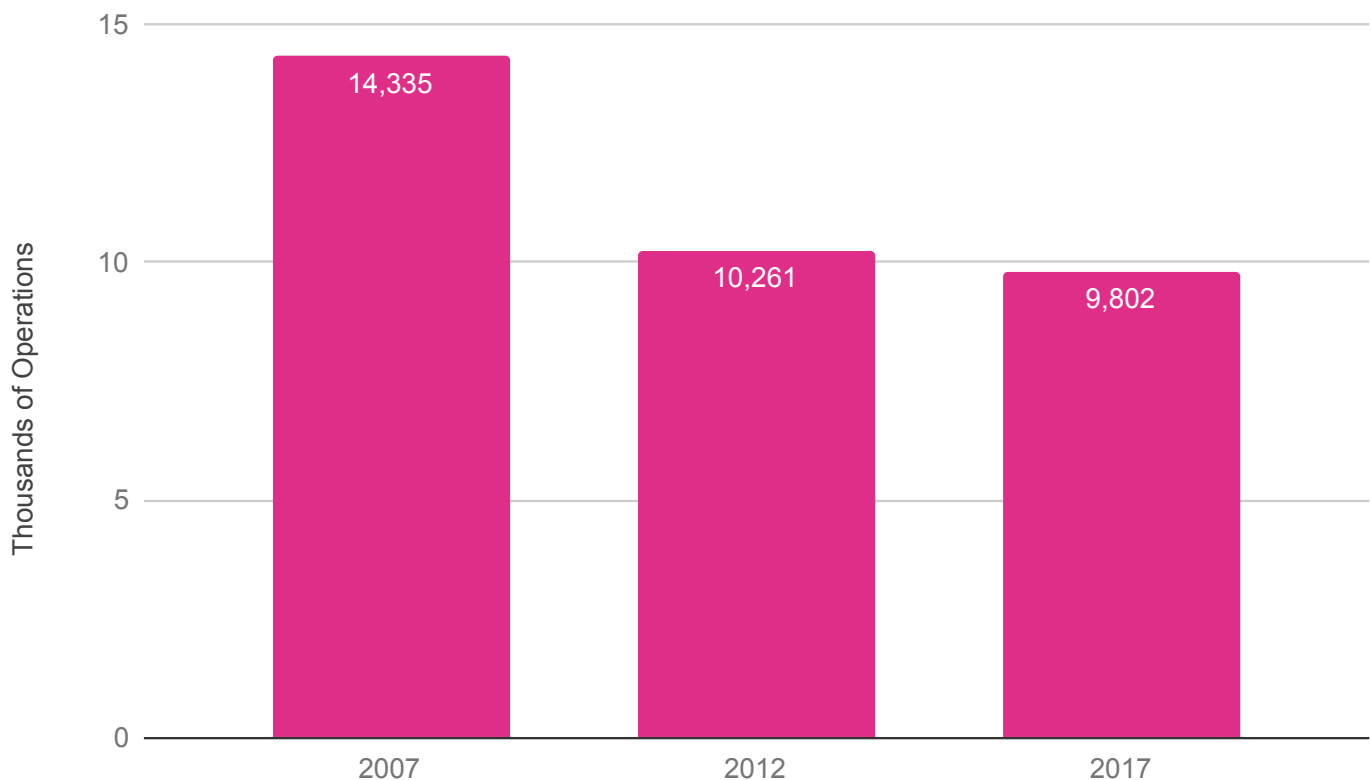


FIGURE 4-10
OPERATIONS USING ROTATIONAL OR MANAGEMENT-INTENSIVE
GRAZING PRACTICES IN THE FOODSHED, 2007-2017*

*Only includes data from state counties within St. Louis Regional Foodshed

CHAPTER 5

What We Grow

Food Table, Food System, and Non-Food Crops

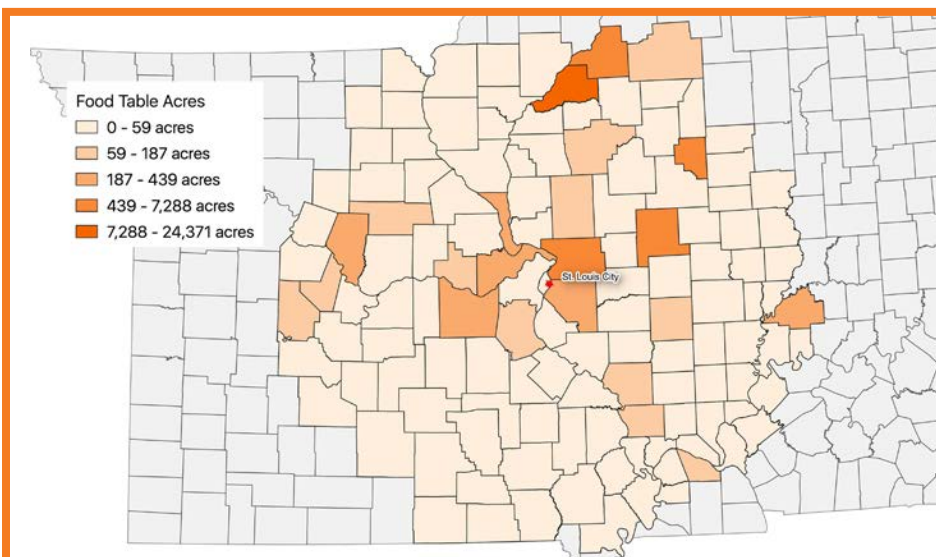
The national trend of intensification that we discussed in the previous chapter has not only resulted in a greater percentage of cropland harvested, but also has led to farms producing fewer different types of crops. This lack of diversification has a number of environmental costs, from soil degradation to less variety in local produce, as farms try to increase their efficiency through specialization.

Specialization is driven through

technological innovation and agricultural policy. Since specialization allows operations to produce more product, it facilitates use of land in the St. Louis Regional Foodshed for growing commodity crops for export.

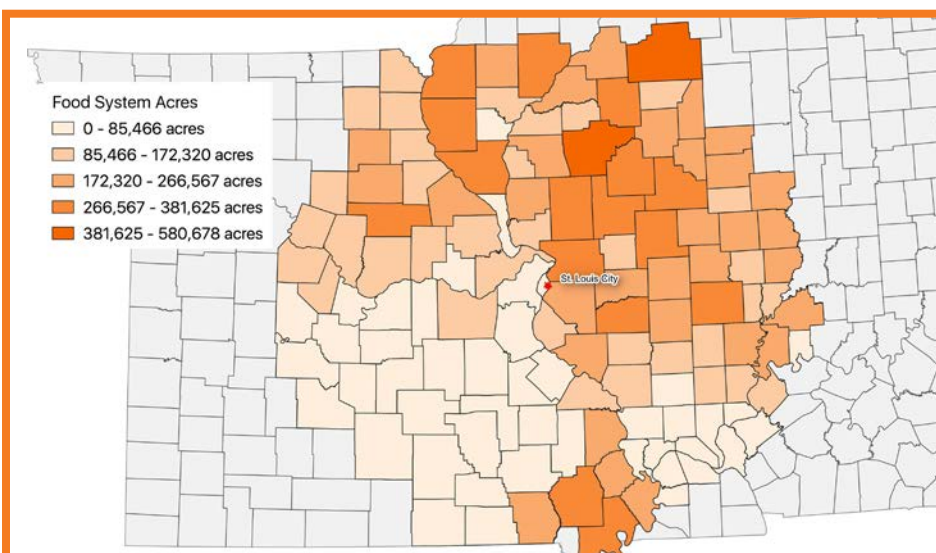
Rather than growing the fruits and vegetables that travel from the farm to our plates, most farms specialize and focus their resources on growing one or two crops, often commodity or “Food System” crops.

In 2017, 19.9 million acres were dedicated to producing “Food System” crops in our Foodshed.⁴³



MAP 5-1

FOODSHED ACRES USED TO GROW “FOOD TABLE” CROPS, 2017



MAP 5-2

FOODSHED ACRES USED TO GROW “FOOD SYSTEM” CROPS, 2017

Map 5-1 and 5-2 show the acres dedicated to growing “Food Table” and “Food System” crops within our Foodshed. These maps illustrate the extreme lack of cropland acreage dedicated to growing fruits and vegetables in comparison to land used to grow crops like corn, soybeans, hay, and more.

The two counties producing the most “Food System” crops in 2017 were McLean, IL with 580,678 acres and Sangamon, IL, with 483,093 acres. The two counties producing the most “Food Table” crops were Mason, IL with 24,371 acres and Tazewell, IL with 7,288 acres.⁴⁴ The acreage for the two different categories of crops shows the stark difference between “Food System” and “Food Table” production—the St. Louis Regional Foodshed uses over 13 times more land for “Food System” crops than “Food Table” crops.

Missouri Coalition for the Environment encourages farms within the Foodshed to grow more “Food Table” crops with which we can feed our region. Missouri Coalition for the Environment’s [2019 St. Louis Farm to Institution Feasibility Study](#) found that there is increasing demand from consumers for “Food Table” crops grown with environmentally-responsible practices. To accommodate this demand, Missouri Coalition for the Environment has launched the [Known & Grown STL](#) program to help educate environmentally-conscious consumers by promoting local farmers employing sustainable practices.

It is important to note that the USDA’s Census of Agriculture does not report acreage for counties that have fewer than three farms producing a specific product or “if the distribution of the data within the cell allowed a data user to estimate any respondent’s data too closely”.⁴⁵ For example, artichokes have no acreage

reported in our Foodshed, but the census notes that farms in three counties responded that they did, in fact, grow the crop. As fewer farms produce “Food Table” crops and more operations turn to growing “Food System” crops, much of the acreage for vegetables, fruits, and tree nuts was withdrawn in the 2017 Census of Agriculture.

Figure 5-1 shows the proportion of Foodshed land dedicated to growing “Food Table” crops, “Food System” crops, “Non-Food” crops, and Unreported Cropland from information retracted by the USDA to protect these producers’ privacy.

The use of nearly 1.5 million acres, 6.8% of our Foodshed cropland, was withdrawn by the USDA.

Since this land was unreported, it is impossible to tell what type of crop may have been on these acres. One small portion of Foodshed cropland—9,752 acres, or 0.05%—is used to grow “Non-Food” crops. These “Non-Food” crops are shown in Figure 5-2.

The “Non-Food” crop with the most land acreage in the St. Louis Regional Foodshed was grasses and legumes with 39 counties growing the crop.⁴⁶

“Food Table” crops were reported to be grown on only two tenths of a percentage of our Foodshed cropland. This tiny portion amounts to 38,942 acres of land.

“Food Table” crops are essentially fruits and vegetables that are ready to be eaten with minimal processing. The very small percentage of land dedicated to growing these directly consumable foods indicates again that our Foodshed is not growing food for people in the region to eat, resulting in food access issues and the need to import fresh food, causing food dollars to leave the region.

Vegetables are listed in Figure 5-3 on the next page and fruits and tree nuts are listed in Figure 5-4 on page 20. Map 5-3 on the next page shows the number of acres where vegetables are harvested across the Foodshed, and Map 5-4 on page 20 shows the number of acres where fruits and tree nuts are harvested or land is bearing the crop.

Pumpkins were the most-grown vegetable, with Mason, IL and Tazewell, IL growing the majority of the 9,898 acres.⁴⁷

In addition to listing the vegetables and their acreage, Figure 5-3 shows that the USDA withdrew the number of acres for the majority of counties growing vegetables. This indicates that the actual acreage is most likely much higher. It is also possible that the total Foodshed acreage for growing fruits, vegetables, tree nuts, and

other “Food Table” crops could be underestimated because not all farmers are able to fill out the USDA’s survey. It is more than likely that producers who maintain small fruit and vegetable operations would struggle to make time to fill out the survey, and therefore their data would be absent from the census results.

As an example of the change in USDA Census of Agriculture data that may have resulted in partial underestimation, in 2007, horseradish had the most dedicated land acreage of any “Food Table” crop with 1,332 acres. Ten years later, all 11 counties that grew horseradish in the Foodshed had their data withdrawn in the census, indicating that there were fewer farms contributing to the

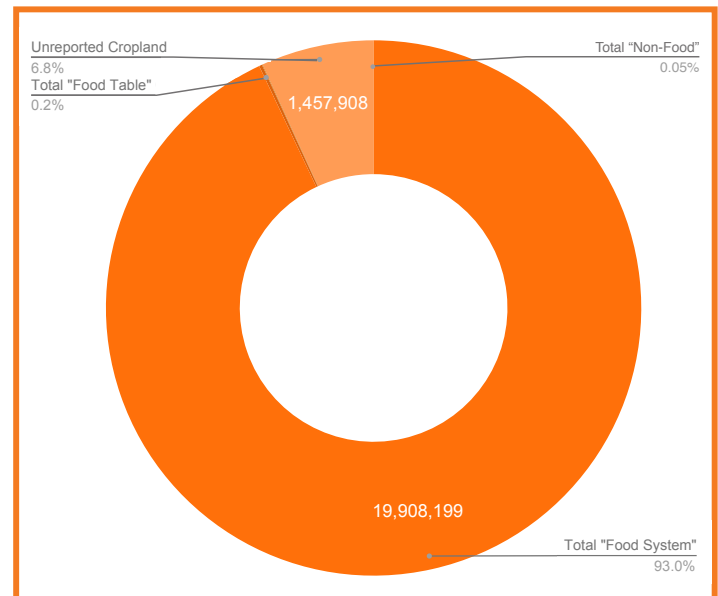
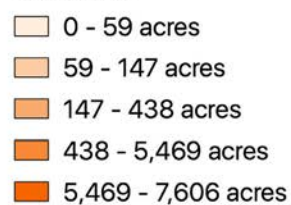


FIGURE 5-1
CROPLAND ACREAGE BY CONTRIBUTION TO FOOD SYSTEM, 2017

Crop (Food System)	Acres Harvested (Reported)	Counties with Unreported Acreage/Total Counties Producing Crop
aquatic plants	0	3/3
bedding plants totals	69	38/50
bulbs & corms, etc.	30	4/6
cut christmas trees	1,582	37/61
cut flowers/cultivated greens	64	21/31
flowering plants, potted	32	24/30
flower seeds	7	13/14
foliage plants	1	7/8
grasses and legumes	6,595	27/39
miscanthus	310	7/9
propagative material	2	5/6
short term woody crops	69	9/10
sod	408	10/12
sunflower	132	6/8
tobacco	495	3/7

FIGURE 5-2
“NON-FOOD” CROPS HARVESTED IN FOODSHED, 2017

Acres of Vegetables Harvested



MAP 5-3

FOODSHED ACRES HARVESTED FOR VEGETABLES, 2017

Crop (Vegetables)	Acres Harvested (Reported)	Counties with Unreported Acreage/Total Counties Producing Crop	Crop (Vegetables)	Acres Harvested (Reported)	Counties with Unreported Acreage/Total Counties Producing Crop
artichokes	0	3/3	cantaloupe	152	41/62
asparagus	24	50/57	honeydew melons	6	12/13
beans, green, lima	1	8/9	watermelon	597	50/74
beans, snap	4,338	52/88	mushrooms	0.25	13/17
beets	19	36/46	okra	17	34/45
broccoli	11	42/49	olives	1	0/St. Clair, IL
brussel sprouts	3	22/25	onions, dry	20	37/51
cabbage, chinese	1	30/31	onions, green	16	29/42
cabbage, head	16	43/52	parsley	3	25/28
cabbage, mustard	1	8/9	peas, chinese	2	22/24
carrots	14	22/29	peas, green (excl. southern)	7	13/19
cauliflower	14	26/31	peas, green, southern	1	6/7
celery	0	11/11	peppers, bell	157	54/82
chicory	0	4/4	peppers, chile	49	42/64
cucumbers	158	50/80	potatoes	74	52/73
daikon	1	11/12	pumpkins	9,898	44/88
eggplant	28	35/48	radishes	14	32/42
escarole & endive	0	3/3	rhubarb	1	22/23
garlic	21	38/47	spinach	9	35/42
ginger root	0	2/2	squash	178	49/81
greens, collard	1	17/18	sweet corn	1,739	50/94
greens, kale	15	34/43	sweet potatoes	20	34/45
greens, mustard	1	26/27	taro	0	1/McCracken, KY
greens, turnip	4	23/27	tomatoes	452	100/170
herbs, dry	0	1/Washington, MO	turnips	15	31/42
herbs, fresh cut	13	34/46	watercress	0	3/3
horseradish	0	11/11	vegetable seeds	2	8/10
lettuce	36	48/66	other	40	27/34

FIGURE 5-3

VEGETABLES HARVESTED IN FOODSHED, 2017

total amount and that a significant source of acreage was no longer counted in our Foodshed's total.

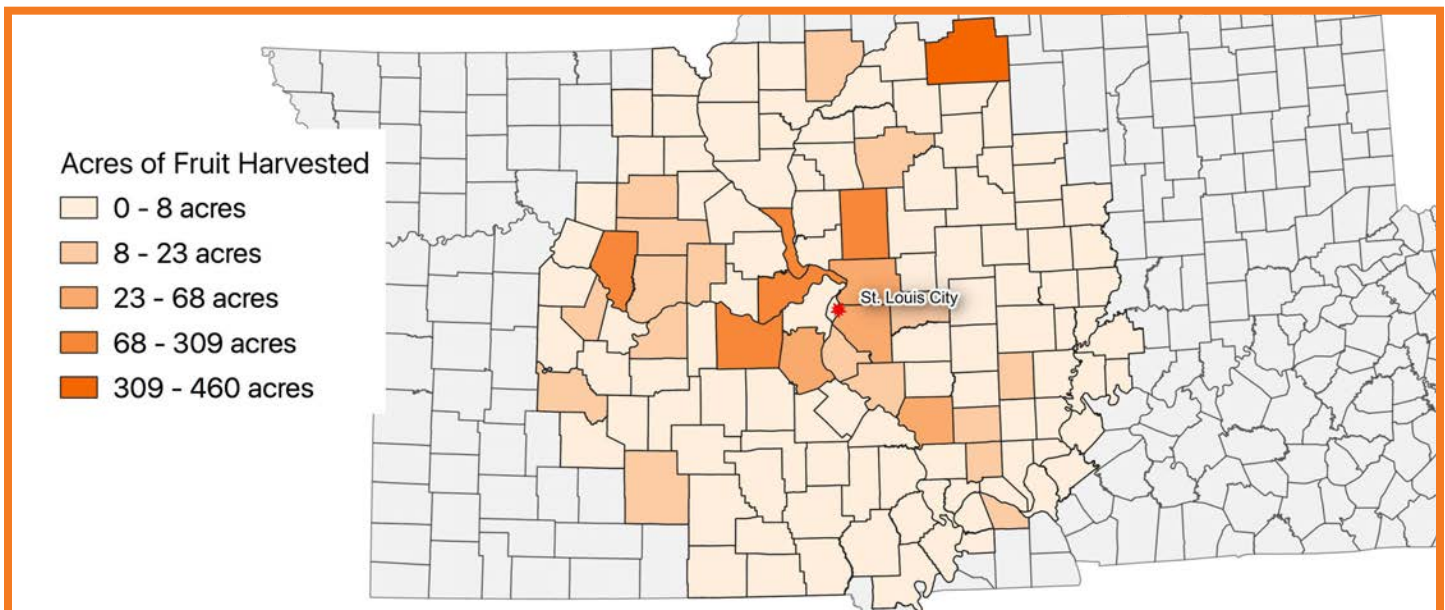
Shelled popcorn was the most-grown crop in the “Food Table” category, with Mason, IL growing the majority of the total 19,000 acres.⁴⁸

In 2007, peaches had the most dedicated land acreage with 1,325 acres—ten years later, peaches only contributed 416 acres to the foodshed and an overwhelmingly majority of the counties producing the crop (67 out of 78 total) had their data withdrawn. Just like previously discussed with horseradish and vegetables generally, this data does not give us the full picture of “Food Table” crops in our Foodshed beyond the fact that there are fewer farms in each county, and therefore less data made public.

The last category of food to discuss is “Food System” crops. “Food System”

crops are largely used for livestock feed, oil, ethanol production, and processed foods, and farmers are encouraged to grow these products by the federal government. The 2018 Farm Bill continues to provide monetary assistance to farmers producing commodity crops such as corn and soybeans through the Farm Bill's Commodity and Crop Insurance Titles⁴⁹—this effectively acts as a financial disincentive to grow specialty crops and employ sustainable agriculture practices.

The largest two “Food System” crops throughout the country and within our Foodshed are corn and soybeans.



MAP 5-4

FOODSHED ACRES BEARING FRUIT AND TREE NUTS, 2017

Crop (Fruits and Tree Nuts)	Acres Harvested (Reported)	Counties with Unreported Acreage/Total Counties Producing Crop	Crop (Fruits and Tree Nuts)	Acres Harvested (Reported)	Counties with Unreported Acreage/Total Counties Producing Crop
almonds	0	3/3	kumquats	0	1/Moniteau, MO
apples	162	68/85	nectarines	0	7/7
apricots	0	12/12	peaches	416	67/78
aronia berries	0	6/6	pears	8	42/49
berries, other	0	3/3	pecans	21	49/53
blackberries	52	54/71	persimmons	1	21/22
blueberries	24	47/55	plums & prunes	3	30/33
cherries, sweet	6	24/29	pomegranates	0	3/3
cherries, tart	2	21/23	popcorn	19,162	6/10
chestnuts	14	18/20	raspberries	2	33/34
elderberries	74	17/19	strawberries	57	53/65
figs	2	2/4	tree nuts, other	0	3/3
hazelnuts	0	9/9	walnuts, English	13	25/28

FIGURE 5-4

FRUIT AND TREE NUTS HARVESTED IN FOODSHED, 2017

Our Foodshed grows 7,744,193 acres of corn for grain and silage and 9,571,522 acres of soybeans. Nearly every county in the Foodshed grew one of the two crops.⁵⁰

Map 5-5 and Map 5-6 depict the acres of corn and soybeans grown across our Foodshed's counties. Figure 5-5 shows all "Food System" crops and their acreage. Figure 5-6 shows the amount of cropland used to grow "Food System" crops over time.

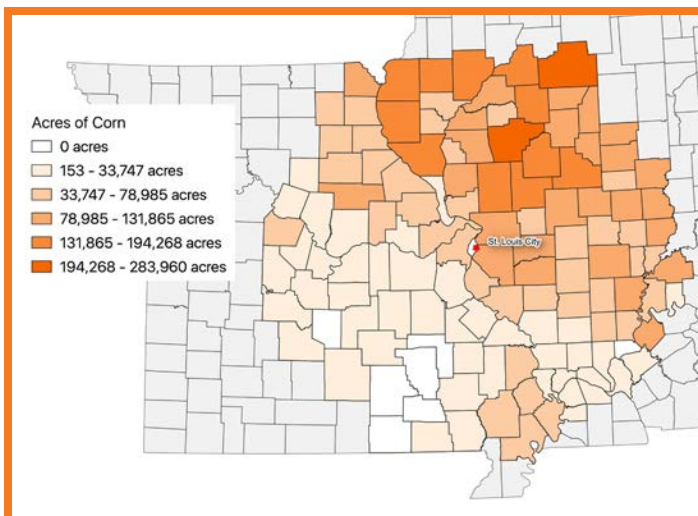
In order to better feed the population of the St. Louis Regional Foodshed, there needs to be a shift from growing "Food System" crops toward growing "Food Table" crops. This will not be

accomplished without some economic incentive for farmers to ensure that their crops will be protected against risky conditions such as weather or market demand. This is difficult with specialty crops such as fruits and vegetables, where products have much fewer uses and less insurance than commodity crops, which are demanded as ingredients in many goods and protected with insurance from the federal government. However, it is necessary to ensure that the people in our Foodshed can consume nutritious foods as well as benefit from a thriving economy by keeping food dollars in our region.

Crop (Food System)	Acres Harvested (Reported)	Counties with Unreported Acreage/Total Counties Producing Crop
barley	1,136	16/24
buckwheat	0	2/2
corn, grain	7,652,028	2/123
corn, silage	92,165	23/109
emmer & spelt	168	1/4
hay	1,544,172	2/128
haylage	145,824	4/126
hops	0	4/4
grapes	600	66/82
oats	5,221	25/60
rice	113,299	3/8
rye	3,500	20/42
sorghum, grain	22,002	30/77
sorghum, silage	716	25/32
sorghum, syrup	12	2/4
soybeans	9,571,522	5/126
triticale	0	7/7
wheat	755,834	6/121

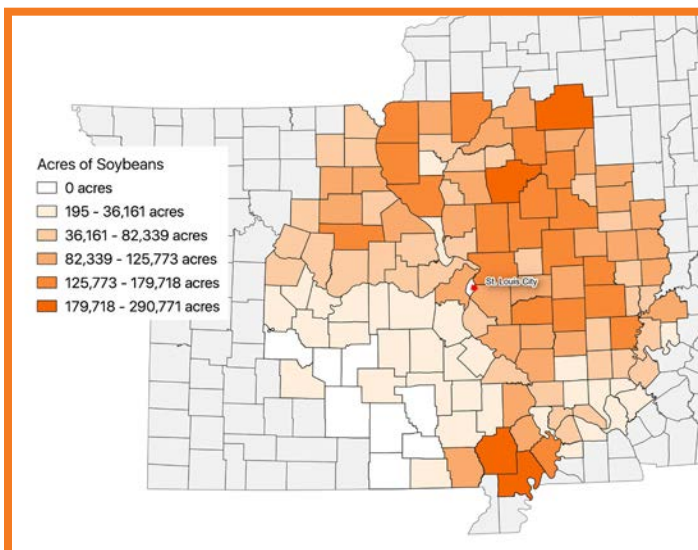
FIGURE 5-5

FOOD SYSTEM CROPS HARVESTED IN FOODSHED, 2017



MAP 5-5

FOODSHED ACRES HARVESTED FOR CORN, 2017



MAP 5-6

FOODSHED ACRES HARVESTED FOR SOYBEANS, 2017

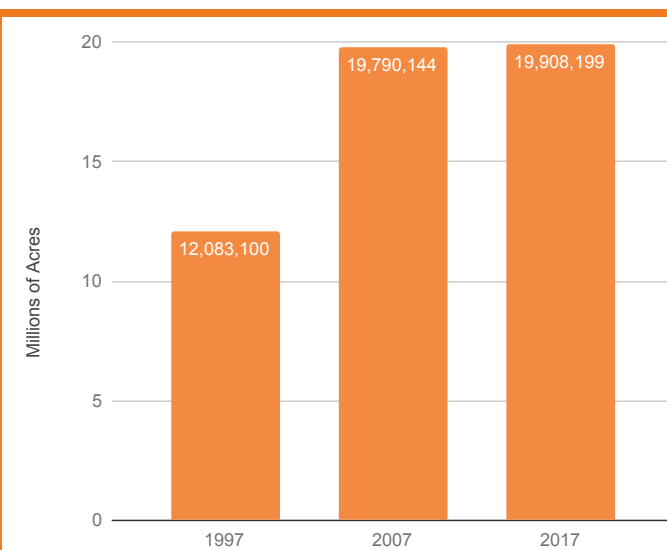


FIGURE 5-6

FOODSHED "FOOD SYSTEM" CROPLAND ACRES, 2007-2017

CHAPTER 6

What We Raise

The St. Louis Regional Foodshed raises a variety of animals for products such as meat, wool, hair, and milk. Over 25 different types of animals were reported to be raised in the Foodshed by the 2017 USDA Census of Agriculture as shown in Figure 6-1.

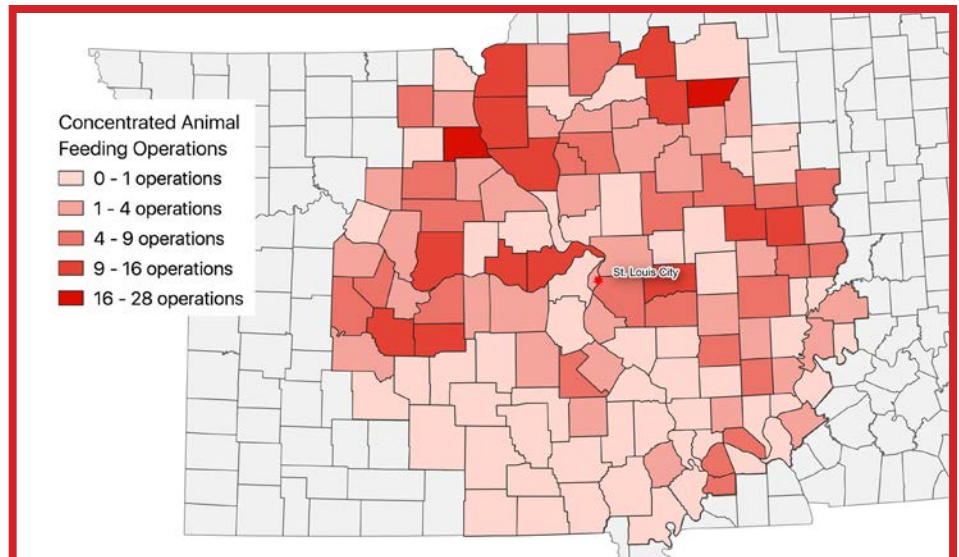
Beef cows and horses and ponies are the most popular livestock, with at least one operation in all 128 counties raising the animals.⁵¹

However, the animals with the highest total inventory are broiler chickens raised specifically for chicken meat.

In 2017, our Foodshed raised over 14 million broiler chickens.⁵²

The huge number of broiler chickens reflects the large quantity of Concentrated Animal Feeding Operations (CAFOs) located within our Foodshed. Map 6-1 shows the number of operations spread across the counties. CAFOs in our Foodshed raise cattle, chickens, hogs, and turkeys in indoor feedlots to produce

meat, dairy, or eggs in huge quantities. These operations use processed, “Food System” crops such as corn to feed their animals and emphasize maximizing output while minimizing input. However, CAFOs’ practices of livestock production create many environmental issues—waste from the operations pollutes surrounding



MAP 6-1

FOODSHED CONCENTRATED ANIMAL FEEDING OPERATIONS, 2013

Animal	Number of Animals in Inventory	Counties with Unreported Number/Total Counties Raising Animal	Animal	Number of Animals in Inventory	Counties with Unreported Number/Total Counties Raising Animal
alpacas	1,940	27/53	goats, total	52,692	6/127
bison	100	18/21	goats, angora	884	21/47
cattle, including calves	2,201,336	0/128	goats, meat & other	32,624	37/123
cattle, beef cows	912,400	30/128	goats, milk	10,152	51/114
cattle, milk cows	75,544	30/113	guineas	4,129	35/93
chickens, broilers	14,092,745	29/109	llamas	355	31/48
chickens, egg layers	1,326,694	12/125	ostriches	0	5/5
chukars	20	11/12	peafowl, hens & cocks	1,060	25/59
deer	1,175	32/37	pheasants	19,490	18/22
ducks	7,827	29/114	pigeons & squab	4,736	18/32
elk	99	11/13	poultry, other	833	10/14
emus	0	12/12	quail	2,141	19/26
horses & ponies	61,427	0/128	rabbits, live	2,218	42/74
mules & burros & donkeys	7,661	8/126	sheep, including lambs	81,721	3/124
hogs & pigs	4,150,306	18/125	turkeys	3,666,741	44/104
geese	1,645	32/71			

FIGURE 6-1

ANIMALS RAISED IN FOODSHED, 2017

water and air, negatively affecting the health of surrounding populations and the ecosystems of the connecting waterways.

Our Foodshed had a total of 481 Concentrated Animal Feeding Operations in 2013.⁵³

Although it would theoretically be better for our health for the number of CAFOs to decrease, we can expect that as farms intensify their production and grow in scale, there will be fewer but larger livestock farms in operation. This means that even if the number of CAFOs are decreasing, their negative impact will increase if operations get bigger and pollute more.

The growth and intensification of the agricultural industry has resulted in fewer local animal products being supplied to consumers. According to proposed federal bill H.R. 2933, the top four largest pork packers have controlled 71% of the national market over the past thirty years.⁵⁴ In the same time span, the top four beef, sheep, poultry, and fluid milk processors have controlled 85%, 57%, 53%, and 50% of the market, respectively. This oligopoly in agriculture has specifically resulted in a few companies controlling large CAFOs in Missouri. China's Smithfield Foods owns several operations in the Foodshed, as does Brazil's JBS. Since these large industrial producers are not locally owned, food dollars are leaving the region while also polluting local communities.

Recent policy changes in the state of Missouri have significantly impacted the state of the Foodshed in terms of how its food production affects health. Recently, the enactment of Missouri Senate Bill 391 prevented counties from passing regulations on CAFOs that are more stringent than state rules. The result of this rule means that communities, particularly rural ones, cannot protect themselves from detrimental air and water pollution on the local level.

In order to promote the well-being of local farmers, grow a flourishing farm economy, and minimize the impact that CAFOs have on Foodshed residents, we need to prioritize competitive markets rather than allowing livestock production

Pollutant/Emission	Source	Health Risks/Environmental Impact
WATER POLLUTION		
nitrates	land application of manure, leaching from improperly spread manure, leaks or breaks in storage or containment units of manure	blue baby syndrome; higher rates of stomach, esophageal, ovarian, and thyroid cancer; birth defects
hormones		alter reproductive habits of aquatic species and decreased fertility of fish
fecal bacteria, pathogens		fever, nausea, stomach cramps, typhoid fever, hepatitis, gastroenteritis, dysentery, and ear infections (contact through swimming)
nitrogen/phosphorus runoff		harmful algal blooms cause vomiting, diarrhea, confusion, seizures, permanent short term memory loss, or death
AIR POLLUTION		
ammonia	microbes decompose undigested organic nitrogen compounds in manure	respiratory irritant, chemical burns to the respiratory tract, skin, and eyes, severe cough, chronic lung disease
hydrogen sulfide	anaerobic bacterial decomposition of protein and other sulfur containing organic matter	inflammation of the moist membranes of eye and respiratory tract, olfactory neuron loss, death
methane	microbial degradation of organic matter under anaerobic conditions	greenhouse gas contributes to climate change
particulate matter	feed, bedding materials, dry manure, unpaved soil surfaces, animal dander, poultry feathers	chronic bronchitis and respiratory symptoms, decline in lung function, organic toxic dust syndrome

FIGURE 6-2

POTENTIAL IMPACTS OF CAFO POLLUTANTS⁶⁴



FIGURE 6-3

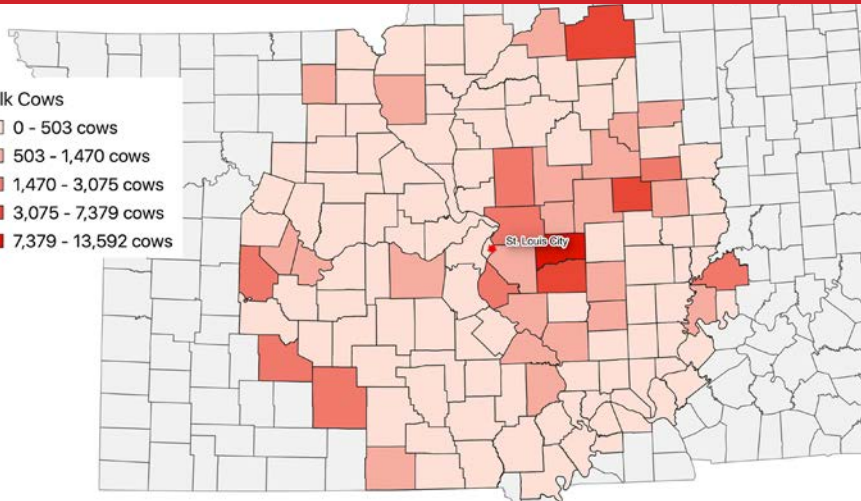
HOG CAFO, IMAGE COURTESY OF EPA

to be dominated by one or a few large companies. On an individual level, it is important to purchase animal products from local, environmentally responsible businesses such as those in MCE's Known and Grown program.

Figure 6-2 shows some environmental and human health impacts that may be

caused by animal feeding operations. Missouri Coalition for the Environment is working to further analyze the impact CAFOs have on our Foodshed residents' health and the market for livestock production in order to advocate for healthier, more sustainable agriculture policies. Figure 6-3 shows a hog CAFO.

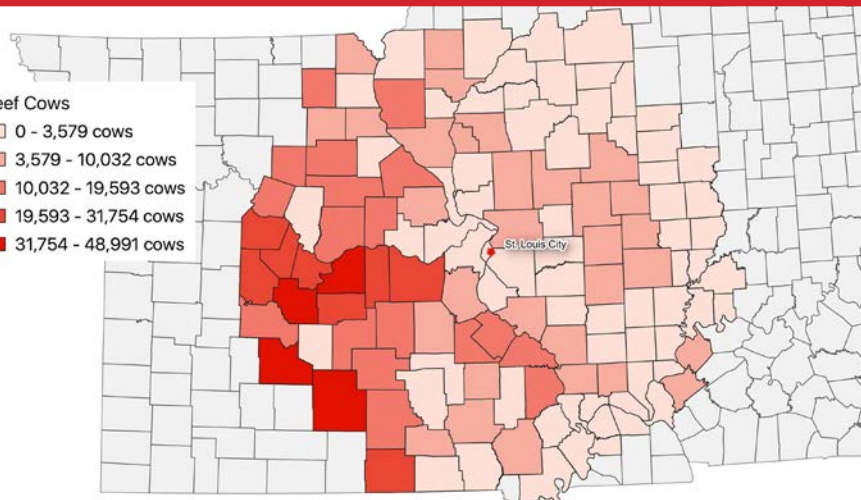
Milk Cows



MAP 6-2

FOODSHED COUNTIES BY NUMBER OF MILK COWS INVENTORIED, 2017

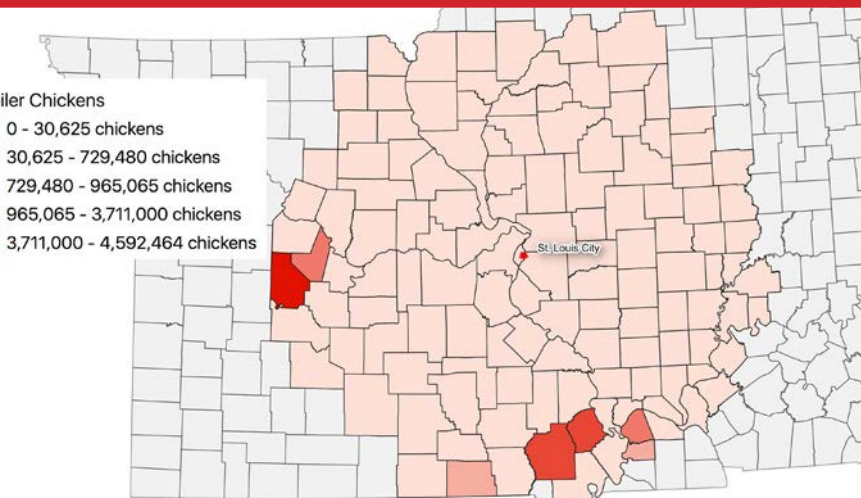
Beef Cows



MAP 6-3

FOODSHED COUNTIES BY NUMBER OF BEEF COWS INVENTORIED, 2017

Broiler Chickens



MAP 6-4

FOODSHED COUNTIES BY NUMBER OF BROILER CHICKENS INVENTORIED, 2017

The livestock grown for the most commonly consumed animal products are cows for milk and beef, poultry for chicken meat and eggs, and hogs for pork.

**In our Foodshed,
over 75,544 milk
cows were in
inventory in 2017.⁵⁵**

Over the past decade, the number of operations raising cattle in our Foodshed for milk has decreased, resulting in fewer local dairy options available to Foodshed residents. According to the USDA's Dairy Forecasts,⁵⁶ the nation-wide average of milk produced from each cow is 21,346 lbs per year. Based on this estimate, the reported milk cows in our Foodshed can produce an estimated total of 193 million gallons of milk each year. Considering the growing demand for dairy products such as cheese and yogurt⁵⁷ as well as the fact that dairy operations within the Foodshed are also exporting their products, this creates a deficit of milk needed in our Foodshed, requiring food producers to import milk and dairy products from other areas of the country. Map 6-2 shows the distribution of dairy cows and Map 6-3 shows beef cows in the St. Louis Regional Foodshed.

**Foodshed farm
operations
produced over
912,400 beef cows
in 2017.⁵⁸**

A large majority of beef cows in our Foodshed are raised in the Missouri counties. This can perhaps be attributed to specialization of farms—while Illinois farms have a lot of cropland to grow commodity and speciality crops, Missouri dedicates its land in farms to raising livestock.

Since cows are the most land-intensive source of protein, it is important to critically analyze our Foodshed's consumption of these animals and their products and how this consumption affects the overall health of our Foodshed. Cattle not only require the most land, but they also have very inefficient feed to meat ratios. Researchers from Bard College, the Weizmann Institute of Science and Yale University calculated the feed costs for each class of animal in addition to data about land area, water, and fertilizer.

They found that “beef requires 28 times more land, six times more fertilizer and 11 times more water” in comparison to pork, chicken, dairy, and eggs.⁵⁹

In addition, cows contribute to climate change by producing large amounts of methane, a critical greenhouse gas, that ends up in the atmosphere. The result of this is not confined to the Foodshed; rather, its effect is far-reaching and impacts individuals around the globe. We will discuss more about the relationship between agriculture and climate change in Chapter 8.

Broiler, or chicken for meat, production has rapidly increased as an increasing number of consumers have substituted chicken meat for beef and pork nationwide.⁶⁰

Chicken meat is comparably more efficient to produce than producing beef and pork. Chickens require much less water and feed than the larger cattle and hogs, allowing farmers to raise a significantly higher number of the animals while also producing lower amounts of greenhouse gases.

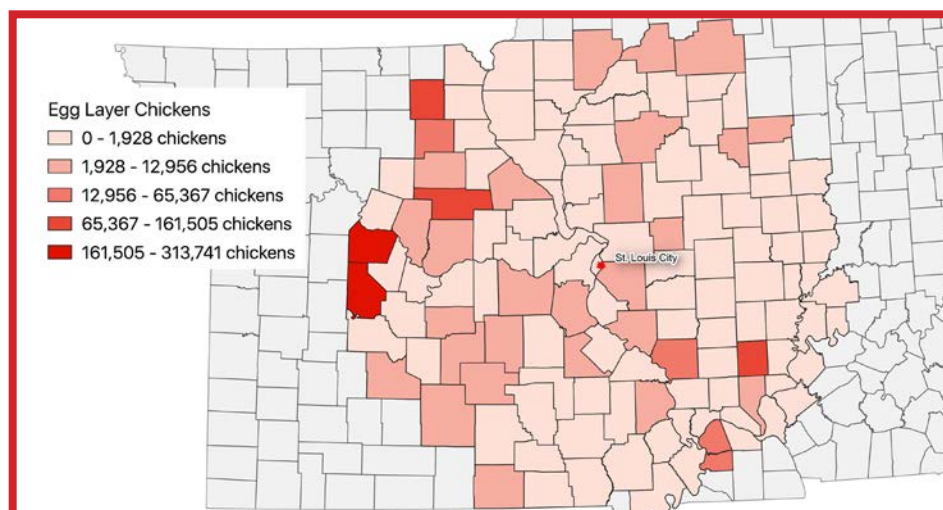
Our Foodshed raised a total of 15,419,466 chickens for broiler meat and egg laying.⁶¹

In addition to chicken meat being more sustainable, it is also touted as a healthy protein option because it is leaner than beef or pork. Chicken meat is also cheaper than beef or pork. Map 6-4 shows the distribution of broiler chickens inventoried across the Foodshed.

Map 6-5 shows the distribution of egg layer chickens inventoried across the Foodshed.

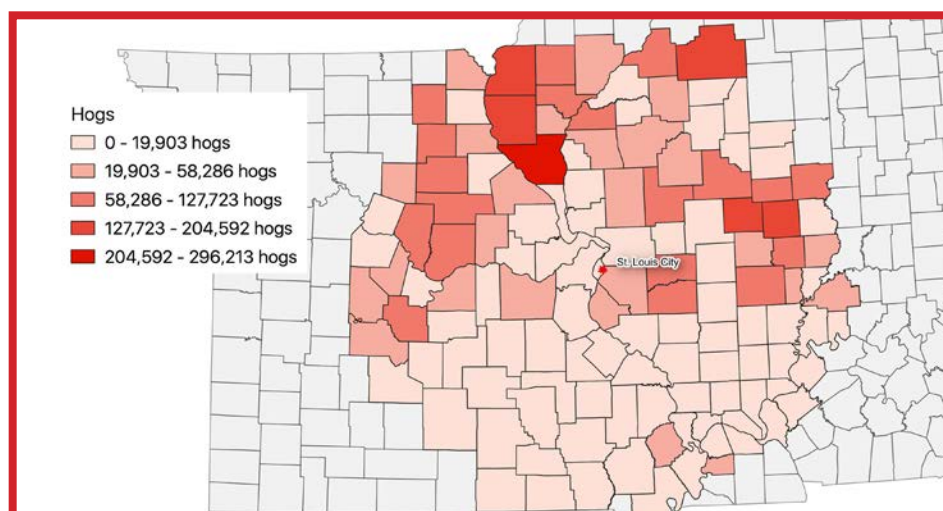
Although poultry and eggs are relatively more sustainable to produce than beef and pork, it is important to note that the poultry and egg industry is a major user of feed grains. This means that the poultry and egg industry, especially CAFOs, relies on food system crops such as corn to produce the grains that feed the chickens. Therefore, if demand for poultry and eggs continues to grow, it is likely that this will increase demand for food system crops. This would prevent growers from being able to produce specialty crops such as fruits and vegetables, unless there is significant change in consumer demand for chicken products that are pasture-raised.

However, chickens for meat and eggs can be raised responsibly and humanely, especially in urban settings. In 2017, Mayor



MAP 6-5

FOODSHED COUNTIES BY NUMBER OF EGG LAYER CHICKENS INVENTORIED, 2017



MAP 6-6

FOODSHED COUNTIES BY NUMBER OF HOGS INVENTORIED, 2017

Lyda Krewson signed a bill allowing St. Louis residents to keep up to eight chickens in their homes, accommodating growing interest in local food. Although a related bill also allowing residents to keep goats, sheep, and larger birds like ostriches failed to pass, it is important to recognize the progress our Foodshed is making and to keep in mind other cities on which we can model urban agriculture, particularly to ensure we are raising animals responsibly and humanely.

In comparison to chickens, which are raised in highest concentrations in Missouri Foodshed counties, hogs are raised in relatively high concentrations across the top half of the Foodshed region. Map 6-6 shows Foodshed counties by the number of hogs inventoried, and depicts that Illinois counties in particular have high concentrations.

4,150,306 hogs and pigs were raised in 107 counties out of the 125 counties with hog production.⁶²

A number of CAFOs produce pork in our Foodshed, contributing a significant amount to the hogs raised. The St. Louis Regional Foodshed plays a role in contributing to the global supply of pork—in 2017, Missouri was the seventh largest exporter of pork in the U.S. with \$281.5 million of exports.⁶³

CHAPTER 7

Food Safety and Security

Food safety in our Foodshed is threatened by our farming practices from pollution from CAFOs to application of toxic fertilizers and pesticides, from the use of genetically-modified seeds for monoculture production to foodborne pathogens. As the industry intensifies production and emphasizes economic gain over the nutrition of the food it grows, producers are placing consumers at risk.

Most notably within our Foodshed is The Monsanto Company, acquired by Bayer in 2018, which genetically engineers seeds and creates chemicals for crop protection such as Roundup. This company poses an immediate threat to food safety, as seen in the recent case, *Hardeman v Monsanto Co.*, against Monsanto and its Roundup weed killer—on July 15, 2019, U.S. District Judge Vince Chhabria decided to award \$25.27 million in damages to a California man who claimed using Roundup caused his cancer. While the judge also refused Bayer's bid for a new trial, the case was notable because while it gave validity to claims that Bayer and Monsanto's products had detrimental effects on health, the judge also made the decision to slash the damages from the original \$80.27 million.

“More than 13,400 plaintiffs who have sued Bayer and Monsanto over Roundup, saying the herbicide’s active ingredient, glyphosate, is unsafe.”⁶⁵

Having a large corporation like Monsanto within our Foodshed means that it is extremely likely that their interests sway the policies and regulation of agricultural lands around them. This means that the economic value that selling Roundup, genetically modified seeds, and other products makes it less likely for policymakers to regulate distribution, much less prevent it.

In 2015, the World Health Organization's



FIGURE 7-1

SOYBEAN PLANT DAMAGED BY HERBICIDES
IMAGE COURTESY OF UNITED SOYBEAN BOARD

International Agency for Research on Cancer (IARC) reviewed insecticides and declared that glyphosate is “probably carcinogenic to humans.”⁶⁶ In order to protect the farmers and the consumers within the St. Louis Regional Foodshed, there needs to be more urgency given to policy based on science the science telling us that glyphosate is unsafe and must be banned.

Bayer-Monsanto is one of three companies that are registered with the EPA to use dicamba, a toxic agricultural chemical like glyphosate. Dicamba was developed as an herbicide for genetically-modified varieties of soybeans and cotton which are resistant to the chemical. This has caused a lot of conflict in agricultural communities since Bayer-Monsanto released new dicamba-resistant seeds in 2016, because dicamba not only kills weeds, but any crop varieties which have not been engineered for resistance.

In the fall of 2016, a Missouri farmer allegedly shot and killed his neighbor, Mike Wallace, when the men met up to address Wallace's concerns about dicamba drifting onto his property.⁶⁷ Dicamba is

highly volatile and soluble, which means it travels easily through air and groundwater, and often drifts into nearby fields where crops are not resistant. When dicamba registration was extended in 2018, the EPA made certain changes to the pesticide label “to further minimize the potential for off-target movement.”⁶⁸ However, in 2018 there were still thousands of complaints reported to the Association of American Pesticide Control Officials (AAPCO) about crop damage from dicamba drift.⁶⁹

Concerns about dicamba exposure reflect a larger conflict in the agricultural community between independent farmers and agribusiness. Small farmers can't protect their crops against dicamba drift, while agricultural companies like Bayer-Monsanto continue to apply these herbicides because they help increase production for resistant crop varieties. Small farmers may resort to buying expensive, genetically-modified seeds from these companies so their crops won't fail because of chemical exposure. In turn, our Foodshed loses seed variety and puts more money in the pockets of corporations.

CHAPTER 8

Climate Change and Agriculture

Climate change is an essential topic to discuss when reviewing the quality of our environment, the consequences of our farming practices, and the health of our Foodshed's people.

18% of all U.S. land is cropland, and “soil management is the largest source of agricultural greenhouse gas emissions”.⁷⁰

Poor soil management practices such as leaving soil bare, using chemical fertilizers, and overplowing reduce soil biodiversity and organic matter and prevent the formation of deep, complex root systems.⁷¹ Not only does this make farm land more vulnerable to erosion, but it also may result in fertilizer running into waterways to pollute water.

Some examples of good soil management practices are agroforestry practices like alley cropping, forest farming,⁷² riparian buffers,⁷³ silvopasture, and windbreaks.⁷⁴ To learn more about these practices, check out the [Savanna Institute's resources](#).

Aside from soil management practices, other aspects of agriculture also affect land use and water use.

As commercial animal agriculture expands to meet the global demand for meat, the Amazon rainforest is shrinking. JBS S.A., a Brazilian meat processing company, is the world's largest supplier of beef, chicken, and leather. An investigation found that companies in the JBS supply chain may be responsible for about 18% of 5,800 square kilometers of Brazilian Amazon that is cleared and converted into livestock pasture each year. JBS also owns an American food processing company, which operates hog farms in Missouri. Early this year, the USDA promised to buy \$1.2 million of American pork, beef, and produce, to offset these industries' losses from Donald Trump's international trade wars. So far, more than 26% of the money allocated for pork has gone to JBS USA. Effectively, our taxpayer dollars are propping up a foreign company which is responsible for deforestation in one of the world's greatest ecological assets.

Commercial agriculture is also water-intensive—especially livestock agriculture. Livestock animals require drinking water, but a significant amount of water also goes into growing their feed, washing barns, flushing waste from pits and lagoons, and applying waste to fields.

816,000 gallons of water are used during the average lifespan of a beef cow.

This includes 6,300 gallons for it to drink; 808,400 gallons for its pasture, feed and hay; and 1,900 gallons for cleaning barns, waste facilities, and farmyards. When considering all of these water demands, animal consumption has a tremendous water footprint. Field crops are typically more water-intensive than fruits and vegetables, however all of these foodstuffs have markedly lower water footprints per pound than animal products.

Agriculture accounts for approximately 80% of consumptive water use in the United States, and as much as 90% in Western states which experience less rainfall.⁷⁵ The agriculture industry draws from both groundwater and surface water sources; efficient water irrigation systems are fundamental to improve agricultural water management. In arid and semi-arid climates, irrigation systems can deplete groundwater systems⁷⁶ and increase drought conditions. In wet environments, water drainage systems may benefit crops but they can also increase agricultural pollution from field runoff.⁷⁷ This serves as evidence that, without proper management, agricultural irrigation and drainage systems exacerbate environmental harm.

In addition to agriculture affecting climate, climate change also affects agriculture—drastic changes in climate result in poor farming conditions. Climate change exacerbates weather such as intense rainfall, flooding, drought, and wind. Global increases in average temperature also result in melting icecaps, which in turn raise sea-levels, eroding coastal land.

Along with the farm production and economic costs of climate change degrading agricultural land, we must consider the cost of climate change on food security as well.

Endnotes

1 Counties considered within the 150-mile radius of St. Louis City had at least 50% of their land area within the 150-mile boundary. The 129 counties included in our Foodshed were: Audrain, MO; Bollinger, MO; Boone, MO; Butler, MO; Callaway, MO; Camden, MO; Cape Girardeau, MO; Carter, MO; Clark, MO; Cole, MO; Cooper, MO; Crawford, MO; Dent, MO; Franklin, MO; Gasconade, MO; Howard, MO; Iron, MO; Jefferson, MO; Knox, MO; Laclede, MO; Lewis, MO; Lincoln, MO; Madison, MO; Maries, MO; Marion, MO; Miller, MO; Mississippi, MO; Moniteau, MO; Monroe, MO; Montgomery, MO; Morgan, MO; New Madrid, MO; Oregon, MO; Osage, MO; Perry, MO; Phelps, MO; Pike, MO; Pulaski, MO; Ralls, MO; Randolph, MO; Reynolds, MO; Ripley, MO; St. Charles, MO; Ste. Genevieve, MO; St. Francois, MO; St. Louis, MO; St. Louis City, MO; Scott, MO; Shannon, MO; Shelby, MO; Stoddard, MO; Texas, MO; Warren, MO; Washington, MO; Wayne, MO; Adams, IL; Alexander, IL; Bond, IL; Brown, IL; Calhoun, IL; Cass, IL; Christian, IL; Clark, IL; Clay, IL; Clinton, IL; Coles, IL; Crawford, IL; Cumberland, IL; De Witt, IL; Douglas, IL; Edwards, IL; Effingham, IL; Fayette, IL; Franking, IL; Fulton, IL; Gallatin, IL; Greene, IL; Hamilton, IL; Hancock, IL; Hardin, IL; Jackson, IL; Jasper, IL; Jefferson, IL; Jersey, IL; Johnson, IL; Lawrence, IL; Logan, IL; McDonough, IL; McLean, IL; Macon, IL; Macoupin, IL; Madison, IL; Marion, IL; Mason, IL; Massac, IL; Menard, IL; Monroe, IL; Montgomery, IL; Morgan, IL; Moultrie, IL; Perry, IL; Piatt, IL; Pike, IL; Pope, IL; Pulaski, IL; Randolph, IL; Richland, IL; St. Clair, IL; Saline, IL; Sangamon, IL; Schuyler, IL; Scott, IL; Shelby, IL; Tazewell, IL; Union, IL; Wabash, IL; Washington, IL; Wayne, IL; White, IL; Williamson, IL; Gibson, IN; Posey, IN; Vanderburgh, IN; Ballard, KY; Carlisle, KY; Crittenden, KY; Livingston, KY; McCracken, KY; Union, KY.

2 County Totals: Annual Population Estimates, U.S. Census (April 2019), https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=PEP_2018_PEPANNRES&prodType=table (add geographies for Illinois, Indiana, Kentucky, and Missouri and select counties in Foodshed).

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36 2017 Census of Agriculture, Table 8.

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