

Agricultural land lost to development in Ohio

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Introduction

A topic of increasing interest in Ohio, conversion of agricultural land to developed land is examined.

Highlights of our findings are:

- Between 2001 and 2021, agricultural land in Ohio has declined by 268,430 acres or 2.04%.
- Development accounted for 48% of the decline in agricultural land.
- Ohio's loss of agricultural land is close to the 55% average for eight Midwest states examined by Islam, Katchova, and Zulauf (2024).
- Conversion of agricultural to developed land is concentrated in Ohio's 14 Metropolitan Statistical Areas (MSAs). They accounted for 78% of all Ohio's agricultural land lost to development.
- Franklin and Delaware Counties within the Columbus MSA lost the most agricultural land to development during the 21st Century: 13,170 and 9,547 acres, respectively.
- Within the City of Columbus, 19,670 agricultural acres were lost to development inside a 3-mile distance from the city boundary. The cities of Toledo and Dayton had the next highest ag-to-development loss inside the 3-mile distance: 1,976 and 1,901 acres, respectively.

Data Sources

The National Land Cover Database (NLCD), produced by the Multi-Resolution Land Characteristics (MRLC) consortium, is likely to be the most accurate data set for studying the conversion of agricultural land to development. It has leading-edge capabilities for assessing and projecting changes in land cover. The current analysis uses two satellite images and other supplementary cartographic datasets to analyze

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land use change from 2001 to 2021, the earliest and latest years in the dataset. A wide variety of land conversions can be studied. In this article, we focus solely on the conversion of agricultural to developed land. Data Note 1 contains a detailed description of the definitions of the NLCD land categories.

Agricultural land lost to development in Ohio

According to NLCD images, Ohio's agricultural land decreased 268,430 acres or 2.04% from 13,115,911 acres in 2001 to 12,847,481 acres in 2021. This is a net change that accounts for both losses and gains in agricultural land.

Conversion to development accounted for only 48% of Ohio's loss of agricultural land (see Table 1). Ag-to-development conversion was likely due to activities such as urbanization and infrastructure expansion. Other agricultural land losses include conversion to forest, barren land, open water, and grassland.

Agricultural land lost to development in Ohio in Midwest Context

Ohio's percent loss of agricultural land was nearly twice that of the average for the eight Midwestern states—Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin—examined by Islam, Katchova, and Zulauf (2024). In terms of ag acres lost to development, Ohio ranks second among the eight states. Only Missouri lost more agricultural land (322,499 acres).

Despite its large relative loss of agricultural land, development accounted for a lower share in Ohio than in the eight Midwestern states as a group (see Table 1). Development's 48% share of lost agricultural land in Ohio was the second lowest percentage among the eight Midwestern states. Iowa had the highest share at 90% (Islam, Katchova, and Zulauf, 2024).

Table 1: Comparison of agricultural land lost to development, Ohio in Midwest Context

State	Ag land 2001 (acres)	Ag land 2021 (acres)	Ag land lost (acres)	Ag land lost to development (acres)	Ag land lost to development (%)
Ohio	13,115,911	12,847,481	268,430	128,486	48%
Eight Midwest States	150,312,467	148,716,812	1,595,655	877,386	55%

The following map of Ohio portrays areas of current developed land (as of 2021) that were converted from former agricultural land over the past two decades (Figure 1).

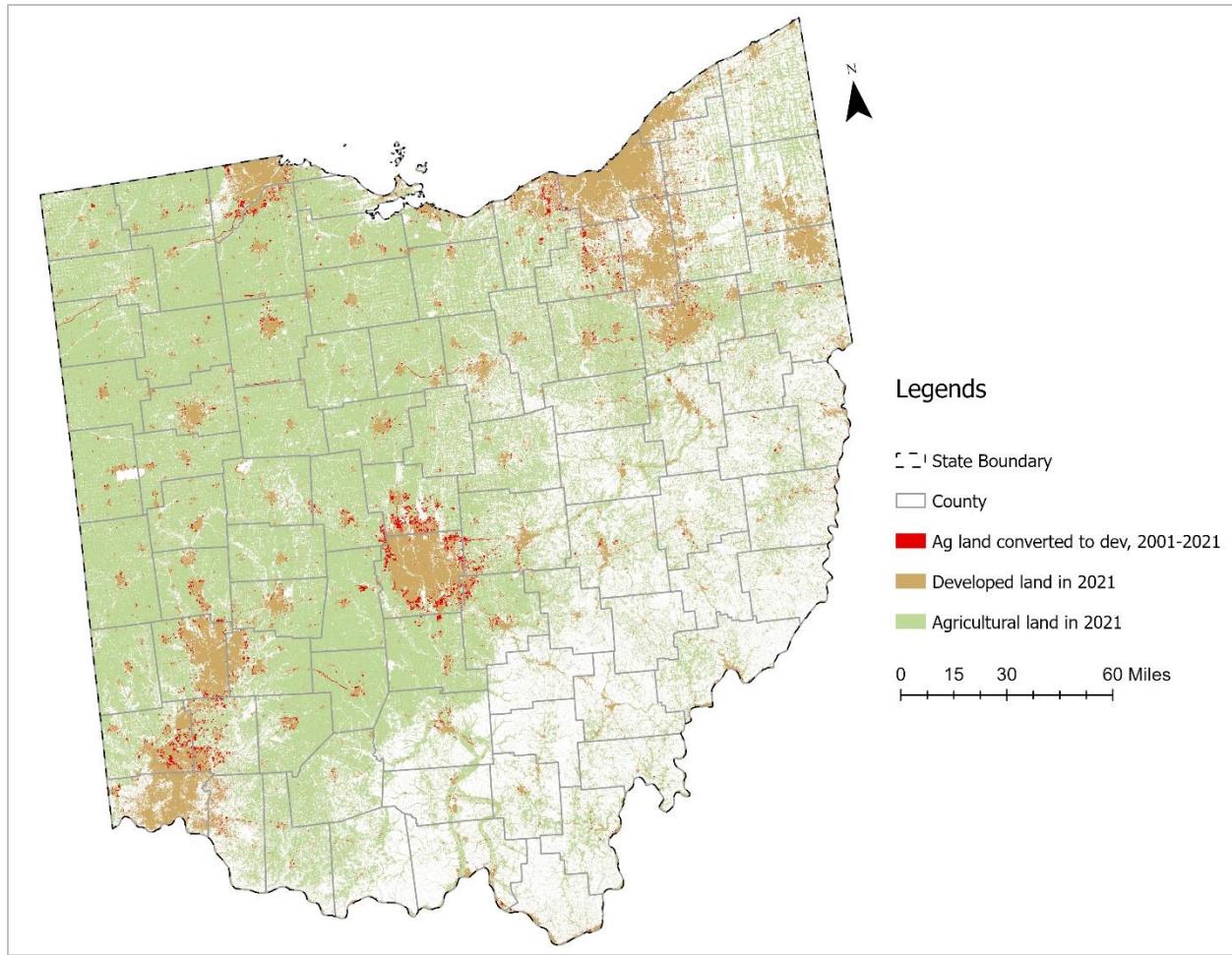


Figure 1: Agricultural land converted to development between 2001 and 2021 in Ohio

Ohio Agricultural land lost to development by Metropolitan Statistical Areas (MSAs)

Metropolitan Statistical Areas (MSAs) play a prominent role in the location of the conversion of agricultural land to developed land. The Office of Management and Budget (OMB) defines an MSA as a geographical region consisting of a core city with “a population of at least 50,000” and maintaining strong economic and social interactions between the core city and the surrounding communities. Ohio has 14 MSAs. Five share a boundary with Indiana, Kentucky, West Virginia, and Pennsylvania.

Ohio’s 14 MSAs account for 78% of the agricultural land in Ohio lost to development over the last two decades. This share is consistent with the MSA share of 81% in the eight Midwestern states as a group. The Columbus MSA is the largest MSA in Ohio in terms of agricultural land within the MSA, 1.95 million acres in 2021 (see Table 2). The two next largest MSAs in terms of agricultural land are the

Toledo MSA and Dayton MSA, both with 0.67 million acres. Columbus MSA also had the largest number of agricultural land converted to developed land between 2001 and 2021, 37,795 acres (see Table 2 and Figure 2. Cincinnati and Cleveland-Elyria MSAs lost the second and third most agricultural land to development, respectively 17,189 and 12,200 acres. Dayton and Toledo MSAs had 9,510 and 8,698 acres of their agricultural land converted to developed land. All other MSAs had less than 5,000 acres of agricultural land converted to developed land.

Table 2: Agricultural land lost to development, Ohio MSAs, 2001 – 2021

MSA	Ag land	Ag land 2021	Ag land lost to	Ag land lost to
	2001 (acres)	(acres)	development	development
Columbus, OH	2,014,856	1,946,616	37,795	55%
Cincinnati, OH-KY-IN	606,922	574,780	17,189	53%
Cleveland-Elyria, OH	370,149	351,950	12,200	67%
Dayton, OH	686,446	667,597	9,510	50%
Toledo, OH	710,047	670,281	8,698	22%
Akron, OH	138,207	129,062	3,961	43%
Canton-Massillon, OH	265,181	256,520	3,873	45%
Youngstown-Warren-Boardman, OH-PA	225,748	220,196	2,164	39%
Lima, OH	282,122	279,512	1,355	52%
Springfield, OH	394,334	368,168	1,195	5%
Mansfield, OH	192,807	191,166	817	50%
Wheeling, WV-OH	107,129	103,690	749	22%
Huntington-Ashland, WV-KY-OH	33,486	29,246	432	10%
Weirton-Steubenville, WV-OH	59,363	57,391	398	20%

Based on the percent of lost agricultural land converted to developed land, development had the most impact in the Cleveland-Elyria MSA as development accounted for 67% of the loss in agricultural land (see Table 2 and Figure 2). Development's next highest impact was in the Columbus MSA. It accounted for 55% of the loss in agricultural land. Other MSAs for which development accounted for at least half of the loss in agricultural land are Cincinnati (53%), Lima (52%), Dayton (50%), and Mansfield (50%) MSAs.

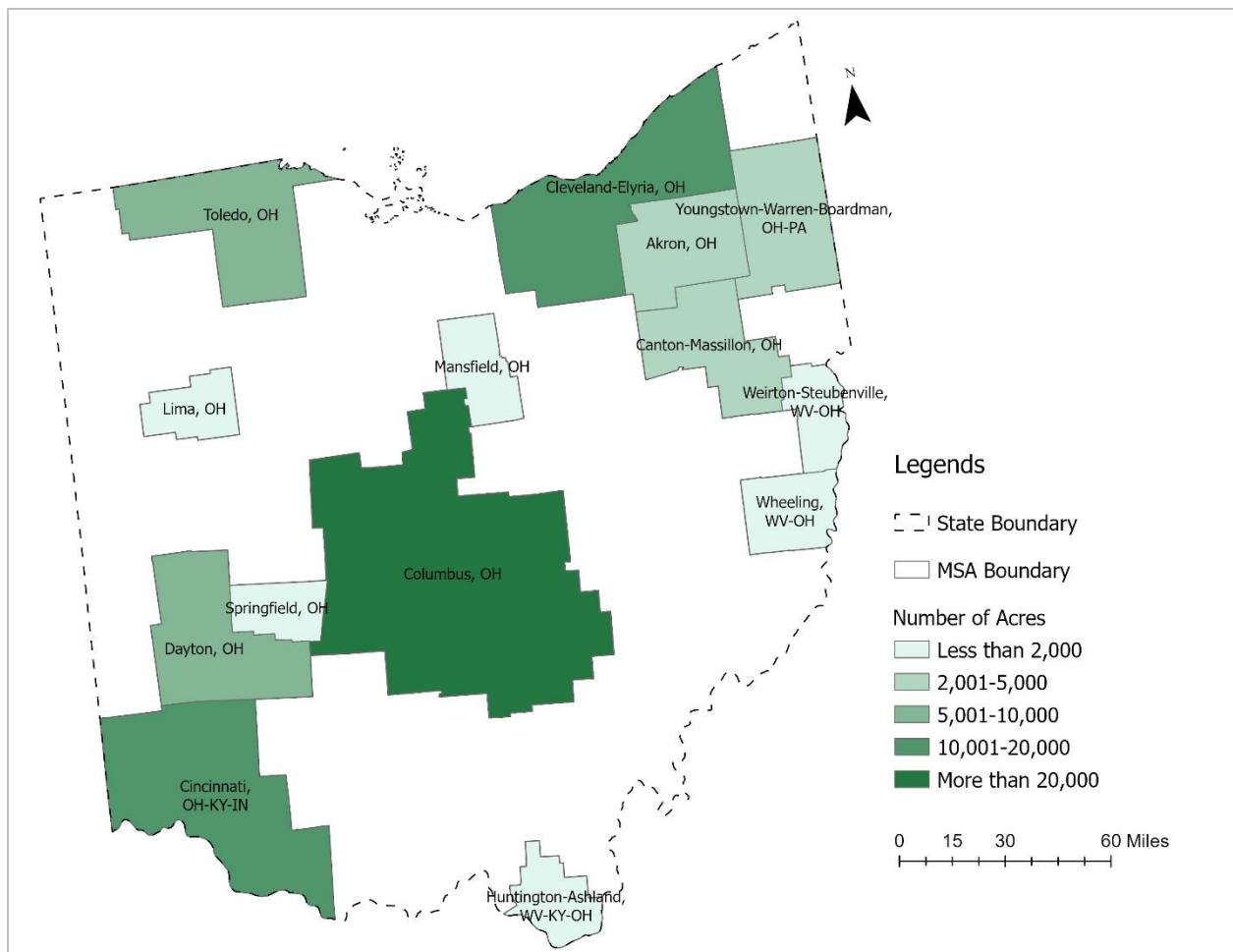


Figure 2: Agricultural land lost to development by MSA (in acres)

Ohio Agricultural land lost to development by County

Table 3 lists the 20 Ohio counties with the most agricultural acres lost to development. Figure 3 presents a visual picture of each county in Ohio.

Franklin County (part of Columbus MSA) lost the most agricultural land to development at 13,170 acres. This was 37% of the total agricultural land converted to developed land in the state of Ohio. Delaware County, also part of Ohio's Columbus MSA, lost the next highest amount of agricultural land to development at 9,547 acres. Third and fourth highest losses were 6,975 acres in Butler County and 6,419 acres in Warren County, both within Ohio's part of the Cincinnati MSA. The rest of Ohio counties lost less than 5,000 acres of agricultural land to development.

Table 3: Agricultural land lost to development in Ohio (top twenty contributing counties)

MSA	County	Ag land 2001 (acres)	Ag land 2021 (acres)	Ag land lost to dev (acres)
Columbus, OH	Franklin	70,432	62,041	13,170
Columbus, OH	Delaware	142,662	131,558	9,547
Cincinnati, OH-KY-IN	Butler	118,213	110,495	6,975
Cincinnati, OH-KY-IN	Warren	107,464	99,498	6,419
Cleveland-Elyria, OH	Medina	104,920	100,467	4,905
Cleveland-Elyria, OH	Lorain	127,624	122,315	4,528
Columbus, OH	Licking	187,870	183,531	4,048
Toledo, OH	Wood	290,086	285,753	4,027
Toledo, OH	Lucas	63,525	59,810	3,935
Canton-Massillon, OH	Stark	137,205	131,911	3,515
Dayton, OH	Montgomery	98,820	93,754	3,501
Columbus, OH	Fairfield	171,167	167,155	2,897
Columbus, OH	Union	144,774	151,058	2,758
Dayton, OH	Greene	119,272	115,897	2,318
Dayton, OH	Miami	166,790	166,070	2,128
Outside MSA	Hancock	211,801	217,757	2,075
Akron, OH	Summit	23,248	20,102	2,053
Outside MSA	Wayne	211,384	208,641	1,795
Akron, OH	Portage	99,327	95,567	1,766
Columbus, OH	Pickaway	121,993	128,877	1,733

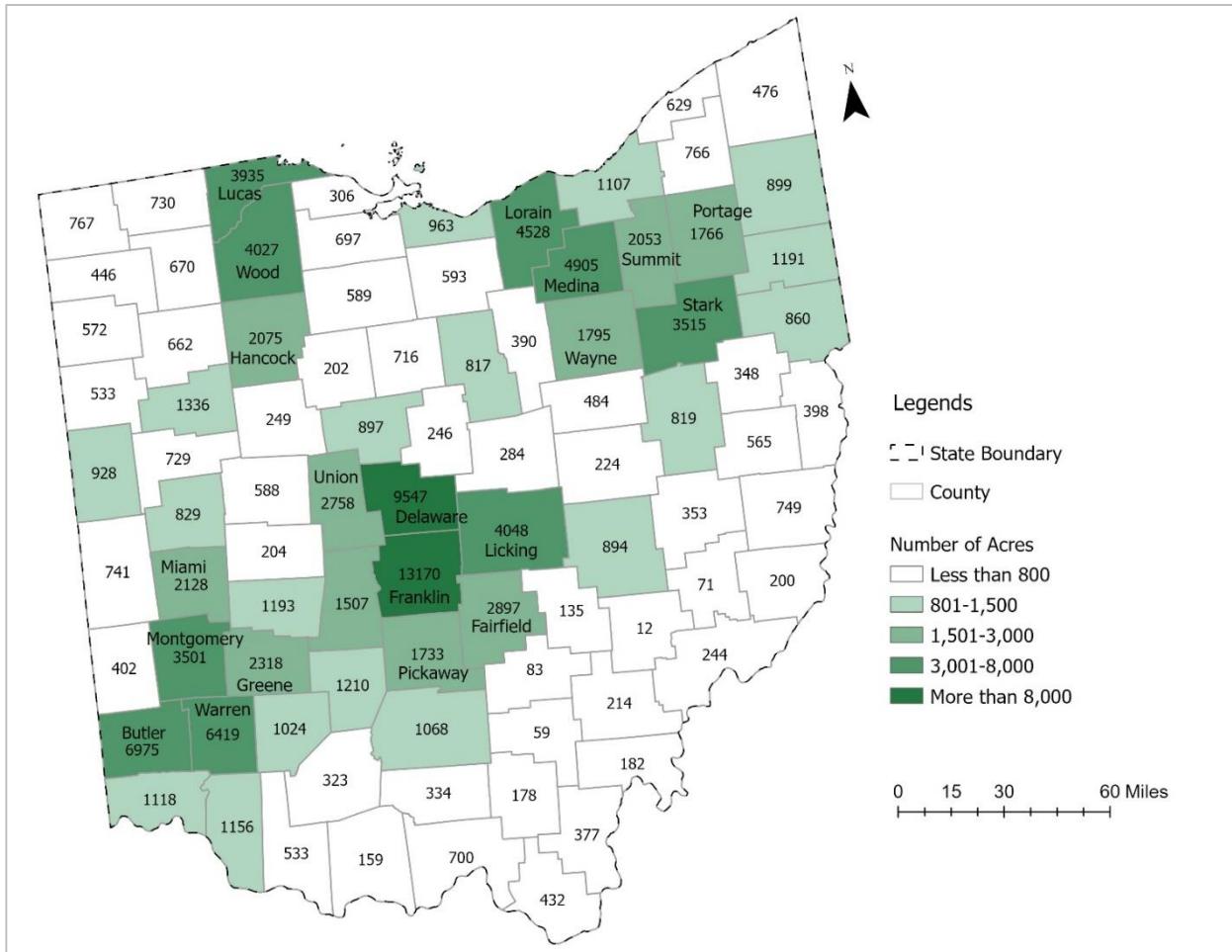


Figure 3: Agricultural land lost to development by county (in acres)

Agricultural land lost to development by city

Table 4 lists the 9 Ohio cities with the most agricultural acres lost to development. Figure 4 presents a detailed visual picture for Columbus, which had the highest loss of agricultural land due to development close to its city boundaries.

Most agricultural land lost to development occurs in near proximity to a city's boundary. The City of Columbus lost 19,670 acres of agricultural land to development within 3 miles of its city boundary. The Cities of Dayton and Toledo lost 1,976 acres and 1,901 acres, respectively, of agricultural land to development within 3 miles of their city boundaries. The City of Columbus lost the most agricultural land to development within its city boundary (1,666), between its city boundary and one mile away from its city boundary (10,895), and from 1-mile to 3-mile distance from the city boundary (7,109). The city with

the next highest loss of agricultural land to development was Dayton within city boundary (195 acres) and between city boundary and 1 mile away from the city boundary (1,100) but Toledo within 1-mile to 3-mile distance from the city boundary (1,661). No other combination of city and distance from the city boundary had a loss of agricultural land to development that exceeded 1,000 acres.

Table 4: Agricultural land lost to development within and next to City boundaries

MSA	City	Ag land lost within city boundary	Ag land lost from city boundary to 1 mile from city boundary	Ag land lost from 1 mile to 3 miles from city boundary	Total ag land lost within 3 miles of city boundary
Columbus, OH	Columbus	1,666	10,895	7,109	19,670
Dayton, OH	Dayton	195	1,100	681	1,976
Toledo, OH	Toledo	17	223	1661	1,901
Canton-Massillon, OH	Canton	107	354	522	983
Akron, OH	Akron	73	165	637	875
Cincinnati, OH-KY-IN	Cincinnati	135	35	93	263
Youngstown-Warren-Boardman, OH-PA	Youngstown	32	33	99	164
Cleveland-Elyria, OH	Parma	11	21	121	153
Cleveland-Elyria, OH	Cleveland	34	53	45	132

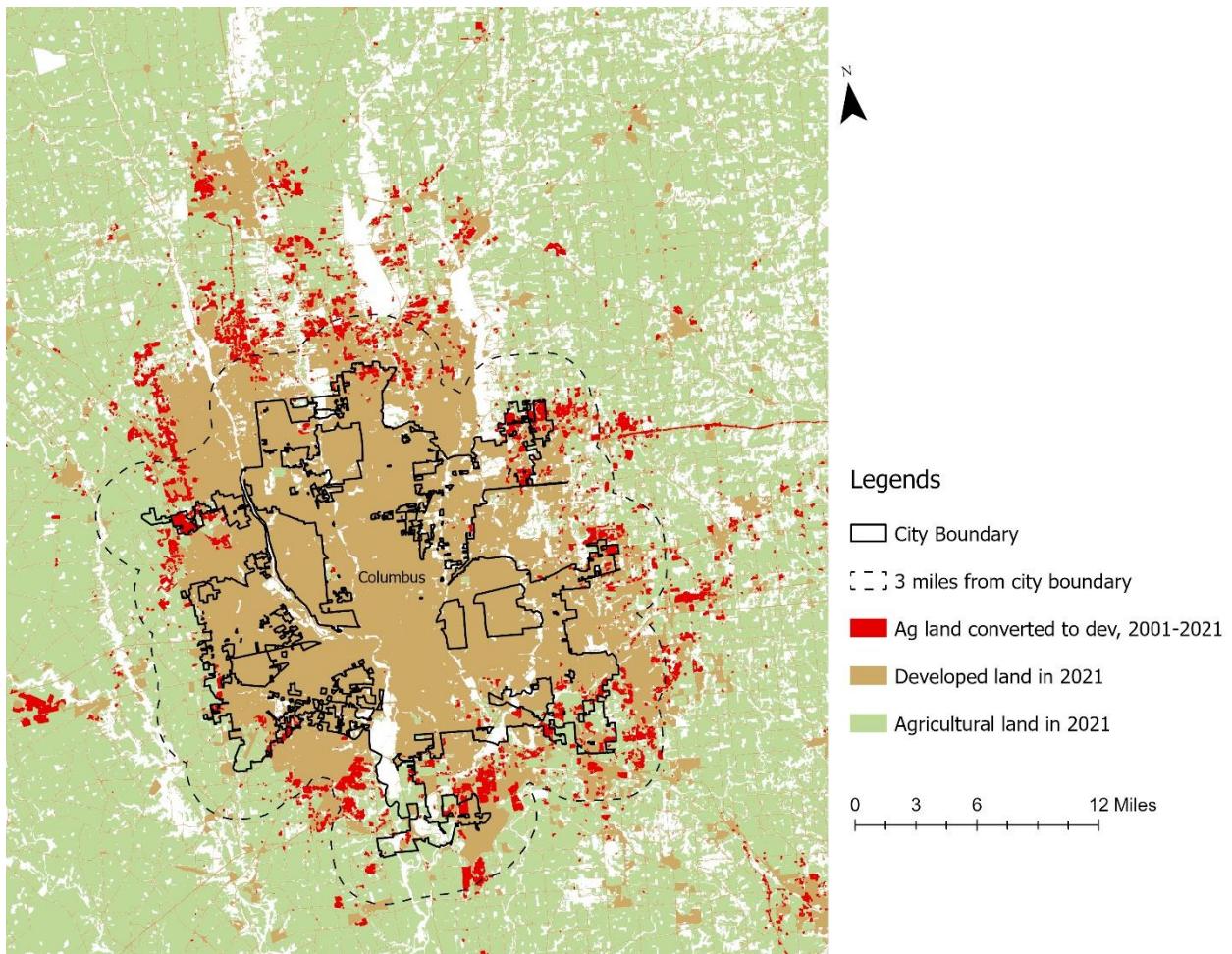


Figure 4: Agricultural land lost to development within and next to the city boundary for Columbus

Implications

The following key implications can be drawn from our analysis:

- Understanding the loss of agricultural land in Ohio is due to more than development since development accounts for only about half of the agricultural land loss since 2001.
- It is important to identify and understand factors other than development that contribute to the loss of agricultural land in Ohio.
- Policy related to the loss of agricultural land is likely to differ between areas in MSAs and areas not in MSAs.

- Conversion of agricultural to developed land is most pronounced near the city of Columbus and may be occurring at such a rate that this area deserves special attention should the desire exist to protect agricultural land.

Note 1

According to NLCD, agricultural land is defined as any area designated as cultivated cropland or pasture/hay. Cultivated cropland includes perennial woody crops such as orchards and vineyards. Pasture/Hay are areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. By definition, within each land observation, cultivated cropland or pasture/hay vegetation must account for more than 20% of total vegetation.

Developed land is composed of these categories: (a) developed open space, (b) developed low intensity, (c) developed medium intensity, and (d) developed high intensity. Developed open spaces consist of some constructed materials but are mainly covered with vegetation, such as lawn grasses, with less than 20% of the area being impervious surfaces. These areas include large-lot single-family homes, parks, golf courses, and vegetation used for recreation, erosion control, or aesthetic purposes. Developed low-intensity areas contain a mix of built materials and vegetation, with 20% to 49% of the area being impervious surfaces, typically including single-family homes. Developed medium-intensity areas, where impervious surfaces cover 50% to 79% of the area, also primarily consist of single-family homes. Developed high-intensity areas have 80% to 100% impervious surfaces and are characterized by dense human habitation or commercial/industrial activities, such as apartment complexes, row houses, and commercial or industrial zones. For additional discussion, visit [National Land Cover Database Class Legend and Description | Multi-Resolution Land Characteristics \(MRLC\) Consortium](#)

References

Islam, M., A. Katchova and C. Zulauf. "[Agricultural Land Lost to Development in the Midwest.](#)" *farmdoc daily* (14):144, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, August 5, 2024.

Multi-Resolution Land Characteristics Consortium. (2021). National Land Cover Database class legend and description. Retrieved from [NLCD 2021 Land Cover \(CONUS\) | Multi-Resolution Land Characteristics \(MRLC\) Consortium](#)