A Proof of Concept for Estimating the Agricultural Economic Impact of Farmland Loss to Development

American Farmland Trust

Project Summary

The Issue
The rapid conversion of farmland to development is impacting the value of agricultural production and its contribution to the local and regional economy.

The Need
A clear and conservative estimate of the value of the agricultural production lost to land conversion.

Where
Canyon County, Idaho

Who
David Anderson (American Farmland Trust) and Patrick Hatzenbuehler (University of Idaho)

How This Project Started

In April 2022, American Farmland Trust (AFT) participated in a Canyon County Board of County Commissioners (BOCC) public hearing of their draft 2030 Comprehensive Plan ("comprehensive plan"). The draft comprehensive plan proposed several elements that help plan for and protect their agricultural economy, including permanent agricultural land protection with conservation easements. Real estate development interests at the hearing challenged the need for those proposed agricultural protection elements and suggested that any economic loss due to agricultural land conversion was minimal and easily replaced with the growth of the service industry that follows residential development. **AFT recognized the need for a data-driven analysis to accurately estimate the value of agricultural production of Canyon County and the impact of rapid conversion to non-agricultural land uses** to support these stakeholder conversations regarding the comprehensive plan.

Project Objectives

AFT research identified a couple of economic impact models that would serve well to address the question. However, the time and resources needed to input data into the models was beyond the Canyon County BOCC approval timeline for the comprehensive plan update, which was less than 6 months.

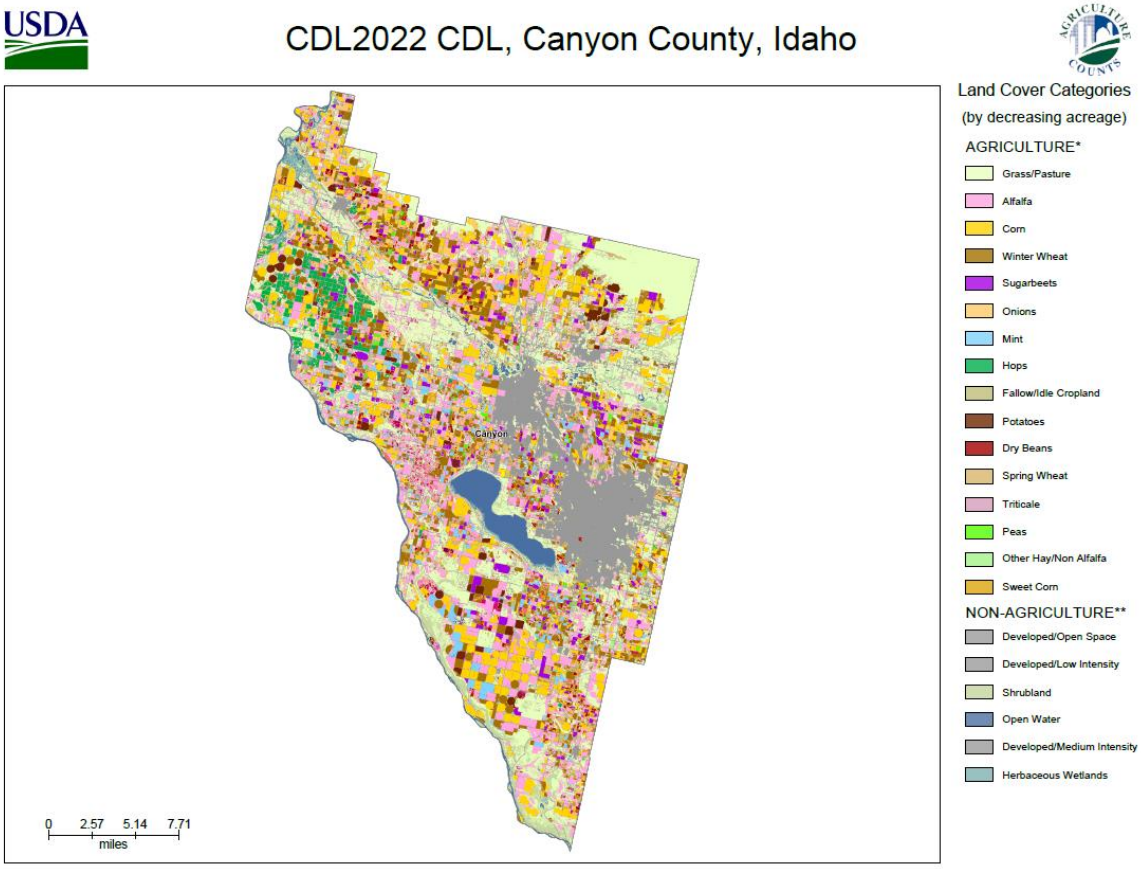
AFT partnered with University of Idaho Assistant Professor of Agricultural Economics, Patrick Hatzenbuehler, **to design an innovative and less data-intensive analysis that would rely on publicly available information** with the understanding that such an analysis would provide a conservative and useful baseline estimate.

Proof of Concept

The Agricultural Economic Impact Analysis (AEIA) is a simple mathematical spreadsheet analysis using:

- Predicted land conversion rates for Canyon County from AFT's Farms Under Threat 2040: Choosing an Abundant Future model and enhancements by the Boise State University Land Use Lab (FUT 2040);
- Area of City Impact (AOCI) shapefile from Canyon County GIS staff, which designates the planning boundary for future growth around a city or town;
- Total acres of over fifty different crops grown in Canyon County extracted from the USDA CropScape – Cropland Data Layer (CDL), supported by the Center for Spatial Information Science and Systems at George Mason University. This dataset provides annual crop-specific land cover data layers created for the continental United States using the USDA National Agricultural Statistics Service (NASS) data, moderate resolution satellite imagery, and extensive agricultural ground truthing (see Figure 1 – Canyon County CDL); and
- Crop values from the Idaho Annual Statistical Bulletin, which is a summary of the most recent data collected by the USDA NASS (2021 data).

Figure 1 – Canyon County Cropscape Data Layer



The analysis assumes the estimated land conversion from the FUT 2040 model will occur exclusively within the ten AOCIs designated on the future land use map in the comprehensive plan, based on commitments made by Canyon County to limit conditional use permits for non-agricultural development on productive farmland outside of the AOCIs. The land conversion rate is equally allocated across the total acres of each of the top-twelve crops (acres and value) currently grown within the AOCIs, which results in an annual percent loss of production of those top-twelve crops relative the total for the county. The loss of production is multiplied by the NASS crop values to calculate the farm gate value of that loss.

AFT research has identified a multiplier range of 2-10 times the farm gate value as the total economic impact depending mostly on crop types, region, and market fluctuations. A multiplier of 6 was used in the AEIA, considering that Canyon County hosts one of the largest vegetable seed growing regions globally (Farm Credit East, 2020).

An important design element of the AEIA is that it can be easily replicated for other counties with available data from the same sources listed above.

Findings

The Boise State University Land Use Lab enhancements of AFTs Farms Under Threat 2040 model estimates the 2022 agricultural land conversion rate in Canyon County is 1,115 acres per year. The AEIA calculated a baseline economic loss of nearly $11 million per year, or 1.6% of the estimated $620 million annual agricultural economic income of the county in 2022 (Table 1 – AEIA Results for Canyon County). In just 20 years, Canyon County is on track to lose approximately one-fifth of its agricultural economy to suburban development. To reemphasize, this is a conservative baseline estimate based on NASS data that does not differentiate for seed crops and given that added granularity, the estimated economic impact would be greater.

Impacts

AFT presented the results of the AEIA to the Canyon BOCC at a public hearing in May 2022. It was the first opportunity for the Canyon BOCC to learn of the scale of agricultural land conversion and economic value (loss) of that conversion. The Canyon BOCC recognized the challenge for their existing economic development program in actively replacing that lost income with new businesses and industries. The AEIA results reinforced the importance of protecting an established and robust agricultural economy, in addition to making better long-range planning decisions about where to locate future development in response to population growth.

The results were also shared with various stakeholder groups, including working landowners. The AEIA results became a call-to-action for many of these stakeholders to voice their support for the agricultural

protection elements of the comprehensive plan update. The Canyon BOCC approved the comprehensive plan update with all proposed agricultural protection elements in October 2022.

Table 1 – AEIA Results for Canyon County

Canyon County Area of City Impact (AOCI)	Acres	Crop[2]	Acres Grown Full county	Acres Grown within AOCIs	% in AoIs	Anual Farm Gate Loss	Economic Impact (6x Farm Gate)[4]
Nampa	45,117	Winter wheat	22,572	9,386	41.6%	$ 107,528	$ 645,167
Caldwell	30,163	Alfalfa	42,039	11,926	28.4%	$ 195,141	$ 1,170,848
Middleton	20,623	Corn	41,112	11,082	27.0%	$ 239,809	$ 1,438,852
Star	6,303	Mint	7,442	2,312	31.1%	$ 112,368	$ 674,207
Greenleaf	18,397	Sugarbeets	9,459	3,686	39.0%	$ 169,337	$ 1,016,020
Parma	12,266	Dry beans	5,394	1,791	33.2%	$ 32,000	$ 191,999
Wilder	7,716	Onions	7,158	3,021	42.2%	$ 370,353	$ 2,222,118
Melba	2,494	Potatoes	4,545	652	14.3%	$ 49,434	$ 296,605
Notus	8,901	Hops	6,542	1,702	26.0%	$ 423,766	$ 2,542,597
Wilder	7,716	Orchards	1,479	172	11.6%	$ 8,320	$ 49,918
		Spring wheat, other grains, pulses	4,497	1,352	30.1%	$ 14,738	$ 88,427
		Vegetables	2,616	1,095	41.9%	$ 52,966	$ 317,795
Total	**159,696**		**154,855**	**48,177**	**31.1%**	**$ 1,775,759**	**$ 10,654,552**

Conversion rate (ac/yr)[1]	1115	1-year loss (acres)	2%	20-year loss	$ 213,091,049

1AFT Farms Under Threat & Boise State University - Land Use Lab

[2]Cropscape - Cropland Data Layer, Center for Spatial Information Science and Systems, George Mason University

[3]2021 Idaho Annual Statistical Bulletin (October 2021), USDA National Agricultural Statistics Service - Northwest Regional Office

[4]Northeast Economic Engine: Agriculture, Forest Products and Commercial Fishing, Farm Credit East, 2020

Future Uses

Sharing the Canyon County AEIA results served as a grassroots conversation starter between the Canyon BOCC and planning staff, working landowners, and stakeholders wanting to protect the agricultural economy from the threat of rampant land conversion. This starter conversation matured and evolved into an advocacy group that felt empowered to call for proactive planning for agriculture in the comprehensive plan, including the importance of keeping the agricultural protection elements in the comprehensive plan and countered the arguments of the developer community that they were unnecessary.

The strategic design of the AEIA allows for easy replication for other counties. Counties using Geographic Information Systems (GIS) for planning and recording their land use maps can easily provide the digital boundaries needed to calculate the crop areas used as input into the AEIA. The AEIA will be a valuable tool for a wide range of stakeholders including county and municipal planning staff, elected officials and commissions, agricultural product processing and distribution industries, land conservation organizations, federal and state land agencies, and academic land use research.

For questions about the AEIA contact David Anderson, AFT Idaho Program Manager, at danderson@farmland.org

References

Farms Under Threat 2040: Choosing an Abundant Future, American Farmland Trust, 2022

CropScape – Cropland Data Layer (CDL), supported by the Center for Spatial Information Science and Systems at Geroge Mason University

National Agricultural Statistics Service, United States Department of Agriculture, 2021

Northeast Economic Engine: Agriculture, Forest Products and Commercial Fishing, Farm Credit East, 2020

About Us

American Farmland Trust was founded in 1980 to save America's farms and ranches.

We created the conservation agriculture movement, which speaks for the land—and for the people who grow our food. As the movement's leaders, we have three priorities: protecting agricultural land, promoting environmentally sound farming practices, and keeping farmers on the land.

AFT is the only national agricultural organization that approaches its work in this comprehensive, holistic manner. We recognize the connection between the land, forward-looking farming practices, and the farmers and ranchers who do the work. We also recognize the power of combining on-the-ground projects with objective research and effective advocacy.

Today, because of AFT, millions of acres of farmland that otherwise would have been converted into house lots and shopping malls remain in farming, and tens of thousands of farmers and ranchers have adopted better farming practices.