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Access to Farmland by Beginning and Socially Disadvantaged Farmers: Issues and Opportunities

A Report to Congress

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Access to Farmland by Beginning and Socially Disadvantaged Farmers: Issues and Opportunities

Scott Callahan and Daniel Hellerstein

Abstract

The 2017 Census of Agriculture reported that more than one-third of producers are over 65 years of age, and the distribution of agricultural land has shifted to fewer, larger landholders. Socially disadvantaged (SDA) producers (classified by race, ethnicity, and/or gender) may have fewer financial resources and face additional constraints when buying or raising capital for expanding farm operations. This report used USDA survey, census, and administrative data to examine measures of land access and other factors associated with the share of SDA and beginning farmers and ranchers in a county in 25 States. Several measures of land tenure, federal program participation, agricultural sales, and demographic information were used to estimate how land access and federal programs correlate with the percentage of SDA and beginning farming operations at the county level. The percentage of beginning farmers and ranchers in a county is positively correlated with the percent of rented farmland acres and negatively correlated with crop insurance premiums (measured in dollars per acre) and average farmer age. The study also found the percentage of SDA operations in a county is negatively correlated with the percentage of sales in field crops and positively correlated with the percentage of USDA's Farm Service Agency (FSA) loan applications granted, and percentage of direct-to-consumer sales. Results indicated the average lease size, the percentage of livestock sales, and decreasing urbanization are negatively correlated with the percentage of SDA and beginning operations. In contrast, the percentage of rented farmland and the percentage of SDA populations are positively correlated with the percentage of SDA operators in a county.

Keywords: land access, land tenure, landlords, socially disadvantaged (SDA) farmers, beginning farmers, TOTAL survey

Acknowledgments

About the Authors

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Contents

Access to Farmland by Beginning and Socially Disadvantaged Farmers: Issues and Opportunities

Scott Callahan and Daniel Hellerstein

What Is the Issue?

This report is in response to Section 12607 of the Agriculture Improvement Act of 2018 (the 2018 Farm Bill)[1], wherein the U.S. Congress tasked the U.S. Department of Agriculture (USDA) with analyzing the barriers preventing or hindering the ability of beginning and socially disadvantaged (SDA) farmers and ranchers to acquire or access farmland, and what USDA is doing to address these concerns.

Several factors may contribute to the challenges of accessing land for farming through purchase or rental, including the aging of the population of U.S. farmers, the increasing concentration of farmland ownership, credit constraints, and competition for land from urban and environmental uses. Beginning farms—those operated by farmers who have operated a farm or ranch for 10 years or less—as well as farms managed by operators defined by USDA as SDA—based on race, ethnicity, or gender—may have fewer financial resources and those that do face additional constraints when buying or raising capital for expansion. Due to significant gaps in available data, a robust analysis accurately measuring barriers to land access outcomes is not possible. Hence, this study uses regression analysis to measure the correlation between the share of farming operations classified as SDA or beginning operations by county and several measures of land access, federal program participation, and several USDA loan programs, including the Direct Loan Program and Guaranteed Loan Program.

What Did the Study Find?

This study assessed the relationship between county share of SDA farmers and ranchers and possible influencing variables for the 25 states collected using the 2014 Tenure, Ownership and Transition of Agricultural Land (TOTAL) survey. These variables include indicators of the ease of land access, participation in Federal programs that directly or indirectly support beginning and SDA farm operations, and measures of county land use characteristics. The study also examined the correlation between the share of these farmers and the average age of farmers in the county, measures of agricultural land rental markets, and population growth as a proxy for local economic development.

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[1] SEC. 12607 of the Agriculture Improvement Act of 2018 requests the Secretary of Agriculture to make publicly available a report on farmland access.
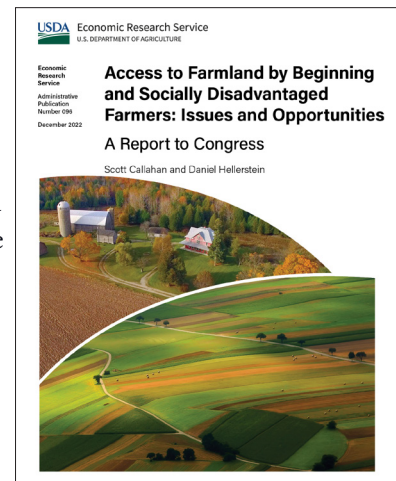
ERS is a primary source of economic research and analysis from the U.S. Department of Agriculture, providing timely information on economic and policy issues related to agriculture, food, the environment, and rural America.

The share of SDA and beginning farming operations is correlated with some measures of land availability, participation in USDA programs, and land use metrics.

- The percentage of SDA and beginning farming operations is negatively correlated with average lease size. The percentage of SDA operations is also negatively correlated with the percentage of cropland acreage. However, the percentage of rented farmland is positively correlated with the percentage of SDA and beginning farming operations.

- The percentage of SDA operations was positively correlated with the percentage of successful applications to the Farm Service Agency's (FSA) Direct and Guaranteed Loan Programs. When defining SDA operations to include race, ethnicity, and gender (REG), these are positively correlated with Conservation Reserve Program (CRP) acreage. However, the percentage of SDA-REG and beginning operations were negatively correlated with per-acre crop insurance premiums by county.

How Was the Study Conducted?

This study examined the geographic distribution of beginning and socially disadvantaged (SDA) farmers and ranchers across counties in the United States. The county share of farm operations that identifies as the beginning or socially disadvantaged is used as a measure of the ease or difficulty of establishing or expanding farm enterprises for these groups. This study used data from the 2017 Census of Agriculture on farm demographics and beginning-farm numbers at the county level, as well as county-level data on land use and land tenure. To characterize the state of land ownership, tenure, and land availability, this research used USDA's Tenure, Ownership, and Transition of Agricultural Land (TOTAL) Survey from 2014. In addition, the study used USDA administrative data from 2012 to 2017 from USDA's Farm Service Agency (FSA), Risk Management Agency (RMA), and Natural Resources Conservation Service (NRCS). Data on participation in the FSA Direct and Guaranteed Farm Loan Programs came from the USDA Race, Ethnicity, and Gender Program Statistics (REGStats) site. Descriptive statistics were presented for the 48 contiguous States, but regression models using the entire data complement were restricted to 25 States—the extent of TOTAL Survey data coverage. Results from the fractional probit model indicated the factors correlated with variations in a county's share of beginning and SDA farms.

Access to Farmland by Beginning and Socially Disadvantaged Farmers: Issues and Opportunities

Introduction

As farmers retire or otherwise cease operations, agricultural production continues through a combination of consolidating existing farms and establishing beginning farm operations. Over time, farmland could be expected to pass from one generation of farmers to the next, which could provide beginning farmers with the land needed to farm, either through renting or purchase, as well as allowing existing farmers to expand operations.

Several demographic and financial trends may be limiting the availability of land for purchase or rental, which is referred to by the shorthand "land access" in this report. The 2017 Census of Agriculture reported the average age of agricultural producers to be 57.5 years and over one-third of producers are over 65. These numbers have increased over time (Boyce, 2019) and suggest farmers are holding onto land longer, which may affect land availability in a given year.

Furthermore, for several decades, the distribution of land (particularly cropland) has shifted to fewer and larger land holdings (MacDonald et al., 2018). Larger farms, on average, tend to be more productive and realize higher financial returns per acre (MacDonald et al., 2018). Higher returns are typically associated with higher land values and could limit the amount of land available for sale to operators with lower income or wealth. Larger farms also rent a greater share of their total acres operated, which could ultimately bid land away from beginning and socially disadvantaged (SDA) farmers.

This report explores the challenges beginning and SDA farmers may face when accessing land. Beginning farms—farms in which all operators have been farming for 10 years or less—may have difficulty competing for the purchase of land sold by exiting farms, compared with existing farms trying to expand, especially if the beginning farm is a small operation. Beginning farms are generally smaller operations with younger principal operators, and an average beginning farm household has about half the net worth of an average established farm—$1.2 million compared to $2.2 million, within 2013–17 (Key and Lyons, 2019). Given the limitations of available data, this is a correlative analysis rather than a causal one; that is, the goal is to identify important factors that are possibly correlated with land access, rather than to determine cause and effect.

Although not a new concern (Ruhf, 2013), land access may also present a serious challenge to enter farming for SDA operators. According to the 2017 Census of Agriculture, SDA operations defined by the race, ethnicity and gender criteria comprise 17 percent of farming operations, while SDA operations comprise 9 percent of farming operations when gender is excluded from the definition. SDA farmers on average have smaller financial resources than non-SDA producers, making land purchases more difficult. Thirty-three percent of SDA producers earn positive farm income, whereas nearly 45 percent of non-SDA farmers do. Median household income for SDA farmers is less than for non-SDA farmers—about $60,000

1

Access to Farmland by Beginning and Socially Disadvantaged Farmers: Issues and Opportunities, AP-096
USDA, Economic Research Service

compared to about $75,000 (Todd, 2020).[2] The USDA has recognized barriers faced by SDA operators,[3] providing "outreach and technical assistance to encourage and assist socially disadvantaged farmers and ranchers to own and operate farms and ranches and to participate in agricultural programs."[4]

Since 1992,[5] the USDA has provided additional support to farmers with limited access to traditional lending markets (Congressional Research Service (CRS), 2008; Government Accountability Office (GAO), 2019; and USDA, Economic Research Service, 2018).[6] Since 2015, USDA has obligated between $5 billion and $7 billion per year to support Direct and Guaranteed Loan Programs.[7] As discussed below, these loan programs target and reserve a share of funding—70 percent of combined Direct Farm Ownership and Operating Loans in FY21—to underrepresented and SDA applicants and beginning farmers.[8]

Federal programs may have ambiguous effects on land access for beginning and SDA operators. For example, the Conservation Reserve Program removes about 20.7 million acres of cropland from production (USDA, Farm Service Agency, 2021). Although retiring this land does provide environmental benefits, it may shrink the land available to farmers, including beginning and SDA farmers. On the other hand, USDA conservation programs targeted toward preserving farmland or improving environmental outcomes on working lands can often help beginning and SDA farmers achieve conservation and sustainability goals through cost-sharing.[9]

This report provides an overview of the condition and structure of U.S. agriculture, including the aging of U.S. farmers, the evolution in the concentration of farmland, and trends in agricultural land sales and rental markets. The relationships between these factors may impact the ability of beginning and SDA farmers to access land. Several potential influencing variables are regressed against county-level measures of the share of SDA and beginning farmers. Variables that have statistically significant coefficients are identified and discussed.

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[2] These statistics are based on a USDA, Economic Research Service (ERS) analysis of 2017–18 ARMS data. In 2017, about 10 percent of farms were operated by limited-resource (LR) farmers. An SDA farm may or may not also be an LR farm. USDA, NRCS classified LR farmers as those who operate farms with direct or indirect gross farm sales not more than $180,300 (in 2020 dollars) in each of the previous 2 years and who have total household income at or below the national poverty level for a family of four, or below 50 percent of the median income in the county where they live.

[3] Section 2501(c)(2) of the Food, Agriculture, Conservation, and Trade Act of 1990. 7 U.S.C. § 2279(c)(2). A description can be found at USDA, ERS topic page: Beginning, Limited Resource, Socially Disadvantaged, and Female Farmers.

[4] *Food*, Conservation and Energy Act of 2008. Pub. L. 110-246.

[5] The Agricultural Credit Improvement Act of 1992 (P.L. 102- 554) established the trend of gearing USDA farm loan funds more toward beginning and minority farmers (Congressional Research Service 1996).

[6] The GAO report finds some evidence on challenges hampering the ability of SDA farmers to access credit, though available data preclude definitive statements.

[7] Several states (such as Connecticut, Nebraska, New Jersey, South Dakota, Virginia, and Wisconsin) have State programs that address land access for beginning farmers. Due to data unavailability, the researchers focus on Federal programs in this report.

[8] The Consolidated Farm and Rural Development Act (CONACT), in section 346(b)(2), requires USDA to reserve at least 75 percent of Direct Farm Ownership and 50 percent of direct Operating Loans for use by beginning farmers. For SDA-focused programs, the targets are established annually following procedures set forth in 7 CFR § 761.208 (CFR 761) and are based on the number of minority groups in each State and county.

[9] Several USDA conservation programs have features that recognize beginning and SDA farmers. For example, since 2008, the CRP's Transitions Incentive Program (CRP-TIP) has provided incentives to beginning and SDA farmers to acquire land that will be exiting the CRP.

How Producer Characteristics and Farm Structure Affect Land Availability

The condition and structure of U.S. agriculture—for instance, who owns and operates farmland and the extent and size of markets for agricultural land—may impact the ability of beginning and SDA farmers to access land. These structural features include the distribution of farmer age and land ownership, participation in rental markets, and the size and profitability of farm operators.

The Distribution of Farm Size and Operation

As of 2019, land in farms was approximately 897 million acres (37 percent of the United States land mass), including around 400 million acres of cropland (USDA, NASS, 2019). This land is managed on about 2 million farms based on data from the 2020 ARMS survey (Whitt et al., 2020). Both values—total land in farm operations and the total number of farms—have been fairly steady since the 1990s (Burns and Hoppe, 2019) but have seen some decline since 2012. Between 2012 and 2017, land in farm operations dropped 1.8 percent and the number of farms dropped 4.1 percent.

Many of these 2 million farms are small. Based on 2017 data from USDA's Economic Research Service (ERS) and National Agricultural Statistics Service (NASS) (Burns and Hoppe, 2019), about 89 percent of U.S. farms are "small family farms," with annual gross cash farm income (GCFI) less than $350,000. However, production and acreage are concentrated in the remaining 11 percent of farms, with over 74 percent of total production occurring on just 48 percent of total farmland acreage. This concentration has increased over the last several decades (MacDonald et al., 2018), especially for cropland. As of 2012, 36 percent of all cropland was on farms with at least 2,000 acres of cropland, up from 15 percent in 1987.

Only a small fraction of total farmland changes hands annually. Bigelow et al. (2016) found between 2015 and 2019, about 10 percent of farmland (93 million acres) was expected to be transferred; 4 percent was anticipated to be sold in markets, and 6 percent transferred through gifts, trust, or wills.[10] Of that 4 percent projected to be sold, over half (21 million acres) was expected to be sold to nonrelatives, with most of the remainder expected to be exchanged between relatives. Additionally, some of the land expected to be transferred through gifts, trusts, and wills could be sold to new owners.

The aging producer population is partly correlated with this low rate of expected sales. According to the 2017 Census of Agriculture, the average age of U.S. farm producers was 57.5 years old, with over a third older than 65 years of age. The 2017 average age is 1.2 years older than the 2012 average, and 9.7 years older than the first average age reported for farmers in the 1945 Census.[11] In contrast, in 2020, about 14 percent of self-employed U.S. workers in nonagricultural businesses are 65 or older (Bureau of Labor Statistics, 2020)—up from the 11 percent reported by Hoppe in 2010.

Moreover, these older farmers continue to play a key role in production. Farms with principal operators 65 or older generated 23 percent of all U.S. farm sales in 2017. Their involvement in farm production is similar to that of younger farmers. For example, 87 percent of all age groups are involved in the day-to-day operations of a farm, and around three-quarters of both younger and older farmers make cropping and land-use decisions on behalf of their respective operation.

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[10] These values are derived from table 5 of the Tenure, Ownership, and Transition of Agricultural Land (TOTAL) report: *Land expected to undergo ownership transfer in next 5 years, as of 2014*.

[11] For a summary of farmer age, see the 2017 U.S. Ag AGDAILY-Insights News: "2017 Census of Agriculture: An aging farm population but with optimism".

Access to Farmland by Beginning and Socially Disadvantaged Farmers: Issues and Opportunities, AP-096
USDA, Economic Research Service

Farm Size, Farmland Tenure, and Land Access

Given that so little farmland typically changes hands through markets in any year, rented land is an important source of acreage for new or expanding farmers. According to the USDA Tenure, Ownership, and Transition of Agricultural Land (TOTAL) Survey of 2014, over 61 percent of U.S. farmland was owned and operated by the same entity (Bigelow et al., 2016). The remaining 39 percent was rented by landowners to tenant operators—with roughly 80 percent of this rented land owned by a non-operator landlord (Bawa and Callahan, 2021). The percentage of land rented varies by land use, with significantly more cropland being rented by tenant operators than pastureland. Although 54 percent of cropland is rented, only 28 percent of pastureland is rented (Bigelow et al., 2016).

Farms in different size classes use different methods to expand the land base needed for production.[12] Only 30 percent of small family farms—farms with a Gross Cash Farm Income (GCFI) less than $350,000—rent any land for their own operations. In aggregate, they rented 31 percent of the land they operated.[13] It is notable that small family farms often rented out a portion of their land and accounted for 81 percent of the 57 million acres rented out by farmers to other farmers.

In contrast, 79 percent of midsize family farms (GCFI $350,000 to $999,999) and 87 percent of large farms (GFCI over $1,000,000) rented at least some of the land they operated, and together about half of their operated farmland was rented from others.

Land rental markets are particularly important for younger farmers. Twenty-seven percent of the total acreage of farmland operated by those under 34 years of age is associated with full-tenant operations, whereas just 8 percent of land is in fully-owned operations. The remaining 65 percent of the land is in part-owner operations. Conversely, 7 percent of the total acreage of farmland operated by those who are 65 or older is found in full-tenant operations, and 43 percent of the land is in fully-owned operations. The remaining 50 percent of the land is in part-owner operations.

The relationship duration between a given landlord and tenants can affect rented land availability. Most landlords have long-term relationships with their tenants. In 2014, 70 percent of acres rented had been to the same tenant over 3 years and 28 percent for over 10 years. There is an even longer bond for non-operator landlords—84 percent for 3 years, 41 percent for 10 years.

Rates of return have affected land values and these vary by size of the farm. Since mid-1992, very large family farms (at least $5 million in GCFI) have earned rates of return—measured as the annual rate of return on assets—that have exceeded all other size classes in nearly every year. Farms with $1 million–$5 million in GCFI (large family farms) have estimated average returns exceeding those for the three smaller classes in every year. The smallest class—farms with less than $100,000 in sales—consistently earn the lowest returns.[14] To the extent that beginning and SDA farmers are small operations, their rates of return may be lower than established farms.

Another trend possibly impacting land access is growing urbanization. According to a 2020 report (Freedgood et al., 2020), about 11 million acres—or 2,000 acres a day—of farmland and ranchland were converted to either urban and highly developed land use (4.1 million acres) or low-density residential land use (nearly 7 million acres) between 2001 and 2016.

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[12] See figure 5 in MacDonald et al., 2018.

[13] Gross Cash Farm Income (GCFI) is a measure of farm revenue that includes sales of crops and livestock, Government payments, and other farm-related income. Further details on farm income can be found on the USDA, ERS topic page on farm household income and characteristics.

[14] See figure 10 in MacDonald et al., 2018.

4

Access to Farmland by Beginning and Socially Disadvantaged Farmers: Issues and Opportunities, AP-096
USDA, Economic Research Service

USDA Programs for SDA and Beginning Farms

In recognition of the challenges facing beginning and SDA farmers, the USDA operates several programs to target beginning and SDA operators. In particular, the Farm Service Agency (FSA) administers a number of loan and loan guarantee programs. In addition, USDA conservation programs include initiatives that recognize beginning and SDA farmers and ranchers.

USDA Loan and Loan Guarantee Programs

Since 1992 a portion of USDA loan programs operated by FSA have been directed toward SDA and beginning farms (CRS, 2008). These programs can be classified as either (1) direct loan programs that loan Federal dollars to recipients through local FSA offices or (2) guaranteed loan programs that guarantee and facilitate private loans made and serviced by commercial lenders. In general, participants in both categories of loan programs must meet all eligibility requirements, which include a documented inability to obtain sufficient credit elsewhere to finance actual needs at reasonable rates and terms.[15]

In fiscal years 2017, 2018, and 2019, between $1.04 and $1.47 billion was obligated annually to the three main Direct Farm Ownership (FO) Loans,[16] and between $2.05 and $2.28 billion per year were obligated to Guaranteed FO Loans (USDA, FSA, 2019b). As described in appendix B, these loan programs differ in interest rates, loan caps, and whether funds are directly provided by USDA.

Although beginning farms are just as likely as established farms to borrow from commercial banks (61 and 62 percent, respectively, of all loan sources to farms), they are twice as likely as established farms to obtain a direct loan from USDA's FSA—16 percent compared to 8 percent.

USDA Conservation Programs: SDA and Beginning Farms

The USDA annually spends over $5 billion on conservation programs (Claassen et al., 2019), most of which goes toward land retirement programs such as the Conservation Reserve Program (CRP), and working lands programs such as the Environmental Quality Incentives Program (EQIP) and the Conservation Stewardship Program (CSP). Other conservation programs include the Agricultural Land Easements and the Wetland Reserve Easements of the Agricultural Conservation Easement Program (ACEP).

In contrast to commodity-related and insurance program payments, which tend to be positively correlated with farm acreage, conservation program payments, especially land retirement payments, are distributed to smaller farms (McFadden and Hoppe, 2017).[17] In 2019, about 80 percent of USDA's CRP payments went to retired farmers, farmers with off-farm occupations, and low-sales farms (farms with less than $150,000 in GCFI). About 31 percent of working lands conservation payments went to small family farms (GCFI less than $350,000), with another 31 percent to midsized (GCFI between $350,000 and $999,999) (Whitt et al., 2020).

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[15] Eligibility requirements are listed in sections 764.101 for direct loans and 762.120 for guaranteed loans of the Code of Federal Regulations.

[16] In 2019, 3,851 beginning farmers and 1,155 SDA farmers received Direct Farm Ownership Loans.

[17] The values in this section were pulled from McFadden and Hoppe (2017) and Burns and Hoppe (2019).

5

Access to Farmland by Beginning and Socially Disadvantaged Farmers: Issues and Opportunities, AP-096
USDA, Economic Research Service

As voluntary programs, USDA land retirement and working lands programs help farmers meet conservation and stewardship goals. While land enrolled in land retirement programs is not available to farmers, including beginning and SDA farmers, there is mixed evidence linking the CRP acreage and access to agricultural land.[18] Several program features may limit the program's impact on land access, including a 25 percent limit on the amount of a county's farmland that can be enrolled in the CRP or wetland easement programs and per acre payment caps based on county average dryland cropland rental rates.

A number of USDA's conservation programs include initiatives targeting beginning and SDA farmers. One such program is the CRP's Transition Incentives Program (CRP-TIP) created by the Food, Conservation, and Energy Act of 2008 (the 2008 Farm Bill). It allows a retired or retiring landowner who has land enrolled in CRP to receive 2 additional years of payments if land is immediately transitioned back into production through being sold or leased to a beginning or SDA farmer or rancher. CRP-TIP was modified in the Agricultural Act of 2014 (the 2014 Farm Bill), with program eligibility expanded to veteran farmers and ranchers. The 2018 Farm Bill opened the program to all landowners with an expiring contract, whether retiring or not.[19]

Two years prior to the termination of their contract, a CRP-TIP contract holder can allow the incoming farmer to begin making conservation and land improvements—or begin the organic certification process—on the land covered by the CRP contract. On or near the date the CRP contract is terminated, the landowner must sell, enter a long-term lease, or lease with an option to purchase with some or all the land covered by CRP to the incoming farmer. The incoming farmer must then develop and implement a conservation plan on the land previously covered by CRP.

The 2008 Farm Bill provided $25 million in funding for this program between 2009 and 2014; the 2014 Farm Bill provided $33 million between 2014 and 2018; and the 2018 Farm Bill provides $50 million in funding between 2019 and 2023. Between 2014 and 2018, more than 1,500 CRP-TIP participants covered over 225,000 acres at a total cost of approximately $22 million (USDA, FSA, 2019c).

Program participation in CRP-TIP has varied geographically and has been influenced by several factors (Johnson, 2017):

- knowledge of the program with counties conducting multiple forms of outreach having greater participation;

- the existence of a strong relationship between owners of CRP land and prospective farmer or rancher—interested landowners and prospective farmers often have difficulty finding each other;

- the state of the agricultural economy with farm costs and profitability impacting prospective farmers; and

- the amounts of expiring land and the distribution of those acres. FSA (CRP Cost Benefit Analysis) estimates that up to 400,000 acres could potentially be enrolled in TIP during the 2018 Farm Bill period (USDA, FSA: Cost-Benefit Analysis for the Conservation Reserve Program (CRP), as amended by the Agriculture Improvement Act of 2018, November 2019).

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[18] Sullivan et al. (2006), found that high CRP enrollment did not systematically spur the loss of farm populations (including beginning farmers). In contrast, Wu and Lin (2010), found in 1997 that CRP raised land values between 1.3 percent and 1.8 percent in the United States.

[19] FSA defines an eligible farmer as "An owner or operator of land enrolled in a CRP contract who has ended active labor in farming operations as a producer of agricultural crops or expects to do so within 5 years and has land expiring under a CRP contract."

In addition to CRP-TIP, USDA has several other resources to help new and beginning farmers. From 2017 to 2018, a USDA initiative like CRP-TIP allowed CRP contracts planted with certain CRP practices to be terminated early without having to repay past payments if the land is passed to a beginning or SDA operator. Eligible land includes the least environmentally-sensitive land in CRP. One difference between CRP provisions and CRP-TIP is that these new land tenure provisions were available to landowners who passed land on to family members, while CRP-TIP includes restrictions on transfer within a family. Another difference is that veterans were not targeted by this authority. Although formal data is not readily available, less than 10,000 acres were affected by this initiative.[20]

A variety of education and assistance programs also support new farmers, such as the Farming Opportunities Training and Outreach Program in the 2018 Farm Bill, which will provide over $90 million between 2019 and 2023. This combined two prior programs—Beginning Farmer and Rancher Development Program and the Outreach and Assistance to Socially Disadvantaged and Veteran Farmers and Ranchers Program—to support education, mentoring, and technical assistance initiatives for beginning and SDA farmers or ranchers.[21]

Although smaller in size than CRP, the Agricultural Conservation Easement Program (ACEP) may also affect the availability of farmland for beginning and SDA farmers. Created in the 2018 Farm Bill by merging several existing programs, including the Wetlands Reserve Program (WRP) and the Farm and Ranch Lands Protection Program (FRPP), ACEP has two main components: the Wetland Reserve Easement (WRE) and the Agricultural Land Easement (ALE). The WRE component is used to restore, protect, and enhance wetlands through the purchase of a long-term (permanent or 30-year) easement—with payments for restoring wetland features on formerly cropped landscapes and retiring the land from agricultural uses. The ALE component is used to cost share (with States and other entities) on the purchase of development restrictions on agricultural land. Farmland preserved under the ALE component may be available on the sales or rental markets, rather than being obtained by developers.

Agricultural land easements may improve land access for farmers, including SDA and beginning farmers. These easements have served to protect agricultural land from future urban development. Particularly for farmland where cities are expected to expand, the value of potential future development is capitalized into the value of farmland (Zhang and Nickerson, 2020). By facilitating the purchase of easements—which prohibit future development potential—the value of this land is reduced to its use value for agriculture.[22] This can reduce the cost of acquiring this farmland for agriculture. There is also explicit recognition of beginning farmers in ACEP, such as increased Federal cost share for ALE contracts facilitating the transfer to beginning farmers.

Between 2014 and 2019, obligations for the easement programs (or their predecessors) varied between $300 million and $536 million per year. In this time span, over 310,000 wetland acres were placed into easements, and over 850,000 acres entered an agricultural land easement.

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[20] Based on personal communication with Alex Barbarika, USDA, FSA. FSA did not assign a formal name to this initiative.

[21] USDA, New Farmers: Education and Assistance.

[22] Conservation easements alter the property rights associated with the land by removing the development rights from the remaining rights, including agricultural use, of the land. The intention is twofold. First, removing the development rights ensures the land will not be developed and, therefore, remain available for agricultural use. Second, removing a portion of the rights—the right to develop the property—means the remaining land and rights (largely the agricultural rights) should theoretically be closer in value to the agricultural-use value and therefore more affordable to farmers. This helps to defray the purchase cost and reduces property tax liabilities (Bigelow et al., 2016).

7

Access to Farmland by Beginning and Socially Disadvantaged Farmers: Issues and Opportunities, AP-096
USDA, Economic Research Service

The Geographic Distribution of Socially Disadvantaged and Beginning Farm Operations

As detailed in the box titled "Definitions of Terms", the definition of SDA and beginning farms varies across USDA programs.[23] As noted above, this research has employed two alternative definitions of SDA intended to approximate key definitional differences in USDA programs. Data used to define SDA and beginning farm operations come from the 2017 Census of Agriculture and were compiled by the USDA, National Agricultural Statistics Service (NASS) by special request from individual Census responses. According to the 2017 Census of Agriculture, 36.10 percent of producers were female; 2.33 percent were Native American, Alaskan, or of mixed race; 0.74 percent were of Asian or of mixed race; and 1.43 percent Black or African American or of mixed race.[24]

Definitions of Terms: Farm Operators and Producers, Beginning Farmers, and Socially Disadvantaged Farmers

Operators and producers: A farm producer or operator is someone involved in running a farm who makes daily management decisions. In 2017, the Census of Agriculture and the USDA Agricultural Resource Management Survey (ARMS) identified up to four operators or producers on a farm.

Beginning farmers: This report uses the USDA, Economic Research Service definition of a "beginning farming operation," in which all operators have no more than 10 years of experience as an operator on any farm. This study is not accounting for multigenerational-family farming operations with a mixture of beginning and experienced farm operators in the definition of "beginning farming operations."

Socially disadvantaged farmers. In general, the classification of "socially disadvantaged farmers" (SDA) is based on the racial or ethnic status, or gender of the operators. However, as discussed in the appendix A, this definition is flexible. In some circumstances if a female operator is present, the farm is classified as SDA. In other circumstances, if a female operator shares the operation with a male operator, the farm is not classified as SDA. For quantifying SDA operations, this study constructed two definitions including: (1) The race and ethnicity-based definition classifies a farming operation as socially disadvantaged if any operator is non-White or Hispanic; and (2) The race, ethnicity, and gender-based definition additionally classifies operations as socially disadvantaged if any operator is non-White or Hispanic *or* all operators are female.

This study first defines SDA operations based on the race and ethnicity of the operators on the farm; an operation is considered SDA if any operator on the operation is either non-White or Hispanic, henceforth referred to as SDA-RE operations. This definition is used to approximate the USDA's Natural Resources Conservation Service (NRCS) definition of SDA and does not consider gender as a separate criterion in determining whether an operation meets the SDA definition.

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[23] See the supplemental appendix for details.

[24] Note that these statistics express the percentage of producers, not the percentage of operations that our analysis focuses on.

8

Access to Farmland by Beginning and Socially Disadvantaged Farmers: Issues and Opportunities, AP-096
USDA, Economic Research Service

Figure 1

Distribution of socially disadvantaged farm operations, according to race and ethnicity definition, by county in 2017
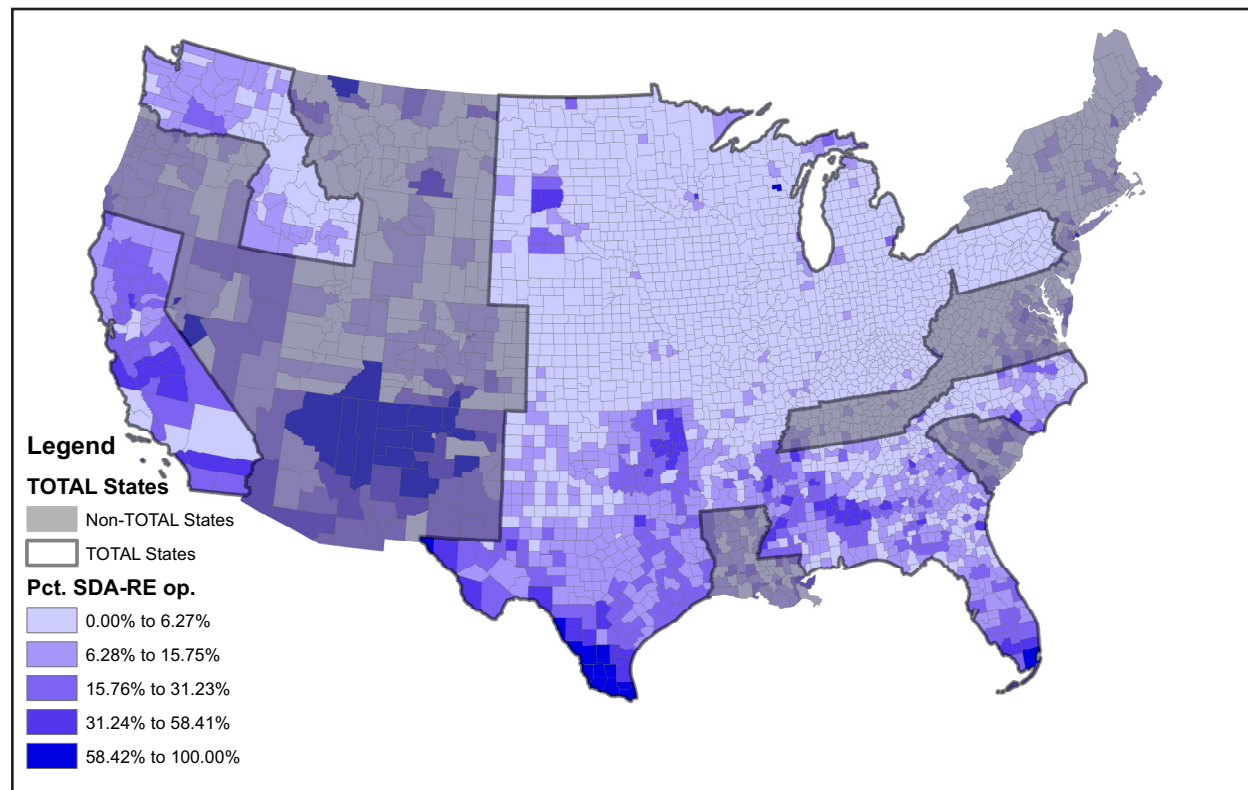
Notes: This map depicts the percentage of operations classified as socially disadvantaged (SDA)—using the SDA, by racial and ethnic status (SDA-RE) definition (Pct. SDA-RE op.). The models used in the regression analysis used data from Tenure, Ownership, and Transition of Agricultural Land (TOTAL) States (the non-gray regions in the map). The Western and Southern regions of the United States have a considerably higher percentage of SDA-RE operations than the Northern and Midwestern regions.

Source: USDA, Economic Research Service using 2017 Census of Agriculture data.

Figure 1 depicts the distribution of the percentage of farm operations that are SDA by county according to the definition of race and ethnicity. The Western and Southern regions of the United States have considerably higher percentages of SDA operations than the Midwestern and Northeastern U.S. regions.

The second SDA definition is intended to approximate the USDA Farm Service Agency (FSA) definition of SDA, which includes operations with one or more female operators in addition to those with Hispanic or non-White operators. However, the second SDA definition excludes operations consisting of a combination of White males and females, only including operations with White females if they are unaccompanied by White males. Note the FSA included women in their definition of SDA farmers without qualification. This study's definition differs because including all operations with women present would flag most U.S. farming operations as SDA. These operations will be henceforth referred to as SDA operations according to the race, ethnicity, and gender definition (SDA-REG).

9

Access to Farmland by Beginning and Socially Disadvantaged Farmers: Issues and Opportunities, AP-096
USDA, Economic Research Service

Figure 2

Distribution of socially disadvantaged farm operations, according to race, ethnicity, and gender definition, by county in 2017
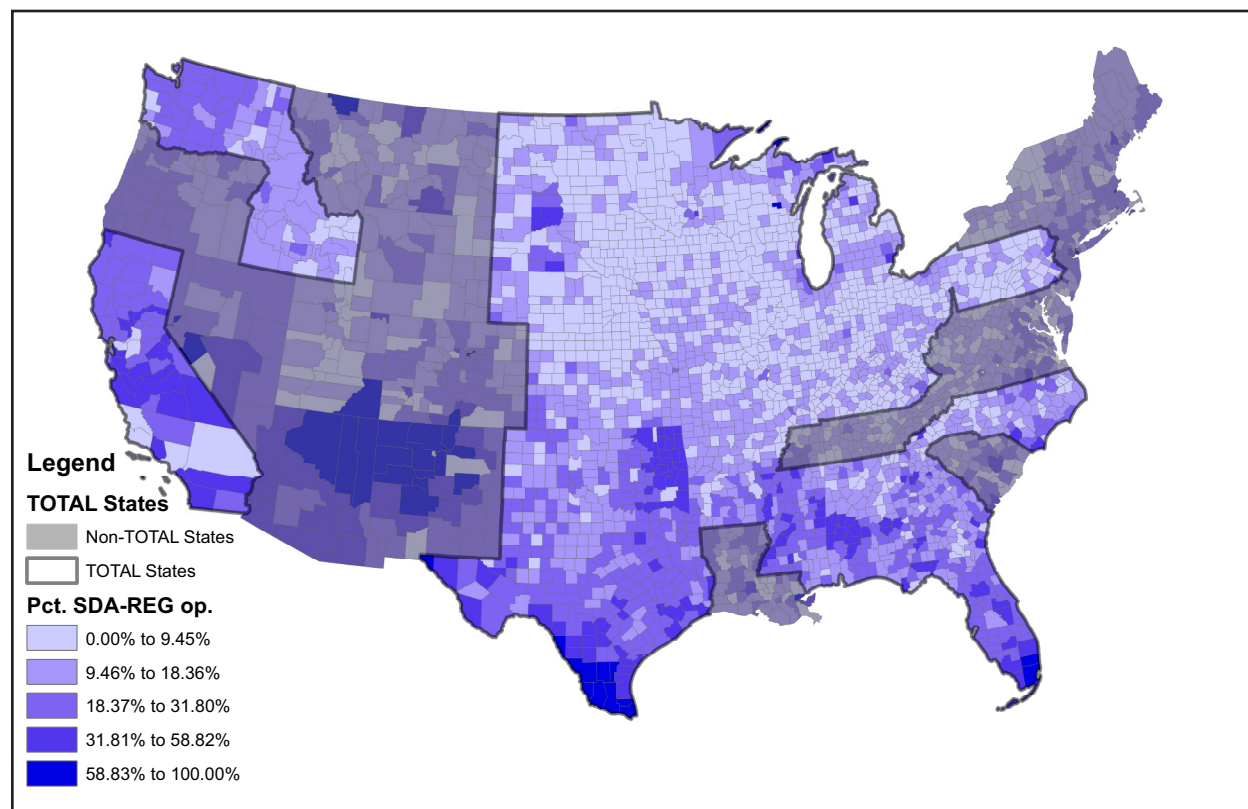
Notes: This map depicts the percentage of operations classified socially disadvantaged (SDA)—using the SDA, according to race, ethnicity, and gender (SDA-REG) definition (Pct. SDA-REG op.). The models used in the regression analysis used data from Tenure, Ownership, and Transition of Agricultural Land (TOTAL) States (the non-gray regions in the map). In general, White female operations are more common in counties where non-Hispanic White people comprise large shares of the population.

Source: USDA, Economic Research Service using 2017 Census of Agriculture data.

Figure 2 depicts the share of SDA farm operations by county using the expanded race, ethnicity, and gender definition. There are higher percentages of SDA operations in the Midwestern and Northeastern U.S. regions relative to the race and ethnicity definition alone. In general, White female operations are more common in counties where non-Hispanic Whites comprise larger shares of the population.

This study defines beginning farm operations as any operation in which all operators have been farming for 10 years or less (Katchova and Ahearn, 2016; Key and Lyons, 2019). Box 2 describes the extent and characteristics of beginning farmers, and figure 3 depicts the share of beginning farmer operations by county. Beginning operations are somewhat less common in the Midwest and the Northern Plains States. However, unlike the distribution of SDA operations, the pattern of the beginning farmer geographic distribution is far more dispersed with less of a geographic pattern. Moreover, there are lower percentages of beginning farmers in most Midwestern and Northern Plains States.

Beginning Farms

As of 2017, there were about 340,000 farms—with almost 900,000 operators—on which all operators were beginning farmers with 10 or less years of management experience on any farm. These new "beginning farms"[1] and ranches accounted for 17 percent of all farms in the United States and 8 percent of the total agricultural production (Key and Lyons, 2019).

Following the same pattern as with established farms, most beginning farms are small-scale operations that, in aggregate, contribute a relatively low share of total production value. For example, only about 33 percent of beginning farms produced more than $10,000 worth of output when compared with roughly 50 percent of established farms. About 2 percent of beginning farms have annual production value of more than $1,000,000—compared with 4 percent of established farms. These larger beginning farms are responsible for more than 50 percent of all output produced by beginning farms—compared with over 60 percent for established farms.

In 2017, among farms with at least $10,000 in production value or sales, principal operators of beginning farms were 43 years old—on average—whereas operators of established farms were 63 years old, on average. In addition, 30 percent of beginning-farm principal operators were 35 years old or younger, compared with only 2 percent of principal operators of established farms.

Beginning farm households (with at least $10,000 in production) earned almost as much total household income—around $150,000—as established farms, when averaged over 2013–17. Off-farm income represents a greater share of total income for beginning farms (77 percent) than for established farms (56 percent).

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[1] As noted in the introduction, the definition of new "beginning farms" does not include multigenerational farms where an older operator is the primary operator and a secondary/tertiary operator is a beginning farmer.

11

Access to Farmland by Beginning and Socially Disadvantaged Farmers: Issues and Opportunities, AP-096
USDA, Economic Research Service

Figure 3
Distribution of beginning farming operations, by county, in 2017

Legend

TOTAL States

Non-TOTAL States

TOTAL States

Pct. beginning op.

3.38% to 17.37%

17.38% to 23.11%

23.12% to 30.63%

30.64% to 52.23%

52.24% to 100.00%
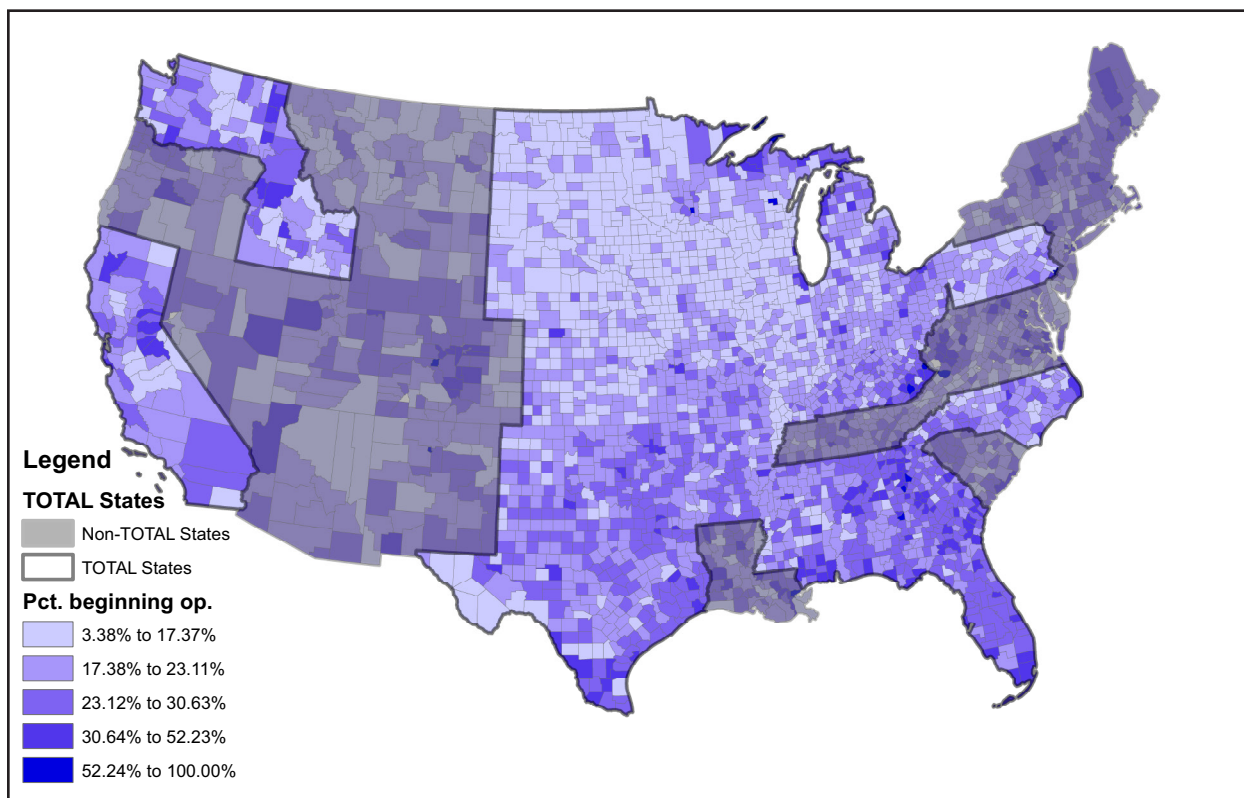
Notes: This map depicts the percentage of beginning farming operations (Pct. beginning op.), defined as an individual or entity that has operated a farm for not more than 10 consecutive years. The models used in the regression analysis used data from Tenure, Ownership, and Transition of Agricultural Land (TOTAL) States (the non-gray regions in the map). Beginning farming operations are more geographically dispersed than socially disadvantaged operations. There are lower percentages of beginning farmers in most Midwestern and Northern Plains States.

Source: USDA, Economic Research Service using 2017 Census of Agriculture data.

This study also considered whether the share of SDA farm operations in a county is representative of the share of the SDA population in the county.[25] Figure 4 has shown the average percentage point difference between the percentage of SDA farm operators and the percentage of the total population that is SDA within the county. SDA operators in the Southeastern United States and West Texas comprise a lower percentage of the farm operator population relative to the overall population. However, in Arizona, Utah, New Mexico, and Oklahoma, there are several counties in which SDA operators comprise a higher percentage of operators relative to their share of county population. These counties tended to include areas under tribal jurisdiction. Note that SDA demographic groups comprise less than 10 percent of the population of most counties in the Midwest and Northeast regions.

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[25] This uses the percentage of the population that is non-White or Hispanic using county population estimates; obtained from table B03002 from the 2017 American Community Survey.

Figure 4

Percentage point difference between socially disadvantaged (SDA) producers and SDA populations, by county in 2017[1]

Legend

TOTAL States

- Non-TOTAL
- TOTAL

Pct. point difference

- -95.85% to -46.73%
- -46.72% to -29.27%
- -29.26% to -16.10%
- -16.09% to 0.00%
- 0.01% to 86.73%
- SDA<10% of population
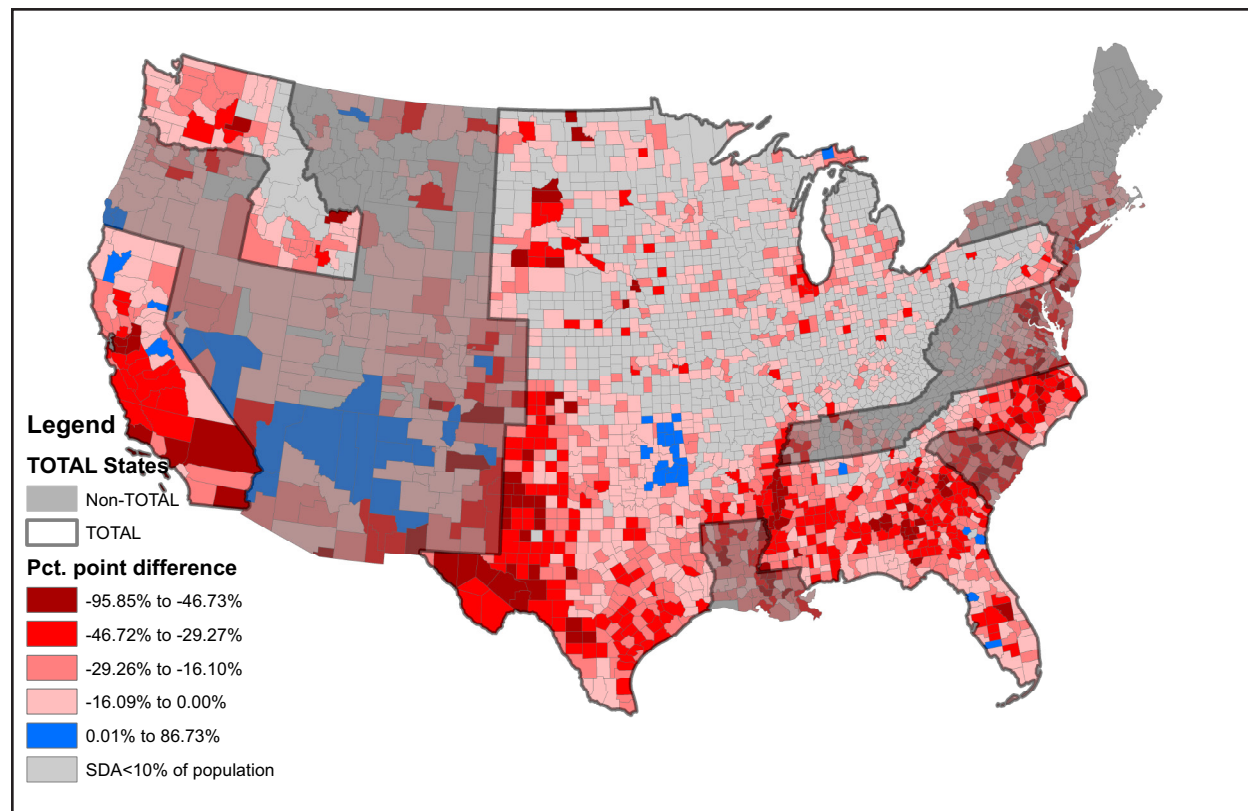
This map depicts the percentage point difference (Pct. point difference) between the percentage of socially disadvantaged (SDA) farming operations and the percentage of SDA population. The models used in the regression analysis used data from Tenure, Ownership, and Transition of Agricultural Land (TOTAL) States (the non-gray regions in the map). SDA operators in the Southeastern United States and West Texas comprise a lower percentage of the farm operator population relative to the overall population. However, in Arizona, Utah, New Mexico, and Oklahoma, there are several counties in which SDA operators comprise a higher percentage of operators relative to their underlying population.

[1] Counties only included if SDA peoples comprise at least 10 percent of the population.

Source: USDA, Economic Research Service using 2017 Census of Agriculture and 2017 American Community Survey data.

What Factors May Be Correlated With Land Access for Beginning and SDA Farmers?

Ultimately, this study is interested in discerning what factors—such as the current ownership of agricultural lands or the size and extent of Federal programs—affect the ability of beginning and SDA farmers to obtain or access farmland. However, given the gaps in available data, a robust analysis accurately measuring operator characteristics and land access outcomes is infeasible. Hence, this analysis of land access challenges used the share of farm operations by county SDA or beginning farming operations to approximate the relative ability of these farmers to thrive in their localities. Through regression analysis, this research estimated the correlation between the three measures of these groups—operation share using the two definitions of SDA operation and the share of beginning farming and ranching operations—and various associated factors. In addition to several measures of land availability, this research also incorporated measures of participation in supportive USDA programs that may counterbalance factors limiting access to land. To control other factors possibly

13

Access to Farmland by Beginning and Socially Disadvantaged Farmers: Issues and Opportunities, AP-096
USDA, Economic Research Service

influencing the relationship between land access and operation shares, this research further included recent county-population growth as a measure of economic development and of commodity mixed into the analysis. This research used a county-level, cross-sectional dataset for the 25 States in the 2014 TOTAL Survey.[26] This methodology estimated statistical associations, not underlying causal mechanisms[27]. As such, this report's estimation results should be considered suggestive rather than definitive.

Measures of Land Access

USDA's 2014 Tenure, Ownership, and Transition of Agricultural Land (TOTAL) Survey directly asked both operator and non-operator landlords about land-ownership characteristics, rental agreements, landlord/tenant relationships, and future land transition plans. From this survey, this research developed several measures to quantify land access for production.

Table 1
Summary statistics for model variables, TOTAL States only

Variable	Source	N	Min	Max	Mean	Median	Standard deviation
Dependent variables							
Percentage of SDA operations (race/ethnicity/gender)	2017 Ag Census	2,263	0.00%	100.00%	15.60%	11.21%	11.20%
Percentage of SDA operations (race/ethnicity)	2017 Ag Census	2,263	0.00%	96.36%	8.42%	3.60%	10.24%
Percentage of beginning operations	2017 Ag Census	2,263	5.93%	70.00%	21.49%	20.24%	6.48%
Land access variables							
Percentage of farmland to be transferred to nonfamily members	2014 TOTAL				3.01%	0.00%	0.18%
Average lease size (acres)	2014 TOTAL				117.80	45.00	388.86
Percentage of leases renewed annually	2014 TOTAL				70.55%	29.13%	0.56%
Average landlord/tenant relationship length	2014 TOTAL				10.707	8.170	0.089
Percentage of rented farmland acres	2014 TOTAL/ 2017 Ag Census				46.83%	32.24%	34.56%
Percentage of cropland acres	2017 Ag Census	2,251	0.05%	99.98%	56.64%	66.83%	28.63%
Land value per acre	2017 Ag Census	2,261	191	77,760.00	6,149.34	3,500.00	4,096.83

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[26] The independent variables in this regression were chosen to both measure the correlation of land access and Federal program measures on the percentage of SDA and beginning farming operations, and to control for as much omitted variable bias as possible. All dollar amounts are measured in per acre terms. All continuous variables are log transformed.

[27] Note that the TOTAL survey was designed to provide State level estimates for the top 25 States in terms of cash receipts. It was not intended to be used to construct county estimates. We do so because it was necessary to obtain a sufficient sample size to conduct the analysis. County level aggregates of TOTAL survey data are not guaranteed to be representative of the underlying population.

Variable	Source	N	Min	Max	Mean	Median	Standard deviation
Government programs variables							
Percentage of SDA (race/ethnicity/gender) granted DLP/GLP loan applications	2017 REGStats	1,736	0.00%	100.00%	59.76%	50.00%	34.54%
Percentage of SDA (race/ethnicity) granted DLP/GLP loan applications	2017 REGStats	1,079	0.00%	100.00%	75.77%	80.00%	26.84%
Percentage of all granted DLP/GLP loan applications	2017 REGStats	2,213	0.00%	100.00%	75.36%	75.61%	12.19%
ARC/PLC payments per acre	2014–2017 FSA	2,311	0	120.875	8.089	4.854	11.628
Crop insurance indemnity payments per acre	2013–2017 RMA	2,311	0	2,746.99	25.368	21.612	84.065
Total crop insurance premium per acre	2013–2017 RMA	2,311	0	1,892.91	35.455	35.339	51.517
Percentage of cropland acres enrolled in general signup CRP	2014–2017 FSA	2,279	0.00%	59.11%	3.53%	0.54%	6.21%
Percentage of cropland acres enrolled in continuous signup CRP	2014–2017 FSA	2,279	0.00%	30.06%	1.98%	0.59%	2.71%
Percentage of cropland enrolled in CRP-TIP	2014–2017 FSA	2,279	0.00%	2.35%	0.04%	0.00%	0.11%
Percentage of cropland acres enrolled in ACEP	Origin-2017 NRCS	2,251	0.00%	19.78%	0.10%	0.00%	1.01%
Share of sales (by type of agricultural commodity) variables							
Percentage of sales in field crops	2017 Ag Census	2,222	0.00%	100.00%	44.51%	45.49%	29.04%
Percentage of sales in specialty crops	2017 Ag Census	2,222	0.00%	100.00%	9.96%	1.15%	12.76%
Percentage of sales in livestock	2017 Ag Census	2,222	0.00%	99.92%	26.03%	20.31%	27.83%
Percentage of direct-to-consumer sales	2017 Ag Census	2,222	0.00%	49.41%	0.45%	0.15%	2.74%
Demographic variables							
Percentage of SDA population (race/ethnicity)	2017 ACS	2,264	0.00%	99.36%	39.24%	15.09%	19.96%
Percentage change in population	2010 Census/ 2017 ACS	2,264	-23.20%	98.52%	5.42%	-0.88%	6.72%
Average age of farmers	2017 Ag Census	2,263	39.7	67.5	58.57	58.6	2.226
Percentage change in farmer age	2012–2017 Ag Census	2,263	-33.83%	12.94%	0.47%	0.52%	3.12%
Rural Urban Continuum Code	2013 ERS	2,264	1	9			

Note: Certain statistics are omitted for TOTAL survey variables to protect producer confidentiality.

Source: Sources depend on the variable and are listed in the second column, including USDA, Census of Agriculture, U.S. Census American Community Survey (ACS); USDA, National Resources Conservation Service (NRCS); USDA, Risk Management Agency (RMA) data; 2014–2017 Farm Service Agency (FSA): derived from FSA administrative data by USDA, Economic Research Service (ERS); USDA 2014 Tenure, Ownership, and Transition of Agricultural Land (TOTAL) Survey.

Table 1 reports summary statistics for the variables used in the empirical analysis, which included data for the 25 TOTAL core States. The TOTAL survey used an area frame stratified random sample. The core States are the 25 States with the highest cash receipts during the prior 3-year period. Although the microdata are intended to be aggregated to the State-level for the TOTAL core States, this study aggregated to the county-level to obtain a reasonable sample size, accounting for the survey weights in the aggregation process.[28]

This report measured land availability to include the following:

- *Percentage of farmland that landlords anticipate selling or transferring to nonfamily members within the next 5 years.* This represented how much farmland will likely be available for purchase by farmers including SDA and beginning farmers. The smaller this percentage is, the less land available for farmers to begin or expand operations by purchasing farmland.

- *Number of acres of farmland available for lease at the county level.* Holding other variables constant, more land available for rent means more acreage to create a new farming operation or expand an existing one.

- *Average size of a lease in acres.* Holding constant the total availability of land for lease, a larger average lease size will make it more difficult for farmers to start or expand operations. The national average size of a lease is 94 acres and the median is 11 acres. Although many parcels are small, there are a smaller number of much larger parcels.

- *Percentage of leases renewed annually.* More long-term leases make land less available for new entrants seeking to take advantage of changing market conditions. Higher shares of annual leases indicated landlords and tenants should be able to adjust leasing terms to changing market conditions with relative ease.

- *Average length of a landlord/tenant relationship.* Specific pairs of landlords and tenants remain in agreements an average of 10 years. This could suggest that, although most leases are renewed annually, these renewals are frequently maintained by the same tenants. Longer landlord/tenant relationships may make it more difficult for beginning farmers to enter the market or more difficult for existing tenants (SDA or otherwise) to expand operations. Alternatively, if leases are renewed annually but are inflexible to change, landlords might be happy to lease to new tenants (SDA or otherwise) if current tenants are unwilling to meet their terms.

This research also constructed three additional county-level measures of land availability based on data from the 2017 Census of Agriculture:

- *Percentage of rented farmland acres.* This variable measures the percentage of all farmland (both cropland and pastureland) that is rented. The researchers expect a higher percentage of rented farmland will be positively correlated with a higher percentage of SDA and beginning farming operations.

- *Percentage of farmland that is cropland.* This variable is a measure of a county's division of land between farming and ranching. The researchers hypothesize SDA operations are more common in areas where livestock is more common, implying counties with a higher percentage of cropland should have a lower percentage of SDA operations.

- *Average agricultural land value per acre.* This measure is constructed as total land value divided by the sum of cropland and pastureland acreage. The higher the land values are, the more difficult it would be for limited resources or beginning farmers to acquire land. Since land is often financed using existing land holdings as collateral, higher land values make it relatively easier for established farms to buy land

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[28] Data obtained from the TOTAL survey were aggregated using the Survey Means procedure in Statistical Analysis System (SAS) software.

Access to Farmland by Beginning and Socially Disadvantaged Farmers: Issues and Opportunities, AP-096
USDA, Economic Research Service

and relatively harder for beginning farmers to do so. Average land values vary by land quality, land use, and future development potential. Higher quality land is both more expensive and more productive. All farmers—including SDA and beginning farmers—face a tradeoff between obtaining more productive and more expensive land versus less productive and less expensive land.

Measures of USDA Program Participation

Although this study does not have county-level data on all USDA efforts to support SDA and beginning farms, it does have detailed demographic information on participation in the USDA, Farm Service Agency (FSA) Direct Loan Program (DLP) and Guaranteed Loan Program (GLP).[29] The researchers used this information as a proxy for participation in the subset of the Direct and Guaranteed Loan Programs by SDA and beginning farmers.[30] These measures include the following:

- *Total participation rate in the DLP and GLP (regardless of demographic group).* Seventy-five percent of producers who applied for DLP and GLP loans had successfully received them. This statistic provides context for the participation rates of SDA producers reported below. This measure is included in the beginning farming operation estimations because no measure exists specifically for beginning farming operations.

- *Participation rates in the DLP and GLP for both definitions of SDA producers.* Under the race and ethnicity definition, national participation rates have been 75 percent. When using the race, ethnicity, and gender definition, participation rates have been 60 percent. The effect of higher county-level participation in these loan programs is expected to be positively correlated with both the percentage of SDA and beginning operations in a county.[31]

In addition to loan programs intended to aid beginning, limited-resource, and SDA operations, the researchers also included measures of payments from major Federal farm programs.

- *Agriculture Risk Coverage (ARC)/Price Loss Coverage (PLC) payments per acre.* This variable is constructed as the level of ARC/PLC payments in a county—based on information obtained from FSA—divided by base acres and averaged from 2014 through 2017.[32]

- *Indemnity payments per acre and total premium payments per acre.* Based on figures from the Federal crop insurance program operated by the Risk Management Agency (RMA), these two crop insurance measures are intended to capture program payments and agricultural risk. This research aggregated across crop and insurance types to obtain payment information at the county level. To minimize the impact of weather and production outcomes in any single year, values of each measure were averaged across 2013–2017.

- *Percentage of cropland acres enrolled in the Conservation Reserve Program (CRP).* This study separately measured the percentage of cropland enrolled in general signup CRP, continuous signup CRP, and the CRP-TIP programs to assess the association between CRP and the percentage of beginning farmers.

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[29] These data come from the USDA Race, Ethnicity, and Gender Program Statistics (REGStats).

[30] There are several possible loans measures—those accounting for who applies, who is accepted, and the amount of funding distributed. Our use of participation rates is conditioned on available data—including the SDA and beginning-farmer information. Thus, these measures are used as best available proxies—they may not fully control for the many factors influencing the capability of beginning and SDA farmers to obtain loans.

[31] There are several possible measures of loan distribution—those reflecting who applies, who is accepted, and amount of funding. Our use of participation rates is conditioned by available data, including the SDA or beginning-farmer information. Thus, these measures are used as best-available proxies that may not fully control for the many factors influencing the capability of beginning and SDA farmers to obtain loans.

[32] Data on ARC/PLC payments for crop year 2017 obtained from the USDA, FSA website.

17

Access to Farmland by Beginning and Socially Disadvantaged Farmers: Issues and Opportunities, AP-096
USDA, Economic Research Service

Researchers expect a negative statistical association between the percentage of CRP cropland and the percentage of SDA or beginning farmers due to less land available for rent and the expectation of CRP-TIP being correlated with a higher percentage of SDA and beginning farmers.

Other Measures

Many of the regional disparities in land values, farm income, and other factors depend on what crops can be farmed, which depends on soil characteristics, weather patterns, and other factors considered to be intrinsic productivity. Crop mix is included in the analysis to control for factors that may mediate the relationship between operator shares and land-access measures.[33] This research measured crop mixes in three ways: as the value of field crop sales, animal product (livestock) sales, and specialty crop sales as shares of total county agricultural sales. This study also included a measure of the percentage of direct sales to consumers and retailers since this is a more common marketing channel for beginning farmers in particular (Low et al., 2015).[34]

This research examined the correlation between the changes of a county's population—as a proxy for local economic opportunity data[35]—and shares of SDA and beginning farmers. This study calculated this measure as the percentage change between 2017 population estimates from the American Community Survey and the 2010 population from the 2010 Decennial Census. Counties with population growth have more economic opportunities—thus, it's expected these counties have more SDA and beginning farming operations.

Similarly, this study accounted for urbanization using the 2013 Rural Urban Continuum Code (USDA, ERS, Rural Urban Continuum Code 2020). This is a categorical value equaling 1 for the most urban counties and 9 for most rural. Since this is meant to be a proxy for urban influence, this value is used as is rather than using separate categorical dummies for each of the possible 9 value categories.

Finally, to gauge how farmer age may matter, this research used the county average age of the producer population from the 2017 Census of Agriculture. Further, this study used the percentage change in average farmer age between 2012 and 2017 to see if the change in operator age matters. Counties with older operators and counties where average operator age is increasing may (or many not) have fewer beginning farming operations. There are no expectations regarding operator age and SDA operations.

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[33] The researchers obtained crop sales data from the 2017 Census of Agriculture.

[34] Although this study considered using various forms of cropland rental rates, it was unclear which of these rental rates would be the most applicable to SDA and beginning farmers. Additionally, including all of the cropland rental rates could result in a collinearity problem.

[35] Areas with economic growth tend to experience population growth, while areas in economic decline tend to experience population decline.

Access to Farmland by Beginning and Socially Disadvantaged Farmers: Issues and Opportunities, AP-096
USDA, Economic Research Service

Findings on Land Access: What Factors have Statistically Significant Correlations?

Table 2 reports on whether a correlated factor (such as average lease size) has a non-zero and statistically significant relationship with each of the three county measures: (1) percentage of SDA farming operations according to the race and ethnicity definition (SDA-RE); (2) percentage of socially disadvantaged farming operations according to the race, ethnicity, and gender definition (SDA-REG); and (3) percentage of beginning farmers.[36] To estimate these statistical associations, this research used a fractional probit model. Since this research lacks the necessary data to identify causal effects, the primary interest remains in the direction of any statistical associations. This research, therefore, only reports the sign of statistically significant effects in table 2. These statistical associations should not be thought of as causal effects. Instead, they indicate correlations that suggest a deeper association between the factor and the outcome variable—or the share of SDA and beginning operations.

Table 2

Statistical evidence of non-zero relationship between possible explanatory factors and measures of SDA and beginning farmers (using fractional probit model)

Explanatory factors	Model		
	SDA-RE	SDA-REG	Beginning
Percentage of farmland to be transferred to nonfamily members	0	0	0
Log of average lease size in acres	-	-	-
Percentage of leases renewed annually	+	0	0
Log of average landlord- or tenant-relationship length	0	0	0
Percentage of rented farmland acres	+	+	+
Percentage of cropland acres	-	-	0
Log of land value per acre	0	0	0
Percentage of granted SDA (Race/Ethnicity) DLP/GLP loan applications	+	na	na
Percentage of granted SDA (Race/Ethnicity/Gender) DLP/GLP loan applications	na	+	na
Percentage of all granted DLP/GLP loan applications	na	na	0
Log of ARC/PLC payments per acre	0	0	0
Log of crop insurance indemnity payments per acre	0	0	0
Log of total crop insurance premium per acre	0	-	-
Percentage of cropland acres enrolled in general signup CRP	0	+	0
Percentage of cropland acres enrolled in continuous signup CRP	0	+	0
Percentage of cropland enrolled in CRP-TIP	0	0	0
Percentage of cropland acres enrolled in ACEP	0	0	0
Percentage of sales in field crops	-	-	-
Percentage of sales in specialty crops	-	0	0
Percentage of sales in livestock	-	-	-
Percentage of direct-to-consumer sales	+	+	0
Percentage change in population (2010–2017)	0	0	0

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[36] See appendix C for a description of the methodology and the coefficient estimates used to create table 2.

19

Access to Farmland by Beginning and Socially Disadvantaged Farmers: Issues and Opportunities, AP-096
USDA, Economic Research Service

Explanatory factors	Model		
	SDA-RE	SDA-REG	Beginning
Percentage of total SDA population (race/ethnicity)	+	+	na
Average age of farmers (in county)	-	0	-
Percentage change in average farmer age (2012–2017)	0	0	-
Rural Urban Continuum Code (2013)	-	-	-

SDA = socially disadvantaged. Log = logarithm. DLP = Direct Loan Program. GLP = Guaranteed Loan Program. ARC = Agricultural Risk Coverage. PLC = Price Loss Coverage. CRP = Conservation Reserve Program. CRP-TIP = CRP Transition Incentives Program. ACEP = Agricultural Conservation Easement Program.

Notes: Each cell indicates whether a statistically significant (at the 10-percent level) relationship exists between an outcome variable and a possible explanatory factor, where:

0 : not statistically different from 0

- : statistically significant negative relationship

+ : statistically significant positive relationship

na : this variable was not included in this model

See appendix 3 for the estimated fractional probit coefficients and robust standard errors used to construct this table.

SDA-RE classifies socially disadvantaged farmers using race and ethnicity; SDA-REG uses race, ethnicity, and gender.

Source: USDA, Economic Research Service.

Several measures of land availability are statistically correlated with the percentage of socially disadvantaged (SDA) operations or the percentage of beginning operations. First, this research found the average lease size is negatively correlated with the percentage of SDA and beginning operations. This finding implies counties with larger lease sizes—on average—have a lower percentage of SDA and beginning farming operations. Second, this research found the percentage of leases annually renewed is positively correlated with the percentage of SDA-RE operations in the county—though not with SDA-REG operations. Third, counties with a higher percentage of rented farmland acres have been statistically correlated with a higher percentage of SDA and beginning operations, which suggests SDA and beginning operations are more likely to rely on farmland rental markets than land purchase markets to gain access to farmland. Finally, this research found the percentage of cropland acreage as a portion of farmland acreage is negatively correlated with SDA operations.

Some measures of Government program participation and payments are also statistically correlated with the percentage of SDA and beginning operations. First, this study found the percentage of accepted DLP and GLP applications are positively correlated with the percentage of SDA operations—both SDA-RE and SDA-REG definitions—which suggests counties with higher percentages of SDA operations experience higher rates of accepted applications in these loan programs. Second, the research found a negative association between crop insurance premiums and the percentage of SDA-REG operations and the percentage of beginning operations—but not of SDA-RE operations. Further, the percentage of SDA-REG operations has been positively correlated with the percentage of cropland acres enrolled in both the general and continuous Conservation Reserve Program (CRP). This study found no statistical association between the percentage of SDA or beginning operations and the percentage of cropland acres in Conservation Reserve Program-Transition Incentives Program (CRP-TIP) or Agricultural Conservation Easement Program (ACEP).

Next, this study assessed the statistical significance of the percentage of total sales by crop category. The percentage of sales in field crops was found to be negatively correlated with the percentage of SDA and beginning operations. The percentage of sales in specialty crops was found to be negatively correlated with the percentage of SDA-RE operations but not with SDA-REG operations. This study also found that SDA and beginning operations are negatively correlated with the percentage of livestock sales. This finding is surprising because the percentage of SDA and beginning operations are negatively correlated with the percentage of sales in field crops. If livestock sales figures are skewed by large livestock operations such as concentrated animal feeding operations, and SDA livestock operations primarily focus on ranching, then the authors would expect this result. However, the authors lack sufficient data to determine if this is the cause. The percentage of direct-to-consumer sales was positively correlated with the percentage of SDA operations. Finally, this study considered farmer and regional demographic measures. The percentage of the overall population classified as SDA was found to be positively correlated with the percentage of SDA operations. This research also found the average age of farm operators has been negatively correlated with the percentage of SDA-RE and beginning operations, though not SDA-REG operations. Additionally, this study found a negative association with the percentage of beginning operations in counties with an increase in operator age between 2012 and 2017. Finally, decreasing urbanization—counties with larger Rural Urban Continuum Codes (RUCC)—has a negative association with SDA and beginning operations.

Conclusion

The aging of the average U.S. farmer has raised questions about the pace of land transfer to the next generation of farm operators. In addition, the increasing concentration of land ownership and the impacts of land retirement programs may affect the ability of beginning and SDA farmers to obtain access to farmland. Reflecting the issue's importance, USDA has maintained a portfolio of farm financing and other support programs that help SDA and beginning farming and ranching operations to initiate and expand.

For both SDA and beginning operations, this study found negative correlations with average lease size, the percentage of sales in field crops, the percentage of sales in livestock, and with decreasing urbanization. However, this study also found a positive correlation with the percentage of rented farmland acres. In addition, results have shown associations specific to each operation group:

- *For SDA-REG operations*: This study found a negative correlation with the percentage of cropland acres and the size of crop insurance premium per acre. Conversely, positive correlations were found with land enrolled in CRP; the percentage of granted USDA, FSA DLP/GLP loans; the percentage of direct-to-consumer sales; and the percentage of county population that is SDA.

- *For SDA-RE operations*: This research found a negative correlation across the percentage of cropland acres, percentage of sales in specialty crops, and the average age of farmers, whereas a positive correlation was found across the percentage of leases renewed annually, the percentage of granted USDA, FSA DLP and GLP loans, the percentage of direct-to-consumer sales, and the percentage of county population that is SDA.

- *For beginning operations*: This research found a negative correlation with the size of crop insurance premiums, the average age of farmers, and the change in average age.

It is important to restate that this report identifies factors—such as land availability, farm policy, and economic characteristics—that have statistically significant correlation with the percentage of SDA and beginning farming operations. And that these statistical correlation findings do not necessarily imply causality.

In particular, when a factor (such as crop insurance premium per acre) influences a measure of interest (such as the share of SDA-RE operations), a correlation will be measurable. However, the existence of a correlation does not necessarily mean that an influence exists. There may be other factors, which are unobservable, that influence both the factor and the measure of interest.

This distinction (finding correlation but not causality) is an unavoidable limitation of this report due to available data being insufficient (in terms of breadth, precision, and abundance) to support rigorous models capable of discerning causality. These results are intended to foster fruitful avenues of future research on the nexus between farm policy and the financial wellbeing of SDA and beginning farming operations. Analyzing new editions of the TOTAL survey could help researchers identify causal effects. The 2018 Farm Bill contains provisions for future versions of the TOTAL survey to follow each subsequent Census of Agriculture.

References

Agricultural Act of 1961 & Consolidated Farm And Rural Development Act Pub. L. No. 87–128, 75 Stat. 294 (1961).

Agricultural Resources and Environmental Indicators. Hellerstein, D., D. Vilorio, and M. Ribaudo (editors). 2019. *Agricultural Resources and Environmental Indicators, 2019.* EIB-208, U.S. Department of Agriculture, Economic Research Service, May 2019.

Bawa, S., and S. Callahan. 2021. *Absent Landlords in Agriculture: A Statistical Analysis*, ERR-281, U.S. Department of Agriculture, Economic Research Service.

Bigelow, D., A. Borshers, and T. Hubbs. 2016. *U.S. Farmland Ownership, Tenure, and Transfer,* EIB-161, U.S. Department of Agriculture, Economic Research Service.

Bureau of Labor Statistics. 2020. Labor Force Statistics from the Current Population Survey: 2020.

Burns, C., and R. Hoppe. 2019. Agricultural Resources and Environmental Indicators, 2019, EIB-208, U.S. Department of Agriculture, Economic Research Service.

Boyce, B. 2019. "2017 Census of Agriculture: An Aging Farm Population But With Optimism," AGDAILY-Insights News.

Claassen, R., D. Hellerstein, and S. Wallander. December 2019. "2018 Farm Act Retains Conservation Programs but Could Reduce Payments for Land Retirement," Amber Waves, U.S. Department of Agriculture, Economic Research Service.

Congressional Research Service. 1996. Credit Provisions of the Enacted 1996 Farm Bill, 96-431 ENR, May 1996.

Congressional Research Service. 2008. The 2008 Farm Bill: Major Provisions and Legislative Action, RL34696, November 2008.

Freedgood, J., M. Hunger, J. Dempsey, and A. Sorensen. 2020. "Farms Under Thread: The State of the States," American Farmland Trust, Washington, DC.

Government Accountability Office. 2019. Information on Credit and Outreach to Socially Disadvantaged Farmers and Ranchers Is Limited, GAO-19-539.

Hoppe, R.A. 2014. Structure and Finances of U.S. Farms: Family Farm Report, 2014 Edition, EIB-132, U.S. Department of Agriculture, Economic Research Service.

Johnson, A., and G. Ready. 2017. "Pathways to Land Access: A Study of the Conservation Reserve Program – Transition Incentives Program in Four States," Center for Rural Affairs.

Katchova, A.L., and M.C. Ahearn. 2016. "Dynamics of Farmland Ownership and Leasing: Implications for Young and Beginning Farmers," *Applied Economic Perspectives and Policy* 38(2):334–350.

Key, N. and G. Lyons. 2019. *An Overview of Beginning Farms and Farmers,* EB-29, U.S. Department of Agriculture, Economic Research Service.

Low, S.A., A. Adalja, E. Beaulieu, N. Key, S. Martinez, A. Melton, A. Perez, K. Ralston, H. Stewart, S. Suttles, S. Vogel, and B.B.R. Jablonski. 2015. *Trends in U.S. Local and Regional Food Systems*, AP-068, U.S. Department of Agriculture, Economic Research Service.

MacDonald, J., P. Korf, and R. Hoppe. 2013. *Farm Size and the Organization of U.S. Crop Farming.* EIB-152, U.S. Department of Agriculture, Economic Research Service.

MacDonald, J., R. Hoppe, and D. Newton. 2018. *Three Decades of Consolidation in U.S. Agriculture.* EIB-189, U.S. Department of Agriculture, Economic Research Service.

MacDonald, J. 2020. "Consolidation in U.S. Agriculture Continues," *Amber Waves*, U.S. Department of Agriculture, Economic Research Service.

McFadden, J., and R. Hoppe. 2017. *The Evolving Distribution of Payments from Commodity, Conservation, and Federal Crop Insurance Programs*, EIB-184, U.S. Department of Agriculture, Economic Research Service.

Ruhf, K.Z. 2013. "Access to Farmland: A System Change Perspective," *Journal of Agriculture, Food Systems, and Community Development* 4(1): 51–60.

Sullivan, P., D. Hellerstein, D. McGranahan, and S. Vogel. July 2006. "Farmland Retirement's Impact on Rural Growth," *Amber Waves*, U.S. Department of Agriculture, Economic Research Service.

Target Participation Rates for Socially Disadvantaged Groups of 2010, CFR § 761.208 (2010).

Taylor, M.R., N.P. Hendricks, G.S. Sampson, and D. Garr. 2021. "The Opportunity Cost of the Conservation Reserve Program: A Kansas Land Example," *Applied Economic Perspectives and Policy* 43(2): 849–865.

Todd, J. March 2020. "U.S. Farm Household Finances," presented at National Agricultural Credit Conference, March 2020.

U.S. Census Bureau. American Community Survey, 2017 American Community Survey 5-Year Estimates, Table B03002, February 2020.

U.S. Department of Agriculture, Economic Research Service. 2019. *Agriculture Improvement Act of 2018: Highlights and Implications. Credit: Title V.*

U.S. Department of Agriculture, Economic Research Service. 2020. *Rural-Urban Continuum Codes.*

U.S. Department of Agriculture, Farm Service Agency. 2019a. *Loans for Beginning Farmers and Ranchers: Fact Sheet.*

U.S. Department of Agriculture, Farm Service Agency. 2019b. *Farm Loan Overview: Fact Sheet.*

U.S. Department of Agriculture, Farm Service Agency. 2019c. *Conservation Reserve Program Monthly Summary, November 2019.*

U.S. Department of Agriculture, Farm Service Agency. 2020. *Farm Loan Programs.*

U.S. Department of Agriculture, Farm Service Agency. 2021. *Conservation Reserve Program Statistics.*

U.S. Department of Agriculture, National Agricultural Statistics Service. 2019. 2017 Census Full Report, Appendix B.

U.S. Department of Agriculture, National Agricultural Statistics Service. 2020. Farms and Land in Farms 2019 Summary.

U.S. Department of Agriculture, Race, Ethnicity, and Gender Program Statistics, February 2019.

U.S. Department of Agriculture, Risk Management Agency. 2018. *Summary of Business.*

Whitt, C., J. MacDonald, and J. Todd. 2020. *America's Diverse Family Farms: 2020 Edition,* EIB-220, U.S. Department of Agriculture, Economic Research Service.

Wu, J.J., and H. Lin. 2010. "The Effect of the Conservation Reserve Program on Land Values," *Land Economics* 86(1):1–21.

Zhang, W., and C.J. Nickerson. 2015. "The Housing Market Bust and Farmland Values: Identifying the Changing Influence of Proximity to Urban Centers," *Land Economics* 91(4):605–626.

Zulauf, C. 2013. "Putting the Age of U.S. Farmers in Perspective," University of Illinois at Urbana-Champaign Department of Agricultural and Consumer Economics, farmdoc daily (3):202.

Appendix A. Legal Definitions of Socially Disadvantaged and Beginning Farmers

A socially disadvantaged (SDA) farmer or rancher belongs to a "socially disadvantaged group," which is any group "whose members have been subjected to racial, ethnic, or gender prejudice because of their identity as members of a group without regard to their individual qualities."[37] USDA program agencies differ in their interpretation of this definition, and thus identify somewhat different populations as belonging to socially disadvantaged groups.

- For example, the USDA's Farm Service Agency (FSA) defines "socially disadvantaged groups" as including African Americans, Alaska Natives, American Indians, Hispanics (White or otherwise), Asian Americans, and women.[38]

- The USDA's Natural Resources Conservation Service (NRCS) definition, on the other hand, excludes women from their definition of "socially disadvantaged group."[39]

A "beginning farmer or rancher" is defined as a person who "has not operated a farm or ranch," or "has not operated a farm or ranch for not more than 10 years" and "meets such other criteria as the Secretary may establish."[40] As noted, the last clause of this definition likewise gives program agencies latitude in implementing more restrictive definitions of who qualifies as a "beginning farmer or rancher."

USDA, FSA restricts the definition of beginning farmer to exclude farmers who own operations that exceed 30 percent of the average size of a farm within that county as determined by the most recent Census of Agriculture.[41]

- The USDA, NRCS definition doesn't impose a restriction on farm size to qualify as a beginning farmer. However, their definition requires all operators on the operation to have less than 10 years of farming experience for the operation to qualify for beginning farming programs.[42]

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[37] Definition comes from Section 335 87-128 of the Consolidated Farm and Rural Development Act of 1961.

[38] For further details, see USDA, FSA Newsroom, *Minority and Women Farmers and Ranchers*.

[39] For further details, see USDA, NRCS, *Historically Underserved Farmers & Rancher*.

[40] Definition comes from Section 2501 of the Food, Agricultural, Conservation and Trade Act of 1990.

[41] For further details, see USDA, FSA, *Farm Loan Programs: Beginning Farmers and Ranchers Loans*.

[42] For further details, see USDA, NRCS, *New and Beginning Farmer and Rancher*.

Appendix B: USDA Loan Programs and SDA and Beginning Farmers

USDA, Farm Service Agency (FSA) delivers several types of loans through the Direct Loan Program, including intermediate term (7-year), annual operating loans, long-term real estate, and emergency loss loans. As described in table B.1, several types of long-term real estate loans—Direct Farm Ownership (FO) Loans—vary by loan limits, the fraction of the purchase price the loan will cover, and the provided interest rate. Between fiscal year (FY) 2017 and FY 2019, between $1.04 and $1.47 billion was annually obligated to the three main Direct FO loans (USDA, FSA, 2019a).

Table B.1

Description of Farm Service Agency direct loan programs

Loan program name	Maximum loan (in dollars)	Maximum % of purchase price covered	Interest Rate (2019). This can vary by year.	Beginning and SDA farmer only?
Direct Farm Ownership loan	$600,000	100%	3.25%	A "farm ownership: microloan" is available for beginning farmers program (with a maximum of $50,000).
Direct Down Payment	$300,000	45%	1.50%	Available only to beginning and SDA farmers. Applicants may not own more than 30 percent of the average size farm at the time of the application.
Direct Farm Ownership participation	$600,000	50%	2.50%	No

Note: Joint financing loans are also known as participation loans.

Source: National Sustainable Agriculture Coalition: Grassroots Guide to Federal Farm and Food Programs; Overview of Farm Bill Programs and Grants; USDA, FSA: Guide to FSA Farm Loans; and USDA, FSA: Programs and Services, Farm Loan Programs (FSA, 2020a).

As described in table B.2, there are several types of real estate loans covered by the Guaranteed Loan Program. Although not subsidizing interest rates, these programs provide lenders with guarantees of up to 95 percent for beginning farmers in the case of operator default. Between 2017 and 2019, between $2.05 and $2.28 billion per year were obligated to Guaranteed FO Loans (USDA, FSA, 2019b).

Table B.2
Description of FSA guaranteed loan programs

Program name	Maximum loan	Requirements	Rate	Beginning and SDA farmer only?
Guaranteed Farm Ownership	1,750,000	Negotiated with lender	Negotiated with lender	No
Land Contract Guarantee	$500,000	5% down payment required	Not more than 3% of the interest rate used for Direct Farm Ownership Loans (as described in table 1)	Provides federal loan guarantees to retiring farmers who self-finance the sale of their land to beginning and SDA farmers.

Notes: FSA = USDA, Farm Service Agency. SDA = socially disadvantaged.

Source: USDA, FSA, Guaranteed Farm Loans, frequently asked questions and National Sustainable Agriculture Coalition: Grass Roots Guide to Federal Farm And Fool Programs, Direct and Guaranteed Farm Loans.

Socially disadvantaged (SDA) and beginning farms may participate in any Direct and Guaranteed Loan Programs if they meet all eligibility criteria. Some programs, however, are mostly reserved for SDA and beginning farms.

- At the start of 2019, 70 percent of Direct Farm Ownership funds was reserved for SDA and beginning farms. A total of $1.11 billion was obligated in Direct Loans in FY 2019 to SDA and beginning farms—up from $833 million in 2017.

- A total of $783 million was obligated in Guaranteed Farm Ownership in FY 2019 to SDA and beginning farms compared with from $779 million in 2017.

For calendar year—not fiscal year—2019, table B.3 breaks down the $1.195 billion obligated to Direct Loan Programs.

Table B.3
2019 participation of beginning and SDA operators in Direct Farm Ownership (FO) loans

	Beginning farmers only	SDA farmers only
	Millions of dollars	
Total direct FO loans	$923	$272
Regular	$411	$42
Down payment	$192	$18
Participation	$320	$212
	Number of borrowers	
Total direct FO loans	3,851	1,155
Regular	1,503	180
Down payment	1,134	122
Participation	1,214	853

Notes: These values are for calendar year 2019 (not fiscal year 2019). FO = farm ownership. SDA = socially disadvantaged.

Source: USDA Guaranteed Loan System (GLS) Obligations Database (January 2020).

For illustrative purposes, consider a highly stylized example comparing the impacts of different subsidized loan rates. For simplicity, assume a 30-year loan of $600,000, ignore down payments—assume the same down payment for all types of loans—and assume no inflation.

Access to Farmland by Beginning and Socially Disadvantaged Farmers: Issues and Opportunities, AP-096
USDA, Economic Research Service

Table B.4

Stylized examples of the impacts of subsidized loan rates: assuming a $600,000 loan with a 30-year term and no down payment

Type of loan	Source of funds	Interest rate	Total costs over life of loan, thousands of dollars
Commercial lender	Commercial lender (100%)	6	$1,295
Direct Farm Ownership	USDA (100%)	3.3	$946
Commercial lender and direct down payment	Commercial lender (50%)	6	$648
	USDA (50%)	1.5	$373
	Total cost	..	$1,021
Commercial lender and Direct Farm Ownership Participation	Commercial lender (50%)	6	$648
	USDA (50%)	2.5	$428
	Total cost	..	$1,075
Commercial lender	Commercial lender (100%)	4.5	$1,094
Commercial lender and Direct Down Payment	Commercial lender (50%)	4.5	$547
	USDA (50%)	1.5	$373
	Total cost	..	$920
Commercial lender and Direct Farm Ownership participation	Commercial lender (50%)	4.5	$547
	USDA (50%)	2.5	$428
	Total cost	..	$975

Source: USDA Economic Research Service calculations based on commercial bank rate derived from approximate average of 2018 and 2019 rates from the Kansas City Federal Reserve, table C.4.

Although this simplified example is not meant to describe real-world conditions, it does highlight a few broad features. Compared with the stylized commercial loan, the stylized Direct Loan from USDA, Farm Service Agency (FSA) would yield over 30 percent in savings on total payments for land acquisition. Similarly, the savings from a stylized subsidized Direct Down Payment Loan is lessened (relative to the Direct Farm Ownership) because the commercial source interest rate is higher.

Appendix C: Results from Regression Models

This study used several regression models to examine possible relationships between beginning farmers, SDA farmers, and several possible explanatory factors. These regressions offered a parsimonious statistical methodology that permits simultaneous consideration of many potential factors.

However, the available data are marked by differences in geographical scope and year. In particular, the TOTAL data is available for 25 States, and was collected to report State-level estimates. Hence many of the measures used in these models are imprecise. They are not suitable for causal inference. They are best used as proxy measures to approximate otherwise unobservable relationships.

Thus, it has been difficult to construct models to provide robust and efficient measures of causation. Hence, this research used these models to highlight correlative relationships between possible explanatory factors and the measures of beginning and SDA farmers. In addition, this study reported which variables have statistically significant—either negative or positive—impacts.

Table C.1
Estimation results, including estimated coefficients and standard errors, for the fractional probit model and ordinary least squares (OLS) model

	Model					
	OLS			Fractional probit		
	SDA-RE	SDA-REG	Beginning	SDA-RE	SDA-REG	Beginning
Explanatory factors						
Percentage of farmland to be transferred to nonfamily members	0.016 (0.026)	0.023 (0.027)	0.002 (0.010)	0.055 (0.138)	0.080 (0.102)	0.008 (0.030)
Log of average lease size in acres	-0.008** (0.003)	-0.009** (0.003)	-0.006*** (0.001)	-0.042*** (0.012)	-0.032*** (0.011)	-0.020*** (0.005)
Percentage of leases renewed annually	0.008 (0.006)	0.008 (0.007)	0.002 (0.004)	0.064* (0.036)	0.035 (0.027)	0.010 (0.012)
Log of average landlord/tenant relationship length	-0.001 (0.002)	0.000 (0.002)	-0.000 (0.001)	-0.006 (0.013)	0.001 (0.007)	-0.001 (0.004)
Percentage of rented farmland acres	0.018** (0.007)	0.019** (0.007)	0.017*** (0.005)	0.119*** (0.041)	0.077*** (0.029)	0.060*** (0.017)
Percentage of cropland acres	-0.073*** (0.024)	-0.068*** (0.020)	-0.016 (0.010)	-0.322*** (0.117)	-0.223*** (0.074)	-0.053 (0.034)
Log of land value per acre	0.011 (0.011)	0.011 (0.014)	-0.003 (0.004)	0.007 (0.067)	0.014 (0.054)	-0.015 (0.012)
Percentage of SDA (race/ethnicity) DLP/GLP applications granted	0.007*** (0.002)	na	na	0.100*** (0.015)	na	na
Percentage of SDA (race/ethnicity/gender) DLP/GLP loan applications that are granted	na	0.009 (0.006)	na	na	0.052** (0.022)	na
Percentage of all DLP/GLP loan applications that are granted	na	na	-0.012 (0.009)	na	na	-0.036 (0.029)
Log of ARC/PLC payments per acre	-0.002 (0.002)	-0.001 (0.003)	-0.001 (0.001)	-0.007 (0.014)	-0.003 (0.011)	-0.001 (0.003)
Log of crop insurance indemnity payments per acre	0.000 (0.003)	0.005 (0.004)	0.004* (0.003)	0.003 (0.022)	0.023 (0.016)	0.014 (0.009)

	Model					
	OLS			**Fractional probit**		
	SDA-RE	**SDA-REG**	**Beginning**	**SDA-RE**	**SDA-REG**	**Beginning**
Log of total crop insurance premium per acre	0.000 (0.003)	-0.007* (0.004)	-0.007** (0.003)	0.002 (0.020)	-0.032** (0.016)	-0.023** (0.009)
Percentage of cropland acres enrolled in General Signup CRP	0.033 (0.062)	0.110** (0.046)	0.013 (0.030)	-0.021 (0.276)	0.318** (0.150)	0.043 (0.101)
Percentage of cropland acres enrolled in Continuous Signup CRP	0.124 (0.099)	0.197** (0.075)	-0.021 (0.049)	0.439 (0.446)	0.694** (0.272)	-0.074 (0.173)
Percentage of cropland enrolled in CRP-TIP	-0.486 (1.062)	-0.243 (1.213)	-0.359 (0.767)	-8.175 (8.116)	-0.967 (5.646)	-1.633 (2.667)
Percentage of cropland acres enrolled in ACEP	-0.214 (0.151)	0.117 (0.170)	0.144 (0.190)	-0.248 (0.734)	0.836 (0.555)	0.478 (0.594)
Percentage of sales in field crops	-0.033 (0.024)	-0.041 (0.026)	-0.023* (0.012)	-0.276** (0.138)	-0.203** (0.100)	-0.078* (0.041)
Percentage of sales in specialty crops	-0.061 (0.037)	-0.042 (0.044)	-0.008 (0.021)	-0.289* (0.166)	-0.166 (0.150)	-0.026 (0.068)
Percentage of sales in livestock	-0.043** (0.018)	-0.050** (0.019)	-0.036*** (0.010)	-0.225*** (0.076)	-0.197*** (0.063)	-0.118*** (0.033)
Percentage of direct to consumer sales	-0.021 (0.057)	0.118 (0.073)	0.102 (0.103)	0.346* (0.200)	0.575** (0.237)	0.341 (0.322)
Percentage change in population (2010–17)	-0.057 (0.034)	-0.031 (0.047)	0.022 (0.039)	-0.222 (0.239)	-0.078 (0.199)	0.077 (0.132)
Percentage of total population that is SDA (race/ethnicity)	0.348*** (0.066)	0.320*** (0.059)	na	1.766*** (0.152)	1.163*** (0.147)	na
Average age of farmers (in county)	-0.005** (0.002)	-0.001 (0.002)	-0.007*** (0.001)	-0.025*** (0.008)	0.002 (0.007)	-0.022*** (0.004)
Percentage change in average age of farmers (2012–17)	0.182** (0.075)	0.074 (0.079)	-0.370*** (0.052)	0.579 (0.454)	-0.028 (0.333)	-1.288*** (0.181)
Rural-Urban Continuum Code (2013)	0.000 (0.000)	-0.001 (0.001)	-0.002*** (0.001)	-0.008*** (0.003)	-0.008*** (0.003)	-0.008*** (0.002)
R-Square	0.619	0.606	0.505	na	na	na

na = not available/variable not included in this model. SDA = socially disadvantaged. SDA-REG = socially disadvantaged (race, ethnicity and gender definition), SDA-RE = socially disadvantaged (race and ethnicity definition). DLP = Direct Loan Program. GLP = Guaranteed Loan Program. CRP = Conservation Reserve Program. OLS = ordinary least squares. CRP = Conservation Reserve Program. CRP-TIP = CRP-Transition Incentive Program. ACEP = Agricultural Conservation Easement Program. ARC = Agriculture Risk Coverage. PLC = Price Loss Coverage.

*,**,*** = statistical significance at the 10-percent, 5-percent and 1-percent levels, respectively.

Notes: There are 2,162 observations. The fractional probit models do not generate R-squared measures. For a description of the fractional probit estimator, see the manual for the STATA statistical software, RFRACREG procedure.

Source: USDA, Economic Research Service.

Table C.1 in appendix C has provided the actual coefficients and the significance measures from two sets of models. These were used to construct table C.2 to identify factors likely to have non-zero impacts.

- The ordinary least squares (OLS) models have yielded a straightforward interpretation—the coefficients are changes in probability with a unit change in a variable. However, this linear probability model estimator is subject to bias, especially when probabilities are near 0.0 and 1.0.

- The fractional probit model has provided unbiased estimates of coefficients. However, interpretation of the coefficients is not straightforward, as the impacts of a change in one variable depends on the values of other variables.

- Both models included State-specific fixed effects. To save space, they are not reported. It is important to note these fixed effects will capture overall—statewide—impacts of State-level programs designed to assist beginning and SDA farmers.

- Endogeneity and simultaneity were not accounted for. Hence, there may be pairs of dependent variables and explanatory factors both impacted by other factors. In such cases, the explanatory factor—even though it has a statistically significant coefficient—has not necessarily impacted a dependent variable.

Table C.2
Summary of significant factors

Factor	Negative correlation			Positive correlation		
	SDA-RE	SDA-REG	Begin	SDA-RE	SDA-REG	Begin
Log of average lease size in acres	✓	✓	✓			
Percent of cropland acres	✓	✓				
Log of total crop insurance premium per acre		✓	✓			
Percent of sales in field crops	✓	✓	✓			
Percent of sales in specialty crops	✓					
Percent of sales in livestock	✓	✓	✓			
Average age of farmers	✓		✓			
Percent change in average age of farmers			✓			
Rural Urban Continuum Code (2013)	✓	✓	✓			
Percent of leases renewed annually				✓		
Percent of rented farmland acres				✓	✓	✓
Percent of FSA DLP/GLP loan applications granted				✓	✓	
Percent of cropland acres enrolled in CRP (general or continuous)					✓	
Percent of direct-to-consumer sale				✓	✓	
Percent of total population that is SDA				✓	✓	

Notes: FSA = Farm Service Agency. DLP = Direct Loan Program. GLP = Guaranteed Loan Program. CRP = Conservation Reserve Program. SDA = socially disadvantaged. This is a condensed version of table 2 and only lists significant factors. Appendix table C.2, lists all factors and their significance levels. Bolded check marks indicate statistically significant status at 5 percent or 1 percent. Non-bolded check marks indicate statistically significant status at 10 percent. Empty cells indicate no statistical significance (t-stat significance above 10 percent). There are no variables that have a significant positive correlation in one model and a significant negative correlation in another model.

Source: USDA, Economic Research Service.

The report used the fractional probit model estimates to form table C.2. However, in all cases, the sign of the coefficients was the same between the OLS and fractional probit models. And about 70 percent of the factors that are statistically significant in the fractional probit model were also statistically significant—at the 10-percent level—in the OLS model. In addition, the State-specific fixed effects always have the same sign when comparing OLS and fractional probit models.

Dependent variables (county measures):

- SDA-RE: percentage of socially disadvantage farmers, using race and ethnicity.

- SDA-REG: percentage of socially disadvantage farmers, using race, ethnicity, and gender.

- Beginning: percentage of farmers who have farmed for 10 or less consecutive years.