FACTORS AFFECTING CROP INSURANCE USE

AMONG UNDERSERVED PRODUCERS

By

ALICIA MAE YOUNG

Bachelor of Science in Agribusiness and Agricultural

Communications

Oklahoma State University

Stillwater, Oklahoma

2021

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
MASTER OF SCIENCE
May 2023

FACTORS AFFECTING CROP INSURANCE USE

AMONG UNDERSERVED PRODUCERS

Thesis Approved:

Dr. Cheryl S. DeVuyst
_____
Thesis Adviser

Dr. K. Aleks Schafer
_____

Dr. Andrew Van Leuven
_____

ACKNOWLEDGEMENTS

I would like to thank my advisor, Dr. Cheryl DeVuyst, as well as my committee members, Dr. Aleks Schafer and Dr. Andrew Van Leuven for their support and mentorship, particularly in these last few months.

Additionally, I would like to thank my USDA-ERS team members Dr. Yacob Zereyesus and Dr. Francis Tsiboe for their advice and guidance throughout this project.

Lastly, I would like to think my parents, Robert and Lindell Young, as well as my twin sister, Katelyn Young, for being not only my cheerleaders, but also my rock through these past two years.

Name: ALICIA YOUNG

Date of Degree: MAY 2023

Title of Study: FACTORS AFFECTING CROP INSURANCE USE AMONG
UNDERSERVED PRODUCERS

Major Field: AGRICULTURAL ECONOMICS

Abstract: Historically, minority producers have been plagued by racial disparities resulting in them settling in areas less suitable for farming and being discriminated against in federal farm programs. In the two most recent Farm Bills, 2014 and 2018, there has been an increase in policies supporting underserved producers. Policies include the addition of veterans in the definition of historically underserved producers as well as reducing experience requirements for veterans to qualify for loans, amending the definition of beginning farmers from someone with five years or less experience to 10 years or less, and offering veteran and beginning producers an additional 10% subsidy rate above normal. The objective of this study is to analyze how spatial, demographic and risk (drought) effect the crop insurance purchases of underserved and veteran producers given the changes made in the 2018 Farm Bill. A cross-sectional analysis is used to determine if veterans and minorities faced greater agricultural risk and if they have equal access to crop insurance to help mitigate that risk prior to the implementation of the 2018 Farm Bill. A difference-in-difference technique is then used to determine the effect the implementation of the 2018 Farm Bill and drought levels had on crop insurance adoption. The cross-sectional analysis indicated a negative correlation between shares of veterans and minorities in a county and access to crop insurance, and a positive correlation between the shares in a county and agricultural risk of drought. The difference-in-difference showed that both veterans and minorities had increased access to crop insurance after the implementation of the 2018 Farm Bill. This is important as crop insurance is the primary way producers can mitigate risk.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Motivation

Dating back as early as the 15th century, racial disparity has played a large role in shaping the geography of minority agriculture producers in the United States (Horst & Marion, 2018). From early settlers dispossessing Native Americans of their land, to the Homestead Acts, failed retribution promises of land to freed slaves, and the Chinese Exclusion Act, minority producers have been pushed into geographical areas less susceptible to farming (Horst & Marion, 2018). Additionally, racial discrimination within the United States Department of Agriculture (USDA) and the federal government resulted in unequal access to federal farm programs (Murphy, 2023). There have been five lawsuits filed against the USDA and Farm Service Agency (FSA) since 1990. These suits were filed by minority producers mainly regarding discrimination in loan programs and government payments.

Studies on how farm characteristics influence crop insurance use are numerous but minimal work has been done focusing on producer characteristics and farm vulnerability.

Additionally, over the last ten years the United States has seen a rise in the quantity of underserved farmers and ranchers. A 2013 study stated that post-2010, minority groups made up approximately 36.3% of the population and only 7.75% of all farmers and ranchers (Harsh, 2013). In 2017, the Census of Agriculture reported the number of minority farmers and ranchers to be 8.25% (NASS, 2017). Along with this growth, we have also seen an increase in policies supporting underserved producers. But with this increase in programs, little to no research has been done to see if these programs are actually benefitting these producers. Farm Bill cost has steadily increased over the years. As we look toward the 2023 Farm Bill as potentially the first Farm Bill to cost over $1 trillion, it is important to determine if the programs funded by this Bill are beneficial and supporting their target audiences (Bipartisan Policy Center, 2023).

The objective of this study is to analyze how spatial, demographic and risk (drought) effect crop insurance purchases given some of the changes made in crop insurance subsidies in the 2018 Agricultural Improvement Act. Specifically, we examine how underserved producers and veterans are affected by these changes.

Crop Insurance: Socially Disadvantaged & Historically Underserved Producers

Since the Farm Bill was implemented in the early 1900s to address widespread hunger and plummeting commodity prices during the Great Depression, it has expanded to encompass a variety of programs, from food assistance to crop insurance (Norkiewitz & Nitsche, 2017). In the 1990s the focus turned to supporting a more diverse population of farmers. In 1994, 29 tribal colleges were granted land-grant university status. The 1996 Farm Bill mandated the Secretary of Agriculture create programs that made sure tribal colleges and Native American communities had equal access to USDA services, resources, programs, and employment. Additionally, it gave veteran farmers preference when applying for farm credit via the USDA.

The 2014 Farm Bill was the first to devote a whole subsection under the Miscellaneous Title to assist socially disadvantaged and historically underserved producers (Norkiewitz & Nitsche, 2017). One noteworthy inclusion in this subsection is the addition of the phrase "veteran farmers or ranchers" in addition to "socially disadvantaged farmers and ranchers" (Congressional Research Service, 2014). A veteran farmer is defined as a farmer or rancher who "has served in the Armed Forces…and who has not operated a farm or ranch…or has operated a farm or ranch for not more than 10 years". The 2014 Farm Bill also included granting additional funds to eligible universities to establish Socially Disadvantaged Farmers and Ranchers Policy Research Centers to further policy recommendations benefiting socially disadvantaged farmers and ranchers.

The 2018 Farm Bill extended this subsection extensively including reducing the experience requirement for veterans to qualify for direct farm ownership loans, increasing the guarantee percentage of the principal value for farm loans for underserved farmers, changing the definition of a beginning farmer from less than five years to less than 10 years of experience, and establishing a National Beginning Farmer and Rancher Coordinator and associated State Coordinators to provide these famers with assistance and awareness of USDA programs (ERS, 2023). Furthermore, it offered veteran and beginning producers an additional 10% subsidy above the normal rate (FAS, 2021). Most importantly, this Farm Bill also formally defined an underserved producer as "a beginning farmer or rancher, a veteran farmer or rancher, or a socially disadvantaged farmer or rancher" (ERS, 2023). It also defined a veteran farmer to include "a veteran who first obtained veteran status during the most recent 10-year period" as well as expanding numerous benefits to veterans.

The terms historically underserved and socially disadvantaged are sometimes used interchangeably even though they encompass similar yet different groups. The Natural Resources Conservation Service (NRCS) defines historically underserved farmers as those who have been
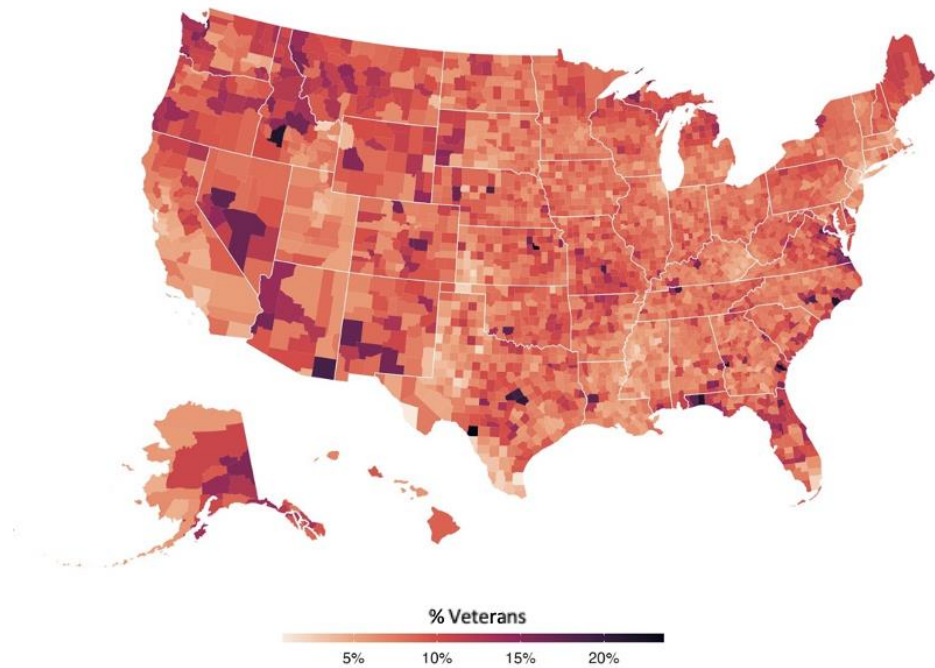
discriminated against or underserved in federal programs and policies (NRCS, 2023). The USDA recognizes four subgroups of farmers as historically underserved, including beginning, socially disadvantaged, veterans, and limited resource. Socially disadvantaged refers to those who are members of a group that has been prone to racial or ethnic prejudice, based on their membership of a group (NRCS, 2023). These groups include American Indians or Alaskan Natives, Asians, Blacks or African Americans, Native Hawaiians or other Pacific Islanders, and Hispanics.

Across the 50 states, socially disadvantaged farmers average 8.1% of all farmers (NASS, 2017). New Mexico is the highest percentage at 63.28%, while South Dakota is the lowest percentage at 0.86%. Beginning farmers comprise 27.7% of all farmers with Alaska having the highest amount at 40% and Minnesota having the lowest amount at 20.6%. Veteran farmers are lower with only 10.9% of total farmers with Utah having the most at 19.4% and South Dakota having the fewest at 6.4%. Figures 1 and 2 illustrate socially disadvantaged and veteran individuals as a percent of the entire population.
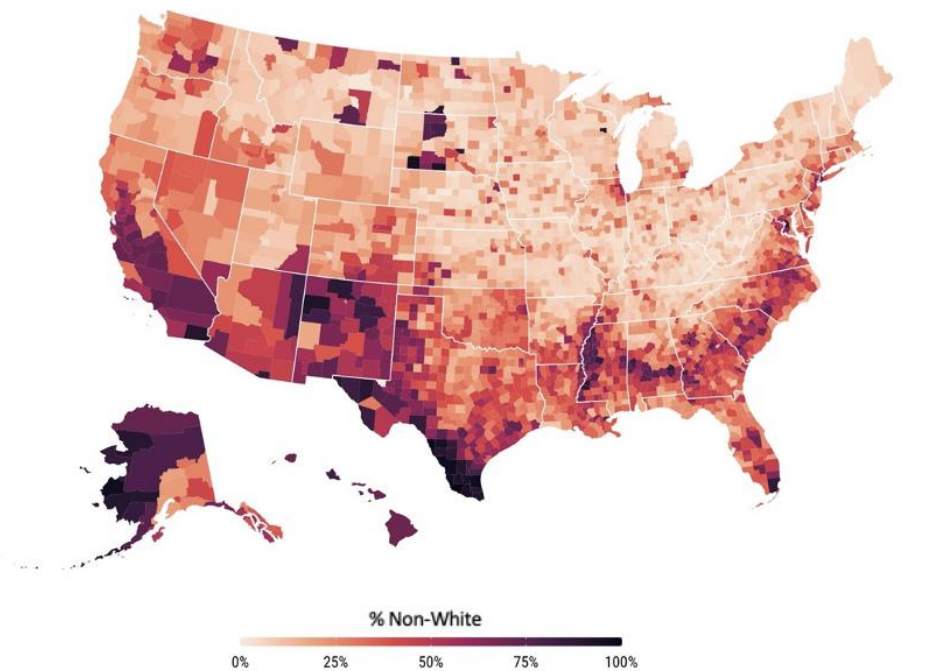
Source: 2021 Census

Figure 1. Percentage of Non-White Individuals in the Population

Figure 2. Percentage of Veterans in the Population

Thesis Roadmap

Chapter II reviews current literature on the benefits of utilizing crop insurance and how socially disadvantaged producers differ from White producers. It also examines previous studies focusing on how drought affects crop insurance utilization and how past implemented policies have attempted to alleviate similar inequalities. Chapter III describes the data and analysis methods. Chapter IV explains the results. Chapter V summarizes the paper, highlighting important findings as well as offering suggestions for further work in this area.

CHAPTER II

LITERATURE REVIEW

Socially Disadvantaged Producers Utilization of Crop Insurance

There are many differences between White and socially disadvantaged producers that need to be

considered when analyzing crop insurance uptake. Historically, socially disadvantaged producers

are not likely to purchase crop insurance (Tables 1-2) (Dismukes et al, 1997). On average, 64%

of all producers participate in crop insurance compared to only 48% of socially disadvantaged

producers and 62% of veteran producers (RMA, 2021). Participation is vital because crop

insurance offers many benefits to producers. Ifft et al (2013) explains that participation in federal

crop insurance programs can lower revenue risk, potentially permit lenders to accept reduced

collateral on loan applications, and increase potential revenue by the utilization of subsidies (Ifft

et al. 2013).

Table 1. Crop Insurance Participation Percentages and Quantities

Demographic Group	Commodity: All Crops	
	Participation Rate	Number of Producers
All Producers	64%	439,060
Military Service	62%	73,870
Black	51%	2,261
Hispanic	50%	11,851
Native American	43%	4,661

<div align="right">Source: RMA, 2021</div>

Table 2. Crop Insurance Participation Compared to All Producers

Demographic Group	Commodity: All Crops
	Participation Rate compared to Participation Rate for All Producers
Military Service	98%
Black	81%
Hispanic	78%
Native American	67%

<div align="right">Source: RMA, 2021</div>

The difference in participation can be attributed to a few factors. Generally, socially disadvantaged producers operate smaller farms then White producers (Dismukes et al, 1997). They tend to raise livestock over crops, and the crops they do raise are principally specialty crops rather than field crops. They are also less likely to rely on farm income. White farmers are more likely to own and operate farmland, while socially disadvantage producers have a higher likelihood of being tenants or if they own land, own fewer acres (Horst & Marion, 2018).

The disparities listed above can also be further broken down by specific races. Collins et al studied Black producers. They found that African American farms had lower total value of production, net cash farm income, government payments, assets, and debts relative to others (Collins et al, 2023). While African American owned farms had higher solvency than others, they also had lower profitability, liquidity, and efficiency.

Policies Implemented to Alleviate Inequities in Food Systems

Inequalities exist in other areas of agriculture outside of crop insurance such as median household wealth and food insecurity (Odoms-Young & Bruce, 2018). The Pew Research Center shows that White households are significantly wealthier than Black and Hispanic households, 13 and 10 times wealthier respectively. A study by Odoms-Young and Bruce concluded that Black and Hispanic households have food insecurity rates twice that of White households, Native American households show similar results. While numerous solutions have been suggested to alleviate these inequalities such as making it easier for families to receive programs like the Supplemental Nutrition Assistance Program (SNAP) and Women, Infants, and Children (WIC), expand Earned Income Tax Credits, and increase opportunities to earn a living wage, more research needs to be done on approaches addressing racism and discrimination.

In some cases, policy solutions can negatively impact inequalities. A study by Aye et al., demonstrates that contractionary fiscal and monetary policies increase inequality (Aye, et al., 2019). These policies are generally implemented to reduce inflation and include actions that increase interest rates, increasing bank reserves, and selling government securities which all ultimately reduce the amount of money in circulation (Hussain & Suarez, 2019). This results in individuals having less money to spend while cost of goods and services increase. For the upper class, this has little to no impact, but for the lower and middle class this can results in the inability to afford basic needs.

Premium Subsidy Effects on Crop Insurance

Crop insurance works similarly to many other types of insurance like car or health insurance; the farmer pays a premium, and in the event of certain circumstances the policy pays the farmer. The big difference though is while with car or health insurance the policy holder pays the whole

premium, the government subsidizes crop insurance premiums making the premium payment lower for the farmer. The average subsidy rate in 2014 was 62% and about 63% in 2018 (Belasco, n.d.). This means that the government paid 62% or 63% of premium payments, leaving farmers having to pay only 38% or 37% respectively. The 2018 Farm Bill further increased these rates for veteran and beginning producers by offering them an additional 10% subsidy (FAS, 2021).

Numerous studies have examined the benefits of higher subsidy rates. Yu et al (2017) estimates that if the subsidy rate were to increase by 10% it would cause a 0.43% increase in the quantity of crop acres (Yu et al, 2017). Other studies suggest that increasing subsidies could also encourage farmers to insure more land or purchase higher levels of coverage on currently insured land (O'Donoghue, 2014).

CHAPTER III

METHODOLOGY

Data

We focus on crop insurance use as our key outcome variable. The USDA Risk Management Agency (RMA) releases a yearly Summary of Business containing state, county, and crop level data on crop insurance. This data includes type of insurance, coverage level, number of policies sold, number of policies indemnified, etc. Specifically, we are using data from 2015-2021 as this date range consists of three years before and three years after the implementation of the 2018 Farm Bill.

To account for regional heterogeneity in agricultural risk, we use a county-level, growing-season-weighted index (Haddock et al., 2023) that measures the presence and severity of drought on an annual basis.

The U.S. Drought Monitor is produced through the cooperation of several organizations including the University of Nebraska-Lincoln's National Drought Mitigation Center, USDA, and the National Oceanic and Atmospheric Administration. They monitor and report drought levels across five categories D0-D4 representing abnormally dry, moderate drought, severe drought, extreme drought, and exceptional drought respectively. For our research we focus on the number of weeks counties experienced drought at the D3 (extreme drought) and D4 (exceptional drought) levels. To properly consider drought severity during key times in crop production months as well as the levels of drought, severity levels were weighted. For both the D3 and D4 levels the months were weighted the same. According to the U.S. Drought Monitor, the D4 level is twice as severe as the D3 level so we weighed the D4 level at 2x the D3 level. Figure A1 in the appendix illustrates these weighted drought levels.

Lastly, we use USDA ERS's Atlas of Rural and Small-Town America to attain our demographic variables of veteran status and the races of Hispanic, Black, and Native American. The Atlas of Rural and Small-Town America provides statistics for categories of people, jobs, county classifications, income, and veterans.[1]

Due to using county level data rather than producer data, the correlation of these data sets needs to be analyzed to determine if the share of minorities and veterans in a county was representative of the share of producers in those categories. Looking at the correlations between producer level and county level data, they are highly positive with Black at 0.845, Hispanic at 0.792 and Native American at 0.808. Veterans are still positively correlated but not as highly at 0.480. Veteran may be mis-measured in the NASS data due to 2012 not reporting the number of veteran producers so the 2017 number of producers had to be used with the 2012 quantity of total producers. While

---

[1] We considered using NASS census data to attain our demographic variables from producers in the counties, but due to a high quantity of N/As in the data either due to unreported demographics or excluded for confidentiality, we ultimately chose the Atlas data and the demographics across the county as a whole.

these two data sets are not perfectly correlated, we assume they are sufficiently proportionate for this analysis.

Analysis

The cross-sectional analysis determines the extent agriculture risk and the number of crop insurance policies sold are correlated with the shares of veterans and minorities in a county (holding constant the percent of the workforce in agriculture, drought levels, and the county's Rural-Urban Continuum Code). [2] This method is used to determine if veterans and minorities face greater agricultural risk and if they have equal access to crop insurance to help mitigate that risk. The Model is:

$$r_i = \beta_0 + \beta_1 Vet_i + \beta_2 Black_i + \beta_3 Native_i + \beta_4 Hispanic_i + \beta_5 Ag\%_i + \beta_6 Drought_i +$$
$$\beta_7 RU_i + \mu_i$$

A difference-in-difference (DID) technique is used to determine the effect the implementation of the 2018 Farm Bill and drought levels had on crop insurance adoption. DID utilizes longitudinal data from treatment and control groups to obtain a suitable counterfactual to approximate a causal effect (Columbia, 2023). This allows the intensity of the treatment to differ by the share of veterans and minorities in the county. The model is:

$$Y_i = \alpha + \beta(FB_i) + \delta(County_i) + \delta(FB_i * Vet_i) + \delta(FB_i * Black_i) + \delta(FB_i * Native_i)$$
$$+ \delta(FB_i * Hispanic_i) + \delta(Drought) + \delta(Drought_{t-1}) + \varepsilon_i$$

Where α represents our constant, (FB_i) represents when the 2018 Farm Bill went into effect. It is a binary variable that denotes whether we are in the benchmark period ($FB = 0$) or treatment period ($FB = 1$), $County_i$ is a fixed effect for each specific county, the interaction variables

---

[2] The variables of percent of the workforce in agriculture, drought levels, and the county's Rural-Urban Continuum Code were chosen to adequately take into consideration the agricultural presence in the County.

between FB_i and the veterans and minority groups are the treatment effects, and *Drought* and

$Drought_{t-1}$ are additional control variables. This specifications isolates the impacts of the 2018

Farm Bill on veterans and socially disadvantaged producers by analyzing the data on a county-by-

county basis.

CHAPTER IV

RESULTS

Structural Inequities in U.S. Agricultural Risk Management

Table 3 shows the cross-sectional analysis results. For crop insurance access veterans and minorities as a whole coefficients are negative and highly significant indicating that they all had decreased access to crop insurance. Disaggregating the minorities, Black, Native American, and Hispanic producers all stay negative and significant at the 1% level with Blacks having the least amount of access followed by Native Americans and Hispanics. This shows a negative correlation between shares of veterans and minorities in a county and access to crop insurance.

Looking at agricultural risk in terms of drought, veteran and minority coefficients are positive and significant indicating that they faced increased risk due to drought. This indicates a positive correlation between shares of veterans and minorities in a county and agricultural risk of drought. This indicates a positive correlation between shares of veterans and minorities in a county and agricultural risk of drought.

For Native Americans and Hispanics this hold true, but we actually see that Black producers are negative and significant indicating that they face decreased risk due to drought. We hypothesize that the primary locations that underserved producers farm play a role in these results. The majority of Native American and Hispanic producers are located in southwest to midwest states, while the majority of Black producers are located in the southeast (NASS, 2019; NASS, 2019; NASS, 2019). Referencing Figure A2 in the appendix, southwest to midwest states have the highest quantity of weeks in drought, while the southeast is mostly untouched. This may explain the results showing that Native American and Hispanic producers face increased risk due to drought, but Black producers do not.

Table 3. Structural Inequities in U.S. Agricultural Risk Management

Variables	Crop Insurance Access		Agricultural Risk (Drought)	
	Aggregated	Disaggregated	Aggregated	Disaggregated
Minority (%)	-0.0094***		0.0159***	
	(0.0004)		(0.0004)	
Black (%)		-0.0166***		-0.0011*
		(0.0005)		(0.0007)
Native American (%)		-0.0103***		0.0156***
		(0.0007)		(0.0007)
Hispanic (%)		-0.0034***		0.0227***
		(0.0005)		(0.0004)
Veteran (%)	-0.0767***	-0.0691***	0.0427***	0.0539***
	(0.0035)	(0.0035)	(0.0043)	(0.0043)
Rural-Urban Cont.	0.0264***	0.0327***	0.0116**	0.0151***
	(0.0032)	(0.0033)	(0.0050)	(0.0051)
(%) Emp. Agriculture	0.0138***	0.0109***	0.0393***	0.0313***
	(0.0009)	(0.0009)	(0.0013)	(0.0013)
Drought	-0.0003	-0.0007**		
	(0.0003)	(0.0003)		
Drought (L1)	-0.0054***	-0.0055***		
	(0.0003)	(0.0003)		
Constant	5.5254***	5.4311***	1.5328***	1.5647***
	(0.0392)	(0.0386)	(0.0517)	(0.0506)
Observations	45,272	45,272	62,363	62,363

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Effects of the 2018 Farm Bill on Crop Insurance Purchases

Table 4 shows the treatment effect of the Farm Bill on crop insurance uptake among socially disadvantaged farmers. The treatment effect of the 2018 Farm Bill on veterans is positive and statistically significant, indicating that veterans had increased access to crop insurance after the implementation of the 2018 Farm Bill. A 1% increase in the share of veterans in a county increases the treatment effect of the 2018 Farm Bill on crop insurance sign-ups by 0.39 policies. This increase can also be seen for minority groups as a whole as a 1% increase in the share of minorities in a county increases the treatment effect on crop insurance sign-ups by 0.09 policies. When the minority groups are disaggregated into their specific categories, we see increases in

crop insurance access for Black, Native American, and Hispanic producers although it is only

significant for Black and Native American producers.

Table 4. Effect of the 2018 Farm Bill on Crop Insurance Purchases

VARIABLES	Avg. Treatment Effect	Hetero. Treatment Effects I	Hetero. Treatment Effects II
Farm Bill	-0.0004	-0.0475***	-0.0365***
	(0.0006)	(0.0034)	(0.0033)
Heterogeneous Effects			
Veteran (%)		0.0039***	0.0028***
		(0.0004)	(0.0004)
Minority (%)		0.0009***	
		(0.0000)	
Black (%)			0.0021***
			(0.0001)
Native (%)			0.0002***
			(0.0001)
Hispanic (%)			0.0001
			(0.0001)
Drought	-0.0000***	-0.0000***	0.0000
	(0.0000)	(0.0000)	(0.0000)
Drought (L1)	0.0000	0.0000	0.0001***
	(0.0000)	(0.0000)	(0.0000)
Constant	5.7816***	5.7818***	5.7807***
	(0.0005)	(0.0005)	(0.0005)
Observations	91,417	91,417	91,417

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

CHAPTER V

CONCLUSIONS & IMPLICATIONS

Summary

For hundreds of years socially disadvantage agricultural producers have faced discrimination and racism in attaining farmland and accessing federal farm programs. To mitigate the damage and inequalities this caused, the 2014 and 2018 Farm Bills have made socially disadvantaged producers an increasing priority by adding extensive benefits for them. A cross-sectional analysis was used to determine pre-existing inequalities and then a difference-in-difference technique was used to determine the effectiveness of the Farm Bills to alleviate these inequalities.

Findings & Discussion

The analysis indicates that underserved producers experienced inequalities in terms of reduced access to crop insurance and are more prone to risks associated with extreme drought. Counties with higher shares of minorities and veterans were more likely to experience severe drought as well as have less enrollment in crop insurance programs.

With the passing of the 2018 Farm Bill, underserved producers' access to crop insurance increased. This is important as crop insurance is the primary way producers can mitigate risk.

In addition to the inequalities we analyzed, previous literature identified that African American producers had lower net cash income, farm income, government payments, and profitability as well as higher solvency (Collins et al, 2023). Black and minority producers have endured centuries of racial disparities. Crop insurance could be part of the solution. As more policies are being introduced to help alleviate inequalities for agricultural producers, this research could be a steppingstone for the introduction of additional policies to target inequalities in other areas such as food security and access to nutrition programs, wage discrepancies, and education.

Further Study & Implications

As underserved producers face higher risks compared to white producers, it is of increased importance for them to utilize crop insurance. Possible policy recommendations include reducing loan requirements for underserved producers as well as expanding resources that inform underserved producers of the benefits of utilizing crop insurance programs.

There are several options for future work. One could look at heterogeneity by commodity type or at change in socially disadvantaged producers who already had insurance at the implementation of the 2018 Farm Bill. Another option would be to look at farm level data instead of county level, but this would require a partnership with ERS due to this data being confidential and unavailable to the public.

REFERENCES

Aye, G. C., Clance, M. W., & Gupta, R., 2019. "The effectiveness of monetary and fiscal policy shocks on U.S. inequality: the role of uncertainty," Quality & Quantity: International Journal of Methodology, Springer, vol. 53(1), pages 283-295, January.

Belasco, Eric J., 2023. "An Economic Analysis of Payment Caps on Crop Insurance Subsidies." *Sustainableagriculture.net*, https://sustainableagriculture.net/wp-content/uploads/2022/07/Payment-Limit-Report-FINAL.pdf.

Bipartisan Policy Center, 2023. "Making Food and Nutrition Security a SNAP: Recommendations for the 2023 Farm Bill", https://bipartisanpolicy.org/download/?file=/wp-content/uploads/2023/01/BPC_State-Governance-Report-2023.pdf.

Collins, L. A., et al. 2023. "The Relative Financial Performance of African American Farms in the United States since the Great Recession." *Applied Economic Perspectives and Policy*, https://doi.org/10.1002/aepp.13346.

Columbia, 2023. "Difference-in-Difference Estimation", *Search the Website*, https://www.publichealth.columbia.edu/research/population-health-methods/difference-difference-estimation.

Congressional Research Service, 2014. *The 2014 Farm Bill (P.L. 113-79): Summary and Side-by-Side Comparison*. Report R43076.

Crop Insurance America, 2022. "History", *Crop Insurance Keeps America Growing*, https://cropinsuranceinamerica.org/history/.

Dismukes, R., Harwood, J. L., & Bentley, S. E., 1997. Characteristics and risk management needs of limited-resource and socially disadvantaged farmers (No. 33622). United States Department of Agriculture, Economic Research Service.

ERS, 2023. *USDA ERS - Beginning, Socially Disadvantaged, and Veteran Farmers and Ranchers*, https://www.ers.usda.gov/agriculture-improvement-act-of-2018-highlights-and-implications/beginning-socially-disadvantaged-and-veteran-farmers-and-ranchers/.

FAS, 2021. "Federal Crop Insurance: A Primer". *Congressional Research Service Reports*, https://sgp.fas.org/crs/.

Giri, A.K., Subedi, D., & Kassel, K., 2022. Analysis of the payments from the coronavirus food assistance program and the market facilitation program to minority producers. Appl Econ Perspect Policy. 2022 Oct 5:10.1002/aepp.13325. doi: 10.1002/aepp.13325. Epub ahead of print. PMID: 36711012; PMCID: PMC9874844.

Haddock, T., A. Van Leuven, and A. Hagerman. 2023. Quantifying Exposure to Extreme Weather Events Among Rural Communities and Agricultural Producers in Oklahoma. *Oklahoma Cooperative Extension Service*.

Harsh, C., 2013. US Federal Crop Insurance Policy: Equity and Access for Small Producers.

Horst, M. & Marion, A. 2018 "Racial, Ethnic and Gender Inequities in Farmland Ownership and Farming in the U.S." *Agriculture and Human Values*, vol. 36, no. 1, pp. 1–16., https://doi.org/10.1007/s10460-018-9883-3.

Hussain, A. & Suarez, J., 2022. "The Federal Reserve Uses Contractionary Monetary Policy to Curb Inflation That Accompanies an Overheating Economy." *Business Insider*, Business Insider, https://www.businessinsider.com/personal-finance/what-is-contractionary-monetary-policy.

Ifft, J., et al. 2013. "Farm Debt Use by Farms with Crop Insurance." *Choices,* Agricultural & Applied Economics Association, Vol. 28, No. 3 (3rd Quarter 2013), pp. 1-5, https://www.jstor.org/stable/10.2307/choices.28.3.13

Murphy, A., 2023. "Is there a Racial Gap in Market Facilitation Program Payments and Total Government Payments?" Master's Thesis. Kansas State University

NASS, 2017. "Census of Agriculture". *USDA NASS*, https://quickstats.nass.usda.gov

NASS, 2019. "2017 Census of Agriculture Highlights, Black Producers." *USDA NASS*, https://www.nass.usda.gov/Publications/Highlights/.

NASS, 2019. "2017 Census of Agriculture Highlights, Hispanic Producers." *USDA NASS*, https://www.nass.usda.gov/Publications/Highlights/.

NASS, 2019. "2017 Census of Agriculture Highlights, American Indian/Alaska Native Producers." *USDA NASS*, https://www.nass.usda.gov/Publications/Highlights/.

Norkiewitz, A. & Nitsche, J., 2017. A Very Brief History of the Farm Bill. Farm Bill Law Enterprise. https://www.farmbilllaw.org/wp-content/uploads/2017/10/Farm-Bill-History.pdf.

NRCS, 2023. "Historically Underserved Farmers and Ranchers", *Natural Resources Conservation Service*, https://www.nrcs.usda.gov/getting-assistance/underserved-farmers-ranchers.

Odoms-Young, A. & Bruce, M.A., 2018. Examining the Impact of Structural Racism on Food Insecurity: Implications for Addressing Racial/Ethnic Disparities. Fam Community Health. 2018 Apr/Jun;41 Suppl 2 Suppl, Food Insecurity and Obesity (Suppl 2 FOOD INSECURITY AND OBESITY):S3-S6. doi: 10.1097/FCH.0000000000000183. PMID: 29461310; PMCID: PMC5823283.

O'Donoghue, E.J., 2014. The Effects of Premium Subsidies on Demand for Crop Insurance, ERR-169, U.S. Department of Agriculture, Economic Research Service.

RMA, 2023. "History of the Crop Insurance Program", *History of the Crop Insurance Program*, https://legacy.rma.usda.gov/aboutrma/what/history.html.

RMA, 2021. "Adequate Coverage for States and Underserved Producers." *USDA Risk Management Agency*, https://www.rma.usda.gov/-/media/RMA/Publications/Report-to-Congress-8744560-RMA-final.ashx?la=en.

Yu, Jisang, et al. 2017. "Effects of Crop Insurance Premium Subsidies on Crop Acreage." *American Journal of Agricultural Economics*, vol. 100, no. 1, pp. 91–114., https://doi.org/10.1093/ajae/aax058.
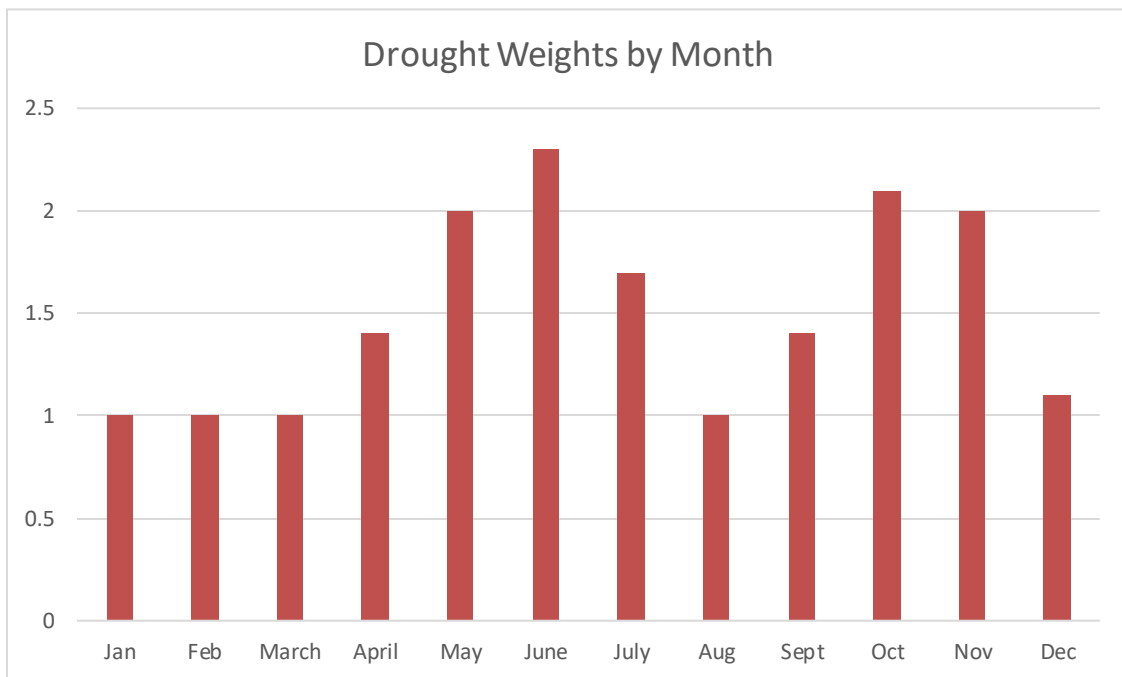
APPENDICES

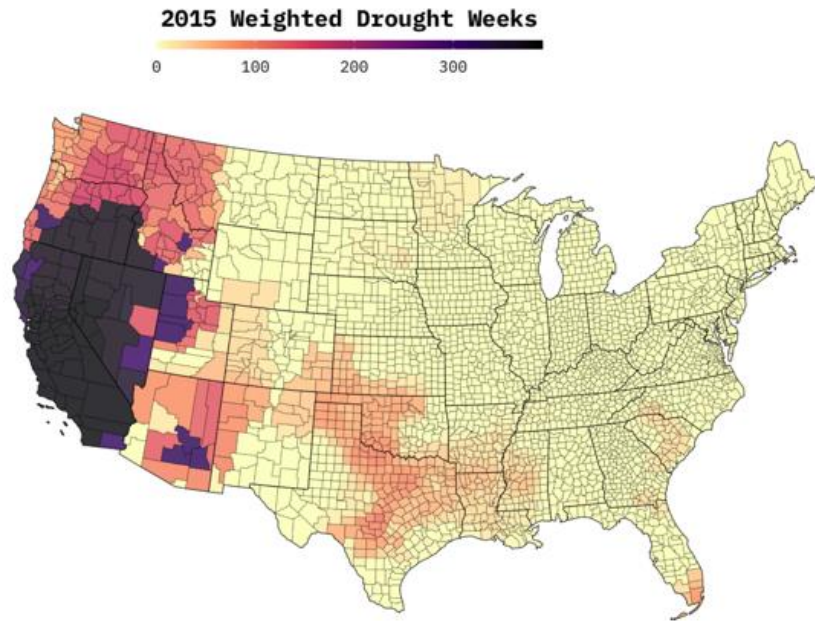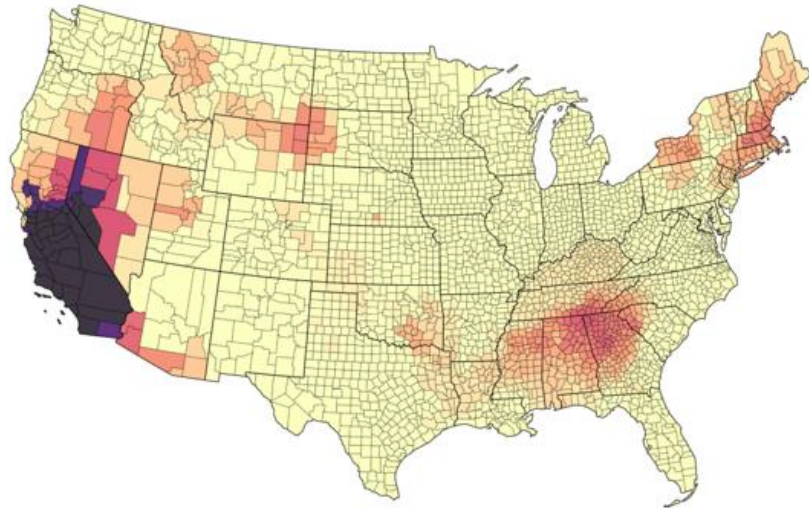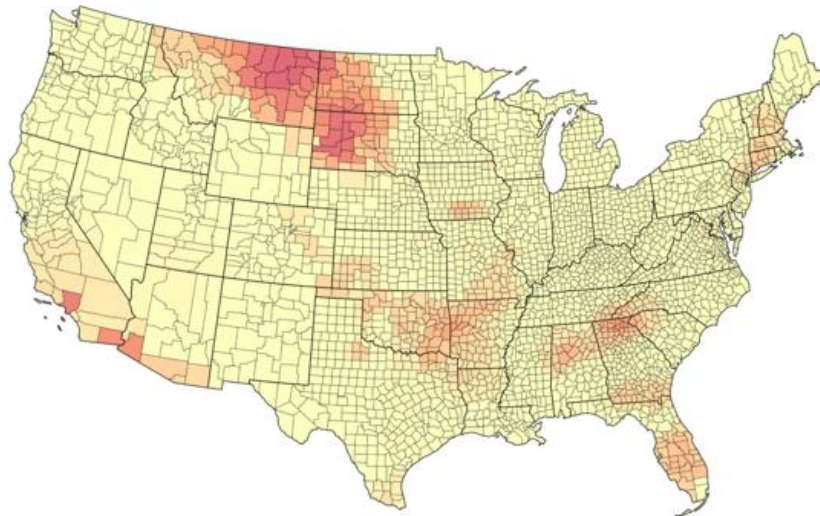**Figure A1.** Drought Weights by Month

Figure A2. County Weighted Drought Weeks 2015-2021
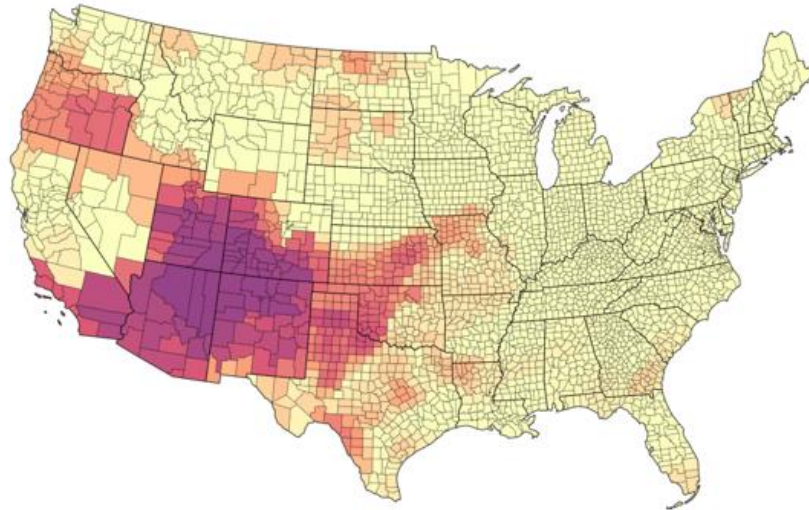

2015 Weighted Drought Weeks
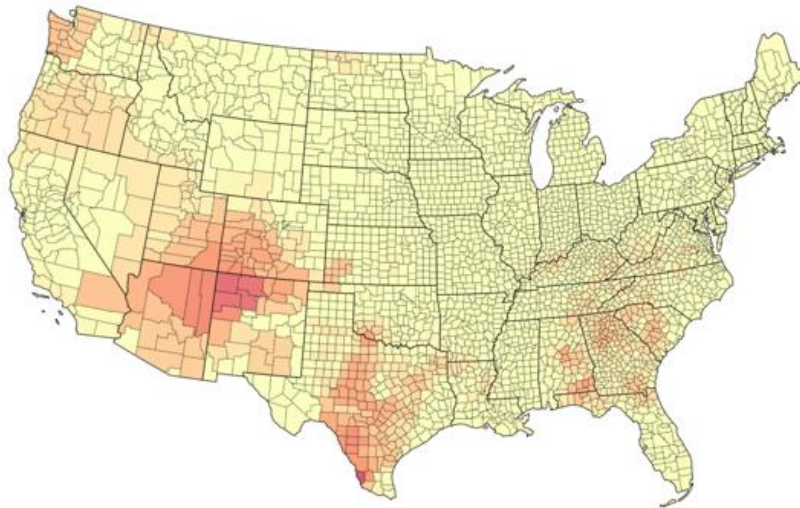
2016 Weighted Drought Weeks
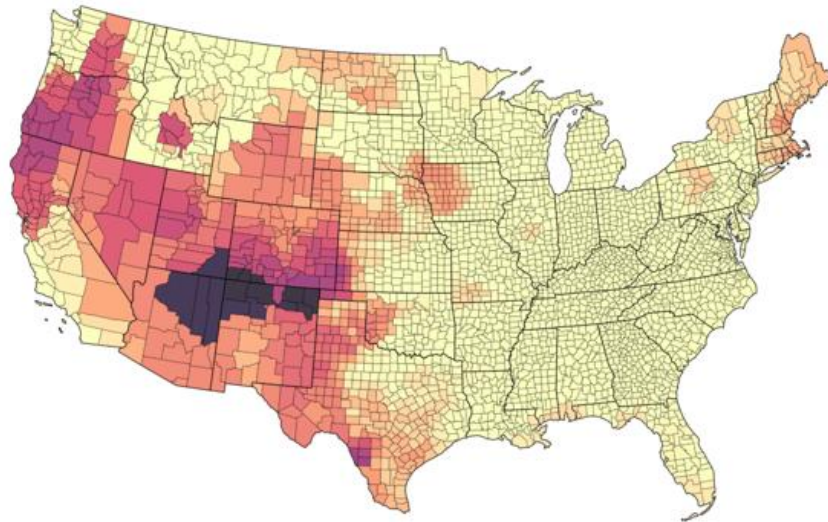

2017 Weighted Drought Weeks
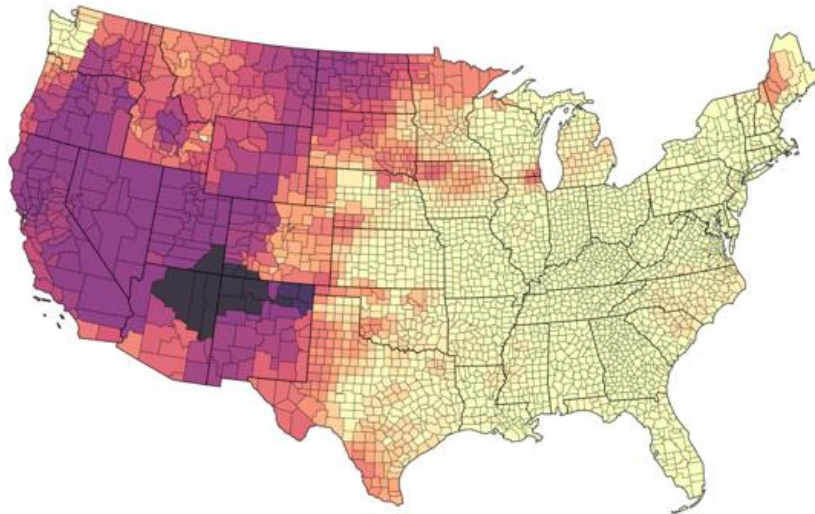
2018 Weighted Drought Weeks

2019 Weighted Drought Weeks

2020 Weighted Drought Weeks

2021 Weighted Drought Weeks

Source: U.S. Drought Monitor, 2022

VITA

Alicia Mae Young

Candidate for the Degree of

Master of Science

Thesis: FACTORS AFFECTING CROP INSURANCE USE AMONG UNDERSERVED PRODUCERS

Major Field: Agricultural Economics

Biographical:

Education:

Completed the requirements for the Master of Science in Agricultural Economics at Oklahoma State University, Stillwater, Oklahoma in May 2023.

Completed the requirements for the Bachelor of Science in Agribusiness and Agricultural Communications at Oklahoma State University, Stillwater, Oklahoma in May 2021.

Experience:

USAID DDI, Washington D.C.
Student Trainee, 35hr/wk - 6/2022-9/2022
Responsibilities: Assist in communications work in support of DDI/ESRM (The Bureau for Development, Democracy, and Innovation/Office of Environmental and Social Risk Management). Participate in a research for a special DDI front office project as well as assist DEIA (The Office for Diversity, Equity, Inclusion, and Accessibility) with various projects.

Professional Memberships:

Mortar Board