SCRI Grant Application

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# **Executive Summary**

Mitigating Revenue Volatility through Federal Crop Insurance: A Comparative Study of Specialty Crop Programs

Project Type: Standard Research and Extension Project

Outreach Plan Summary:

*Project Transdisciplinary:*

Climate events will increase exponentially in the next 20 years, putting pressure on our already fragmented and fragile food system. While investments in creating a more regionalized food system have become a priority for policymakers and researchers, the COVID-19 crisis and recent weather shocks have raised concerns about the overall resiliency of our national and global food systems, especially due to the current highly centralized model. Centralized production, particularly for specialty crop production in California, has created a fragile food system due to increased drought, wildfires, and water restrictions as it produces more than 1/3 of the vegetables and 2/3 of the fruits and nuts grown in the US. (Frisvold et al., 2013). Additionally, while consumers have shown interest in local food for several decades, newer trends show that consumers are now prioritizing shopping in line with their values more so than in previous years creating a higher demand than ever before.

This push for decentralized production and a more diverse and regionalized food system from consumers and policymakers has led to significant interest in increasing specialty crop production in areas of the United States that have not historically been considered significant specialty crop production areas. Numerous policy initiatives and federal programs have been directed toward new and emerging farmers to fill the growing population's increasing food and nutritional needs and to invest in more regional food models. However, while this increased interest in supporting producers has created numerous opportunities, the barriers for producers, especially specialty crop producers, continue to multiply.

Regardless of their crop, all producers are vulnerable to yield and revenue volatility due to weather, price shocks, pests, and more. However, specialty crop producers are often even more vulnerable due to more intensive growing requirements, shorter shelf life, and a lack of risk management tools in contrast with producers of major row crops. This holds true for conventional and specialized local and organic specialty crop markets, considered thin markets defined by few buyers and sellers and lacking active cash markets (Raszap Skorbiansky et al., 2022) (Hungerford et al., 2017) (Rosa and Johnson, 2019).

The specialty crop industry is filled with diverse producers and problems working towards a common goal of building an equitable food system providing healthy and nutritious food for healthy and strong, stable communities. Ensuring the resiliency of this food system and its producers is of the utmost importance, and as our population grows and new pressures test our fragile and fragmented food system, we must find new strategies to protect it at the very foundation: financial. This project is an innovative approach to address the dual pressures of both supply and demand caused by increasing climate change and a growing interest in local food.

Supporting research into current federal specialty crop insurance options is vital for addressing agricultural challenges through a systems approach. By enhancing the effectiveness and accessibility of crop insurance, we enable farmers to manage climate-related risks more effectively, safeguarding both the environment and their livelihoods. This holistic approach ensures that all farmers, including those cultivating specialty crops, have access to essential risk management tools, fostering a more equitable and resilient agricultural system. Improving insurance options contributes to a competitive and fair marketplace, benefiting all producers and reinforcing the interconnectedness of the agricultural economy. Additionally, stabilizing food production through better insurance helps ensure widespread access to a safe and nutritious food supply. Finally, by reducing financial risks for farmers, especially in rural and tribal areas, this research supports economic development and improves quality of life, demonstrating how interconnected elements of the agricultural system can work together to achieve broader societal benefits.

*Logic Model*

# **Project Description**

*Introduction*

Currently, commercial production of one or more specialty crops occurs in every state in the United States. Most US fruits or vegetables are produced in three coastal states (California, Florida, and Washington), while dried beans or pulses are concentrated in North Dakota and Montana. Overall, distribution across regions varies according to commodity. (Johnson, 2017)

|  |  |
| --- | --- |
| State | Acres in Specialty Crops |
| California | 4,767,784 |
| North Dakota | 1,463,183 |
| Montana | 1,429,337 |
| Washington | 1,112,175 |
| Florida | 8,710,669 |

**Figure 1 illustrates the density of vegetable crop production in the United States.**

**Figure 2 shows the density of fruit/nut crop production in the United States.**

California is essential to specialty crop production in the US, as it produces more than 1/3 of the vegetables and 2/3 of the fruits and nuts grown in the US. It is the leading producer of dozens of specialty crops and the sole producer (99% or more) of almonds, dates, figs, raisin grapes, kiwifruit, honeydew, olives, clingstone peaches, pistachios, and walnuts, among others. California's success in specialty crop production can be attributed to several factors. The state's diverse climate and geography create ideal conditions for a wide range of crops, especially high-value specialty crops (Frisvold 2013). Specifically, many areas of California have substantially more stability in terms of rainfall and temperature than in more northern or central parts of the US. Additionally, urban areas in California have benefited agriculture by providing capital, enabling modern operations development, and the ability to attract and fund labor for high-intensity crops (Hart 2003).

The factors contributing to the success of California, Florida, and Washington are the same factors preventing significant growth on a commercial scale in other regions; many other states, even if the growing season provides an opportunity for producer expansion, are unable to produce at a commercial level due to the onslaught of pests from the early rainfalls, late freezes, or lack of skilled labor infrastructure. However, climate change is projected to not only shift the growing areas of many crops but also present more climate variability, with excessive moisture, freeze, and drought events being the most significant factors. (Kistner et al., 2018) (ALSO PARKER 2016) These environmental changes could not only mean the development of new growing regions for certain crops but shifts out of previously ideal growing regions.

In addition to these developments caused by climate change, increased consumer interest in localization rather than globalization has led to a shift towards smaller, more diverse vegetable farms and greenhouse operations, reflecting the influence of consumer preferences for organic and local foods (Dimitri & Effland, 2020). Consumer interest in local food has continued to grow for several decades, as many consumers tie shopping local to positive outcomes for their environment, local economy, and public health (Onozaka et al., n.d.)

While the increased demand for local food has increased diversity in specialty crop growing regions, more comprehensive management and adaptation strategies are needed to mitigate the impact of climate variability on specialty crop production and find ways for producers to address the increasing production risks in their area. For many producers, crop insurance serves as the main form of risk management to sustain their production in the face of a changing climate. However, while federal crop insurance is readily available to most row crop producers, RMA policies are only available for counties and commodities with sufficient production and price data at a local level to maintain an actuarially sound product. (Raszap Skorbiansky, Astill, et al., 2022; Turner et al., 2023). This gap in data causes gaps in insurance options for all types of producer but is especially prevalent for specialty crop producers. For specialty crops, the coverage available from RMA typically falls under the Actual Production History (APH) plan of insurance. For producers growing crops in counties without available RMA FCI policies, USDA- FSA’s Noninsured Crop Disaster Assistance Program (NAP) serves as the main federally supported risk management program. NAP was created in the Federal Crop Insurance Reform Act of 1994 as an attempt to replace ad hoc (and unbudgeted for) disaster programs to repay producers who suffered significant crop losses during natural disasters. There are still some ad-hoc disaster programs that support producers, but NAP has replaced most of that spending. Another, more recent option for specialty crop producers, especially small to medium farms with diverse production, is the Whole Farm Revenue Protection (WFRP) program. This method of whole farm insurance that allows producers to insure revenue earned from all crops grown on their farm was a rework of a previous insurance plan, Adjusted Gross Revenue (AGR), that was available from 1999-2014 but was not available in all states. WFRP protects all revenue produced at a minimum of 50% coverage and up to 85% coverage.

While the literature on crop insurance for row crops is well developed, specialty crop insurance literature is more limited due to the recent addition of the programs federally, but also the diversity of specialty crops and their markets. This diversity makes it difficult not only to build a one-size-fits-all program for all crops in a singular program but also to understand the efficacy and success of the programs. The two major options for specialty crop producers, WFRP and NAP, both have significant gaps in the literature on the impacts of the program on producer revenue volatility. However, the limited literature does point to two key trends: the diversification of risk management strategies for specialty crop producers developed because of the historical lack of federal programs available, and the subsequent diverse options in federal programs to answer diversified strategies created a lack of clarity for producers. This leads to lower participation rates in risk management programs overall, and then a delay in evolving the current programs to fit the needs of producers due to a lack of engagement overall.

Rationale / Significance

From a food system resiliency perspective, the current centralization of domestic production for many specialty crops presents several issues. Because agriculture is highly reliant on regional factors such as weather for the success of a crop, crop failure is more highly correlated in centralized production regions. While international supply could fill the gap in emergencies, global climate change issues and uncertainty in geopolitical relations impacting trade policies make a strong domestic food supply a priority. As consumers demand more unique specialty crop options and current infrastructure becomes more exposed to vulnerabilities, current production will become inherently riskier, and expanding into riskier production spaces will be necessary. Many specialty crop producers are already feeling the strain of this risk in many centralized production regions.

*Pumpkins*

Pumpkins are domesticated winter squashes belonging to the genus Cucurbita. The term "pumpkin" is predominantly associated with round, orange-colored squash varieties. However, it lacks a precise scientific definition and can refer to various squashes with diverse characteristics. Pumpkin production in the US is mainly located in Illinois, Indiana, Virginia, California, and Pennsylvania, depending on the intended use of the crop. Roughly 80% of pumpkins grown for processing are produced in Illinois (Illinois Dept Ag), and Illinois harvests twice as many pumpkin acres as any other state, at 17,600 acres. Pennsylvania leads the country in pumpkins grown for fresh markets. EXPAND

*Christmas Tree (drought)*

Christmas Trees, the umbrella term for sheared or unsheared coniferous trees traditionally marketed as Christmas trees, include but are not limited to varieties of fir, spruce, and pine. EXPAND

In addition to more centralized production regions, many small producers in non-traditional growing regions are feeling the pressure of differing pests, as well as a lack of labor or processing infrastructure. The longstanding federal solution to weather risks for producers has been federal crop insurance, but producer participation in many programs for specialty crops continues to trend significantly lower than their row crop counterparts. While the difference in trends between the groups is believed to be a lack of clear information, there is a lack of literature on the benefits of these programs to specialty crop producers.

# **Approach**

Understanding how the current programs are or are not working for specialty crop producers is key to ensuring that the funding allocated to them is efficiently and accurately spent and that producers are being supported in the most useful way as changes in the food system continue.

For some specialty crop producers, crop insurance is important for ensuring a sustainable business. Crop insurance provides an external form of risk management that does not rely on previously leveraged capital, finances, or time, providing more equal opportunities to producers of all backgrounds and experiences to enter the food system. Federal investment in crop insurance policies is investing in a more equitable food system that balances new and emerging markets.

Therefore, the goals of this proposal are as follows.

1. Quantify the impact of participation in federal risk management programs on the revenue volatility of specialty crop producers.
2. Identify critical drivers and barriers to specialty crop producers' participation in different federal risk management programs.
3. Develop and provide risk management decision making tools for specialty crop producers.

These goals will be achieved through a three-phase process-

1. Data Analysis- Analyzing the participation and payment data on the two major federal specialty crop insurance programs, Whole Farm Revenue Protection (WFRP) and Non-insured Crop Assistance Program (NAP) and the relationship between participation and payment with revenue volatility, as well as trends in participation characteristics.
2. Extension—Following the data from the analysis stage, attend annual check-off board meetings to interview producers to understand how the revenue impact results are perceived by producers, and better understand the drivers of participation.
3. Decision Tool- Based on the results from both the analysis and producer interviews, create a decision tool to help producers choose between different risk management programs.

Understanding the impact of federal crop insurance on specialty crop producers is complex due to the variety of risk management programs available to these producers. Understanding impacts is not as simple as looking at a single program, but the impacts of each and the tradeoffs between them. To accomplish the study goal of understanding participation characteristics and benefits, we will analyze the relationship of 1) drivers in participation and program requirements and 2) program payments and revenue volatility for each form of specialty crop federal crop insurance.

The second step of the study will be to expand on the participation drivers through outreach and extension, working with check-off groups and extension agents to apply the initial results from the revenue analysis to actual producer decision-making. By discussing with producers the motivation behind their decisions in choosing a specific program or to go without coverage, we can understand the drivers behind participation beyond the trends in the data.

Finally, we will take the results from both the data analysis and the producer interviews to build a decision tool. The decision tool will allow producers to input information about their farm, such as crop type and number of acres, and then calculates premiums and evaluates insurance payments.

Supporting research into current federal specialty crop insurance options is crucial in addressing several critical agricultural challenges. Enhancing the effectiveness and accessibility of crop insurance will enable farmers to better manage climate-related risks, thereby protecting both the environment and their livelihoods. Improved insurance options also ensure that all farmers, including those growing specialty crops, have access to essential risk management tools, promoting a fairer and more resilient agricultural system. This research contributes to a more competitive and equitable insurance marketplace, benefiting all producers. Additionally, by stabilizing and sustaining food production, it helps ensure that everyone has access to safe and nutritious food. Finally, by mitigating financial risks for farmers, particularly in rural and tribal areas, this research supports economic development and improves quality of life in these communities.

The expected outcomes of this project are a combination of both academic journal publications and extension publications to ensure that the research and application of policy analysis are reaching both policymakers and producers. We expect at least one scholarly journal publication for each insurance program (NAP, WFRP), then at least one extension publication for each, as well as an extension publication contrasting the insurance options. We will take these results and build on previous flowcharts to create the producer decision tool that will be available publicly through extension platforms. Producer decision tools currently exist for crop insurance options, but none include or are focused on specialty crop producers due to the multiple options and various growing factors for the differing crops.

Methods of Analysis

The structure and methods of each study of insurance options are similar, but the methods will vary slightly due to differences in the data.

For the publication on NAP participation and impacts, we will estimate a model linking NAP payments to revenue volatility by leveraging farm and county-level revenue data. We will utilize a large FSA dataset containing farm-level payment records from various insurance programs, including NAP. The NAP observations are from 2008 to 2023 and include the FSA county/state office that issued the payment, payee name and address, payment amount, program year, payment date, and the program the payment was for. While we do not have information on the crop being grown by each payee, we will also utilize FSA acreage records for each year/county combination to estimate the ratio of specialty crops to non-specialty crops in each county for which producers may receive payments through NAP. These acreage records are available for all years in the NAP dataset and are then linked with FSA-NAP records that list the crops being covered with NAP in each county for a given year, or the “National Crop Table.” The FSA website publicly provides an annual National Crop Table for 2024, 2023, and 2022; additional years will be recovered via a FOIA request. To determine the impact on revenue, we will create a county-level coefficient of variation for revenue to measure revenue volatility, using NASS records on county-level revenue. We plan to further this analysis with a dataset on participation characteristics such as crops covered and size of farm operation from the FSA, available via a FOIA request. As stated above, this study will result in a submission to an academic journal and extension publications on what NAP is and how enrolling in NAP impacts producer income. This study will fill a significant gap in the extension and academic literature on NAP and the revenue impacts of participation.

For the publication on WFRP participation and impacts, we will estimate a similar model by looking at participation in WFRP vs. other RMA specialty crop programs at a county level and the revenue volatility between counties with higher participation in WFRP vs. NAP vs. other RMA products. This will utilize the NAP participation data as referred to above and data from the RMA annual Summary of Business (SOB), which is available from 2024 to 2016. This SOB dataset includes observations by county - insurance product for each year, the number of acres for each observation, and premium, liability, and subsidy information. For all state-county-insurance product combinations, there are a total of 1,288,486 observations over 34 insurance products in the dataset. The WFRP data contains observations for all states and includes 19,640 policies. Some of these observations, such as the enrollment for non-WFRP insurance programs, contain details on the specific crop being covered, which we hope to contrast with additional participation data from NAP that will be acquired via FOIA request. Revenue volatility will also be analyzed in the WFRP dataset by looking at the relationship between county revenue and purchased liability. As with the NAP publication, this study will result in a submission to an academic journal, as well as extension publications on what WFRP is and how producer income is impacted by enrolling in WFRP. This study will fill a significant gap in the extension literature and academic literature on WFRP and the revenue impacts of participation and will be especially crucial in regions with extremely low WFRP enrollment.

With the combination of NAP, WFRP, and other RMA specialty crop insurance participation data, we hope to get a clear view of overall program participation trends and their impacts on revenue, regardless of crop or region, to then apply to our decision tool and in outreach and extension to producers.

# **Outreach plan**

Parts two and three of this project's three-step process fall under outreach and extension. They are concerned with taking the analysis and understanding how it differs from and is impacted by producer experience. The interview portion will consist of attending check-off board meetings of different producer groups, and disseminating surveys to understand drivers in participation, as well as the trade-off logics behind different risk management strategies. This will both give insight into what is preventing producers from participating in the available programs, but also serve as an educational tool for producers that may be confused about how to enroll in the programs.

The final step, the decision tool, is key to ensuring producers are aware of the differences between different risk management programs and how each program could impact their specific situation. This would be beneficial to both existing producers, to help them decide between risk management options, and also potential producers considering entering the market. Potential producers will be able to understand their risks more accurately, and what tools are available, and decide if the risks are at a tolerable level to enter the market or if the risks are too high and they should not enter the market. This would prevent potential producers from wasting money on an unsustainable business model and result in fewer firms entering and leaving the market.

# **Pitfalls/** **Limitations**

The data available for specialty crop insurance is very limited, especially in respect to what insurance or payments are for what specific crops. In the case of the NAP data, this results in needing to estimate on how many payments are for specialty crops vs other crops under NAP, rather than having the payments directly tied to specific crops. Additional limitations include the difficulty of comparing specialty crops with differing needs, pests, seasons, etc. when understanding the best crop insurance plan. This will be especially difficult when creating the decision trees, and result in having specific trees for specific crops.

Producers being more informed about their risk management program options is mutually beneficial to producers and consumers and results in both more sustainable business and a more sustainable food system. There are no immediate pitfalls to this work.