Climate Change, Food System Resilience, and Global Security: Reforming US Farm Subsidies to Incentivize Regenerative Agriculture Practices

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Executive Summary: The agriculture sector is critical to global security, as it provides food security and employment across the world. However, the sector is both vulnerable to the impacts of climate change and one of the biggest contributors of greenhouse gas emissions. As such, all countries must consider the urgent need to respond to climate change and build a resilient and sustainable global food chain and food supply. As one of the largest economies in the world, the US has a large role in the global food chain, and therefore, has a responsibility to fortify its food system against the increasing threats of global climate change. US agricultural policy is largely determined by the Farm Bill, which will be reauthorized this year for the next five years. Thus, Congress has the unique opportunity to improve US agriculture policies that determine the costs of US production, farm earnings, agricultural contributions to global climate change, and ultimately dictate what we eat. This paper is targeted to those legislators tasked with the 2023 Farm Bill reauthorization, namely the House Agriculture Subcommittee on Conservation and Forestry and the Senate Committee on Agriculture, Nutrition & Forestry, and will address how two of the biggest components of the Farm Bill, Agriculture Risk (ARC) and Price Loss Coverage (PLC) programs, can be reformed. Ultimately, we recommend capping the ARC and PLC award per farm and reinvesting the savings in regenerative agriculture practices. Supporting regenerative agricultural practices would help the US food system become more resilient, thereby strengthening global food security and sustainability, setting a powerful example for the rest of the world.

I. Introduction

Climate change has emerged as a pressing global issue, threatening food security and agricultural productivity in the United States and worldwide. USAID defines food security as "having, at all times, both physical and economic access to sufficient food to meet dietary needs for a productive and healthy life" (USAID 2022). In 2021, 10% of US households were food insecure at some point during the year (Martin 2022). While US food security levels have remained constant over the last few years, it is expected that increased temperatures and CO2 levels, fluctuations in precipitation, and extreme weather events will lead to both reduced crop yields and worsening of crop micronutrient profiles (Godde et al. 2021; Wijerathna-Yapa and Pathirana 2022). Thus, creating an agricultural system and food supply that is resilient to the effects of climate change and reducing the risk of food insecurity should be a priority.

Increasing global food insecurity will also have national security implications (CSIS 2023; The World Bank 2022). Food insecurity and resulting malnutrition will exacerbate the global disease burden, imposing significant costs both on quality of life and financial resources (Yang et al. 2022). Food insecurity is also linked to civil unrest and human migration (CSIS 2023; The World Bank 2022). The resulting social, economic, and political instability would be detrimental to the global community (Costain 2023).

Not only is our global agriculture system vulnerable to climate change—it's a major contributor to it. Agriculture accounts for 12% of global and 10% of US greenhouse gas emissions (GHG) (Sharma et al. 2022; Wijerathna-Yapa and Pathirana 2022). Industrial farming practices have caused soil degradation, waterway pollution, and reductions in biodiversity, and are also the largest source of GHG emissions within the agriculture sector (Sharma et al. 2022). Conversely, regenerative agricultural practices provide a path for building resilience to the effects of climate change by minimizing crop losses, protecting crop micronutrient content, and reducing agricultural contributions to the climate problem (Goodwin n.d.).

Regenerative agriculture encompasses a range of sustainable agricultural practices that protect the soil ecosystem, sequester carbon, preserve biodiversity, recycle nutrients, and conserve water (Goodwin n.d.; NRDC 2021). Examples of regenerative agriculture techniques include composting, using cover crops, and crop rotation (NRDC 2021). These practices work together to create sustainable and resilient farming with numerous benefits for the global food system (Goodwin n.d.; NRDC 2021). First, by promoting soil health and efficient nutrient cycling, regenerative practices enhance soil fertility and productivity of agricultural land (Goodwin n.d.; NRDC 2021). This results in increased crop yields and improved food production capacity, which contributes to food security and resilience in the face of global climate change and population growth. Second, regenerative agriculture reduces reliance on synthetic fertilizers and pesticides (Goodwin n.d.; NRDC 2021). Minimizing pesticide use would reduce water pollution and soil degradation and would reduce the agricultural sector's carbon emissions from associated transportation costs (Goodwin n.d.; NRDC 2021). Additionally, regenerative agriculture's focus on carbon sequestration aids in mitigating climate change (Goodwin n.d.; NRDC 2021). Healthy soils with higher organic matter content capture and store carbon dioxide from the atmosphere, also reducing GHG emissions (Goodwin n.d.; NRDC 2021). By supporting regenerative agricultural practices, the US can serve as a model for responsible agriculture and can help strengthen the global food supply.

II. Statement of issue

As Congress plans to reauthorize the Farm Bill for the next five years, we have an opportunity this year to make the US agriculture sector more climate friendly and climate resilient by incentivizing the use of regenerative agriculture practices while continuing to support agricultural productivity. By incorporating measures that reduce greenhouse gas emissions and promoting sustainable farming practices, such as precision agriculture, agroforestry, and cover cropping, the US can reduce its contribution to global climate change. Additionally, the US would become more resilient to climate change impacts on soil quality and food production, while enhancing long-term agricultural productivity and nutrient quality of agricultural products. Additionally, these policy choices can help to stabilize the agricultural market worldwide by ensuring consistency in the quantity and pricing of US exports.

The Farm Bill sets national policy on agriculture, nutrition, conservation, and forestry programs in the US, including various farm subsidies administered by the US Department of Agriculture (USDA). There has been broad criticism across the political spectrum concerning the heavily funded agriculture risk coverage (ARC) and price loss coverage (PLC) programs. ARC and PLC are intended to provide risk management and financial support to farmers in years of challenging market conditions (USDA 2021). The current ARC and PLC subsidy structure was established in the 2014 Farm Bill and was reauthorized in 2018 (USDA 2021). By providing financial incentives for farmers to grow monoculture crops like corn, soy, and wheat, the programs have contributed to an industrial food complex that prioritizes highly processed and packaged foods over fresh, nutrient-dense options (O'Brien and Lee

2022; Sharma et al. 2022). While the USDA has released dietary guidelines aimed at promoting healthy eating patterns, these guidelines are often at odds with the incentives that farmers and consumers receive (O'Brien and Lee 2022; Sharma et al. 2022). Additionally, ARC and PLC incentivize the use of industrial farming practices that rely on synthetic fertilizers and pesticides (O'Brien and Lee 2022; Sharma et al. 2022). These practices contribute to soil erosion, water pollution, and greenhouse gas emissions (O'Brien and Lee 2022; Sharma et al. 2022).

The Journal of Science Policy & Governance previously included a policy memo addressing the optimization of the crop insurance program (Pol, Tibbetts, and Lin Hunter 2021). The 2021 memo recommended reforming crop insurance by changing crop coverage to incentivize practices that would make the agriculture industry more climate-resilient (Pol, Tibbetts, and Lin Hunter 2021). In contrast to that article, this memo will address the ARC and PLC subsidy programs and provide policy recommendations on program reform to be more consistent with economic, nutritional, and climate best practices. Reforming farm subsidies can provide a dual-pronged defense: supporting farmers to grow nutritious foods in a way that strengthens food systems worldwide by making US production more resilient to, and preventative of, climate change (O'Brien and Lee 2022; Sharma et al. 2022).

III. Policy options

i. Policy Option 1: Status quo

As established by the 2014 Farm Bill, the ARC and PLC programs are considered a safety net for farmers. The ARC program provides revenue-loss coverage based on a county or individual farm level, whereas the PLC program provides support payments when commodity prices fall below historical prices (USDA 2021). While each program functions differently, they have been accused of incentivizing agricultural production that is at odds with US and global dietary and environmental goals.

Advantages:

- Continuing the ARC and PLC programs as stipulated by the 2018 Farm Bill requires no adjustments in legislation, agency implementation, or farm operations.
- The ARC and PLC Programs provide supported US farmers with some flexibility in choosing the type of income support that best meets their farm's unique financial needs (Federal Register 2019).

Disadvantages:

- The majority of subsidies currently benefit US farms in the top 10% of income earners, who do not necessarily need the financial support (Bekkerman, Belasco, and Smith 2018).
- These subsidies support crops with a low nutritional value which also contribute significantly to GHG emissions (Toussaint 2021).

ii. Policy Option 2: Eliminate ARC and PLC programs

The ARC and PLC programs were originally introduced to protect farmers from market volatility as a risk management solution (AFBF Staff, 2022). However, critics argue that they distort market prices and production decisions by encouraging farmers to only plant crops that are covered by the programs, which may not be the most economically and environmentally sustainable options (Sharma et al. 2022). Further, examining the distribution of ARC and PLC payments in terms of percentile crop sales, a proxy for farm size, reveals that ARC and PLC disproportionately benefit larger farms (Bekkerman, Belasco, and Smith 2018). The largest 20% of farms by total crop sales receive about 80% of commodity program subsidies, and the largest 5% of farms receive roughly the same amount in ARC and PLC payments as the bottom 90% (Bekkerman, Belasco, and Smith 2018). Smaller farms carry more risk than larger farms due to their smaller profit margins. It is logical for smaller farms to receive more financial support for risk management, but in reality, larger farms receive greater financial support. Eliminating ARC and PLC would restructure how farming is economically incentivized and reduce costs for the government and taxpayers.

Advantages:

- ARC and PLC programs are costly to the US government and taxpayers to maintain; their elimination could lead to significant savings. In 2020 alone, ARC and PLC cost the US government almost $2.2 billion (USDA 2021).

- Without guaranteed ARC and PLC payments, farmers would be incentivized to innovate and adopt new technologies that increase efficiency and productivity. This prompt would help the industry stay competitive in an increasingly globalized market.

Disadvantages:

- Farms with low yields may struggle to compete without the support of ARC and PLC programs. They may be forced to take on debt or exit the industry, leading to further consolidation of power in the agriculture sector and potentially higher product prices globally.
- Without the price support provided by ARC and PLC, markets may become more volatile and unpredictable for US farmers and global consumers alike.
- Farmers may become more vulnerable to extreme events, such as natural disasters and crop failures, further disrupting the global food supply chain.

iii. Policy Option 3: Cap ARC and PLC payments and reinvest savings into regenerative agriculture

This proposed change in policy would save $70 million in US federal funding annually by instituting a per-farm limit for ARC and PLC payments of $125,000, in accordance with the recommendations of the Environmental and Energy Study Institute and National Resource Defense Council (O'Brien and Lee 2022; Sharma et al. 2022). While there is currently a limit of $125,000 per person per year, multiple people at the same farm can collect funds (Bekkerman, Belasco, and Smith 2018). Changing it to a per-farm cap would affect only farms currently receiving more than $125,000, estimated at 17.2% of US farms. The vast majority of these farms are in the top 10% of crop sales; they are large-scale businesses that are not the intended target for these risk-reduction programs. This proposed policy change would eliminate unnecessary ARC and PLC spending on corporate farms without hurting smaller farms and would free up funds for regenerative agriculture initiatives (Bekkerman Belasco, and Smith 2018). We recommend the newly available funds, estimated at $70 million, be used to scale-up existing soil and water conservation programs, in accordance with the previously mentioned organizations (O'Brien and Lee 2022; Sharma et al. 2022). Conservation programs are currently underfunded globally and do not meet current demand: only about 30% of conservation program applicants in the US are accepted (Sharma et al. 2022). Thus, increasing the capacity of US conservation programs would immediately benefit US farmers, as the infrastructure and industry support for these programs already exists. The increased capacity for soil and water conservation will preserve natural carbon sinks, mitigating GHG emissions contributed by the sector (Goodwin n.d.; NRDC 2021). Additionally, improving the agricultural sector's resilience to the impacts of climate change can improve crop yields, which can further contribute to the protection of the global food supply.

The proposal to cap ARC and PLC payments is an evidence-based and broadly supported strategy with the potential to reap huge benefits for the environment, the agricultural sector, and food systems globally. The Congressional Budget Office and influential center-right policy think-tank American Enterprise Institute have proposed similar caps on ARC and PLC spending (Bekkerman Belasco, and Smith 2018; CBO 2022). In addition to those organizations previously mentioned, a group of more than ten leading food, environmental science, and agricultural sector organizations, including the food security-focused Consortium of International Agricultural Research Centers (CGIAR), has also recommended reducing these farm subsidies and repurposing the funds towards regenerative agriculture and resilient, nutritious food production (Glopan 2020; Winowiecki 2021).

Advantages:

- This policy option maintains ARC and PLC as a solution for the majority of farms, especially small family farms most in need of reliable income.
- This policy option is heavily supported by the bipartisan Congressional Budget Office and by reputable organizations across the political spectrum (Bekkerman Belasco, and Smith 2018; CBO 2022).
- Investing in regenerative agricultural practices makes crops more resilient to changes in climate and reduces crop loss, saving money for both US farmers and taxpayers and minimizing global food supply

disruptions. These practices can also minimize the sector's contribution to GHG emissions, improve water quality, and improve soil health (Sharma et al. 2022).
- Redirecting federal funding towards regenerative agricultural practices benefits the production and costs of crops that align with USDA healthy dietary guidelines, while making ultra-processed foods more expensive. This approach would also make USDA public messaging more consistent.

Disadvantages:
- Capping ARC and PLC is a substantial change in agricultural policy that could expose the farming industry to unforeseen risks and harmful secondary effects. For example, owners of larger farms could respond by leaving the industry, which would be destabilizing.
- Smaller farms that currently leverage the per-person rule may now be forced to rely more heavily on private loans and incur more debt. However, according to estimates from the American Enterprise Institute, this program change would only impact 3% of farms in the 50th to 90th percentile of crop sales (Bekkerman Belasco, and Smith 2018; CBO 2022).
- While smaller farms in terms of crop sales are unlikely to be directly impacted by capping ARC and PLC subsidies, they may be disincentivized to grow larger due to a proportionally decreased financial risk safety net.
- Any significant change in agricultural policy is likely to lead to political challenges, such as industry pushback, formal lobbying, and misunderstanding of changes being made to the program.
- ARC and PLC payments are only paid out in low-price or income years for certain crops or farms. Therefore, there may be no estimated savings in a given year directed towards conservation programs, providing challenges in budget forecasting and program planning.

IV. Policy recommendation

Capping ARC and PLC and reinvesting savings into regenerative agriculture is an evidence-based approach with bipartisan support and is advantageous for farmers, the food system, and the overall economy. We propose that the 2023 Farm Bill reauthorization include amendments to the ARC and PLC programs of a $125,000 cap per farm and a corresponding budget increase for conservation programs with the dollars saved. To diffuse potential political challenges, the timeframe of policy implementation could be extended, for example by further capping ARC and PLC each year for five years. Further, companies and constituents could be reassured of the continued existence of emergency support. The USDA would be tasked with implementing program changes resulting from the Farm Bill's reauthorization.

V. Conclusion

The connection between agriculture and global security is profound, with reach into the global food supply, climate change, and population health. Slow reforms, such as the changes to existing programs proposed by this memo, can be the best option to maintain the stability of the agricultural sector. While further changes are needed in agriculture and climate policy worldwide, this memo proposes a next step forward in recognizing these necessary changes and the interconnectedness of our industries and systems.

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