

**Testimony of  
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Agriculture Committee  
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Good morning. Thank you, Chairman David Scott, Vice Chair Alma Adams, and Ranking Member Glenn Thompson, for convening and inviting me to contribute to today's hearing, "*The Role of Climate Research in Supporting Agricultural Resiliency*." I am Dr. Ali Fares, Endowed Professor of Water Security and Water Energy Food Nexus at Prairie View A&M University (PVAMU). I want to thank you for your sustained support to research in the Land Grant Institutions such as PVAMU and the 1890 Institutions, specifically to allow us to train future leaders and professionals and conduct fundamental and applied research that addresses the needs of the over 8 million limited resource farmers, ranchers, and community members in Texas through multiple funding programs included in the 2018 Farm Bill. These rural and urban communities have been one of the more impacted portions of society by climate change.

Through the continued support of Congress and the extra-ordinary efforts of leaders of this Committee, PVAMU, the 1890 Institutions, and other land grant institutions have continued conducting state-of-the-art research while training limited-resources future leaders to address the evolving needs of the US population.

The 1890 Institutions have several active climate research projects; at PVAMU, I am leading the GetAgSmart project, a USDA-NIFA funded project in collaboration with colleagues from Texas A&M University. We have been working on building capacity in smart agricultural technologies to train Texas underserved communities and support them start high-paying careers in this area. The second project is a joint effort with colleagues at the University of Texas at Austin, training over 30 PhD and MS students in the area water-food-energy and climate change. Several of these students graduated and are already training others.

It is crucial to remind ourselves of the critical role research and innovation, R&I, have on the US economy and the US global leadership in this area. The US has been the global leader in R&D investments; The US continues to lead the nations in its spending on R&D; although currently, it was about 30% in 2019, its R&D was 40% of the global R&D in 1999. Our new economy, as many want to call it, is R&D savvy and dominated by tech companies that continuously benefit from R&D. The agricultural sector is one of those economic sectors that heavily rely on research and development (R&I) in its mission to meet ever-increasing demands for food, fiber, clean energy, and ecosystem services while facing an array of climate change-induced challenges, e.g., droughts, flooding, fires, freezes, and pest infestation. Since 2020, the challenges have been compounded by the pandemic and regional wars in crucial food and energy influenceable areas, disrupted the supply chains, and introduced volatility to the food energy markets and the global economy.

The current climate change challenges offer opportunities for economic innovation and the implementation of new growth models. Substantially reducing GHG emissions in about two decades requires innovation in many sectors, especially agriculture, energy, and other related sectors. These innovations will support a new economy with different infrastructure, workforce skills, financial tools, and governance. As a result, new career opportunities will arise, and new markets will develop (e.g., carbon market, resiliency indices), powered by new goods and services. Intentionally embracing this new economy will result in the thriving of the US economy, where small and minority businesses and individuals will play a significant role. Agricultural and natural resources research and innovation helped the agriculture and natural resources sector overcome many of its challenges, including the introduction of erosion control practices that resulted from the extensive soil and water conservation research triggered by the dustbowl in the 1930<sup>th</sup> of the last century. Results of those practical research have been implemented here in the US and internationally to combat soil erosion and protect the environment. In addition, the green revolution, by introducing the crop breeding efforts of legendary agronomists such as Norman Borlaug, helped achieve food security in the US and other countries such as India.

Although the agriculture sector has been one of the major greenhouses gases emitters, it is looked at as the sector that can not only reverse its course but also can mitigate substantial amounts of GHG via carbon sequestration in soil and biomasses through the adaption of effectively proven management practices.

This will help the US achieve its emission reduction goals, strengthen our resilience to climate change, and strengthen our global economic and moral leadership.

Through R&I, we can develop and implement climate-smart and resilient agricultural practices that will help US individuals, families, and communities weather the impact of climate change through adaptation and mitigation approaches. These approaches are interrelated and must be adopted simultaneously as they are needed to improve changing climate resiliency.

The USDA, through NIFA, enumerates several climate research needs that require several actions to help the agriculture sector and other stakeholders adapt to and address climate change crisis via a joint mitigation and adaptation approach, including:

- Adequate funds are needed to study and develop climate-smart practices and technologies that producers and land managers need to implement these practices and approaches.
- Research on the effectiveness of adaptive practices and technologies regarding productivity synergies, tradeoffs and mitigation co-benefits on soil carbon storage and GHG emission reductions.
- There is an urgent need to support site-specific research on fertilizer technologies, climate-resilient plants and trees, and fate of pollinator communities, and vector-borne livestock diseases.
- Support for reliable modeling efforts on the future affordability of climate-smart activities and project pest and disease outbreaks under different scenarios.
- Water security: long-term monitoring of snowpack, precipitation, and soil moisture networks data is essential to investigate trends and develop management options.

- Integrating climate and socioeconomic change with production and land-management outcomes while considering the secondary effects of climate's influence on pollinators, pests, diseases, invasive species, and extreme events such as flooding and drought.
- The advanced and integrated use of Artificial Intelligence and IoT-based technologies will help efficient and effective decision-making for climate-smart and sustainable agriculture.
- Limited resources and minority farmers have additional challenges besides climate change. They are last in adopting new technologies and practices as most of them lack the resources needed and most of the adopted technologies are costly and require a level of technical understanding, two elements lacking most of the limited resources farmers and ranchers.
- Intentional efforts are needed, especially for commodity-specific objectives (e.g., common crops and animals, corn, wheat, beef, small animals) to develop tools and practices tailored to limited resources for farmers and communities.
- Support technology transfer on newly developed scientific information and tools at the local scale to help land and resource managers increase the resilience of those systems and the communities that depend on them.
- Given the enormity of the tasks, public-private partnerships and international collaborations between US and international academic and research institutions and industries are viable options that it would be wise to consider.
- The 1890 institutions are significant players in this effort in helping the most fundable and impacted section of the population by climate change; however, their researchers and research infrastructure desperately need continued support to build capacity in conducting research and training the next generation of climate-smart agriculture experts.

I encourage Congress to support robust funding increases for the 1890 land-grant programs so we can make even more positive impacts on our country's citizens through our research programs. We will be better able to address specific climate change needs of the underserved farming communities and train future professionals in climate-smart agriculture discipline.

In summary, I request you invest in supporting America's future research and innovation leadership by strengthening the 1890s land-grant universities' research portfolio. PVAMU has a 146-year track record of excellence; it ranks as the No. 1 "best value" HBCU No. 4 among Texas universities.

I look forward to answering questions from you and the committee members in the question and answer session of this hearing.

Thank you.