

Testimony of

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The Next Farm Bill: University Research

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Chairman Conaway, Ranking Member Peterson, and members of the Committee, on behalf of Dr. Kent J. Smith, Jr., President- Langston University and chair of the 1890 Council of Presidents; Moses T . Kairo, Chairperson of the Association of 1890 Research Directors (ARD); Dr. Carolyn Williams, Chairperson of the Association of 1890 Extension Administrators (AEA) and the entire 1890 Land-Grant Community, I would like to thank you for this opportunity to speak about research in food and agriculture at the 1890 land-grant universities.

I am Dr. Walter A. Hill, the Vice Provost and Dean of the College of Agriculture, Environment and Nutrition Sciences at the historic Tuskegee University in Tuskegee, Alabama. Within the educational and race equity context of the Morrill Acts of 1862, 1890 and the 1994 expansion; I serve local, regional, national and international communities; I have been committed to the mission of the 1890 land-grant universities for 37-years. I have taught and continue to teach undergraduate and graduate students from the rural deep American South, Black Belt, urban centers and international students from South America, Africa, the Middle East and the Caribbean to engage in research, agricultural, nutrition and science projects. My passion for improving plant-environment relationships for sustainable agriculture and advanced life support systems and aiding small and historically disadvantaged farmers and rural communities also comprise collaborating with residents, farmers, students and building integrated academic research and consumer-community-building coalitions.

In addition, my career in agriculture education includes working as the director of the 1890 Land-Grant Research and Extension Programs, the George Washington Carver Agricultural Experiment Station, founder and director of the Carver Integrative Sustainability Center and project director of the Wal-Mart Foundation-sponsored Sustainable Agriculture Consortium for Historically Disadvantaged Farmers. I was blessed to be an integral part of the leadership team from 1890 universities that developed the 1890 Land Grant University 125th Anniversary, Center for Innovative and Sustainable Small Farms, Ranches and Forest Lands.

There are three 1890 land-grant universities in the state of Alabama from whence I live and work; Alabama Agricultural and Mechanical University, Auburn University and Tuskegee University. It is important to note, August 30, 2015, the United States Senate recognized the 125th Anniversary of the signing of the Second Morrill Act which created 19 historically Black land grant universities. These historically Black institutions are Lincoln University (Missouri), Alabama Agricultural and Mechanical University, Alcorn State University (Mississippi), the University of Arkansas at Pine Bluff, Alabama Agricultural & Mechanical University, Prairie View Agricultural & Technical University (Texas), Southern University (Louisiana), Virginia State University, Kentucky State University, the University of Maryland-Eastern Shore, Florida Agricultural and Mechanical University, Delaware State University, North Carolina Agricultural and Technical University, Fort Valley State University (Georgia), South Carolina State University, Langston University (Oklahoma), Tennessee State University, Central State University (Ohio), West Virginia State University and Tuskegee University (Alabama).

I have intentionally shared the list of historically Black land-grant universities and my work experience with this distinguished committee, only to emphasize the critical importance for U.S. universities to teach agriculture, engineering, science, and nutrition to its citizens. Within the context of the history of former slave states and equitable education for all citizens of the United States, it is an honor for me to represent the 1890 land grant universities and in particular the 19 historically Black institutions because -- today in the 21st century, there is a dire necessity for all U.S. institutions of higher learning, to work in unity for the purpose of achieving educational progress, agricultural assets and digital footprints for agribusinesses, especially in rural and small communities.

Today, 1890 land-grant universities are proactive members of the Board on Agriculture Assembly of the Association of Public and Land Grant Universities (APLU) and we have consistent hands on role in the development of the APLU Board's proposed farm bill recommendations. We endorse APLU's budget priorities, concerning funding needs and the necessity to better integrate science and education programs into all action and policy activities of the United States Department of Agriculture (USDA). I will take this collegial occasion to emphasize research results oriented information and data provided by historically Black land-grant universities and introduce additional issues of concern specific to 1890 land-grant universities in the new 2018 Farm Bill rewrite legislation.

The Second Morrill Act, passed by the Fifty-First U. S. Congress, served the educational needs of African American communities and established the 1890 Land Grant Universities. Although the Second Morrill Act became law during times of great suffering and struggle for African Americans, the 1890 Land-Grant Universities survived and were productive, despite overwhelming odds, due to the commitment and vision of many African American leaders within higher education and some white visionary supporters. The same spirit of sacrifice and concern for students and communities, exhibited by African Americans leaders of the 1890 Land-Grant Universities, embraces the faculty and administrators today in 2017. This spirit, derived from the demographic philosophy of these institutions and the conditions of their founding, is respected worldwide. The general philosophy of the 1890 land-grant universities' administrators boldly asserts, "*...men and women of talent and ability, regardless of their socioeconomic condition, can contribute to the common good through hard work and the opportunity to develop and prosper.*"

At the onset, I would like to thank you and the Committee for your dedication and support to America's farmers and ranchers. Your support of the 1890 land-grant universities promotes the equity, opportunity, productivity and profitability of our farmers and the health and safety of all Americans.

Key Issues for the 1890 Land-Grant Universities

On behalf of my 1890 land-grant universities colleagues, I am honored to present the following key issues to you:

1. The critical need for increased investments; and
2. Appropriate funding mechanisms.

The Critical Need for Increased Investments

I am deeply heartened by the recent calls to increase significantly the investment in agricultural research, extension and education. It is remarkable that so many diverse interests are coming together with an understanding of an urgent need to reinvest in the science and education base serving our farmers and our communities. It is important to note, over the last several decades, according to USDA/Economic Research Service, the U.S. agricultural sector has sustained impressive productivity growth. Our nation's agricultural research system, including Federal-State public research as well as, private-sector research, has been the key driver of this growth. Economic analysis finds strong and consistent evidence that investment in agricultural research has yield high returns per dollar spent. These returns included benefits not only to the farm sector, but also to the food industry and consumers in the form of more abundant commodities at lower prices. There is consensus that the payoff from the government's investment in agricultural research is high. ***We know that the return on investment in agricultural research is \$20 for every \$1 dollar spent.***

The 1890 land-grant universities look forward to working with all the farm and interest groups who are working to enhance our abilities to serve their needs. As we support critically needed investments in agricultural research, extension and teaching, it is essential that the specific funding needs facing the 1890 land-grant university community also be addressed. Now, I would like to convey some of our specific recommendations to meet the unique needs of the 1890 land-grant universities and the communities we serve.

The 1890 Cooperative Extension programs are comprised of a broad range of science based educational efforts, which have been proven to:

1. Strengthen the food and agricultural industry, particularly small and limited resource farmers, by developing agricultural production systems that are efficient, sustainable and highly competitive in the global economy.
2. Enhance the health of families through diet and nutrition and food safety education and their economic well-being through practical financial education.
3. Enhance youth skills in science, technology, math, citizenship and leadership.
4. Foster strong, stable communities through leadership development efforts and encouraging entrepreneurship.

103-years ago, the Smith Lever Act established the effective Cooperative Extension Service. For the more than a century, Cooperative Extension has developed transformation programs that have improved the economic viability of small-scale agriculture and reduced the decline of small minority-owned farms from century to century, including today in the 21st century.

Programs emphasizing agricultural diversification, marketing strategies and risk management have been of paramount importance to this client group. Many of the small farmers have diversified their operations to include vegetable production, fruits, specialty crops and animals to increase their cash flow. For example, the 1890 land-grant university, North Carolina Agricultural and Technical University (North Carolina A&T) developed the Natural Hog Growers Association and increased its association's membership hog-sale income by nearly a million dollars in North Carolina and signed a contract with the Whole Food Market. In addition, 1890 land-grant university, Florida Agricultural and Mechanical University's (Florida A&M) development of the Master Meat Goat Herdsman Program has saved producers over \$16,250, annually, in the state of Florida's veterinarian and production costs.

In Alabama, farmers participating in a comprehensive program in record keeping, fiscal management, production management and farm planning have become producers that are more efficient. It was reported that 13 farmers acquired USDA farm ownership loans in the amount of \$2.6 million and 10 acquired operating loans for nearly \$1.0 million. Without this training, the farmers would not have qualified for the loans. Programs of this nature

enabled the limited- resource farmers in Kentucky to increase their net farm income by \$4,500.00.

Increase the funding base of 1890 Land-Grant University Capacity

Funding

We fully support the reauthorization of capacity programs funding for both 1890 and 1862 land-grant institutions. The amount of capacity funds available to Second Morrill Act 1890 land-grant universities is lesser than the amount of funds made available to our colleagues categorized under the auspices of the First Morrill Act 1862 land-grant universities. Currently, the legislation requires that the funding base of the 1890 land-grant university formula research funding (Section 1445) should be set at an amount equivalent to but not less than 30% of the 1862 land-grant university capacity funding (The Hatch Act of 1887). The 1890 land-grant universities' research program (Evans-Allen) currently received 22% of the 1862 land-grant universities' capacity funding. Therefore, it is within the context of educational equity, that we are requesting the authorized amount of 30 percent.

Similarly, the 1890 Cooperative Extension formula funding (Section 1444) is currently set at an amount equivalent to but not less than 20% of the 1862 Cooperative Extension formula funding (Smith Lever Act signed May 18, 1914). Within the historical context of the purpose of Smith Lever which established the USDA Cooperative Extension Service; for us, the 1890 Second Morrill Act land-grant institutions to be able to implement what was written in the 125th 1890 Land-Grant University Anniversary Resolution announced by U.S. Senator Sherrod Brown to "disseminate information about agriculture and economics." We are requesting to receive the authorized amount of 20 percent because the funding will financially help the 1890 land grant universities fulfil their duty to help the United States train agricultural leaders and enhance agricultural development for the nation.

As an example of the importance of capacity funding, USDA/NIFA (National Institute of Food and Agriculture)-funded researchers at Prairie View Agricultural & Mechanical University (Prairie View A&M) has created an agricultural robot capable of carrying multiple sensors, including one that can detect crop height, a multi-spectral camera, and hyperspectral radiometer for processing information from across the electromagnetic spectrum. Robots in agriculture including self-driving tractors, drones and other machines that perform tasks such as precision weeding and spraying, pruning vines in the wine industry, and herding cattle. Agricultural engineers, such as the ones at Prairie View A&M, with robotics knowledge are in high demand because of

advanced robotics unmanned agricultural vehicles are becoming widely used in precision agriculture.

NIFA-funded researchers at North Carolina A&T State University (N. C. A&T) have developed a safe, relatively simple technology for deactivating the allergenic proteins in whole roasted peanuts. The patented technology relies on treating whole roasted peanuts with various food-grade enzymes. Repeated laboratory trials using extracts from treated peanuts at N.C. A&T, as well as an initial clinical trial using skin- prick tests at the University of North Carolina at Chapel Hill, have shown promising results. Laboratory tests indicate allergenic proteins can be reduced by up to 98 percent. Researchers have also worked on applying the technology to wheat protein allergens. One of the greatest advantages of this technology is its potential to produce peanut products that can reduce the severity of allergic reaction in the case of accidental exposure.

Estimates vary as to the numbers of people who suffer from peanut allergy, but health officials agree it is one of the most severe and prevalent food allergies. A report from the National Institute of Allergy and Infectious Diseases in 2010 reported that the numerous studies on the issue, some based on self- reports, estimate the prevalence of peanut allergy in the United States population ranges from 0.6 percent to 1.3 percent (2-4 million people). According to the American College of Allergy, Asthma and Immunology, approximately 400,000 children in the U.S. suffer from the allergy. Making matters worse for them, peanut allergy is rarely outgrown, unlike many other food allergies.

Reauthorize the 1890 Capacity Building Grant Program

The 1890 Capacity Building Grants Program has played a critical role in helping us build our capacities in research, extension and teaching. This program has allowed us to attract new faculty, enhance our ability to conduct quality research, has enabled us to carry out needed curriculum development programs, and has permitted us to enhance the delivery of our extension and engagement programs. We also recommend that the authorized funding level for this program be continued.

A \$150,000 grant from NIFA's 1890 Capacity Building program helped Fort Valley State University create a bioinformatics curriculum where students learn to transform biological research into informational science. In this program, science, technology, engineering and mathematics (STEM) majors join with computer science majors to become competent bioinformatics programmers and gain hands-on experiences in writing algorithms and coding

for biological problems. Bioinformaticians use computers to store, organize and analyze the vast amounts of data generated by scientific research.

Reauthorize the 1890 Facilities Grant Program

We strongly recommend reauthorizing the 1890 Facilities Grant Program (Section 1447) at the authorized funding level. The 1890 land-grant universities have a clear and immediate need to improve their academic, research and extension physical facilities. There is also an urgent need to adequately equip these facilities with 21st century state-of-the art equipment. Years of limited resources have taken their toll on the institutions and needed improvements cannot be delayed. Meanwhile, modern technologies require updated and additional resources and modifications to existing facilities. Without the needed improvements and technology upgrades, it becomes more and more difficult to recruit and train the highest quality scientists and other educational professionals for the future. We therefore, urge your support of authorization for the 1890 Facilities Grant program.

APLU Deferred Maintenance and Infrastructure Program

A recent Association of Public and Land-Grant Universities (APLU) audit (inclusive of 1862, 1890 and 1994 land grant institutions and Hispanic-serving institutions) estimated \$8.9 billion in deferred maintenance of mission-critical buildings, including classrooms and laboratories, animal and plant research houses/farms, greenhouses, and pilot facilities with a \$29 million replacement value. Investments in academic research infrastructure would immediately create local jobs, conserve energy, and realize savings over time, in addition to improving research, education and extension outcomes. For the U.S. to remain the world leader in food and agricultural research, the aging infrastructure and deferred maintenance problem must be addressed. Requested is an infrastructure program that leverages, federal, state and private sector funds and benefits local, state, regional and national interests, as recommended by APLU.

Change the Carryover Provision for 1890 Extension Funding

The 1890 land-grant universities can only carryover 20 percent of its Extension funding after one year while other capacity programs can carryover their funding at 100 percent for one or more years. The 20 percent carry-over provision limits the flexibility needed for planning and expending the funding based on identified priorities. We are requesting that the carryover provision for 1890 Extension be changed from 20 percent to a carryover level that would be consistent with the carryover provision for other capacity programs such as

Smith-Lever. This will provide the same carryover opportunity for Extension capacity funds for both 1890 and 1862 institutions.

Increase the funding base for McIntire-Stennis (Forestry) funding

We recommend increased funding targeted to forestry issues (McIntire-Stennis) at the authorized level. Many of our institutions abide in states where forestry is a major agricultural industry and these institutions have forestry and natural resource programs that are germane to the forestry industry and applicable to the current program eligibility guidelines. For example, Tuskegee University offers the Pre-college Summer Program in Forestry, National Resources and Related STEM Areas for 7th and 8th graders and high school students. Each program creates an awareness of the educational and career opportunities that are available in Science, Technology, Engineering, Agriculture and Mathematics.

Nutrition Education Program (Expanded Food and Nutrition Education Program)

Nutrition education is important to the health and well-being of all families, but there is a tremendous need for this program for persons with limited income. EFNEP help individuals to improve their diets and change their food buying behavior. It is recommended that EFNEP be reauthorized at its current level of \$90 million. Southern University and Agricultural & Mechanical's (Southern University and A&M) Food Desert Project takes a critical look at the dual food issues of obesity and lack of access to nutritious food as issues being addressed through innovative programs at Southern University and A&M. Obesity and correlated health conditions have a \$100 billion a year impact on the U.S. health care system, and Southern University and A&M is responding with an Extension-based initiative, "Eradicating Food Deserts in Neighborhoods through the Development of School Gardens." Three area schools and 500 students have been reached. The Nutrition Education Program is critical to all communities especially vulnerable people who live in the most economically impoverished rural, urban regions and neighborhoods which comprise the geographic locations of the 1890 land-grant universities.

Authorize the 1890 Centers of Excellence

We recommend authorization of the 1890 Centers of Excellence at a funding level of \$35 million per year. These Centers were developed and initiated in 2015 in recognition of the 125th Anniversary of the Second Morrill Act of 1890. They include: 1) Center for Innovative and Sustainable Small Farms, Ranches and Landowners (CISFRL), 2) Center of Excellence for International

Engagement and Development (CEIIED), and 3) Virtual Center to Motivate and Educate for Achievement (MEA).

In recognition of the 125th Anniversary of the Second Morrill Act of 1890, several USDA agencies committed \$2 million to the 1890 land-grant universities to support the former two centers. The goals of the Anniversary Centers are to substantially increase diversity in the STEM pipeline, increase profitability and jobs in underserved farming communities and enhance talent preparation related to global food security. The 1890 land-grant universities are working in an integrative fashion across multi-disciplines and in partnership with the private sector, government and community-based organizations to make a difference and obtain measurable impacts on the lives of underserved youth, farmers and developing communities who hold enormous potential. Although the funds from these USDA agencies were used prudently to support underserved small farmers and students at our institutions, these funds were woefully inadequate.

Through the years, the 1890 land-grant universities have struggled with inadequate funding resources to meet the especially challenging needs of underserved communities. The proposed Centers of Excellence would be utilized to help address historical inequities of resources and to allow our institutions the opportunity to work collaboratively and synergistically to help our stakeholders while concurrently effectively competing for other funding resources. These Centers of Excellence would jump-start new initiatives on the 1890 land-grant campuses, particularly developing resources to provide practical solutions to improve job opportunities and the quality of life of citizens in the 1890 land-grant universities' regions and beyond.

As I mentioned earlier, the Center for Innovative and Sustainable Small Farms, Ranches and Forest Lands (CISFRL) was initiated in 2015 as an outcome of the 125th Anniversary of the 1890 Land Grant Universities. In its first year of operation, approximately 70 farmer clusters or cooperatives, including five or more owners, were created or operationalized in the seven states that initiated the CISFRL, based on competitive proposals. These clusters and cooperatives included hundreds of farmers, ranchers, and landowners. CISFRL has catalyzed farmers, ranchers and landowners working together with universities and the private sector and state governments to leverage their strengths and resources by working with like-minded producers. Among their successes has been to obtain new markets (including large commercial retailers), who require larger quantities of produce delivered on a consistent basis than a small farmer can supply alone. The cluster approach (farmers working together) has enhanced

GAP and food safety certifications, soil testing, pest management, irrigation, other sustainability practices and improved partnering with USDA agencies. Specific achievements after the first year of operation include:

- Increased marketing of vegetables to large commercial retailers (Walmart, Kroger);
- Increased irrigation capacity for vegetable production;
- Joint purchase of equipment for crop spraying and animal pregnancy testing;
- Joint purchasing of coolers to increase the shelf life of fresh produce and refrigerated trucks for transporting fresh produce;
- Access to modern packing and shipping facilities;
- Conducted collectively over 80 workshops and conferences in partnership with USDA agencies, community based organizations for farmer training on FSA, NRCS, FS and APHIS programs and modern technologies; and
- Trained and provided information to small and limited-resource land owners on forest health, pests, invasive species and fire and disease control, and assisted in developing management plans for 422 landowners.

Reauthorize the Outreach and Technical Assistance for Socially Disadvantaged Farmers

We recommend reauthorizing the Socially Disadvantaged Farmers Initiative (Section 2501) Program at a level not less than \$20 million per year. This program allows the 1890 land-grant universities and other Community Based Organizations to work cooperatively directly in a sustained way with small farmers. We have had tremendous success providing training in risk management, record keeping, farm management environmental stewardship, and alternative enterprises and market development. We train small farmers to access new and alternative markets for their crops and animal commodities. This program has made a dramatic impact on increasing the economic viability and sustainability of these small and limited resource farmers. This critical program should be sustained and strengthened and other small farm programs should be established as a safety net for all such farmers in this category. Comparatively, this group of farming clientele has been vertically ignored in terms of specially targeted programs. We therefore, ask the Committee to rectify this oversight by providing sufficient funding for this program to provide sustained impact.

Authorize Student Scholarships for the 1890 Land Grant Universities

As introduced by Representative David Scott of Georgia, we request support for H.B. 51 to amend the National Agricultural Research, Extension, and Teaching Policy Act of 1977 to direct the Secretary of Agriculture to establish a grant program under which the Secretary will award \$19 million per year (\$1 million to each institution) for student scholarships. This scholarship program is needed to increase the number of young African-American individuals seeking a career in the food and agricultural sciences and shall be provided with the caveat that such scholarship students shall commit to pursue a career in the food and agricultural sciences, including agribusiness, food production, distribution, and retailing, the clothing industries, energy and renewable fuels, and farming marketing, finance, and distribution. Agriculture critically needs a steady supply of diverse individuals with modern agricultural and scientific knowledge and training to support the agricultural industry and R&D enterprise. This requires an ability to translate complex technical knowledge to end-users, particularly farmers and livestock producers, while recognizing the local needs and constraints. According to a recent Purdue University study, the employment opportunities are tremendous for college graduates in food, agriculture, renewable natural resources and the environment; the demand for these graduates exceeds the supply by 39 percent.

Appropriate Funding Mechanisms

We would like to commend the leadership of USDA/NIFA and the Land-Grant University community in the development of the new AFRI competitive grants program, America's flagship competitive grants program for the agricultural sciences. The Department staff and others went the extra mile to make sure that our institutions were fully aware of the new program and gave us the opportunity to compete as equal partners in the process. The 1890 Land Grant Universities achieved some success, however, with enhanced support to increase our competitiveness we will do even better in the future.

We recommend increased funding at a level of \$418 million per year. While we support competitive grants, many of the programs that we provide need to be sustained over time. Short-term competitively awarded projects do not adequately serve the longer-term needs of the underserved populations that we serve. Long-term capacity funding funds provide the necessary sustained funding that is required to truly build capacity. Again, we support competitive grants, but it is not the only funding tool and it is not always the most effective mechanism to meet our needs and the needs of the people we serve in rural and urban communities.

Small Farms/Specialty Crops

The researchers and extension specialists have focused their efforts of helping improve the quality of life and increasing the income/profitability levels of small and undeserved farm operators in the 1890 land-grant universities' regions and beyond, including an emphasis to increase the competitiveness of specialty crops and organic crops. Small farms make up 90 percent of the farm count and operate nearly half of the farmland, but only account for 24 percent of the production. The largest share of farm production, however, occurs on the large-scale family farms. According to the Economic Research Service and other researchers, specialty crops typically account for 30 to 40 percent of the total value of U.S. crops, not an insignificant value.

Even before the increased attention given to specialty crop issues in the 2008 Farm Bill, the 1890 land-grant universities had been assisting specialty crop producers to increase the quality of these products and to develop a market niche.

Specialty crop issues often vary depending on the type of crop involved and the type of market in which they are sold. Among the crops important to producers that the 1890 land-grant universities' researchers and extension specialists have focused on include, but are not limited to, ethnic crops such as *Brassica rapa* cv. *Bosai Chinensis* (Bok choy); *Amaranthus viridis* Linn (Amaranth or Callaloo); *Hibiscus sabdariffa* L. (Hibiscus or Jamaican Sorrel); energy beets; ginger; carrots; kale; specialty peanuts; grapes; watermelon; blueberries; vegetable soybeans (*edamame*); Indian, Chinese and Hispanic vegetable crops; sweet potatoes, southern peas, squash, and eggplant; mushrooms; and herbs.

Among the issues important to producers that the 1890 land-grant universities' researchers and extension specialists have focused on include, but are not limited to, sustainable production practices, planting flexibility restrictions, irrigation programs, labor, food safety, marketing and trade patterns, integrative pest management, and risk management.

With NIFA funding, researchers at Delaware State University have focused on the sweet potato as an alternative agriculture enterprise in Delaware. Sweet potato has become a popular crop for millions of people in Africa, Latin America and south-East Asia. It is a cheap source of carbohydrate and vitamins including vitamin A. In the USA, Louisiana and North Carolina are the largest producers of sweet potato. However, it is becoming popular in other parts of the country, including Delaware. To develop suitable varieties

in Delaware climate and soil, Delaware State University researchers started varietal trial during 2012 and 2013 growing season. There were four varieties planted on sandy loam soil with pH 5-6.5 on the tilled bed of 3' width covered with black plastic. All varieties did well during 120 days of growing period in the state of Delaware. This research has demonstrated that sweet potato can be grown as alternative agriculture enterprises in Delaware. These four varieties are characteristically different for skin color, flesh color, taste and everyone can pick which they like.

With NIFA funding, researchers at Florida A&M University have focused on “biochar technology” and its potential for sustainable agriculture and carbon sequestration, including small and specialty crop farms. Mitigating the anthropogenic increased atmospheric CO₂ and environmental pollution are also major concerns of our society. Finding an economic and ecological feasible solution to those major problems is certainly not an easy task. However, the development of biochar technology may provide a promising means that contribute to the solutions of those global problems. Biochar technology turns portion of the plant materials produced every year into a “charcoal” form and a soil amendment. Biochar enhances soil, water and nutrient holding capacity, reduces fertilizer use and its pollution to the environment. Biochar probably is the only viable technology so far that can significantly sequester atmospheric carbon and mitigates the anthropogenic effect on climate change. The findings revealed that showed that biochar as a soil amendment can increase soil productivity and sequester carbon to various degrees depending on the properties of the biochar and the soil receiving the treatment. Additional research is needed to fully realize the optimal use of the technology in various field conditions. The researchers at Florida A&M University have also initiated a design of a low-cost biochar production system that can facilitate the wide spread usage of the technology. Their research, education and outreach efforts revealed the benefits of biochar technology in enhancing agricultural productivity without increasing fertilizer use and in the meantime, sequestering carbon from the atmosphere.

With NIFA funding, researchers at Tuskegee University are leading a consortium of universities that is addressing development of organic farming in southeastern states through education; conducting research, and development of extension materials for farmers in the region; testing organic pesticides against major pests of southern peas, squash, sweet potato, and tomato; and providing site specific recommendations to organic growers through organized advanced multi-location, multistate on-farm trials.

Tuskegee University's Integrated Research and Extension programs with small farmer clusters and small farmer cooperatives have facilitated production and marketing vegetables to large commercial retailers to increase profitability and jobs. Successes have included adaptive irrigation and solar energy technologies to enhance production efficiencies, and partnering of small farmer clusters with medium sized farmers for consistency in produce quantity and quality delivered.

Conclusion: Investing in the Future

In conclusion, I would like to thank the Committee for the opportunity to submit my testimony today on behalf of the 1890 land-grant universities. The First Morrill Act was established in 1862, one year before President Abraham Lincoln issued the executive order of the Emancipation Proclamation (January 1, 1863) which changed the federal legal status of enslaved Black people from slave to freed persons. Congressman Justin Morrill, one of the founders of the Republican Party and the Father of Land Grant Institutions established the First Morrill Act (1862) to create public colleges and universities and to provide quality education for all citizens of the United States. In fact, the Second Morrill Act (1890) included the condition that former slaves, African Americans would not be discriminated against and would be included in the U.S. Land Grant University Higher Education System. Congressman Morrill said, quote:

"Having emancipated a whole race, shall it be said that there our duty ends, leaving the race as cumberers of the ground, to live or to wilt and perish? They are members of the American family, and their advancement concerns us all. While swiftly forgetting all they ever knew as slaves, shall they have no opportunity to learn anything as freemen?"

Within the historical context of Congressman Justin Morrill's concern, belief and vision for higher education in the United States, as well as, our collective institutions' contributions to educational development and leadership; we are looking forward to working with the U.S. House Committee on Agriculture and our colleagues in the university community as we move through the reauthorizing of the 2018 Farm Bill. Please, we urge you, to use this historic moment, this significant opportunity, to invest in the nation's 1890 land-grant universities and in the future of all farmers, communities and people we serve.