National Cotton Council of America

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Research, Education and Economics Agency
USDA
Via Federal Rulemaking Portal

RE: USDA's Agricultural Innovation Agenda, Docket No. 2020-0003

The National Cotton Council (NCC) is very appreciative to provide comments and suggestions on objectives and opportunities leading to research goals that will facilitate production breakthroughs and enable U.S. agriculture to meet the goals of increasing production by 40 percent by 2050 while cutting its environmental footprint in half as part of USDA's Agricultural Innovation Agenda. The NCC commends the Department in undertaking this effort as it aligns with U.S. agricultural industry efforts to accomplish similar goals through coalitions such as the row crop commodity initiative, Field to Market and through the U.S. cotton industry's own initiative, the U.S. Cotton Trust Protocol, all focused on the continuous improvement of agriculture's sustainability record.

The NCC is the central organization of the United States cotton industry. Its members include growers, ginners, cottonseed processors and merchandizers, merchants, cooperatives, warehouses, and textile manufacturers. Farms and businesses directly involved in the production, distribution and processing of cotton employ more than 125,000 workers and produce direct business revenue of more than $21 billion. Annual cotton production is valued at more than $6.0 billion at the farm gate, the point at which the producer markets the crop. Accounting for the ripple effect of cotton through the broader economy, direct and indirect employment surpasses 280,000 workers with economic activity of almost $75 billion.

Cotton is unique in that two valuable commodities are produced by the crop annually: fiber for clothing, home furnishing and industrial textiles and cottonseed as a source of food and feed protein for human and animal consumption. For every 1 pound of fiber produced there are approximately 1.2 – 1.4 pounds of cottonseed produced. The NCC sees challenges and opportunities for productivity improvement in the areas of plant health and variety improvement, pest management through enhanced integrated pest management (IPM) techniques and improved plant protection products and their application, enhanced water use efficiency and improvement of cottonseed's nutritional profile and its processing quality.

Plant Health and Variety Improvement

- Genome Design – Cotton's fiber characteristics must continually improve to remain competitive as a viable fiber in the global textile world dominated by man-made fibers. Several fiber characteristics are controlled by cotton's genetics. While new varieties are required to provide ever increasing yield potential for the economic well-being of producers, their fiber property potential must also improve to increase demand in global textile production. Cotton breeders, both public and commercial, need access to genomic information and enhanced precision breeding tools in order to streamline variety development and break barriers to improve fiber length, length uniformity, fiber strength and fiber fineness while at the same time enhancing fiber yield. Additionally, improved genetics focused on the plant's agronomic capacity are needed to provide improved nutritional intake efficiencies to support improved fiber and seed development. To enable the necessary breakthroughs, regulatory barriers (both in development and in commercial acceptance domestically and internationally) that prevent/delay the development and

use of genomics in trait identification and utilization must be kept at a minimum, while still providing for human and environmental safety.

- Digital/Automation – While genetic potential for improved fiber and seed quality is critical, the environment plays an almost equal role in determining yield and quality. The ability to sense plant stress (or the lack of) is critical in producing a uniform crop. Continuation of the development and use of affordable sensor technology (whether ground based or remote) is critical for coupling plant health needs with genetic potential to provide the desired yield and quality improvements.
- Prescriptive Intervention – As precision farming equipment and practices continue to evolve coupled with site-specific field level data, the opportunity for prescriptive interventions will increase. Precision application of irrigation water and plant nutrients will allow for ever increasing efficiencies and lower crop input costs, which should translate into improved net economic returns to the producer.
- Systems Based Management - Since cotton is unique as a traditional perennial plant species forced to grow as an annual domesticated crop, cotton producers will continue to be required to manage the crop for optimum fruiting potential as opposed to vegetative growth. Each of the innovation clusters described above must be incorporated into an overall cropping strategy that accounts for seasonal length and climate that ultimately result in improved yield and quality combined with economic profitability. The development of well-tuned strategies for a given production region is essential.

Enhanced IPM and Pest Management

- Genome Design – Cotton production has benefitted greatly from plant incorporated pesticide (PIP) technology developments such as enhanced Bt protection via genetic tools. This technology has now evolved to providing three different genes available for protection from worm pests. However, worm pest resistance to the existing protein-producing genes is building and the need for developing a fourth generation of protection is critical if control is to be maintained in the coming years. Additionally, genomic information has led to the discovery of plant host resistance germplasm to certain nematode pests that is being successfully integrated into new commercial varieties. Additional genomic information will hopefully lead to discovery of germplasm traits resistant to other pests and diseases afflicting cotton plants.
- Digital/Automation – Successful IPM depends on understanding when pest infestations begin to peak and whether an economic threshold of damage will be reached. Identifying technology to improve rapid scouting of crops is needed to support in the near term and replace in the longer term the traditional methods of pheromone trapping and human visual observation via sweep nets or drop cloth methods. Development of chemical odor detection sensors from pests or plant sensors that monitor plant response to infestation is greatly needed.
- Prescriptive Intervention – The development of advanced IPM decision processes through forecasting systems based on agro-eco system landscape ecology should be investigated as a tool to manage pests with multiple row crop hosts, such as aphids, plant bugs and white flies. A better understanding of pest host utilization and movement among hosts would provide modeling information for pest infestation forecasting and would improve resistance management decisions based on pest movement among host crops to preserve pesticide product utility.
- Systems Based Management – Improved systems of pesticide applications to avoid drift and off-target damage concerns are needed. Those systems may incorporate unique application technology utilizing new product formulations (such as foams) to reduce or possibly eliminate drift, which is seen as a serious issue by the consuming public. Additionally, innovative technology for weed seed destruction is needed. The declining weed control options that result from weeds developing resistance to chemistries pose a serious threat to all agricultural production. Weed seed destruction technology could greatly increase weed control by reducing the soil seed bank.

Water Use Efficiency

- Genome Design – While cotton production flourishes in semi-arid climates, consistent and, in many cases, enhanced yield depends on adequate moisture combined with sufficient nutrients. Discovery of genetic pathways to improve the crop's water use efficiency is essential to maintain production in regions where natural rainfall is often insufficient to support economical production.
- Digital/Automation and Prescriptive Intervention – Continued development of economical soil moisture and plant stress monitoring sensors is critical to gathering data required to understand the moisture needs of a crop on a field basis. That data, combined with ever improving weather forecasting, are necessary to continue improvement of cotton's recent thirty-year history of continued reduction of irrigation water use.
- Systems Based Management – With the data gathered from in-field sensors and other sources mentioned above, the use of precision irrigation application techniques will be enhanced. Continued efforts to improve precision application of irrigation when and where needed by the crop is essential.

Cottonseed Improvement

- Genome Design – Cottonseed and its products (oil, meal, hulls and linters) have provided significant economic contributions to overall cotton production for many years. The well-recognized protein source that cottonseed provides has been utilized in animal feeds for many years and oil extracted from the seed has been utilized in a wide array of industrial applications in addition to its use in human food and as a cooking oil. New dietary requirements suggest that cottonseed and its products should be genetically re-evaluated for possible opportunities to enhance their potential to support an improved human lipid profile, to provide a valuable feed alternative/additive for aquaculture production and to provide improvements for livestock feeding. Continued research utilizing new genomic information combined with proper development could verify opportunities for increased use of cottonseed for human food and animal feed needs.

Thank you for this opportunity to provide comments on USDA's efforts to continue to assist U.S. farmers, ranchers, producers and foresters in meeting future challenges. The U.S. cotton industry is prepared to partner with USDA in these efforts.

Sincerely,

Gary M. Adams
President and CEO
National Cotton Council