USDA Agricultural Research Service

National Program 306

Product Quality and New Uses

External Panel Retrospective Review: 2018-2022

Executive Summary

The National Program (NP) 306 Mission is to enhance the marketability of agricultural products, increase the availability of healthful foods, develop value-added food and nonfood products, and enable commercially-preferred technologies for post-harvest processing. Accordingly, the Vision of the research is focused on developing knowledge and enabling commercially-viable technologies to: (1) measure and maintain/enhance post-harvest product quality, (2) harvest and process agricultural materials, and (3) create new value-added products. Finally, the individual program components are: Food, Non-Food, and Biorefining.

An assessment by the NP 306 review panel concludes that the research conducted during the period 2018-2022 has accomplished both the mission and vision of the NP 306 program. Research conducted by ARS scientists achieved significant accomplishments toward NP 306 goal in four main areas:

1. New knowledge about the attributes contributing to product quality, and new methods and instrumentation for the rapid and accurate assessment of raw, in-process, or completed material quality.
2. Identifying and understanding biologically active food compounds and developing functional foods and food ingredients that support and enhance human health.
3. Increasing profitability and reducing risk for processors with new methods, processes, and technologies that enhance product quality and safety; improve process efficiencies; and reduce waste, energy use, and adverse environmental impacts.
4. By developing commercially viable technologies to produce biobased industrial products, ARS biorefining research increases the demand for agricultural products and, therefore, benefits agricultural producers and rural communities by: 1) maximizing the long-term economic impact of ARS biorefining research; 2) emphasizing ARS' unique capabilities and avoiding unnecessary overlap with research at other institutions; and 3) maximizing returns to agricultural stakeholders from ARS investment of public funds.

Following this executive summary is a detailed review supporting our conclusion that NP 306 accomplished its Mission, Vision, and Goals. The committee appreciates the support of the team from USDA that assisted our review.

The committee felt it was very important to share our discussions looking forward regarding the NP 306 program. Considerable discussion focused on strategies to improve the impact that this program can make on meeting the needs of a dynamic government funding environment which is continually being challenged to justify its budgetary expenditures.

First, the USDA should implement a new standard for naming projects. The problem statements presented are all reasonable to solving many food, non-food, and bio renewable challenges. However, several of the projects use the problem statement as the project name and provide no other clarity on the actual underlying project goals.

Projects should be divided into two basic categories: “basic research” solving important underlying challenges with limited chance of adoption or commercial products in less than 7-10 years, or “applied research” developing commercial products in 3-7 years. USDA should fund some combination of both types.

Next, we suggest a future rating scheme for project success, especially “applied research” projects. The focus needs to be on the Technology Readiness Level and Manufacturing Readiness Level achieved by the programs funded within the NP 306 program. Specific focus should be on evaluating and improving the techno-economic feasibility of all NP 306 research projects, moving the technology developed in the NP 306 program toward a maturity level ready for uptake and commercialization by the private sector. Clearly, ARS should focus on getting the technology ready for commercialization. The next step would be to license/transfer the technology to industry. The success of this step is critical to ensure long-term success of the program. This commercialization activity can utilize industry funding pathways and commercialization programs found within USDA Rural Development. The results should be analyzed and a scoring matrix created to measure success and effectiveness. The matrix should include benchmarks measuring capital deployed from public and private sectors, job creation and metrics that address advancements in food security, decreasing food loss and waste and recycling organic waste, enhancing value-added product development, and improvements in biorefining technologies. An example is the ability of the research to participate and receive funding from the USDA Biorefinery Program and Bill Gates’ Breakthrough Energy investment fund.

In short, while monitoring CRADAs and patents is a quantitative way to measure research partnerships and outputs in the short-term, it does not indicate the success of the real end goal: commercialization (licensed technology) with a focus on meeting the economic and environmental challenges of the 21st century.

Finally, during the summer of 2024 the committee recommends a commercialization and industry day which highlights the 3 technologies (food, nonfood and biorefining) which have the best opportunity to attract private capital leveraged with government investment programs that can be deployed to meet the commercial needs of industry. Hosted at one of the labs who has a selected program, invitees will represent industry, financial partners, government and others needed to commercialize the results of the NP306 program. This committee would be willing to assist in the selection of the 3 programs.

The USDA is a great organization with a history of answering our nation’s challenges. With a more direct focus on moving research toward commercialization and addressing emerging needs in food and agri-tech, the NP 306 can continue this important tradition. Members of this committee lead by the chairman are excited to assist in this endeavor.