Statement by Dr. Rajiv Shah
Under Secretary of Research, Education, and Economics
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Committee on Agriculture, U.S. House of Representatives
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Chairman Holden, Ranking Member Goodlatte, and distinguished Members of the Subcommittee, I am Raj Shah, Under Secretary for Research, Education, and Economics. I oversee four agencies: the Agricultural Research Service; the Economic Research Service; the National Agricultural Statistics Service; and the National Institute of Food and Agriculture (NIFA). I appreciate the opportunity to discuss the future of second- and third-generation biofuels with you.

I appreciate the opportunity to share this panel with my colleague, USDA Under Secretary for Rural Development, Dallas Tonsager. He has taken a leadership role in helping to ensure that people throughout rural America can build this new capability to produce and deliver biofuels to the market. He will share with the Committee the various mechanisms the Department has to support bioenergy commercialization so I will not repeat them, except to say that our work with Under Secretary Tonsager is fully complementary and fully aligned with the same goals of U.S. energy security.

Without their work in commercializing biofuels and developing markets to realize rural wealth, our research on biofeedstock development and cultivation won't ensure the energy security biofuels can bring. Promising developments in the laboratory or inventions by a farmer or an aspiring entrepreneur will simply never see the light of day. Innovation and our ability to meet the food, fuel and fiber needs of the country will come from all sorts of places and we need to incubate those technology breakthroughs as well.

Mr. Chairman, Congress has laid out a significant challenge to produce 36 billion gallons of biofuels by 2022 to power our cars, trucks, jets, ships and tractors. This is a substantial goal, but one that the United States, with the help of American agriculture, can meet or beat. However, I believe to achieve this goal the Federal government needs to expand our focus on drop-in or third generation fuels. These are biofuels that can directly substitute for gasoline, jet fuel, and diesel.

Today more than 9 billion gallons of biofuels are produced annually by first-generation biofuel technologies that turn corn grain starch into ethanol. This is a significant accomplishment and a compliment to American farmers and the ethanol industry -- ethanol biofuel has rapidly grown from meeting 1% of the U.S. gasoline supply in 2000, to 7% in 2008.

A number of factors contributed to this outcome. American farmers knew how to efficiently produce corn, the technology for producing corn starch-based ethanol already was available, and -- very importantly -- increased corn acreage supported greater ethanol output. Also, ethanol quickly solved an environmental problem by being a suitable replacement for a gasoline additive called methyl tertiary butyl ether (MTBE) that created water quality concerns and was taken off the market. All of these factors combined helped to establish corn grain ethanol in the market.

The forward-looking legislation that Congress passed in the Energy Independence and Security Act of 2007 (EISA) stipulated that only 15 billion gallons of the 36 billion can be provided by ethanol produced from grain, or what is called first-generation biofuel. This means that 21 billion gallons of biofuels will need to come from sources other than corn grain. Second-generation biofuel technologies that turn crop residue such as corn stover or dedicated energy crops such as switchgrass into ethanol, and third-generation biofuel technologies that turn these feedstocks into advanced biofuels – synthetic substitutes for gasoline, jet fuel, and diesel – will have to come rapidly into commercial use.

If we are to reach our target of 36 billion gallons of biofuels by 2022, we will need to change the way we do business. The U.S. has funded

thousands of worthy projects, but there has been little effective integration of these efforts across government research agencies, and there has not been a focus of partnering with public and private resources to develop biofuel supply chains capable for achieving Congress's goals. Significant parts of the supply chain have been ignored or have received too little attention such as sustainable feedstock production systems, solutions to lower the cost of biomass transport, and efforts to enhance compatibility with America's existing fuel distribution and utilization systems.

To accomplish the Congressional Mandate we need to accelerate the establishment of a sustainable commercial biofuels industry. This will require that we create an overall strategy that builds on the core competencies of all contributors, and integrates all Federal-funded project activities across all supply chain elements.

We need this now more than ever, so that we can unleash the creativity and skills of people in government, in college laboratories, in the garages of aspiring entrepreneurs, and in the R&D facilities of the private sector.

When last I came before this Committee in September, I pledged that I would use my role as Chief Scientist of USDA to sharpen our focus and leverage our expertise and our resources where they would make the most

difference. In this spirit, I am allocating significant resources from both our intramural and extramural research assets where scientific breakthroughs can make significant contributions to the emerging biofuels industry, and where our core competencies can have the most impact.

For example, the use of biomass and other dedicated energy crops to produce second- and third-generation biofuels could potentially create an entirely new agricultural commodity sector. There are many economic and environmental uncertainties to be expected as this potential sector emerges. We intend to focus on feedstock development for a range of first-, second-, and third-generation bioenergy crops. We will continue to work in corn – where our Agricultural Research Service scientists have made important recent discoveries in genomics. And we will build a robust research portfolio in perennial grasses (like switchgrass and miscanthus), energy cane, sorghum, and other potential dedicated feedstocks. The Federal government must also invest in technologies that improve the economics for producers and consumers alike, and lead to greater wealth creation in rural communities.

As land use patterns respond to increasing use of farm and forest land for biofuel feedstock production, ancillary actions may be necessary to avoid serious impacts on food, feed, and fiber prices, and environmental quality.

The Agricultural Research Service, the Economic Research Service, and our university partners supported through the National Institute of Food and Agriculture (NIFA), along with other Federal and State departments and agencies, are conducting research and developing decision tools that will help design the most economical ways to produce and harvest biofuel feedstocks, while protecting natural resources. Recent research has produced guidelines for harvesting corn stover residues so that not only is the soil protected from water erosion, but also to ensure soil carbon levels are maintained at high enough levels to ensure genetically improved varieties can reach their productive potential.

As more and more of our fuel supply comes from biofuels, we will need to continually improve the genetics of the feedstocks grown and the production practices we use to not only produce more on the same amount of land, but to enhance the production of high-value co-products in feedstocks that are then recovered as part of the biofuel production process.

Along with my colleagues at USDA we have begun dialogues with our counterparts at the Department of Energy and other Federal Departments about ways in which we can better coordinate our programs and our grants to realize the full potential of biofuels. For example, NIFA and DOE's Office of Biomass Programs have worked together to award up to $25

million in Biomass Research and Development Initiative competitive grants to support the development of feedstocks, biofuels, and biobased products.

Also, to ensure continued genetic improvement of bioenergy crops, NIFA and DOE Office of Science have partnered to fund seven projects totaling $6.3 million for fundamental science to accelerate plant breeding programs by characterizing the genes, proteins, and molecular interactions that influence biomass production.

I appreciate the opportunity to testify before this Subcommittee today, and I look forward to working with you, Mr. Chairman, Ranking Member, and all the Members of this Subcommittee as we in Agriculture Research, Education, and Economics continue to work hard and make our contributions to help meet the goal of 36 billion gallons of biofuels in 2022. And we appreciate the support you have given us to accomplish that. This concludes my statement.