Testimony of the Biotechnology Industry Organization
Subcommittee on Rural Development, Research, Biotechnology, and Foreign Agriculture
Committee on Agriculture
U.S. House of Representatives
Public Hearing
RE: Agricultural Program Audit: Examination of USDA Research Programs.

July 28, 2011

The Biotechnology Industry Organization (BIO) is the world's largest biotechnology organization, providing advocacy, business development and communications services for more than 1,100 members worldwide. BIO members are involved in the research and development of innovative healthcare, agricultural, industrial, and environmental biotechnology products.

BIO would like to emphasize the value of agricultural research programs within the U.S. Department of Agriculture (USDA), which have sparked agricultural innovation and will help to solve the critical food and energy security challenges facing a rapidly growing global population.

The United Nations predicts that the global population will rise to 9 billion in 2050 and over 10 billion by 2100. It is predicted that global agricultural production will need to double by 2050. Because there is a fixed amount of arable land on the planet, to meet these challenges, new and existing technologies must provide at least 70 percent of the necessary increase in food production. Robust agricultural research will allow scientists to improve technologies and invigorate know-how so that humans can best produce food on a limited land base using safe, efficient, and sustainable methods.

In the six decades since 1948, USDA estimates show that U.S. farm output increased by an average of 1.58 percent per year, inputs under the control of farmers increased by only 0.06 percent per year, and agricultural productivity increased by 1.52 percent per year (USDA–ERS, 2011). Hence, virtually all the increase in U.S. farm output during the past 60 years is due to productivity increases and a negligible amount is due to increases in conventional inputs. According to the USDA Economic Research Service, farm productivity has risen 158 percent since 1948. This increase can be attributed to changes in the efficiency of farming practices and research and development of agricultural technologies. The return on investment of agricultural, food, nutrition, and natural resource research and development is $20 or more to the U.S. economy for every dollar spent (Fuglie et al., 2007).

Growth in agricultural productivity during the last two decades of the twentieth century, which was sizable in developed countries and in some developing countries, was built on previous investments in agricultural research. For modern agriculture to fully flourish, investments in agricultural research must grow. Today, the United States is a leader in agriculture, producing $312 billion in agricultural products and exporting $108 billion annually.

Unfortunately, however, investments in public agricultural research in the United States has slowed since 1980 (Huffman and Evenson 2006; Pardey et al. 2006).

In the United States, broadly defined public agricultural research expenditures grew by an average of 3.2 percent per year (adjusted for inflation) during the two decades leading up to 1980. No net growth occurred between 1980 and 1990, and net growth averaged only 0.6 percent per year between 1990 and 2009. Public funding of agricultural research in the rest of the world during the last two decades has outpaced U.S. research investment.

Meeting the various complex modern agricultural demands of a growing global population will require raising global agricultural total factor productivity (TFP). The rate of TFP growth of U.S. agriculture has averaged about 1.5 percent annually over the past 50 years, but stagnant (inflation-adjusted) funding for public agricultural research since the 1980s may be causing agricultural TFP growth to slow down. ERS simulations indicate that if U.S. public agricultural R&D spending remains constant (in nominal terms) until 2050, the annual rate of agricultural TFP growth will fall to under 0.75 percent and U.S. agricultural output will increase by only 40 percent by 2050. Under this scenario, raising output beyond this level would require bringing more land, labor, capital, materials, and other resources into production (Heisey et al., 2011). With mean lags of 15 to 20 years, agricultural productivity cannot be easily jump-started after a long period of stagnant investment in public agricultural research.

BIO supports research funding for technologies that will provide fuel for the future, improve agricultural production efficiency, and allow us to raise crops in harsher climates. Research in plant and animal biotechnology will play a key role not only in improving food, feed, and fuel production and reducing the environmental impact of agriculture but also in improving models of human disease and producing pharmaceuticals for animal and human uses. Agricultural and forestry biotechnology also contribute to rural economies and rural job growth.

BIO supports increased funding for the research programs at the Department of Agriculture, including all programs within the Research, Education, and Economics mission area: the National Institute of Food and Agriculture and its Agriculture and Food Research Initiative, the Agricultural Research Service, the National Agricultural Statistics Service, and the Economic Research Service and research conducted by the Forest Service. Results from these important research programs can be leveraged across the

research arms of the government to solve critical problems that require science-based, cross-cutting and multi-disciplinary solutions.

Through biotechnology, animals can be raised that produce high concentrations of readily extractible human antibodies and other proteins to treat human diseases and protect military personnel and to replace tissues for regenerative medicine. High level research can be perfomed on livestock that have been engineered to accurately develop diseases that afflict humans. As agriculture continues to be pressed to be ever more productive and economically and environmentally sustainable, the targets of research are to increase yields; to develop more nutritious and safer foods; to reduce requirements for water, nitrogen and other inputs; and to develop disease resistant crops that require fewer chemical protectants, crops that are used to produce more and better biofuels, and crops that produce useful and valuable materials that will fuel the industrial and pharmaceutical sectors of the future.

While biotechnology has been heavily utilized in commodity crops, it also shows great promise for specialty crops and in parts of the world not already realizing its benefits. Nutrient-enhanced crops and those tolerant of sub-standard growing conditions benefit people around the world who otherwise would have difficulty getting the proper nutrition. Many of these advances will come out the research performed within public institutions, such as the USDA. Most research in general, basic and pre-invention sciences, occurs in public and private universities. Applied research is shared among universities, government institutions and private firms.

Publicly financed Research, Extension, and Education is a necessary complement to private sector research, focusing in areas where the private sector does not have an incentive to invest, when 1) the pay-off is over a long term; 2) the potential market is more speculative; 3) the effort is during the pre-technology stage; and 4) where the benefits are widely diffused. Public research, extension and education help provide oversight and measure long-term progress. Public research, extension and education also act as a means to detect and resolve problems in an early stage, thus saving American taxpayer dollars in remedial and corrective actions.

The Research Title of the Farm Bill represents the nation's signature federal investment in the future of the food and agricultural sector. Other Farm Bill titles depend heavily upon the Research Title for tools to help achieve their stated objectives. Continued authorized and appropriated support for public research benefits producers domestically and worldwide while preparing for the future of all of agriculture.

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