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Agriculture involves the transformation of wild species of plants and animals into strains that are amenable to the provision of food, feed, fiber, and industrial uses through cultivation and husbandry. During 5,000-10,000 years of agricultural history, many of the crop production increases came from taking additional lands into cultivation- actions that disturb wild flora and fauna and may contribute to the loss of species and radical changes of landscape.

Further advances in agricultural productivity are needed to meet the food and fiber demands of increasing populations, to add nutritional benefits and ensure food safety, to reduce use of marginal or fragile lands, and to move toward a more sustainable agriculture that will preserve and restore diversity of flora and fauna. We are mindful that economic capacity and distribution of resources are also required to provide adequate food and raw materials.

Research helped us learn about plant growth and how to increase productivity. During the twentieth century, an increased proportion of yield advances came from applications of research into principles of genetics, physiology, statistics, and chemistry. Newly bred varieties, coupled with advances in husbandry, irrigation, and the wider use of fertilizers, herbicides, insecticides, and fungicides have increased crop yields and reduced losses from pests. Much has been learned about the environmental impacts of chemical inputs on the environment. More remains to be learned and applied so that new plant varieties contribute to greater productivity, health, and nutrition in a sustainable environment.

Increased capabilities to identify and manipulate plant genes that affect productivity and nutrition now exist. These biotechnologies enable scientists to conduct more informative research into the genetic and physiological basis of crop growth and environmental responses and interactions. New prospects have emerged for more effective and efficient improvement of crop performance across a range of environments. New techniques are available to transfer genes among species. These capabilities are being used to enhance traditional crop breeding. Effective use of these new tools will require that they be integrated into overall schemes of plant breeding and field evaluation. Effective stewardship of genetic resources is a prerequisite to achieving the goal of a productive, sustainable, and environmentally harmonious agriculture. There are inevitable questions and concerns associated with the development and use of new technologies, especially with those that affect food, human health, and the environment. Issues that have been and will continue to be addressed include the movement of genes from a transformed variety to surrounding crops and potential introduction of allergens into the food supply. Existing concerns such as increased dependence upon herbicides, destruction of non-target species, and increased dependence upon an ever-narrower germplasm base remain. These concerns are and will continue to be addressed by scientific studies that are conducted with full public scrutiny and in the overall context of the risks associated with alternative strategies for crop production. Appropriate research using these new technologies has the potential to demonstrate means of employing greater genetic diversity in a more sustainable and productive environment that can help protect natural ecosystems. Increased public and government support is required to support research programs, particularly in developing and emerging economies.

New biotechnologies in agriculture and medicine will continue to play an increasing role in our daily lives. These include gene expression analysis to identify important genes and marker-assisted selection to efficiently create new varieties. Also included are transgenic products such as those that confer herbicide or insect resistance. Varieties with enhanced nutrition are on the horizon, and many other possibilities exist. It is important to discover which new approaches can improve sustainable crop productivity, health, and the environment.

Consumers have a right to expect a plentiful, healthful, affordable, and safe food supply. Transgenic products must continue to be evaluated for safety concerns. Products that are not approved for human consumption should only be released if they cannot co-mingle with other products that have received approval for human consumption. Test procedures must be available to verify genetic identities. Product labeling should continue to indicate any known safety or allergenic issues for consumers, in keeping with existing federal regulations.

New knowledge and capabilities that flow from the application of new biotechnologies will provide a broader set of options for the cultivation of crops. By making appropriate choices, present generations can improve the quality of life and leave an improved environmental heritage to future generations. Nonetheless, opportunities that arise from biotechnology are only components of a successful agricultural and environmental legacy. Positive economic and social factors also contribute to vibrant rural economies, and the distribution and marketing of food has a powerful effect on nutrition and health. The full potential of scientific endeavor in crop production from biotechnology can best be realized in a holistic environment of research with increased public knowledge of food production, environmental, health, and safety issues.

Agricultural production has profound effects by transforming our environment, human health, the economy, and human culture. The Crop Science Society of America supports education and research in all aspects of crop production, including the judicious application of biotechnology.