

Technology Can Feed the World: An Old Idea

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In his thesis “Plants as Modified by Man,” George Washington Carver wrote over 100 years ago that “...the day is not far distant when man...will be able to use the tools nature has placed before him from a purely scientific basis, free from all conjecture.” At the time, the tools to which Carver referred were not biotechnological tools, but instead tools and techniques that we find common today, including breeding and selection of varieties, budding and grafting. Carver noted that “Ever since science overthrew the idea of spontaneous generation and established beyond doubt that no organism could have existence without a parent cell, the scientific world received a thunderbolt which was to be the means of its first great awakening.” He also suggested in his thesis that “as the message was heralded from one to another it aroused more careful investigation, stimulated advanced thought and opened up a new line of possibilities respecting the whole plant kingdom.” Fast forward... the evolution of biotechnological tools have yielded another Awakening; one that has grown exponentially, resulting in an ever increasing amount of data, which has led to the subsequent development of additional biotechnological tools being used to understand and apply this new knowledge.

Technological advances are used in many fields of science (e.g. medicine); however, when posed for agricultural products, some hesitate. Even Carver noted in his thesis that, “the chemist takes original elements or compounds, breaks up their combination or combines them into various proportions to suit his purpose...” be that purpose to design new medicines or other products, such as those that result from material science engineering. This is said not to attack those fields, but to draw on parallels, as these scientists are working within laws of nature to formulate these new derivatives;; similarly biotechnology allows those in the life sciences who work with plants and animals to do the same, as the laws of nature themselves are not being violated, thus the resultant products continue to propagate with targeted outcomes. In his thesis, Carver suggested that “This was the dawn of a new era... [and that]...man was not simply to assist nature in producing endless varieties, but be the actual progenitor of new creations.” He went on to reference several scientists’ works that had resulted in the development of novel and more robust crop varieties through the usage of the new technological tools of that time, such as selection, cross fertilizing and cultivating, with resultant increasing fruit and flower yields up to four-fold.

When we consider the benefits of biotechnology to society, we can focus on any single area of agriculture and identify the positive impact(s) of the technology. For instance, to address the issue of poor nutrition in developing countries, a derivative of the sweetpotato, produced at Tuskegee University, was shown to have increased protein content, up to 500%. If consumed by individuals in areas where protein sources are scarce, these individuals will have at their fingertips a food source that can mean the difference between malnutrition and survival. When we consider food production here in the US, a developed nation, it is clear that food production requires many natural resources and labor to

manage crops. However, varieties of crops that require less labor, less water and less land have resulted in lower food costs, making food products more affordable domestically. This also results in sustainable agricultural practices that are necessary to reduce the human footprint on the environment. Further, as we yield food surpluses, we also are able to export them to countries that may not have the ability to produce adequate food for their needs allowing the US to play a significant role in feeding the world.

With every “great awakening,” scientific or otherwise, questions will arise; skeptics will ensue; however, it is critical that we as a society look at the facts. And the facts are these: 1) the incorporation of GMO crops into operations in developing countries result in increased farm incomes and reduced labor associated with agricultural practices, allowing for more time for education and other avenues of income; 2) it is predicted that food production must double within the next 30 years to meet the demand of the projected population; 3) biotechnology provides scientists with answers that can result in the production of more affordable foods while sustaining the environment. This is not to say that technology should be haphazardly implored, as care must be taken and questions must be asked. Carver suggested that “man is simply nature’s agent...to assist her in her work, hence the more careful and scientific the man, the more valuable he is as an aid to nature in carrying out her plans methodically...” Irrespective of one’s positions, it is sure that society must be educated about current biotechnology and forthcoming tools to come for the future.

The science is advancing; what is not advancing adequately is the communication and conversations about biotechnology with all components of our society. Creativity and resources must be increased to bring all members of the U.S. family along in terms of sharing in the benefits of the new technologies to improve in their quality of life.