

Editorial

Technology-Assisted Environmentally-Sustainable Food Production

Can we produce sufficient food to satisfy Africa's population without incurring irreversible "damage" to the environment? What is the appropriate role of biotechnology in supplementing subsistence agriculture that still dominates food production on the continent? What are the tradeoffs in balancing productivity, technology, and environmental sustainability? These are questions raised by the 2009 World Food Prize awarded to Dr. Gebisa Ejeta of Ethiopia (World Food Prize. 2009 Laureate Gebisa Ejeta. http://www.worldfoodprize.org/press_room/2009/june/ejeta.htm. Accessed on 17 October 2009). Dr. Ejeta was formally recognized on 15th October for his research to produce sorghum hybrids that are drought-resistant, and that survive against the scourge of parasitic witchweed, *Striga asiatica*. Witchweed literally sucks the life out of food crop plants such as sorghum, causing \$6 - 7 billion loss in harvests in Africa.

In his speech at the *Borlaug Dialogue* and ceremony in honor of Dr. Ejeta, the world's richest man, Mr. Bill Gates lamented the fragmentation of the environmentalism and humanitarian movements, where advocates against hunger and malnutrition are frequently at loggerheads with advocates against pollution of the natural gene stock through genetically engineered crops and the use of hazardous chemicals such as toxic pesticides and herbicides in African agriculture (Borlaug Dialogue. http://www.worldfoodprize.org/press_room/2009/sept/symposium.htm. Accessed on 17 October 2009). Mr. Gates' point is that it is possible to have it both ways. He should know. The "e-business" world where he made his fortune is about seeking opportunities where innovative gadgets succeed best at the juncture of need and want. Similarly, we *need* a reliable food supply system and we *want* guarantees of safety and sustainability. This enduring tension was also well recognized by Dr. Norman Borlaug, Nobel laureate, father of the "Green Revolution," and the founder of the World Food Prize who passed away on 12th September 2009 (Dr. Norman E. Borlaug. <http://www.worldfoodprize.org/borlaug/borlaug-CV.htm>. Accessed on 17 October 2009).

Among his numerous roles, Dr. Borlaug served as President of Sasakawa Africa Association (SAA) beginning in 1986 (Sasakawa Africa Association. <http://www.saa-tokyo.org/english/aboutsaa/>. Accessed on 17 October 2009). SAA's mission is to simultaneously defeat poverty and malnutrition in Africa through science-based methods for improvements in crop production. It is notable that the impetus for SAA emerged out of natural environmental cycles that brought the devastating Sahelian drought in the 1980s (i.e. the "Ethiopian Famine" with more than 1 million casualties). The thinking was that combining high yield crops and fertilizer technology can temper the vicious cycles of famine. Dr. Borlaug must have believed that innovative translation of proven agricultural technology in small farms is crucial for ending food shortages in Africa. The Quality Protein maize (QPM) which contains two times as much protein as other maize varieties resulted from hard work that combined technological advancement and sustainable environmental management. The research that brought QPM to life was spearheaded by Dr. Surinder Vasal and Dr. Evangelina Villegas at the International Maize and Wheat Improvement Center {(*Centro Internacional de Mejoramiento de Maíz y Trigo*) (International Maize and Wheat Improvement Center (CIMMYT) <http://www.cimmyt.org/index.htm#>. Accessed on 17 October 2009)}.

It is in this backdrop of distinguished accomplishments that Dr. Ejeta's World Food Prize takes particular significance for the future of famine relief and environmental sustainability in Africa.

His research aims to exploit the genetic basis of crop resistance to environmental stressors, pests, and of nutritional quality (Ejeta, G. 2005. Integrating biotechnology, breeding, and agronomy in the control of *Striga* in sorghum. pp 239-251. In: Tuberosa, R. Phillips, R.L., Gale, M. (eds) *In the Wake of the Double Helix: From the Green Revolution to the Gene Revolution*. Avenue Media Press, Bologna, Italy). In addition, Dr. Ejeta is interested in the contemporary question of agricultural production of alternative energy resources. These all fit within the agenda of various activist organizations, whether they are in favor of banishing famine, preserving nature, deploying genetically engineering organisms to solve societal problems, or mitigating climate change. There is no need to choose among these lofty goals. We can do them

all. Hopefully, Dr. Ejeta's honor will inspire this and coming generations of African Scientists, working at home and abroad to make a difference in ending malnutrition in Africa – without compromising environmental quality.

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