



Broad Scientific Consensus on Safety of GMO Technology

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Despite the long enunciated national policy of safe, responsible use of modern biotechnology, a few local government units in the Philippines have unilaterally passed resolutions/ordinances banning genetically modified (GMO) crops in their respective jurisdictions.

These bans deprive our farmers of an effective technology that can raise their productivity, increase their incomes, and enhance competitiveness of our agricultural products vis-a-vis our neighbors. Thus, these proscriptions are misdirected, unlawfully restrict free choice in business, anti-farmer and consequently anti-poor.

The broad acceptance of GMO technology by our corn farmers who planted 642,000 hectares of GMO corn hybrids in 2017 (ISAAA, 2017) is eloquent proof of the productivity and income-raising potential of modern biotechnology. Instead of attaining an average national yield of only 1.75 tons per hectare with non-GMO white corn, our yellow corn GMO farmers average 4.17 tons per hectare, a productivity advantage of 138 percent.

PINOY BT EGGPLANT ON HOLD WHILE BANGLADESH GOES AHEAD

Ten years ago our scientists at the Institute of Plant Breeding, University of the Philippines Los Baños (IPB-UPLB) started a breeding program to insert genes from a soil bacterium, *Bacillus thuringiensis* (Bt) into eggplant to combat the dreaded eggplant fruit and shoot borer insect. The insect lays its eggs in the fruit that later hatch into worms which render the eggplant inedible and non-marketable. The eggplant fruit and shoot borer is so destructive that farmers have to spray almost every other day to save their crops. The insect spray is not only costly but also harmful to the farmers themselves and to consumers who fail to wash the vegetable thoroughly to get rid of pesticide residues.

However, after successfully introducing the Bt gene into one of our Philippine recommended varieties, the Supreme Court issued a temporary restraining order (TRO) restricting further research at IPB-UPLB on Bt eggplant.

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Actually, the development of the Bt eggplant was a 4-way collaborative effort among national scientists from India, Bangladesh, and the Philippines with full scientific support from Cornell University USA. While our Supreme Court held back the commercialization of our Bt eggplant, our Bangladeshi research collaborators have received approval from their government to release four of their most popular eggplant varieties which have been engineered to have the Bt gene.

The four Bangladeshi Bt eggplant varieties were launched in January 2014 with 20 small farmer cooperators. The new GMO varieties were received very well by the farmers and the demonstration was expanded into 108 farms in 19 districts distributed all over the country.

In 2015, a press release by the Director General of the Bangladesh Agricultural Research Institute (BARI) disclosed that their GMO eggplant varieties were very resistant to the fruit and shoot borer with field infestation of less than 1.0 percent versus 48–57 percent infestation for the non-GMO versions. Their average yields were 25–39 tons per hectare which were 40–100 percent higher than the unprotected non-GMO varieties. In terms of income, the advantages of the four Bt eggplant varieties were 66 percent, 68 percent, 40 percent and 100 percent (average of 68 percent higher income) over the conventional non-GMO crops.

With so much popular support from farmers the Bangladesh government is going ahead full steam with their Bt eggplants commercialization program. In addition to the first four Bt eggplant varieties, BARI intends to seek approval for three more in the coming planting season.

**BROAD SCIENTIFIC CONSENSUS
ON SAFETY OF GMO CROPS**

Although there are still plenty of skeptics particularly in Europe who refuse to recognize the potential value to mankind of GMO technology in crops to enhance farmers income, raise yields, improve adaptation to drought and other environment stresses as well as to increase their nutritive value, the weight of scientific consensus in favor of GMO technology is abundantly clear from published statements of the world's leading academies of science and responsible development agencies:

American Association for the Advancement of Science: "The science is quite clear: crop improvement by the modern molecular techniques of biotechnology is safe." (*AAAS Board Statement on Labeling of Genetically Modified Foods, 2012*)

American Medical Association: "Our AMA recognizes that there is no evidence that unique hazards exist either in the use of rDNA (GE) techniques or in the movement of genes between unrelated organisms." "Bioengineered foods have been consumed for close to 20 years, and during that time, no overt consequences on human health have been reported and/or substantiated in the peer-reviewed literature." "To date, no evidence has supported an increased degree of allergenicity of bioengineered foods compared to their nonbioengineered counterparts." (*Report of the Council on Science and Public Health, 2012*)

National Academies of Science (USA): “An analysis of the U.S. experience with genetically engineered crops shows that they offer substantial net environmental and economic benefits compared to conventional crops.” “The transfer of GE traits from GE crops to other crops or relatives has not been a concern for most non-GE crops.” “Generally, GE crops have had fewer adverse effects on the environment than non-GE crops produced conventionally.” (*Impact of Genetically Engineered Crops on Farm Sustainability in the United States, 2010*)

World Health Organization: “GM foods currently available on the international market have passed risk assessments and are not likely to present risks for human health. In addition, no effects on human health have been shown as a result of the consumption of such foods by the general population in the countries where they have been approved.” (*20 Questions on Genetically Modified Foods, 2013*)

European Commission: “The main conclusion to be drawn from the efforts of more than 130 research projects, covering a period of more than 25 years of research, and involving more than 500 independent research groups, is that biotechnology, and in particular GMOs, are no more risky than conventional plant breeding technologies.” (*A Decade of EU-funded GMO Research, 2010*)

The Royal Society (UK): “A previous Royal Society report (2002) and the Government’s GM Science Review (2003/2004)

assessed the possibilities of health impacts from GM crops and found no evidence of harm. Since then no significant new evidence has appeared. There is therefore no reason to suspect that the process of genetic modification of crops should per se present new allergic or toxic reactions... Global food insecurity is the product of a set of interrelated local problems of food production and consumption. The diversity of these problems needs to be reflected in the diversity of scientific approaches used to tackle them.” (*Reaping the Benefits: Science and the Sustainable Intensification of Global Agriculture, 2009*)

International Science Academies: Joint Statement (including the Brazilian Academy of Sciences, the Chinese Academy of Sciences, the Indian National Science Academy, the Mexican Academy of Sciences and the Third World Academy of Sciences): “GM technology has shown its potential to address micronutrient deficiencies [in developing nations]. These nutritional improvements have rarely been achieved previously by traditional methods of plant breeding.” “GM technology, coupled with important developments in other areas, should be used to increase the production of main food staples, improve the efficiency of production, reduce the environmental impact of agriculture, and provide access to food for small-scale farmers.” “Decisions regarding safety should be based on the nature of the product, rather than on the method by which it was modified. It is important to bear in mind that many of the crop plants we use contain natural toxins and allergens.” (*Transgenic Plants and World Agriculture, 2000*)



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