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**PAMELA RONALD** correctly points out that GE crops currently grown in the United States are beneficial and safe to eat. But their rapid adoption has not been without problems. The federal government pasted together from existing laws a regulatory system that does not adequately assess the safety of all GE crops with respect to the environment and to human consumption. At the same time, the seed industry and farmers poorly managed the introduction and planting of GE crops, overusing certain varieties, resulting in environmental harm. Improvements in federal oversight and better farm management are crucial not only to ensure that future GE crops benefit farmers, consumers, and the environment, but also to lessen the controversy surrounding GE crops and improve public acceptance.

The most significant regulatory improvement would be for the Food and Drug Administration to ensure that foods made from GE crops are safe to eat by instituting a mandatory pre-market approval procedure, which would replace the weak, voluntary consultation process it uses now. The public must rely on the seed industry's self-interested safety determination instead of a thorough safety assessment performed by the FDA. In contrast,

every other country with a functional biosafety regulatory system mandates government safety approvals of GE foods.

### Farmers must use GE crops in ways that don't cause harm. That hasn't been the case.

The U.S. Department of Agriculture also should review every GE crop for environmental and agricultural safety before it is planted by farmers. Currently the USDA regulates GE crops only if they act like a plant pest (an organism that could potentially harm plants). Several years ago a GE herbicide-tolerant variety of Kentucky blue grass was developed without any plant pest DNA, and the USDA acknowledged a large loophole in the regulatory system when it informed the developer that the crop was not regulated and could be released to farmers without any environmental safety assessment or public notice. GE seed developers can avoid USDA regulation by introducing new traits into a crop variety using the same laboratory techniques used to engineer Kentucky blue grass.

In order to ensure the safety of all GE crops, Congress needs to enact legislation to plug loopholes in the current system and provide a comprehensive—but also efficient—regulatory process. Responsible use of GE crops demands that the government address any potential risks using the best scientific evidence.

Once a GE variety is found safe by the federal government, farmers must use that crop in a manner that does not cause environmental problems. That has not been the case for GE crops tolerant of the herbicide glyphosate. In 2012 farmers grew more than 150 million acres of glyphosate-tolerant corn, soybeans, cotton, and sugar beets, and some of those farmers aban-

doned traditional weed-control measures, such as rotating different crops or herbicides in the same field. Instead they relied on that GE seed-herbicide combination, which is cheap, easy to use, and relatively environmentally benign compared to other herbicides. Now there are glyphosate-resistant weeds on more than ten million acres of farmland, weeds that farmers must battle with more harmful herbicides.

Farmers have also misused a GE corn variety with a built-in pesticide that kills corn rootworm pests. Spurred by high corn prices, farmers planted that engineered corn year after year in the same fields, without rotating to a different crop or using other pest management practices. As a result, resistant pest populations developed on tens of thousands of acres of farmland, and now many corn farmers have resorted to spraying dangerous chemical pesticides—with all their adverse environmental impacts—to protect their crops.

To prevent such mismanagement in the future, farmers growing GE crops must use integrated weed and pest management practices, including crop and pesticide rotation. If seed companies and farmers won't adopt those practices voluntarily, federal regulators need to mandate them. Environmentally benign pesticides such as glyphosate and engineered Bt toxins are valuable public goods that need to be used judiciously to ensure that they remain available to future farmers.

Future actions by seed developers, farmers, and regulators will determine whether the seed industry will continue to provide safe and beneficial GE crops that are accepted by consumers—or whether GE seeds will become yet another abused and ineffective agricultural technology. If a strong, but not stifling, regulatory system can be implemented, and if GE seeds are used with sustainable practices that minimize environmental impacts, public confidence will improve, and the technology's enormous promise will be given the opportunity to be realized.