



Cooperative Extension Service
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In focus

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National Academies Report on GM Crops: Social and Economic Effects, Closing Thoughts

Introduced in the United States 20 years ago, GM crops are now grown in 28 countries on every inhabited continent. Almost 180 million hectares (445 million acres) of GM crops are farmed worldwide on about 12 percent of the world's planted cropland.



Earlier this year, the National Academies of Sciences, Engineering, and Medicine released a report on GM crops. An 18-member committee considered more than 1000 studies, hundreds of comments, and dozens of presentations. The resulting document compares genetically modified (GM) crops that contain recombinant DNA—instructions for a cell to make protein, built by humans using genes from different species—and conventionally bred crops that do not contain recombinant DNA. A free copy of the report is available for download (nas-sites.org/ge-crops).



This is our third bulletin focusing on the National Academies report. In previous bulletins we considered how GM crops have affected farming, the environment, and human health. Here we touch on some of the report's social and economic findings relating to GM crops.

The National Academies considered various studies that compared farmer income from GM and conventional crops. Meta-analyses—reviews that analyze multiple studies—have consistently associated adoption of GM crops with increases in gross income, the total cash and non-cash income received by the farm before any expenses are paid. Some meta-analyses have also identified improvements in net income, measured after expenses have been deducted.



For GM crops to provide more income than conventional crops, added expenses such as buying GM seed, must be more than offset by increased income or cost savings that the GM crop provides. In the studies evaluated by the committee, commonly cited advantages to herbicide-tolerant and Bt crops included higher yields (a larger amount of crop produced per unit land), reduced use of agricultural chemicals, and increased time available for other paid work because less time is spent on pest control.



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Variations in Outcome

However, adopting GM crops that are herbicide tolerant, insect resistant, or both does not always lead to increased farm income. Researchers report wide variations in outcome across different countries and across different regions within a country. The National Academies explored this variability by focusing on small farmers planting no more than 5 hectares (12.4 acres). For these farmers, the costs and benefits of farming GM crops are strongly influenced by local institutions. Access to credit, affordable inputs, agricultural extension services, and markets all affect economic outcomes for small-scale adopters of GM technology.



GM for Small Farms?

Most commercially available GM crops were not developed with small, local farmers in mind. One exception is papaya engineered to resist papaya ringspot virus, which was first released in the late 1990s by the University of Hawaii. Additional GM papaya varieties that resist different ringspot virus strains have been developed in 10 nations, but have been brought to market only in China; factors contributing to lack of commercialization elsewhere include organized opposition to GM crops, inadequate regulatory frameworks, and consumer resistance. These factors will likely also influence the ultimate social and economic impact of GM crops currently being bred in developing countries for small and impoverished farmers.



Likely Sources



The report's authors note that under current regulatory structures, the development of GM crops for small-scale or specialty crop farmers must likely come from public-sector institutions or private/public partnerships. However, investment in public agricultural research has declined during the past half-century.

Shaping Opinions

Commercialization of GM traits that simplify farming but do not offer obvious benefits to consumers has helped shape public opinion of GM foods. In turn, unfavorable public opinion creates additional barriers to the commercialization of publically developed GM crops that could significantly contribute to the economic and food security of small farmers.

