A MEASURED RESPONSE TO UNCTAD’S 2013 REPORT
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Event
The 2013 report by the United Nations Conference on Trade and Development (UNCTAD) titled, Trade and Environmental Review 2013: Wake Up Before It Is Too Late, advocates that improving food security in the 21st century requires that agriculture in developing countries remain committed to, and focused on, natural, largely organic, small-scale farming practices. Over 60 international experts, with wide experience and expertise, contributed to this report.

Significance
Unfortunately, the report does not include a thorough discussion of the potential role that biotechnology and genetically modified (GM) crops can play (and already have played) in the improvement of agricultural production and food security. The report does not review the mounting volume of quantified evidence on the economic, environmental and health benefits resulting from small-landholder adoption of GM crops especially in developing countries.

Evidence
Economic benefits are widely reported through increased yields that have resulted from lower abiotic and biotic stresses, such as weeds or insect pressures. In the case of GM cotton, yield increases of 37-58% have occurred in India (Qaim, 2003; Subramamian and Qaim, 2010), with Burkina Faso experiencing increases of 22% (Vitale et al., 2014). In China, GM cotton raised adopter income by US$500 per hectare (Pray et al., 2002). In South Africa, GM cotton yield increases of 89-129% have occurred, resulting in rising net incomes equal to 2-4 months of wages (Bennett et al., 2006). GM maize adopters in the Philippines have a net household income that is 50% higher than non-adopters due to the ability to secure off-farm employment following the adoption of GM maize (Yorobe and Smale, 2012).

The distribution of economic benefits varies widely between farmers, consumers and innovators. Studies that have attempted to measure the cumulative benefits of a GM crop have progressed from individual countries assessments to global assessments. Cumulative economic benefits ranged from US$2M from GM maize in Spain (Demont and Tollens, 2004) to US$160M and US$315M for GM cotton in the US (Price et al., 2003) and India (Qaim, 2003). GM canola in Canada increased income by US$400M annually (Gusta et al., 2011), GM maize in Argentina increased income by US$5B between 1996 and 2010 (Trigo, 2011). The global economic benefits for GM soybeans have now reached US$46 billion, 31% accruing to consumers (Alston et al., 2014).

Environmental benefits are increasingly being observed through the reduction in herbicide, pesticide and insecticide applications to GM crops. Pesticide applications have dropped dramatically with GM cotton adoption. In India, pesticide use dropped by 41% (Subramamian and Qaim, 2010). Insecticide applications in China dropped from 14kg/ha to 4kg/ha (Huang et al., 2010). In Canada, the environmental impact of GM canola resulted in a reduction of 53%, or 1.3 million kg of herbicide active ingredient annually (Smyth et al., 2011a). There has also been a corresponding increase in conservation tillage practices, especially in North and South America. Conservation tillage practices reduce the amount of carbon released from tillage, increase the moisture content of the soil and reduces soil erosion. In Canada, conservation tillage rose from 11% to 64% in canola production (Smyth et al., 2011b), while in the USA, its use increased from 30% to 63% with GM soybean production (Fernandez-Cornejo and Weschsler, 2014).

Health benefits to small-holder farmers and farm labourers due to reductions in pesticide applications from the adoption of GM cotton have been reported in India, China and South Africa (Hossain et al., 2004; Bennett et al., 2003). The adoption of GM cotton in India has lowered the number of reported pesticide poisoning by 2.4-9 million cases (Kouser and Qaim, 2011). In Burkina Faso, GM cotton has resulted in 30,000 fewer cases of pesticide poisoning annually (Vitale et al., 2014). The adoption of GM maize in South Africa has reduced the number of days spent hand weeding by 10-12 days per season, allowing farm women to have larger gardens (Gouse, 2013).
Conclusion
UNCTAD's report provides an assessment of agriculture, sustainability and food security but fails to highlight the role of new technologies in agriculture. The reality is that economic, environmental and health benefits from GM crops are occurring on an annual basis, contributing to increased production and food security.

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References