CellPress

Science & Society

EU Failing FAO Challenge to Improve Global Food Security

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The announcement that the European Union (EU) had reached an agreement allowing Member States (MS) to ban genetically modified (GM) crops confirms that the EU has chosen to ignore the food security challenge issued to the world by the Food and Agriculture Organization of the United Nations (FAO) in 2009. The FAO suggests that agricultural biotechnology has a central role in meeting the food security challenge.

The FAO Challenge

In 2009, the FAO released its report addressing food security issues through to 2050[i] (Box 1). The FAO identified necessary agricultural production increases of 70% globally to meet the requirements of a projected 9.6 billion people. The upper global population bound could be as high as 11.5 billion. Developing countries struggle to feed their current populations, with millions unable to secure sufficient food quantities to provide daily nutritional needs. The FAO and others assert that agricultural biotechnology will be important to meet global nutritional needs in 2050. Many countries have responded to this challenge, allowing agricultural biotechnology innovations to be commercialized as part of their strategic response to the FAO challenge. While Argentina, Australia, Brazil, Canada, and the USA have all approved the production of GM crops, few developing countries have followed suit.

EU Ignores Scientific Findings

The EU has repeatedly failed to respond to the FAO challenge. While two MS plant small amounts of GM crops (GM maize has been produced in Spain since 1997 and in Portugal since 1999), for the most part, GM crops are not welcomed by governments or consumers in the EU. The European Commission agreement in December 2014 allowing MS to domestically ban the production of GM crops[ii] once again affirms an unwillingness to credibly respond to global food security through the adoption of advanced technologies. Current EU environmental policy appears to be dictated by objectives that contribute to global food insecurity.

This new EU policy is flawed for three reasons: (i) it ignores conventional scientific findings; (ii) it has politicized and mischaracterized risk; and (iii) it deters developing countries from adopting GM crops.

EU Parliamentarians and politicians routinely ignore the proven safety and environmental benefits of GM crops. GM crops have undergone risk assessments by federal regulatory agencies in over 30 different countries since their first commercialization in Canada and the USA in 1995, and, in 2010, the European Commission produced a review of 130 EU-funded biotechnology research projects that showed that GM-bred crops are as safe as conventionally bred crops[iii]. EU politicians appear happy to ignore their own and others' peer-reviewed science that demonstrates the safety and efficacy of a range of new crops that are widely accepted across world markets. The evidence in adopting countries is growing and compelling. A recent meta-analysis of 147 publications detailing GM crop impacts found that chemical pesticide use dropped by 37%, crop yields increased by 22%, and farmer profits increased by 68% [1]. The main impacts are in cotton, maize, soybeans, and canola. GM cotton increased yields by 24% in India [2] and 22% in Burkina Faso [3]. In China, farmers growing GM cotton raised returns by US$470/ha [4]. In South Africa, GM varieties increased cotton yields by 89–129%, generating net incomes equal to 2–4 months of wages [5]. GM maize adopters in the Philippines have a net household income that is 50% higher than nonadopters due to the opportunity to pursue off-farm employment following adoption of GM maize [6]. GM maize in Argentina increased income by US$5 billion between 1996 and 2010. The annual global economic benefits for GM soybeans have reached US$46 billion, 31% accruing to consumers [7].

Meanwhile, reductions in chemical use have been quantified in both developing and developed countries. Pesticide use on cotton in India dropped by 41% and in China from 14 kg/ha to 4 kg/ha [8]. In Canada, the environmental impact of GM canola resulted in a reduction of 53%, or 1.3 million kg, of herbicide active ingredient applied annually [9].

There are also measurable health benefits to smallholder farmers and farm laborers due to reductions in pesticide applications from GM crop adoption. GM cotton in India has lowered the number of reported pesticide poisoning by between 2.4 and 9 million cases annually [10]. This reduction in pesticide poisonings saves the Indian Government an estimated US $14–51 million in health costs every year. In Burkina Faso, GM cotton has resulted in 30 000 fewer cases of pesticide poisoning annually [3].

The risk assessment process in the EU has become politicized and often ignores the results of its science-based risk assessment in its deliberations. The EU has a zero-tolerance threshold for EU-unapproved GM traits that have been approved in other countries, including major trading partners, such as Australia, Argentina, Brazil, Canada, and the USA. These GM traits have had risk assessments cumulatively undertaken by over

Box 1. Historical Growth of Crop Yields

In addition to agricultural production needing to rise by 70% globally, the FAO observed that, in most developing countries, production would need to rise by 100%[i]. The FAO reports that annual increases in crop yields of 2% are needed to sustain the existing global population. Current yield increases are below 2% and have slowed considerably (Table I). Crop yield increases for the three key staple crops of wheat, maize, and rice have been trending downward since the 1990s, and this decline is most significant for wheat and rice, where annual global increases are less than 1%. Of particular concern is the rate of wheat yield increases in developed countries, which has become negative. With rice being a staple crop for many developing countries, recent rice yield increases of 1% highlights the inefficient application of crop breeding innovations. Innovative agricultural biotechnologies are required to aid the development of new varieties of all three staple crops to assist in raising annual yield increases to meet increasing global demand. Without the ability to adopt agricultural biotechnology, hundreds of millions will remain nutritionally insecure on a daily basis.

Table I. Average yield growth rates for selected crops (% per year)[iv]

	Crop					
	Maize		Wheat		Rice	
Time period	1961–1989	1990–2006	1961–1989	1990–2006	1961–1989	1990–2006
Global average	2.21	1.59	2.78	0.55	2.19	0.97
Developing world	2.53	1.92	3.76	1.43	2.34	1.01
Developed world	2.50	1.67	2.41	-0.13	0.77	0.73
Western Europe	3.65	1.74	3.25	0.86	0.33	0.53
Eastern Europe	2.62	2.45	3.29	-1.27	-0.61	3.63
North America	2.20	1.43	1.58	0.19	1.87	1.35

200 national regulators. Presently, the EU has higher acceptable levels in food products for contaminants such as insect fragments, sticks, and manure, than it does for EU-unapproved GM crops [11].

The decision by the EU to allow MS to individually regulate approvals for cultivation of GM crops that have already received EU-wide approval will have wide-ranging effects that, ultimately, will make it more difficult for the most food-insecure countries in the world to achieve their food security goals (Box 2). After 15 years during which the EU-wide biotechnology policy was sufficiently opaque that investment in agricultural biotechnology research and development on a global basis was considerably inhibited, the rules adopted in 2010 that clarified their decision-making provided a renewed measure of transparency, although not predictability, for potential investors. This decision to allow individual MS to intervene and make local decisions considerably increases the risks associated with investing in agricultural biotechnology in the EU and beyond.

Box 2. GM Opt-Outs in EU Member States

EU MS had until October 2015 to inform the Commission on whether they would opt out of EU-wide GM crop approvals. By this deadline, 19 of 28 MS indicated they would opt out. There are two views on the opt-out.

First, some are of the opinion that this will allow MS opposed to GM crops to ban them domestically and no longer vote to block them at the EU level, thus returning GM crop approvals to science-based processes. Removing some of the politics of GM crop approvals would theoretically allow those MS supporting the technology to approve and produce GM crops. However, this is not assured because there are no legal obligations within the opt-out for MS to cease blocking GM crops at the EU level.

Second, science-based regulation seems to have taken a back seat in the EU. Those blocking GM crops approvals are not compelled by science; rather, decisions are based on political calculations. This has stalled most research and investment in the EU, discouraging research and commercialization of new GM traits in other MS due to the difficulty of meeting the increasing array of market access hurdles. Moreover, given that the EU is the single largest food-importing region, this change will undoubtedly discourage developing countries exporting commodities to the EU from adopting GM crops; the cost and uncertainty of having shipments rejected by MS will offset many of the benefits of GM adoption.

Effects on Global Food Security

Investment decisions of individual firms are determined, in part, by the size of the potential market for the products of the new technology and the cost of securing entry in those markets. When countries ban new technologies or their products or make their approvals sufficiently risky or uncertain, the size of the potential market shrinks. This reduces the likelihood of a positive investment decision. Meeting the goals of improved global food security will require a range of efforts; most policy-makers see improving agricultural productivity through new breeding techniques as central to achieving the goals. Agricultural biotechnology can greatly contribute to advances in agricultural productivity. Any major increases in the riskiness of investments in research and development will work to reduce investment and the rate at which agricultural productivity increases.

The effects on food insecure countries, particularly in sub-Saharan Africa, are direct and immediate. The EU prohibits imports of all unapproved GM events. Shipments can be refused when minute traces of GM material are detected, either comingling