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## Country trends



# Tending the GM garden: does public interest fertilize or poison the field?

TOM JONES

Genetic modification (GM), which involves altering the genome of an organism, typically by introducing genes taken from a distantly related species, has become a highly controversial technology. Both hailed as a solution to world hunger and vilified as a potentially devastating attempt to subvert nature, its development and applications have become a polarizing and emotional issue.

GM technologies are an effective way of introducing novel traits to organisms and, with the launch of the FlavrSavr tomato (a tomato with a gene to prevent ripe fruit from going soft) in the mid 1990s, GM crops have become a commercial reality. Initially, advocates promoted GM technologies as the great 'Green' hope – with benefits for our health, productivity and economies. There was rapid uptake in a number of countries, including Canada, the USA and Japan.

However, crises linked to industrial agriculture (such as the bovine spongiform encephalopathy (BSE) epidemic in the UK, for example) fuelled concern about the potential risks of GM in Europe, and public attention rapidly became focused on the negative aspects of GM crops, including impacts on biodiversity, health issues for consumers, and consolidation of control of the food chain.

The UK, for instance, has shown continued public resistance to GM crop technologies (1): surveys suggest that only 2% of British people would be happy to eat GM food, and 50% are against it being publicly available.

Broader shifts in the developed world have also seen the increasing popularity of organic and locally sourced food, small-scale production (an approach that is in opposition to GM agriculture), and strict legislation and control of GM material in the EU.

### Additional focus

The storm of negative media attention and public opinion does not seem to have had a direct effect on publication output on the development and applications of GM crops, which has grown steadily since the launch of the FlavrSavr tomato. However, these public concerns may be helping to boost research into the environmental impact of GM crops, an issue that has attracted considerable public attention and has also seen a significant rise in research output (see Figure 1).

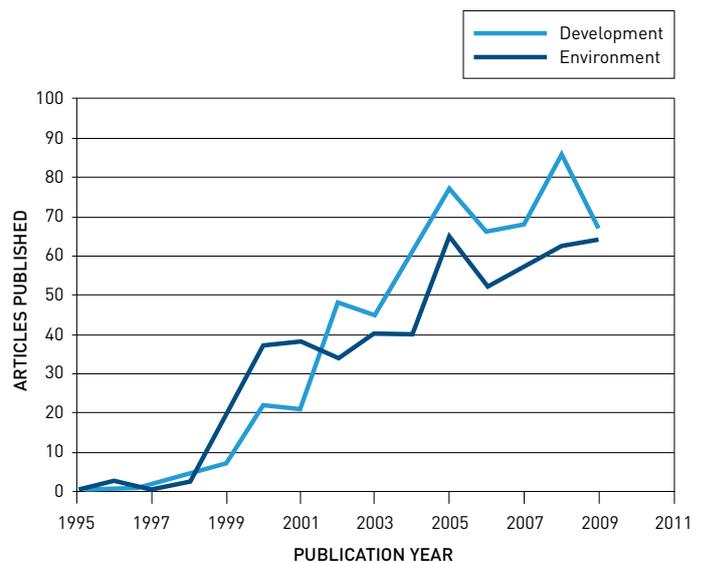


Figure 1: While there was a steady increase in research output into the development and applications of GM crops between 1995 and 2009 (keyword search: gm and crop\* and develop\*), this was matched by growth in research into the environmental impacts of growing GM crops (keyword search: gm and crop\* and environment\*).

Source: Scopus

### Where GM blooms

Not everyone shares these environmental and health concerns, and developing countries have been quick to develop their GM farming sector. Brazil, for example, has significantly stepped up its GM soybean production. A major concern for developing economies, however, is that by growing GM crops they will harm their prospects of exporting food to wealthy countries with stringent restrictions and labeling rules on GM in the food chain (2).

For developing countries, GM crops are also a food-security issue, and for those with rising wealth and growing populations, GM crops offer great promise. In China, for instance, where famine is within living memory, public attention is naturally concerned with food security and this has helped fuel a huge expansion in research into the development and applications of GM crops. In 1998–1999, China was the 20th most prolific producer of research on this topic; in 2007–2008, it had jumped to fourth place (see Table 1).

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2008–2009		1998–1999	
Country	Number of articles	Country	Number of articles
USA	1,586	USA	1,232
Germany	752	Spain	301
Spain	668	France	281
China	513	UK	219
Italy	417	Japan	205
Japan	407	Germany	180
UK	399	Canada	140
France	390	Italy	140
Canada	317	Netherlands	81
Belgium	174	Switzerland	66
Netherlands	172	Belgium	63
Switzerland	166	Taiwan	54
Taiwan	164	Australia	48
Korea, Republic of	146	Denmark	47
India	142	India	39
Brazil	138	Sweden	34
Australia	131	Israel	33
Sweden	114	Brazil	30
Denmark	108	Korea, Republic of	30
Austria	94	China	28

Table 1 – Developing countries are steadily overtaking their developed counterparts in research output on the development of GM crops (keyword search: gm and crop\* and develop\*).

Source: Scopus

Because these lists can be distorted by factors such as national wealth or the size of the historical research base, a better alternative is to look at relative research growth in different countries. Even here, developing countries with increasing wealth and populations, coupled with food-security concerns, are outstripping their developed counterparts. Between 1998–1999 and 2007–2008 China's output rose by 1,700%, India's by 264% and Brazil's by 360%, compared with growth of 82%, 28.7% and 39% in the UK, the USA and France, respectively, all of which were early leaders in GM research.

It seems that media interest is not only fuelling research into the effects of GM crops, it is boosting research output in regions where GM is seen as a potential answer to food-security concerns and suppressing output in countries where public opinion is more skeptical of its potential.

**References:**

- [1] Franks, J.R. (1999) "The status and prospects for genetically modified crops in Europe", *Food Policy*, issue 24, pp. 565–584.
- [2] Azadi, H. and Ho, P. (2010) "Genetically modified and organic crops in developing countries: A review of options for food security", *Biotechnology Advances*, issue 28, pp. 160–168.