

Acceptance of “GM food” in Europe: What People Say and Do

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Abstract: It is often stated that consumers in Europe reject “GM food” – or that GM crops would be outright banned. While the latter is patently false, there is also little tangible evidence to support the assumption that Europeans wouldn’t buy food that was produced using genetic engineering: The impression of a general rejection of GM crops by Europeans relies largely on the results of more or less rigorous surveys and the absence of labeled GM food in the mainstream food retail system – which may be more the result of power dynamics and incentives of other stakeholders than a deeper rejection of GM food by consumers. This paper reviews some of the more recent literature on the acceptance of GM food in Europe, draws tentative conclusions why labeled GM food in the European food retail market is largely absent, and highlights implications for the rest of the world.

Key words: food, genetically modified organism, GMO, consumer acceptance, Europe, revealed preference

Introduction

It is sometimes stated in the media or on internet platforms that genetically modified (GM) organisms or crops are “banned” in Europe (Kloor 2013; Gupta 2013).² This is patently untrue: Dozens of GM crops are authorized for use in food and feed in the European Union (European Commission 2013b), i.e. these crops can be imported freely and no EU country has banned these crops as such. In fact, the EU is almost entirely dependent on the import of (genetically modified) protein crops, in particular soybeans from the Americas, raising concerns about the supply of non-GM ingredients for the “GM-free” market: More than 90 percent of the EU’s soybean requirements and 70 percent of its protein requirements for animal feed are satisfied through imports (which in 2011/12 amounted to 21 million tons of soymeal, 12 million tons of soybeans, 4 million tons of canola and 5 million tons of palm oil) (Slovenian Delegation 2013; European Commission 2013a). Moreover, throughout the EU a whole range of foodstuffs and ingredients are exempt from GM labeling requirements – and therefore presumably widely consumed – such as meat, dairy and eggs from animals that were fed GM feed; food containing additives, flavors or vitamins produced with the help of GM microorganisms; or enzymes produced by GM microorganisms that are used in the processing of food (GMO Compass 2007).

What is true, though, is that *individual* countries invoked a “safeguard clause” to temporarily restrict the *cultivation* of *specific* GM crops pending the satisfactory assessment of new information regarding the biosafety of these crops relating to the particular situation in their country (European Commission 2013c). In 2012 eight out of 27 EU Member States applied these safeguard clauses to specific GM crops, but on the other hand five Member States planted almost 130,000 hectares of GM maize (European Commission 2013d), with farmers in the Spanish region of Catalonia planting a higher proportion of their maize crop with GM seed than their peers in the United States (Agrimony 2013) – and also those countries that invoked the safeguard clause on selected GM crops import other GM crops, such as the aforementioned GM soybeans.

Nevertheless, in the media it seems to be an accepted fact that GM crops are at least “broadly unpopular” in Europe (Birnbaum 2013). Given the widespread use of GMOs and also the regional cultivation of GM crops, this raises the question how this seeming contradiction can be explained – or what kind of evidence there is in support of the notion that GM crops are indeed unpopular in Europe? A recent meta-analysis identified more than 200 studies on

¹ This manuscript is based on work done while the author was at Genius Science & Communication, it was drafted while the author worked at the International Food Policy Research Institute, and it was updated in July 2015. Please cite as: Stein, A.J. (2015). “Acceptance of ‘GM food’ in Europe: What People Say and Do.” *ResearchGate Technical Report 2015/07*. doi:10.13140/RG.2.1.1052.9127. <http://www.researchgate.net/publication/280578072>

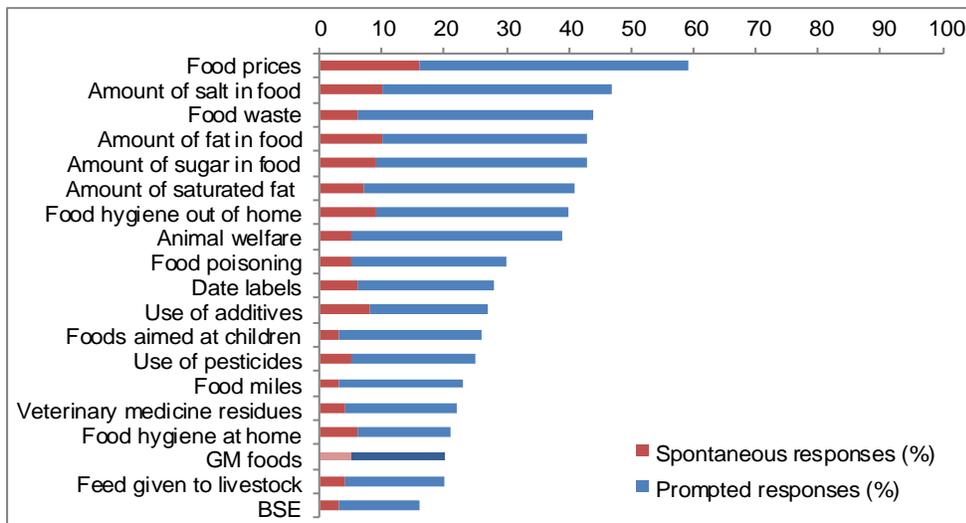
² Here the focus is mainly on member states of the European Union (EU), even if there are many more countries in Europe.

consumers’ evaluation of biotechnology in food products (Hess et al. 2013), many in Europe, while in the wider field of the public perception of genomics there are many more (Pin and Gutteling 2008). Given such a number of studies, there will be individual results that support all kinds of views on the (lack of) popularity of “GM food” in Europe.³ In this paper, rather than doing a quantitative analysis, an answer is sought for how people’s acceptance of GM food changes when the abstractness of the purchasing situation decreases in which they find themselves in.

GM food does not rank among the major food issues for most Europeans

In 2013 the United Kingdom’s Food Standards Agency (FSA) published findings of research looking at consumer attitudes to the labeling of GM food (Food Standards Agency 2013b). What they found when asking consumers open questions about their concerns when buying food was that: “The main information respondents spontaneously reported to look for when buying food for the first time were price (37%) and nutritional information (37%) such as the amount of fat (25%) and sugar (19%). In contrast, only 2% of respondents spontaneously mentioned they looked for GM information on labels. When prompted, 4% of respondents said that GM information was important on a food label while 60% mentioned price, 51% mentioned best before/use by dates and 30% mentioned nutritional information” (p. 13). This means when asked an unframed question, only 2 percent of grocery shoppers in the UK even think of GMOs – i.e. presumably 98 percent just buy any food with an acceptable price and nutritional value.

Figure 1. Food issues of concern to respondents in the UK, 2013



Source: Food Standards Agency 2013a.

This finding is in line with the results of surveys about concerns about food safety issues that are conducted regularly in the United Kingdom and that (after a peak of around 15 percent ten years ago) find that only about 5 percent of respondents mention GMOs (Food Standards Agency 2013a). More importantly, though, these results are also close to the 8 percent of respondents who spontaneously identified GM food as an issue of concern in a representative, EU-wide “Eurobarometer” survey in 2010 (TNS Opinion & Social 2010c).

Of course one could argue that people in the EU do not check for GM information because they think there is no (labeled) GM food on the shelves anyway. But in the aforementioned study, even when prompted on the issue of labeling, only 4 percent of the UK respondents considered it important to have such information at all. And when

³ Here “GM food” is understood as foodstuffs that are explicitly labeled as consisting of GM crops or containing ingredients that were derived from such crops.

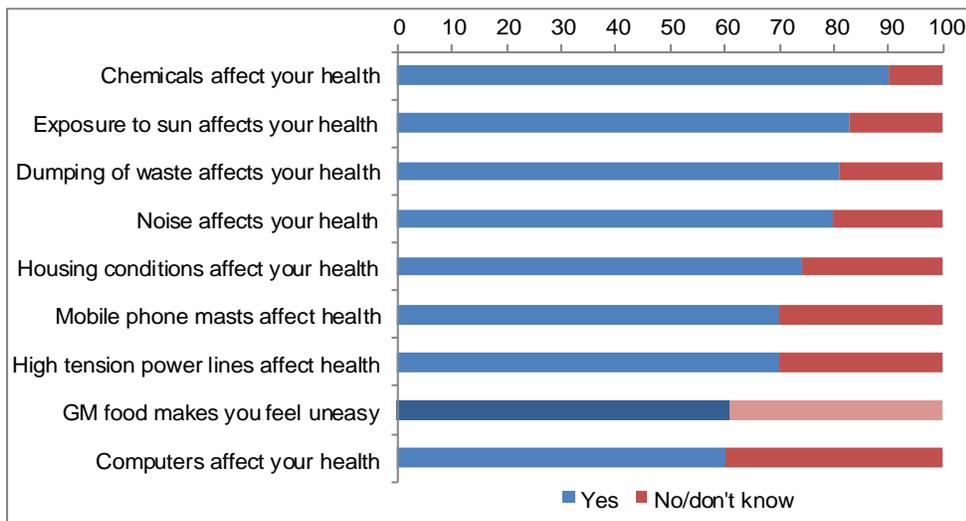
spontaneous and prompted responses were combined into a ranking of the total concern about food issues, UK respondents considered a host of other issues far more important than GM food (Figure 1).

GM food might be both accepted and unpopular in Europe

As the discussion in the previous section indicates, it seems as if GM food is nothing consumers in Europe are spontaneously concerned about. However, surveys usually prompt respondents for answers on a specific topic, and responses might then reflect the framing of the question, such as the background information provided or the details of the decision-making scenario that are given.

For instance, a Eurobarometer study also elicited responses to the statement “GM food makes you feel uneasy.” In this case 61 percent of respondents agreed, 29 percent disagreed, and 10 percent didn’t know. Similarly, with the statement that “The development of GM food should be encouraged,” 61 percent of respondents disagreed, 23 percent agreed, and 16 percent didn’t know (TNS Opinion & Social 2010a). Hence, if presented with what amounted to simple either/or questions, about 60 percent of respondents expressed unease about GM food – but a non-negligible 40 percent of EU consumers were either agnostic about or even supportive of GM food. To put the magnitude of these responses into context, they were juxtaposed to responses on perceived or real health risks taken from another Eurobarometer survey (Figure 2), showing that Europeans have more negative views on a range of other technologies and environmental conditions that they nevertheless embrace in their daily lives.

Figure 2. Eurobarometer surveys on biotechnology and electromagnetic fields, 2010



Note. To offer a benchmark for assessing the answers to the question about GM food, answers to other questions from a survey on electromagnetic fields were added. *Source:* TNS Opinion & Social 2010b; TNS Opinion & Social 2010a.

A survey by the Belgian consumer association (which in the report and elsewhere on its website seems to take a fairly negative stance on GMOs) indicates a similar split between those who are skeptical of GM food and those who are indifferent or even in favor of it: On the one hand 15 percent of respondents stated they would welcome GM food and 25 percent declared the presence of GM ingredients would not affect their purchasing behavior, while on the other hand about 30 percent stated they would not knowingly buy GM food and 15 percent claimed they even bought organic food to avoid any GM ingredients (Inghelbrecht and Vandercammen 2011). Similarly a more recent study found for a sample of 3000 consumers across Belgium, France, the Netherlands, Spain and the UK that only 17 percent were not willing to consume GM food, while 82 percent were either willing to do so (36 percent) or stated they would not have enough information to make such a decision (46 percent) (Delwaide et al. 2015).

The answers to such rather simplistic dichotomous questions indicate that GM crops may be characterized as being unpopular in Europe – and if anything views of GM food were worsening over the years (Table 1). Still, given that non-negligible segments of the population would nevertheless accept or even welcome GM food, qualifying it as being “broadly” unpopular might be misleading.

Table 1. Prompted opinion of GM food in the EU (percent)

| | 1996 | 1999 | 2002 | 2005 | 2007 | 2010 |
|-------------------------------|------|------|------|------|------|------|
| Supportive or tolerant | 26 | 24 | 28 | 21 | 21 | 23 |
| Undecided | - | - | - | - | 21 | 16 |
| No opinion | 58 | 49 | 45 | 49 | - | - |
| Negative | 16 | 27 | 28 | 30 | 58 | 61 |

Note: For surveys from 1996-2005 results were adjusted to take into account those respondents who had not formed an opinion on GM food; the change in the questions after 2005 that prevented respondents from opting out may have driven more people to opt for a “cautious” negative response (Moses 2012). *Source:* Gaskell, Allum, and Stares 2003; Gaskell et al. 2006; TNS Opinion & Social 2008; TNS Opinion & Social 2010a.

In the absence of knowledge, respondents might “play safe” in their answers

One reason for negative responses to survey questions about GM food – and for the apparently worsening views of such food (Table 1) – might not be people’s deeper convictions but the nature of opinion polls, fear of social disapproval through others and the fact that, over time, respondents were exposed to an increasing number of rumors and worrying claims. For instance, one study on social stigma and consumer benefits in the context of GM crops suggests that when responding to surveys on controversial issues, people may do so “in a manner that is influenced by social desirability, the basic human tendency to cast oneself in the ‘best’ light and conform to societal rules” (Mather et al. 2011). This means that studies that rely on stated preferences may provide an unrealistically negative view of how consumers will actually respond in a real-world situation in which they act outside the spotlight of the poll.

Moreover, a lack of knowledge about GM food combined with the impression that there is criticism of GMOs could incite people to “play safe” in their responses and state that they see (unfamiliar) GM food in a negative light:⁴

“People know when they are... invited to participate in an opinion poll. Individual answers may be influenced by the nature of the question: asking ‘Would you eat Frankenstein food?’ ... is hardly the way to elicit a rational, dispassionate answer... Even if in a particular poll about GM the word ‘Frankenstein’ is not used, some people will remember that GM-foods have been referred to by that term... Furthermore, respondents may wonder why the question is being asked: ‘Would I eat GM-food? Why are they asking me that? Nobody asks me whether I would eat any other sort of food. Is something the matter with it, something I don’t know about? Will I appear stupid or ignorant if I say I would eat it when I ought to know that it may be dangerous? I suspect that’s why they are asking the question: it would be better play safe and say “no” ... Actually, I really know nothing about it... I ought to have read that stuff more carefully but, if some people are worried, I had best say that I am worried, too.’ In the case of GM-crops and foods, consumers are indeed likely to have read worrying claims, hundreds of them over the years...” (Moses 2012: 279).

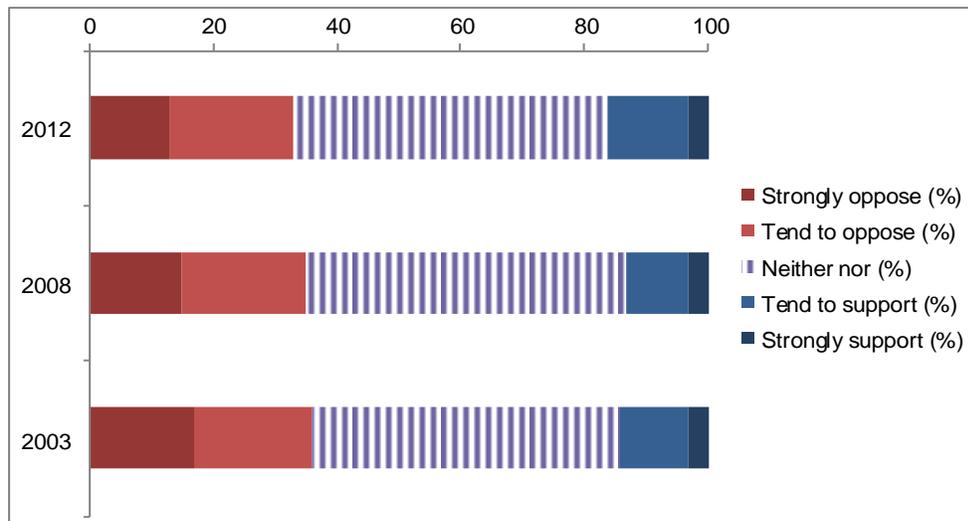
Against this background it might help in the assessment of such survey results to know how well Europeans are informed about GM food: In the 2010 Eurobarometer survey 16% of respondents said they had never heard of GM food before, and among those who had, 62% never actively looked for information about GM food (TNS Opinion & Social 2010a). Hence, about 70% of Europeans know about GM food only from hearsay or cursory reading of the

⁴ Such a mechanism can perhaps also be seen in results of a research project at Oklahoma State University, where most respondents believed that salt was “natural,” whereas a majority of the same people believed that “sodium chloride” was not – alas, sodium chloride is table salt (Lusk 2013).

news – if at all. This is perhaps not enough for many of them to feel confident enough to take a positive position in a discussion that they might perceive as being contentious.

Indeed, an earlier FSA review of public attitudes to emerging food technologies showed that a majority of consumers is undecided or feels that they do not know enough about GMOs to build an opinion (Brook Lyndhurst 2009). Similarly, if given the choice to take a neutral position, respondents might prefer to do so rather than taking a stand against or in favor of GM food, as a majority of people did in surveys in the UK over the last 10 years (Figure 3), as well as in the recent study in Belgium, France, the Netherlands, Spain and the UK where the biggest share of respondents chose not to take a decision (Delwaide et al. 2015).

Figure 3. Support for GM food in the United Kingdom, 2003-2012



Note: The survey was done on behalf of the UK food and retail industry, but given that the association includes members from the entire agri-food chain (incl. organic, fair-trade or cooperative producers), a bias might be excluded and the point that many people are undecided is probably valid either way. *Source:* Institute of Grocery Distribution 2012.

Consumers differentiate their acceptance of GM food depending on its benefits

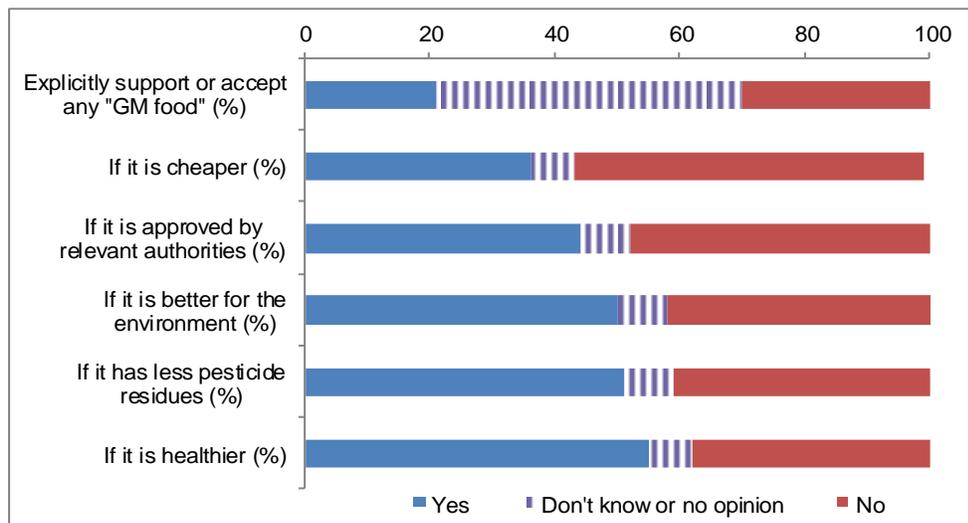
As apparently many people in Europe have little knowledge or no strong opinion about unspecified “GM food,” eliciting dichotomous decisions “for” or “against” it might lead respondents to hedge their bets and give more guarded answers, as discussed above. If this is the case, describing some of the (possible) characteristics of different GM crops might help people in their decision-making. And indeed, when respondents were asked if they would buy GM food for a variety of different reasons, they clearly differentiated their responses (Figure 4). For instance, if people know that a GM food is approved by relevant authorities, the acceptance of the food doubles compared to the baseline when respondents are simply asked about their support for any “GM food”, and a majority of respondents stated they would buy GM food that has less pesticide residues or that is healthier (Gaskell et al. 2006). Figure 4 also shows how respondents in the large group of those who initially have no opinion on GM food base their (hypothetical) purchasing decision on the kind of attributes of the GM food they are presented with.

Unfortunately the more recent Eurobarometer surveys did not elicit such differentiated responses on the acceptance of GM food, but as Figure 1 shows, there are more important food issues on people’s minds. That is, if GM food can address some of these concerns (e.g. if it is cheaper or contains less saturated fat), then people probably weigh their preferences accordingly and make similarly differentiated decisions. And indeed, also a smaller study on Spanish consumer attitudes showed a change in responses when more detailed questions were asked: Compared to the initial question about the willingness to consume “GM food”, almost twice as many respondents would consume

GM food that reduced pesticide use, and while initially 60 percent of respondents stated that they would not want to consume GM food, this rate fell to 45 percent if the GM food was more nutritious (Angulo and Gil 2007).

Similarly a study in the UK found that 75 percent of respondents would purchase GM food if it was cheap enough (Spence and Townsend 2006). In another study “spray-free” alleged GM fruit was offered at roadside stalls along with conventional and organic fruit: a (realistic) decrease of 15 percent of the price of the “GM” fruits boosted their sale by 13-14 percentage points in most countries (Knight et al. 2007). The afore-mentioned study in five EU countries found that rice that had been developed using new breeding technologies to provide environmental benefits made it more acceptable compared to rice that was simply labeled as “GM” (Delwaide et al. 2015). A study in Ireland found that almost three quarters of the respondents would accept disease-resistant GM potatoes: 58 percent would purchase the potatoes at the same or slightly lower price than conventionally grown ones, while 14 percent were willing to pay a premium for such potatoes (Thorne et al. 2014). And an experiment in the UK found that 65 percent of the sampled consumers would be willing to buy functional GM bread (better shelf-life, vitamin content, and environmental footprint) and 33 percent would be willing to pay a premium for such bread (Ison and Kontoleon 2014).

Figure 4. Reasons for which respondents in the EU would buy GM food, 2005



Source: Gaskell et al. 2006.

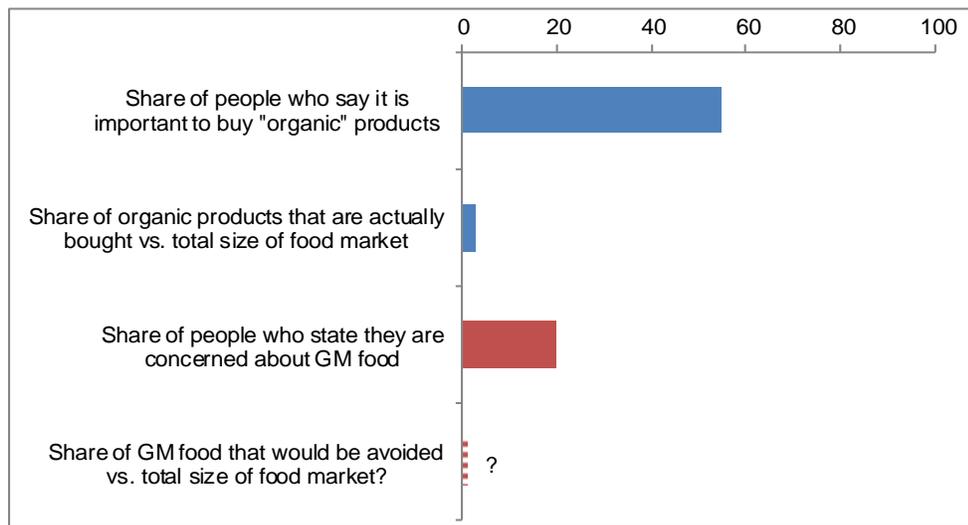
What these surveys suggest is that respondents who initially avoid GM food change their minds once they know more about its characteristics. Consequently, many respondents who state that they are skeptical of GM food may not oppose it out of principle but simply shun it because possible benefits of such food are not well defined and people do not see any reason why they should buy or consume it. This means demand for GM food is not inelastic, and given the right incentives GM food in the market place may be considerably more popular than what people’s responses to abstract survey questions suggest.

The actual shopping behavior of consumers clashes with opinion polls

The studies that were reviewed so far asked people hypothetical and abstract questions that had no real-life consequences – not least because there is very little labeled GM food available in European supermarkets. However, this is not the case for certified “organic” food, which in some ways could be seen an “opposite” of GM food as the use of GMOs in organic production is prohibited (Council of the European Union 2007). Therefore it could be enlightening to see how surveys on organic food compare with statistics on the organic industry.

A British environmental advocacy group reports that 55 percent of shoppers say they believe it is important to buy organic products (Soil Association 2013). However, only 4 percent of the agricultural land in the United Kingdom and 5 percent in the EU are cultivated following organic practices (FiBL and IFOAM 2013), and according to the latest report from the European Commission, in 2007 the organic sector did not represent more than 2 percent of total food expenses in the 15 oldest EU Member States (European Commission 2010), while a more recent industry report puts the organic food market in 2012 at €22 billion (about US\$ 30 billion) – or 3 percent of the total European food market (Royal Wessanen 2013). Hence, it seems there is a glaring mismatch between how many people say they believe it is important to buy organic products (55%) and how much of the food they buy is actually “organic” (3%) (Figure 5). Given that fewer people say that they are skeptical of GM food, the question is how big a share of the total food market could cater for the non-GM niche?

Figure 5. Stated opinion and apparent behavior of respondents in the UK, 2012/13



Note: Given that the share of agricultural land that is dedicated to “organic” agriculture is smaller in the United Kingdom than the corresponding EU figure (FiBL and IFOAM 2013), using the information on the share of organic products in the total European food market as proxy for the corresponding share in the United Kingdom might be justified. The bar for the share of GM food that would be avoided is hypothetical, but indicatively it reflects the discrepancy between stated and apparent behavior that can be observed for organic products. *Source:* Soil Association 2013; Royal Wessanen 2013; Food Standards Agency 2013a.

A similar situation has also been suggested for Denmark, where positive consumer attitudes towards organic food do not translate into corresponding purchasing behavior – even though supermarkets offer a comparatively broad organic food range at relatively small price premiums (Aschemann-Witzel and Niebuhr Aagaard 2014). Such a discrepancy is also apparent in a study on EU consumers’ willingness to pay for fruit that is grown according different agricultural practices: While overall most people indicated that they would pay a more for organic apples, the premium they were prepared to pay was far below actual market prices for apples that were marketed this way (Bazoche et al. 2013). And a study on the use of sustainability labels in several EU countries found that while respondents expressed concern for sustainability issues in general, sustainability labels did do not play a major role in consumers’ food choices (Grunert, Hieke, and Wills 2014).

Such discrepancies between stated opinions and real-world behaviors also occur elsewhere, though. For instance in the United States a majority of people say they would like to improve the lives of farm animals, but only a few buy products from humanely raised animals when presented with cheaper options (Anderson 2013). These examples give little reason to believe that consumers in Europe will not buy GM food just because in surveys a significant share of respondents expressed their skepticism about such food.

Where available, European consumers actually buy GM food

Given the discrepancy described in the previous section, real-life purchasing decisions may be better indicators for the acceptance of GM food. While perhaps not ubiquitous, labeled GM food products are available in some EU countries, and surveys on the acceptance of those products were carried out by a EU-funded research project, “Consumerchoice” (King’s College London 2008). The result was that only 20 percent of shoppers said they actively avoided GM food. Similarly, in the United Kingdom only 20 percent of shoppers said they check food labels for GM ingredients, while a majority of people is willing to taste GM food (Brook Lyndhurst 2009). Perhaps most telling, in one recent incident about alleged GM “Macaroni & Cheese” that was sold in the United Kingdom, one of the buyers affirmed that she had become aware of the controversy, but she put her consumption of the food pragmatically into perspective: “I eat it in moderation and I haven’t stopped buying it. I like it” (Strom 2013).

Consumerchoice also asked European tourists who had visited the United States about their awareness of the prevalence of GM food in the United States and whether they had tried to avoid eating GM food – only 15 percent had informed themselves about the food in the US and tried to avoid GM products. Moreover, GM food from the United States is actually imported into the European Union and sold as treats in gas stations, at food stalls, in video stores and online (Greenpeace 2013b), as well as in Berlin’s “Kaufhaus des Westens” (Greenpeace 2012), the German equivalent to the British department store “Harrods.” Likewise, international GM specialty food is imported and sold in “Asia shops” throughout Germany (Greenpeace 2013a). To the extent that food sold at gas stations and in video shops, upmarket department stores, and delis is more expensive than food bought in supermarkets and at regular food retailers, this indicates that consumers in Europe are even willing to pay a premium for GM food that has desired attributes.

Farmers across the European Union do, did and want to grow GM crops

As already mentioned in the introduction, currently farmers in five EU countries (Spain, Portugal, the Czech Republic, Romania and Slovakia) grow GM crops,⁵ and since their introduction in 1998 at one point in time – when no safe-guard clauses were applied – farmers in another five EU countries (Germany, France, Poland, Sweden and Bulgaria) also cultivated them (James 2012 and earlier years). Moreover, almost two thirds of British and of larger Greek farmers said they would grow GM crops if there were suitable varieties or if it was permitted to do so (Farmers Weekly 2013; Skevas et al. 2013), as would a majority of farmers in Piedmont, a region in Italy (Spadaro, Alessandria, and Gullino 2012). It seems reasonable to assume that many farmers in many EU countries are not opposed to GM crops.

Conclusions

Given the potential biases in opinion surveys, the purpose of this review was not to determine the exact extent to which GM food is popular or unpopular among consumers in Europe. Rather, the contribution of this paper is to discuss more qualitatively how and in which direction consumer acceptance changes when the scenario in which decisions are made moves from simple and abstract questions to more nuanced trade-offs and concrete shopping experiences. This comparison of stated vs. revealed preferences indicates that most respondents in Europe are likely to embrace “GM food” if they encounter it in real life settings in which they have to balance various priorities, even if they are hedging their bets by voicing skepticism in response to inconsequential hypothetical questions. This is also in line with the findings of a recent meta-analysis that suggests European consumers are as much or as little reluc-

⁵ In particular in Romania large-scale cultivation of GM soybeans (estimated 70%) took place prior to the country’s accession to the EU in 2007 (GMO Compass 2010); currently Romanian farmers can only grow GM maize.

tant to accept biotechnology in food products as the global average, and that any perceived differences in the popularity of GM food may be due to the fact that in the surveys in Europe more often questions were asked that had a critical tendency and thus generated negative results (Hess et al. 2013).

If GM food is not necessarily less popular in Europe than elsewhere, the question of course is why it is not more ubiquitous? The answer may lie in the labeling requirements in the European Union where the power balance, the level of organization and the (lack of) incentives of the various stakeholders may be tilted against the production and consumption of labeled GM food.⁶ However, this is speculation and such an analysis is beyond the scope of the present paper, even if UK supermarkets showed that a switch from non-GM to (unlabeled) GM is possible in the face of criticism from activist groups: “Starting in 2012, UK supermarkets, which hitherto had insisted that they would sell only those poultry and poultry products derived from chickens fed non-GM feed abruptly changed their views... they would begin allowing their suppliers to use GM feed for poultry... Politics may generate the noise but in commerce seems to be where many important decisions are made” (Moses 2014).

The acceptance or rejection of GM food in Europe may not be a matter of great concern as long as its people and the actors along its agri-food supply-chain can afford to selectively avoid applications of modern technologies in agriculture. However, this is not the case for developing countries (Qaim 2009; Herring 2007), where a negative European stance on GM food can have the effect that poor farmers are denied access to potentially beneficial technologies and tools (Paarlberg 2008; Fedoroff et al. 2013). This negative externality is the real problem of the view that GMOs are banned or broadly unpopular in Europe: the costs of Europe’s first-world indifference and complacency about GM food are borne by those who can least afford to do so, i.e. by smallholders and consumers in poor countries who lose the opportunity to realize the benefits that current and future GM crops could bring them and help them improve their livelihoods.

⁶ For instance, reductions in input prices that are possible through the use of current GM crops may not affect the final price of processed food enough to send strong enough price signals to (dispersed) consumers that would incentivize them to get organized and demand GM food. Or, rather, where the use of GM crops does have a crucial impact on consumer prices, namely in the livestock sector, GM crops are already used to a large extent in the European Union – interestingly enough, foodstuffs derived from animals that were raised on GM feed do not need to be labeled and, moreover, when low-level presence of new GM material in imports threatened the cheap supply of feed for the European Union’s livestock sector, the European Commission defined a “technical zero” as threshold for such material (European Commission 2011), thus ensuring the continued supply of GM soybeans. As discussed above, farmers would cultivate GM crops if approved and suitable seeds were more widely available in the European Union, but as long as they are not – meaning there is a level playing field within the protected EU market and growing conventional crops might give them an edge in the non-GM market – EU farmers have no big incentive to press for a change of the status quo. Ditto for the EU food industry: Fear of an initial activist-driven backlash against the first company that introduces GM food on a large scale might well turn its introduction into a game of chicken in which the company loses that does the first step – even though there can probably be little doubt that any backlash will not last for very long, given the experience from numerous real food scandals that first upset EU consumers but then quickly are forgotten, be it horse meat in beef burgers, dioxin contaminations in animal food products, E. coli contaminated sprouts, glycol in wine, or many more (Wikipedia 2013). Unless the food industry manages to coordinate the introduction of food that is at least labeled as containing GMOs (given that its non-adventitious presence cannot be excluded), it cannot take advantage of any benefits that GM crops might offer (and hand part of it down to the consumers). However, it also means the situation is the same for all players, i.e. the situation represents a local equilibrium. And among the two actors that have a clear interest – seed companies in favor and activist groups against – it seems as if the latter are supported now and again by the media and politicians for which the topic might be more useful if, respectively, it generates headlines or allows demonstrating concern for a “public interest” at no obvious cost to themselves or their constituents.

References

- Agrimoney. 2013. “Catalan Farmers Keener on GM Corn than US Peers.” In *Agrimoney*, ed. Michael Verdin. Hereford: Agrimoney. www.agrimoney.com/news/news.php?id=5079
- Anderson, L. 2013. “Voting One Way, Eating Another.” *Modern Farmer*. Hudson, NY. <http://modernfarmer.com/2013/06/voting-one-way-eating-another/>
- Angulo, A.M. and J.M. Gil. 2007. “Spanish Consumers’ Attitudes and Acceptability towards GM Food Products.” *Agricultural Economics Review* 8(1): 50–64. <http://purl.umn.edu/42142>
- Aschemann-Witzel, J. and E.M. Niebuhr Aagaard. 2014. “Elaborating on the Attitude-Behaviour Gap Regarding Organic Products: Young Danish Consumers and in-Store Food Choice.” *International Journal of Consumer Studies* 38(5): 550–58. <http://dx.doi.org/10.1111/ijcs.12115>
- Bazoche, P., P. Combris, E. Giraud-Heraud, A. Seabra Pinto, F. Bunte and E. Tsakiridou. 2013. “Willingness to Pay for Pesticide Reduction in the EU: Nothing but Organic?” *European Review of Agricultural Economics*. <http://dx.doi.org/10.1093/erae/jbt011>
- Birnbaum, M. 2013. “At Trade Talks, U.S., E.U. Ready for Fight on Genetically Modified Crops.” *Washington Post*. Washington, DC. www.washingtonpost.com/8e61176a-bdb0-11e2-9b09-1638acc3942e_story.html
- Brook Lyndhurst. 2009. “An Evidence Review of Public Attitudes to Emerging Food Technologies.” *Social Science Research Unit Report*. London: Food Standards Agency. www.food.gov.uk/science/research/ssres/crosscutss/emerge
- Council of the European Union. 2007. “Council Regulation (EC) No 834/2007 of 28 June 2007 on Organic Production and Labelling of Organic Products and Repealing Regulation (EEC) No 2092/91.” *Official Journal of the European Union* L (189/50). Brussels: Council of the European Union: 1–23. <http://eur-lex.europa.eu/JOYear.do?year=2007>
- Delwaide, A.-C., L.L. Nalley, B.L. Dixon, D.M. Danforth, R.M. Nayga, E.J. Van Loo and W. Verbeke. 2015. “Revisiting GMOs: Are There Differences in European Consumers’ Acceptance and Valuation for Cisgenically vs Transgenically Bred Rice?” *PLoS One* 10(5): e0126060. <http://dx.doi.org/10.1371/journal.pone.0126060>
- European Commission. 2010. *An Analysis of the EU Organic Sector*. Brussels: European Commission. http://ec.europa.eu/agriculture/markets-and-prices/more-reports/pdf/organic_2010_en.pdf
- . 2011. “Questions and Answers on the Low Level Presence (LLP) of GMOs in Feed Imports.” *European Commission Memo*. Brussels: European Commission. [http://europa.eu/rapid/press-release MEMO-11-451_en.htm](http://europa.eu/rapid/press-release_MEMO-11-451_en.htm)
- . 2013a. “EU Oilseeds Trade 2011/12.” *Trade in Cereals, Oilseeds and Protein Crops, Rice*. Brussels: European Commission. http://ec.europa.eu/agriculture/cereals/trade/index_en.htm
- . 2013b. “EU Register of Authorised GMOs.” *Community Register of Genetically Modified Food and Feed*. Brussels: European Commission. http://ec.europa.eu/food/dyna/gm_register/index_en.cfm
- . 2013c. “GMOs in a Nutshell.” *DG Health and Consumers*. Brussels: European Commission. http://ec.europa.eu/food/food/biotechnology/qanda/d1_en.htm#d
- . 2013d. “Questions and Answers on EU’s Policies on Cultivation and Imports of GMOs.” *European Commission Memo*. Brussels: European Commission. [http://europa.eu/rapid/press-release MEMO-13-952_en.htm](http://europa.eu/rapid/press-release_MEMO-13-952_en.htm)
- Farmers Weekly. 2013. “Survey Results: What Farmers Really Think about GM.” *Farmers Weekly*. Sutton: Farmers Weekly. www.fwi.co.uk/articles/12/06/2013/139481/survey-results-what-farmers-really-think-about-gm.htm
- Fedoroff, N., R.S. Zeigler, T. Fagerström, S. Stymne, S. Jansson and J. Sundström. 2013. “Scientists Challenge Swedish Government over Funding of Golden Rice Trial Vandalism.” *Environmental News and Comment*. Oxford: Mark Lynas. www.marklynas.org/2013/10/scientists-challenge-swedish-government-over-funding-of-golden-rice-trial-vandalism/
- FiBL and IFOAM. 2013. *The World of Organic Agriculture 2013*. Frick and Bonn: FiBL and IFOAM.
- Food Standards Agency. 2013a. *Biannual Public Attitudes Tracker*. London: Food Standards Agency. <http://food.gov.uk/science/research/ssres/publictrackingsurvey/>
- . 2013b. *Exploring Public Responses to the Labelling of GM Food and the Use of GM-Free Labelling*. London: Food Standards Agency. www.food.gov.uk/science/research/ssres/foodsafetyss/gm-labelling/
- Gaskell, G., N. Allum and S. Stares. 2003. “Europeans and Biotechnology in 2002.” *Special Eurobarometer*. 2nd ed. Brussels: European Commission. http://ec.europa.eu/public_opinion/archives/eb_special_180_160_en.htm
- Gaskell, G., S. Stares, A. Allansdottir, N. Allum, C. Corchero, C. Fischler, J. Hampel, et al. 2006. “Europeans and Biotechnology in 2005: Patterns and Trends.” *Special Eurobarometer*. Brussels: European Commission. http://ec.europa.eu/public_opinion/archives/eb_special_260_240_en.htm
- GMO Compass. 2007. “These Products Do Not Require Labelling.” *GMO Compass*. Darmstadt: Genius GmbH. www.gmo-compass.org/eng/regulation/labelling/88.gmo_labelling_these_products_require.html
- . 2010. “Genetically Modified Plants: Global Cultivation Area Soybean.” *GMO Compass*. Darmstadt: Genius GmbH. www.gmo-compass.org/eng/agri_biotechnology/gmo_planting/342.genetically_modified_soybean_global_area_under_cultivation.html
- Greenpeace. 2012. “Gen-Food in Deutschland.” *Liste Gekennzeichneter Lebensmittel*. Hamburg: Greenpeace.
- . 2013a. “Gen-Alarm Bei Asia- & US-Produkten, Döner & Co.” *Liste Gekennzeichneter Lebensmittel*. Hamburg: Greenpeace.
- . 2013b. “Gen-Alarm Bei Süßigkeiten & Softdrinks.” *Liste Gekennzeichneter Lebensmittel*. Hamburg: Greenpeace.
- Grunert, K.G., S. Hieke and J. Wills. 2014. “Sustainability Labels on Food Products: Consumer Motivation, Understanding and Use.” *Food Policy* 44: 177–89. <http://dx.doi.org/10.1016/j.foodpol.2013.12.001>
- Gupta, S. 2013. “GM Crops Are a Global Threat, Warn Experts.” New Delhi: OneWorld South Asia.

- Herring, R.J. 2007. “The Genomics Revolution and Development Studies: Science, Poverty and Politics.” *Journal of Development Studies* 43(1): 1–30. <http://dx.doi.org/10.1080/00220380601055502>
- Hess, S., C.J. Lagerkvist, W. Redekop and A. Pakseresht. 2013. “Consumers’ Evaluation of Biotechnology in Food Products: New Evidence from a Meta-Survey.” *Agricultural and Applied Economics Association Annual Meeting*. St. Paul, MN: AgEcon Search. <http://purl.umn.edu/151148>
- Inghelbrecht, L. and M. Vandercammen. 2011. “Alimentation et Cultures Génétiquement Modifiées.” *Recherches et Analyses*. Brussels: CRIOC. www.crioc.be/FR/doc/x/y/document-6070.html
- Institute of Grocery Distribution. 2012. “Consumer Attitudes to GM Foods.” Hertfordshire: IGD. www.igd.com/our-expertise/Shopper-Insight/ethics-and-health/4130/Consumer-Attitudes-to-GM-Foods/
- Ison, J. and A. Kontoleon. 2014. “Consumer Preferences for Functional GM Foods in the UK: A Choice Experiment.” *AgBioForum* 17(1): 4. <http://agbioforum.org/v17n1/v17n1a04-kontoleon.htm>
- James, C. 2012. “Global Status of Commercialized biotech/GM Crops: 2012.” *ISAAA Briefs*. Ithaca, NY: ISAAA. www.isaaa.org/resources/publications/briefs/
- King’s College London. 2008. “Do European Consumers Buy GM Food? (‘Consumerchoice’).” *Framework 6 Report*. London: King’s College. www.kcl.ac.uk/medicine/research/divisions/dns/projects/consumerchoice/
- Kloor, K. 2013. “When Journalists Say Really Stupid Stuff about GMOs.” *Discover*. Waukesha, WI. <http://blogs.discovermagazine.com/collideascape/2013/06/03/>
- Knight, J.G., D.W. Mather, D.K. Holdsworth and D.F. Ermen. 2007. “Acceptance of GM Food: An Experiment in Six Countries.” *Nature Biotechnology* 25(5): 507–8. <http://dx.doi.org/10.1038/nbt0507-507>
- Lusk, J. 2013. “What Is Natural Food Anyway?” *Jayson Lusk Blog*. Stillwater, OK: Jayson Lusk. <http://jaysonlusk.com/blog/2013/6/11/what-is-natural-food-anyway>
- Mather, D.W., J.G. Knight, A. Insch, D.K. Holdsworth, D.F. Ermen and T. Breitbarth. 2011. “Social Stigma and Consumer Benefits: Trade-Offs in Adoption of Genetically Modified Foods.” *Science Communication* 34(4): 487–519. <http://dx.doi.org/10.1177/1075547011428183>
- Moses, V. 2012. “European Consumers and GM-Foods.” *BioTechnologia* 93(3): 277–83. www.biotechnologia-journal.org/journals/biotechnologia-933
- . 2014. “GM in the Media.” *GM Crops & Food* 5(2): 81–86. <http://dx.doi.org/10.4161/gmcr.32207>
- Paarlberg, R. 2008. *Starved for Science: How Biotechnology Is Being Kept out of Africa*. Harvard College. Vol. 5. Cambridge, MA: Harvard University Press. <http://books.google.com/books?id=fRcbkvo5X7IC&pgis=1>
- Pin, R.R. and J.M. Gutteling. 2008. “The Development of Public Perception Research in the Genomics Field: An Empirical Analysis of the Literature in the Field.” *Science Communication* 31(1): 57–83. <http://dx.doi.org/10.1177/1075547008327273>
- Qaim, M. 2009. “The Economics of Genetically Modified Crops.” *Annual Review of Resource Economics* 1: 665–94. <http://dx.doi.org/10.1146/annurev.resource.050708.144203>
- Royal Wessanen. 2013. “Annual Report 2012: Organic Is Our Choice.” Amsterdam: Royal Wessanen. <http://annualreport.wessanen.com/>
- Skevas, T., E.M. Kikulwe, H. Papadopoulou, I. Skevas and J. Wesseler. 2013. “Do European Union Farmers Reject Genetically Modified Maize? Farmer Preferences for Genetically Modified Maize in Greece.” *AgBioForum* 15(3): 242–56. <http://agbioforum.org/v15n3/v15n3a02-skevas.htm>
- Slovenian Delegation. 2013. “Information on International Conference on Furthering the Production of Protein Crops in the Danube and South European Region.” *Agriculture and Fisheries Council Note*. Brussels: Council of the European Union. <http://register.consilium.europa.eu/pdf/en/13/st13/st13670.en13.pdf>
- Soil Association. 2013. *Organic Market Report 2013*. Bristol: Soil Association.
- Spadaro, D., S. Alessandria and M.L. Gullino. 2012. “La Propensione Degli Agricoltori Piemontesi Alla Coltivazione Di Mais Geneticamente Modificato.” *Protezione Delle Colture* 2: 75–76. www.cabdirect.org/abstracts/20123315068.html
- Spence, A. and E. Townsend. 2006. “Examining Consumer Behavior toward Genetically Modified (GM) Food in Britain.” *Risk Analysis* 26(3): 657–70. <http://dx.doi.org/10.1111/j.1539-6924.2006.00777.x>
- Strom, S. 2013. “A Suspect Food Warning in Britain Spreads an Alarm.” *New York Times*. New York City, NY. www.nytimes.com/2013/06/06/business/gmo-label-on-kraft-mac-cheese-box-raises-alarm.html
- Thorne, F., D. Loughran, S. Fox, E. Mullins and M. Wallace. 2014. “Consumer Willingness to Pay for Genetically Modified Potatoes in Ireland: An Experimental Auction Approach.” *88th Annual Conference of the Agricultural Economics Society*. Paris: Agricultural Economics Society. <http://purl.umn.edu/169746>
- TNS Opinion & Social. 2008. “Attitudes of European Citizens towards the Environment.” *Special Eurobarometer*. Brussels: European Commission. http://ec.europa.eu/public_opinion/archives/eb_special_300_280_en.htm
- . 2010a. “Biotechnology.” *Special Eurobarometer*. Brussels: European Commission. http://ec.europa.eu/public_opinion/archives/eb_special_359_340_en.htm
- . 2010b. “Electromagnetic Fields.” *Special Eurobarometer*. Brussels: European Commission. http://ec.europa.eu/public_opinion/archives/eb_special_359_340_en.htm
- . 2010c. “Food-Related Risks.” Edited by TNS Opinion & Social. *Special Eurobarometer*. Brussels: European Commission. <http://dx.doi.org/10.2805/51162>
- Wikipedia. 2013. “List of Food Contamination Incidents.” *Wikipedia*. San Francisco, CA: Wikimedia Foundation. http://en.wikipedia.org/wiki/List_of_food_contamination_incidents