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**Dairies investment decisions in voluntary GM-free labeling standards in
Germany**

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Abstract:

Food suppliers in the European Union must comply with labelling regulations for genetically modified organisms (GMOs). However, excluded from mandatory labeling are food products derived from animals fed with GM feed (mainly GM soybean in the European Union). Because of this labeling exemption, consumers are unable to identify which animal products were derived without the use of GMOs. Therefore, Germany and other countries introduced voluntary 'GM-free' labeling legislations or guidelines that allow companies to signal that their products are 'GM-free'. In this paper we present the results of a survey among German dairy companies. We asked them whether they produce 'GM-free' and to assess the 'GM-free' market in terms of (1) the current status, (2) potential benefits, (3) limitations, and (4) risks. We find that smaller dairy companies mostly switch completely, whereas 'GM-free' production of larger dairy companies is often limited. The results indicate that for switching to 'GM-free' production, long-term effects such as the creation of a positive image or differentiation from competitors are more important than short term effects such as higher sales or turn over.

Keywords: Voluntary production standard, GM-free labeling, GMO, dairy

JEL codes: Q13, Q18

1 Introduction

The European Commission (EC) has decided to grant producers and consumers a freedom of choice to cultivate and consume the variety they prefer, be it genetically modified (GM), or not genetically modified (European Commission, 2010). Since the GM-trait is an unobservable characteristic the final product needs to be labeled, such that the consumer can identify a product that contains GM ingredients. This positive labeling is mandatory for almost all food products in the EU that contain GM ingredients.¹

In addition, a number of EU Member States have introduced national voluntary ‘GM-free’ labeling legislations or guidelines. This labeling covers products that are not covered by the EU regulation 1831/2003 on labeling of GMOs (European Commission, 2003), such as products derived from animals that were fed with GM-labelled feed. National legislations or guidelines either facilitate ‘GM-free’ labeling (e.g. in Austria, France, and Germany), are highly restrictive (e.g. in the Netherlands), or prohibit ‘GM-free’ labeling (e.g. in Belgium and Sweden) (European Commission, 2015).

In Germany, the use of the claim ‘ohne Gentechnik’ (without genetic engineering) is regulated through the ‘EG-Gentechnik-Durchführungsgesetz’ (2004) (EU genetic engineering implementation act). Firms may either use a national uniform logo or a firm-specific one; the only text allowed is ‘ohne Gentechnik’. In order for milk products to be labeled as ‘GM-free’ the animals in question should be fed with non-GMO feed. In addition, certificates and record keeping are required to prove the ‘GM-free’ claim (EG-Gentechnik-Durchführungsgesetz (2004)). The incremental costs need eventually be covered by the farmer, the milk processor (henceforth: dairy), the retailer, or the consumer.

In this article, we present the results of a survey of dairy companies on ‘GM-free’ production and labeling in Germany. The survey provides some insights on how producers view the market (development), benefits, limits, and risks of ‘GM-free’ production, as well as their motives to switch to ‘GM-free’ production. These insights are important for policy makers because the switching of producers to ‘GM-free’ affects feed trades and prices of livestock products.

Box 1: Methodology and sample description

In 2014 we approached all dairy companies in Germany, enquiring: a) whether they wanted to participate in the survey and b) if yes, whether they preferred an online or paper survey. We sent

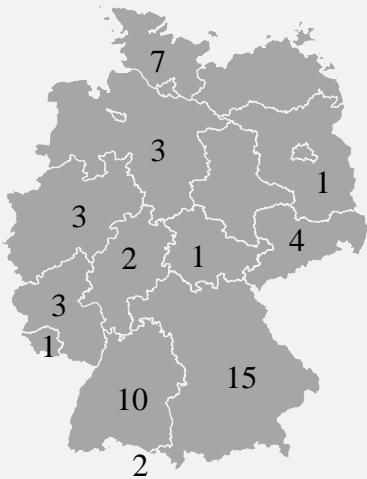
out 103 invitations for online surveys, and 14 postal surveys to the dairy companies that agreed. We received 38 completed online surveys, and 13 completed postal surveys. Thus we obtained a total of 51 responses.

The survey covered general information about the dairy, such as location, size and product range. The questionnaire also contains questions on ‘GM-free’ production. In the final part of the survey we asked the respondents to assess the development, benefits, limits and risks of the ‘GM-free’ market.

In total, we analyzed data of 12 conventional, 18 organic, and 21 non-organic ‘GM-free’ dairies (of which 24 are direct marketers, 16 are private companies, and 11 are cooperatives). Table 1 shows the sample distribution. The divergence between mean and median is due to the high number of small dairy producers and in addition an over-representation of small dairy companies in our sample and an under representation of dairy companies with intermediate

Table 1: Sample description (N = 12 conventional, 18 organic, 21 non-organic ‘GM-free’)

| Variable | |
|---|------------------|
| Amount of raw milk in 2013[10 ⁶ kg/year] | |
| - Mean (SD) | 85.35 (212.36) |
| - Median | 0.60 |
| Revenue in 2013 [Million Euro] | |
| - Mean (SD) | 338.38 (1870.75) |
| - Median | 1.00 |
| No. of suppliers | |
| - Mean (SD) | 222 (685) |
| - Median | 2 |



Map 1: Map of Germany with number of dairy companies in the survey

production.ⁱⁱ The country as a whole is covered, with a somewhat larger representation of the southern federal states (see Map 1). Two foreign dairies in the survey are from South Tirol and Switzerland.

2 The dairy companies and their ‘GM-free’ production

Of the 51 sampled dairy companies 76 per cent produced at least some ‘GM-free’ milk. Dairies processing ‘GM-free’ raw milk and those that process only conventional raw milk do not significantly differ in their milk volume processed, turnover, or number of suppliers. We find weak evidence of a difference in milk volume processed when the sample is split into conventional

producers, non-organic 'GM free' producers, and organic producers; the organic dairy producers are smaller.

Some 'GM-free' dairies produce only part of their products with 'GM-free' raw milk, which averages to only 36 per cent of their total raw milk. Dividing the dairy companies into small and medium/large changes the picture somewhat. For those dairies that produce 'GM-free' and process less than 5000 tonnes per year, the 'GM-free' percentage is on average 96 per cent, whereas for those 'GM-free' dairies that process more than 5000 tonnes per year the percentage is 53 per cent. Thus, while almost all smaller 'GM-free' dairies produce completely 'GM-free', this does not hold for the larger dairies. Part of the reason is that smaller dairies in the sample are organic, obliging them to produce 100 per cent 'GM-free'.

The reasons why dairies do not completely switch differ. Answers from the survey included among others: 'Labeling 'GM-free' for certain products not allowed', 'On requests of the individual suppliers', 'Demand and supply of 'GM-free' milk' and 'Because it fits our brand'. Interestingly, the non-organic 'GM-free' producers do not always label their products as 'GM-free', even if they have completely switched, and are not covered by another label.

3 Perception of the 'GM-free' market, benefits, limits, and risks

In the survey we asked the participants to specify their level of agreement or disagreement to some questions about the market for 'GM-free' products on a Likert scale from 1 ('completely disagree') to 6 ('completely agree'). The questions ask how they judge the market situation, what potential benefits they see, what factors limit them in switching to 'GM-free', and what risks they see. The results are presented in Figures 1, 2, 3 and 4.

The Figures display a number of striking similarities and differences. Parallel profiles for organic, non-organic 'GM-free', and conventional dairies show that on average all dairies agree on the ranking within one group of statements. The magnitude of the individual statements, however, differs significantly. Organic producers are the most positive about the 'GM-free' market development and judge the overall benefits as higher. They are also least negative about the limits and potential risks of 'GM-free' production. On the other end of the scale are the conventional producers. They perceive the current and future market for 'GM-free' products as small, and rank the benefits lower. Also, they judge the risks as higher and consider themselves to be more limited by external factors. The non-organic 'GM-free' producers fall in between these two groups, but tend a bit more towards conventional producers.

3.1 The 'GM-free' market and its development

The surveyed dairies are moderately positive about the current market situation for 'GM-free' (see Figure 1). Conventional dairies are not overly negative, even though they tend to disagree with statements about the positive market situation for 'GM-free' products (see figure1)**Fehler!**

Verweisquelle konnte nicht gefunden werden.. Conventional producers also tend to view the future of 'GM-free' production as a niche market.

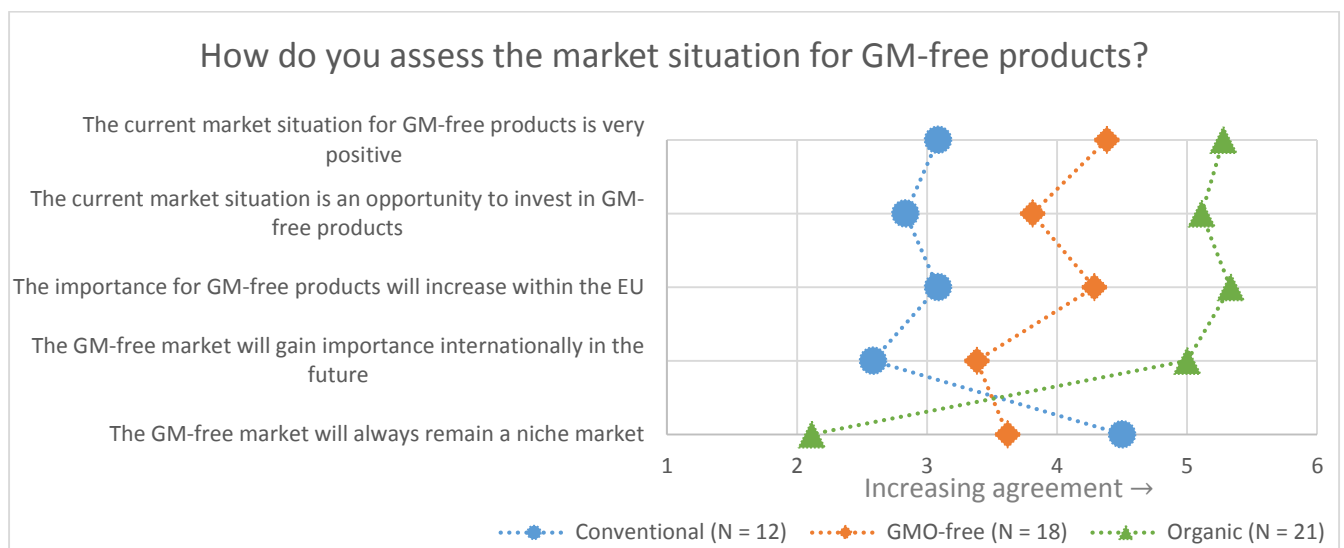


Figure 1: Current and future market for 'GM-free'. Shown are the means of the responses for each group. The scale runs from 1= completely disagree to 6=completely agree.

3.2 Benefits of 'GM-free' production

Dairies of all three types agree on average that a potential benefit of 'GM-free' production is the positive impact on their image, and a potential to differentiate themselves from their competitors. Answers by conventional and non-organic producers also indicate a lower vulnerability to NGO attacks. These three effects can be considered as long-term benefits. For the organic producers the production of safe food is considered an important benefit, too, but this is much less important for the conventional and non-organic 'GM-free' producer (figure 2). Additionally, non-organic 'GM-free' and organic dairies stronger agreed that 'GM-free' is supportive for regional production. The three groups of dairies have less common agreement on economic measures such as higher sales, higher value added to milk products, higher turnover, or higher profits, which we consider to be short-term effects.

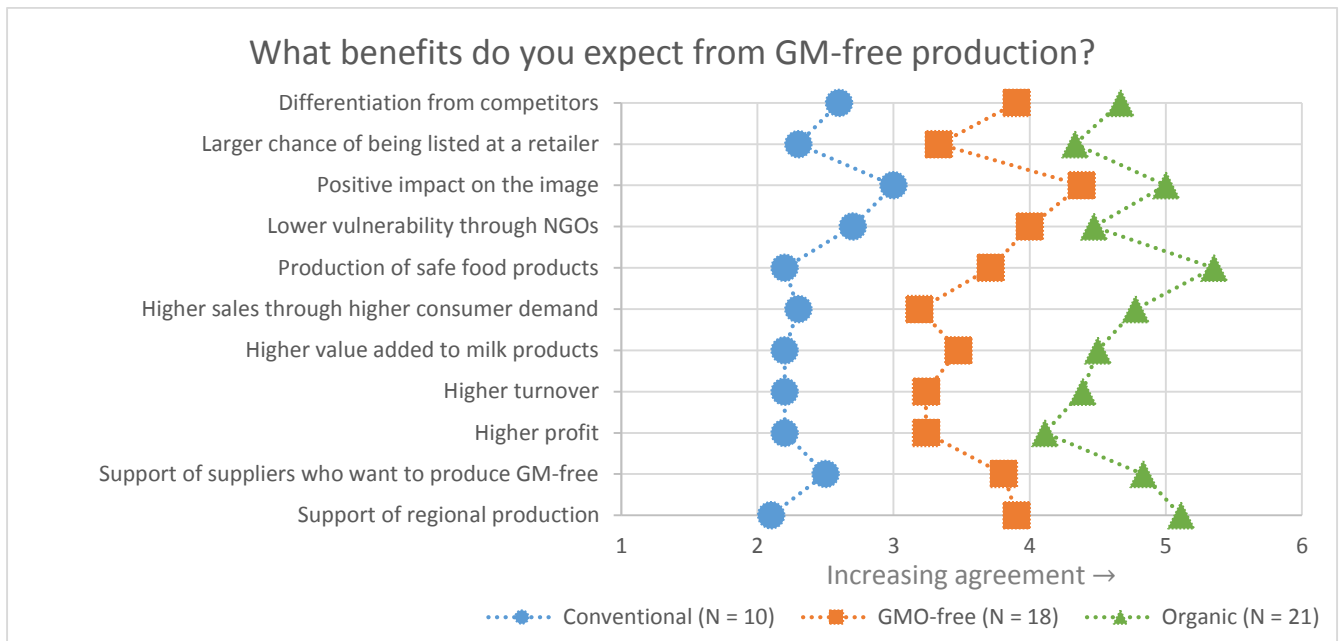


Figure 2: Potential benefits of ‘GM-free’ production. Shown are the means of the responses for each group. The scale runs from 1= completely disagree to 6=completely agree.

3.3 Limitations to switching to ‘GM-free’

Considering the limits to ‘GM-free’ production, one statement stands out because all dairy companies hold the same opinion both in ranking and magnitude: all dairy companies think that production capacity is not a limiting factor for ‘GM-free’ milk production (see Figure 3). On a few other statements the non-organic ‘GM-free’ and conventional dairy companies hold the same opinion, but the organic dairy companies do not. Both, the conventional and non-organic ‘GM-free’ dairy companies find themselves limited by a low willingness of consumers to pay for ‘GM-free’ milk and by the prices of ‘GM-free’ feed. These are also the most important factors within this series of statements. This perception of low willingness to pay of consumers and high ‘GM-free’ input prices is in line with the low agreement the ‘GM-free’ production creates higher profits.

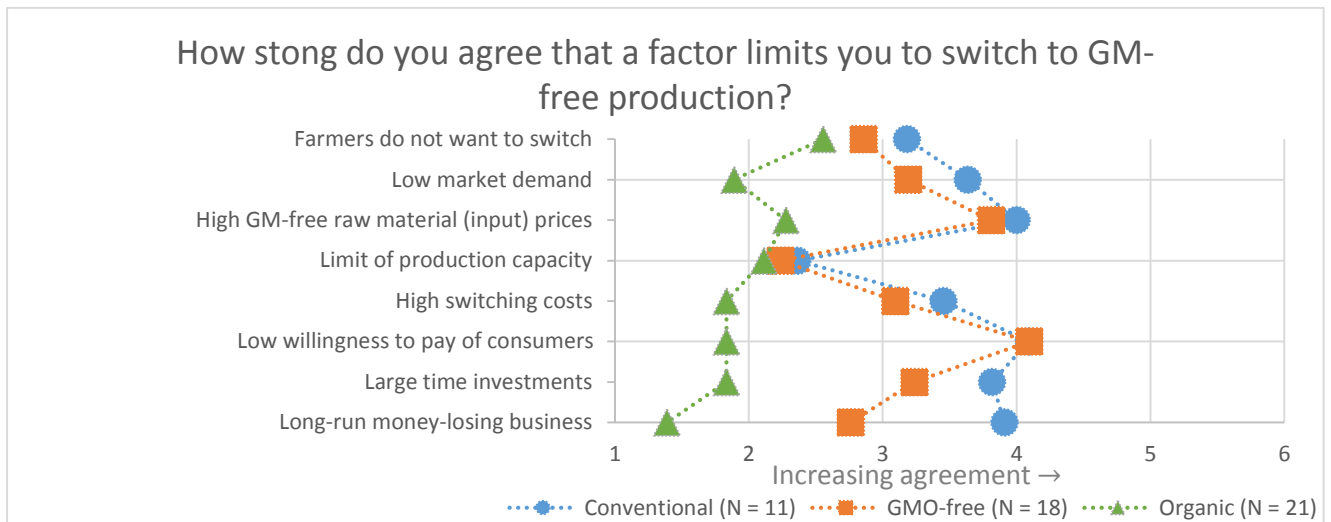


Figure 3: Limits switching capability to ‘GM-free’ production. Shown are the means of the responses for each group. The scale runs from 1= completely disagree to 6=completely agree.

3.4 Risks of ‘GM-free’ production

In terms of risks the most important ones are problems associated with raw milk impurity: the risk of being held liable for non-compliance to the production standard and the risk of damage to the image of the dairy company in case of impurity. This risk is real: even within our small sample two dairy companies report having had problems with impurity in the past. A statement on risk to which conventional and non-organic ‘GM-free’ producers agree on both the magnitude and rank is the availability of ‘GM-free’ feed (see figure 4). Conventional producers also see a higher risk that ‘GM-free’ certification requirements may increase. Again, overall the dairy companies are divided on whether or not ‘GM-free’ production is risky or not. Conventional dairies see the most risks; organic ones see hardly any risks.

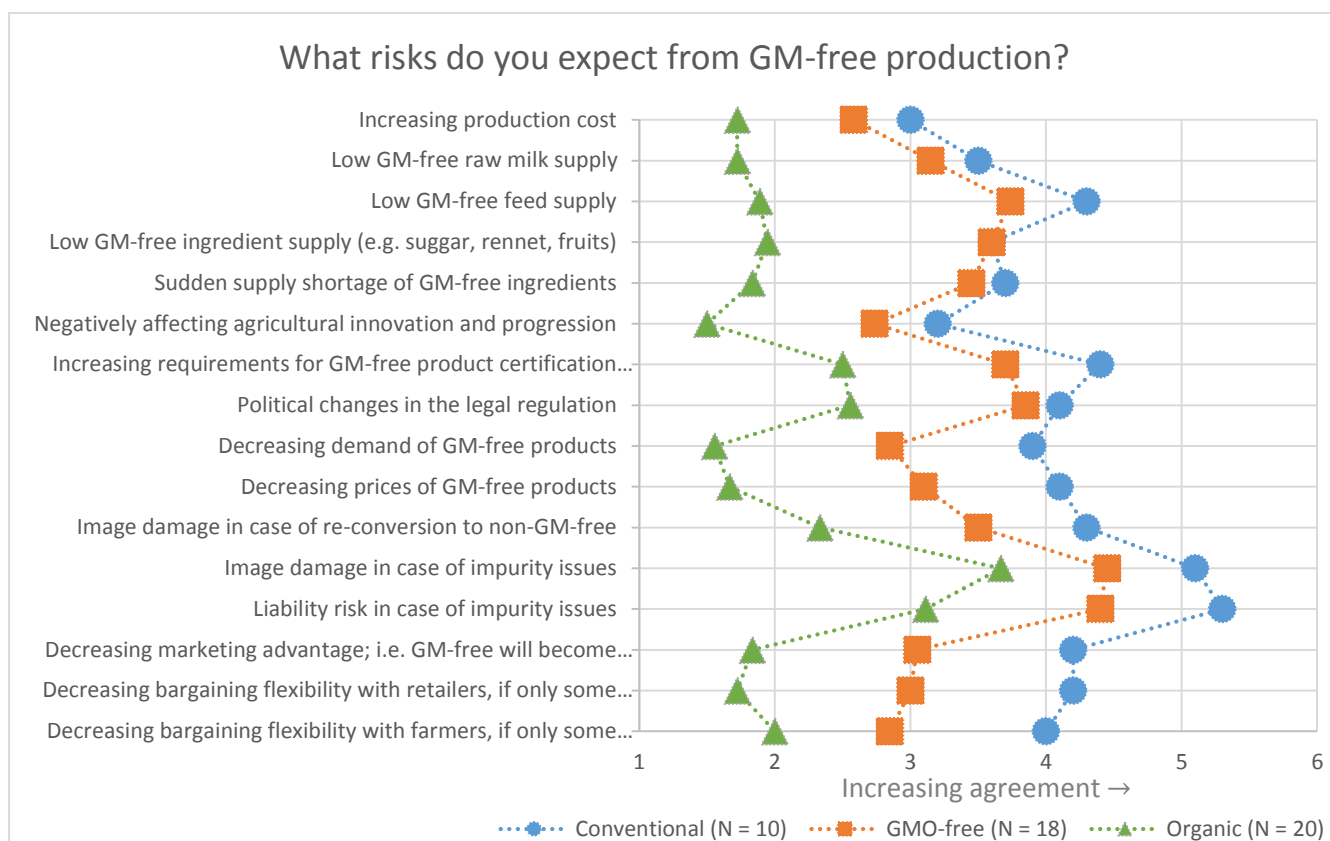


Figure 4: Potential risks of ‘GM-free’ production. Shown are the means of the responses for each group. The scale runs from 1= completely disagree to 6=completely agree.

4 Key findings and factors influencing the future ‘GM-free’ market

Overall the survey results provide an overview of how the actual or potential users of ‘GM-free’ labels perceive the market. Dairy companies that produce ‘GM-free’ or organic are generally more positive about the market and its development than conventional dairy companies. The observation, however, is ex-post and as such it is difficult to say whether the positive perception was present in the first place or is an effect of learning. The findings of this limited sample do not allow for generalization but may indicate which factors impact whether the ‘GM-free’ market will expand or remain a niche market.

Assuming profit maximizing firms, producers will likely switch to produce ‘GM-free’ if consumers’ willingness to pay increases and/or variable as well as f costs decrease. However, the survey results indicate that short term economic benefits such as higher profits may not play as an important role in the current ‘GM-free’ market than long term effects such as image improvement or a lower vulnerability to NGO attacks. That is, if a positive long term effect exists, firms may

benefit from ‘GM-free’ production in the long run, even if consumers marginal willingness to pay is low.

Other two factors that are likely to impact the future of the ‘GM-free’ market (mainly through a reduction of risks) are political ones: decision on supporting protein feed production and decisions on requirements for labeling. The political support of protein production in the European Union plays a role because soybean meal is the major input that farmers need to replace when switching to ‘GM-free’. Requirements for labeling play a role because the stricter a labeling requirement, the costlier its compliance. Whether stricter standards would increase consumer’s willingness to pay, however, is unclear. Given the perceptions stated in this survey it is likely that the ‘GM-free’ market will continue to exist if the current labeling policy remains.

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ⁱ An exception is made for ‘accidental or unavoidable’ presence of GMOs (often referred to as ‘adventitious presence’), in case it amounts to less than 0.9 per cent of the single ingredient (European Commission, 2003).

ⁱⁱ The last year for which the population distribution of the amount of raw milk processed is available from the Germany Federal Ministry of Food and Agriculture is 2009.