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# The impact of the EU GMO policy on the competitiveness of the livestock industry

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**Abstract**

The stringent GMO policy of the EU adversely affects the competitiveness of the member states' livestock industries, in particular the poultry and pig sectors. This arises from the fact that the EU animal industry is highly dependent on the import of feedstuffs sourced from pro-GMO countries. The import is expected to face increasing difficulties especially due to two elements of the EU GMO policy: the prolonged approval process of new GM varieties and the zero tolerance threshold towards GMOs that have not yet received authorization. To overcome this problem the study recommends actions including the speeding up of the authorisation process and the introduction of a tolerance level for unapproved GMOs.

**Keywords**

EU GMO policy, zero tolerance threshold, asynchronous authorisation, soybean imports

## 1. Introduction

Over the last twelve years the cultivation of genetically modified (GM) crops have rapidly developed worldwide, especially in North and South America. All countries that play a key role in the agricultural market have adopted GM varieties on a large scale. The only exception is the European Union (EU) which created an unfavourable climate towards genetically modified organisms (GMOs). This anti-GMO stance creates advantageous economic circumstances for many players in the agricultural industry. But there are sectors being adversely influenced by the strict EU GMO policy. One of the most affected sectors is the livestock industry. This is because the EU feed industry is highly dependent on the import of soybean and – to a lesser extent – maize products. These feedstuffs are mainly sourced from countries where GMOs are widely used. Imports of these raw materials are expected to face increasing difficulties due to longer approval procedures of new GM varieties. The approval procedure in the EU takes at least twice as long as countries supplying feedstock.

This mismatch in time (so-called asynchrony) has not yet caused severe trade disruptions because there have been only a few GM varieties dominating the soybean and maize areas in the exporting countries. But the number of new GM varieties is likely to rise considerably in the future. Unless the laggard authorisation of new GM varieties speeds up, the import of EU soybean and maize is likely to encounter great difficulties. There will be GM varieties which have already been authorised in the supplier countries, but not (yet) in the importing EU. On top of that, this asynchronous approval couples with the operation of a zero tolerance threshold towards GM varieties that have not yet been approved (EU-unapproved GMOs). The EU does not tolerate the presence of unapproved GMOs, even as traces in a batch.

Given the complexity of the supply chain, it tends to become increasingly difficult to completely segregate EU-tolerant[2] varieties from EU-unapproved GMOs in times of quick expansion of new GM crops in the exporting nations. This results in a great upward pressure on the feed prices in the EU, leading to the loss of competitiveness in the husbandry sector.

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[2] EU-tolerant soybean – all soybean varieties that can be exported to the EU (EU approved GM soybean and non-GM soybean)

Numerous studies have been published on the effects of the EU GMO policy recently. (e.g. Aramyan et al., 2009; Backus, 2008; Cardy-Brown, 2008; DG AGRI, 2007) They outline several possible scenarios covering a wide spectrum of outcomes for the coming years. What they have in common is that they all forecast a massive spike in the soybean price unless the EU changes its GMO policy.

**Objectives**

The principal objectives of the study are (a) to analyse what negative impacts the EU GMO policy has on the competitiveness of various livestock sectors; and (b) to determine the possible measures that the EU need to take to overcome this problem. More specifically, the study analyses the following target areas:

- What influence do two key elements of the EU GMO policy – the prolonged approval system and the zero tolerance threshold – have on the import of soybean and maize products?
- Which animal sectors are the most affected by the rising price of these feedstuffs?
- What unpredictable factors in the exporting countries do affect the import of these raw materials?
- What is the scope of action for the EU to tackle this problem?
- What measures could the EU use most effectively to overcome the challenges?

**Methods**

The study has been based largely on relevant survey results conducted by the European Commission, the European Feed Manufacturers' Federation (FEFAC) and the Dutch Agricultural Research Institute (LEI). Numerous international literature supports the analysis (e.g.: Desquilbet, 2009; Lin and Johnson 2004; Brookes, 2002; Buckwell at al., 1999). The database of the FAO, USDA and the Hungarian Research Institute of Agricultural Economics has also been used in the examination. The study focuses mainly on soybean products, because the difficulties with soybean imports cause more problems in the EU livestock industry than maize imports.

## 2. Results

The first part of this chapter describes the importance of soybean imports in the EU. It covers the degree of dependency of the EU on imports from third countries and the replacement possibilities of this crucial protein-rich feedstuff. Then, the root of the problem is discussed: in what way does the European anti-GMO stance make the sourcing of soybean costly and impossible for the feed industry. The paper attempts to provide an answer on why the import of these feedstuffs comes under increasing threat in the light of the global trends. Also, the various animal sectors are analysed: which ones are the most sensitive to the fluctuation of soybean price. Lastly, the chapter focuses on the measures that the EU can take to overcome the problem.

### 2.1. The EU dependency on soybean imports

The EU animal sector is highly dependent on importing large quantities of soybean products from third countries. Soybean products play a crucial role as a protein-rich source in the feed of livestock. The degree of self-sufficiency of the EU in protein rich feedstuffs is only 28%. When it comes to soybean its rate is 3%. (FEFAC, 2009). In 2008, the EU-27 imported around 40 million tonnes

of soybean products, mainly taken up by the feed industry. The bulk of the imported raw materials comes from Brazil, Argentina followed far behind by the USA (Figures 1 and 2).

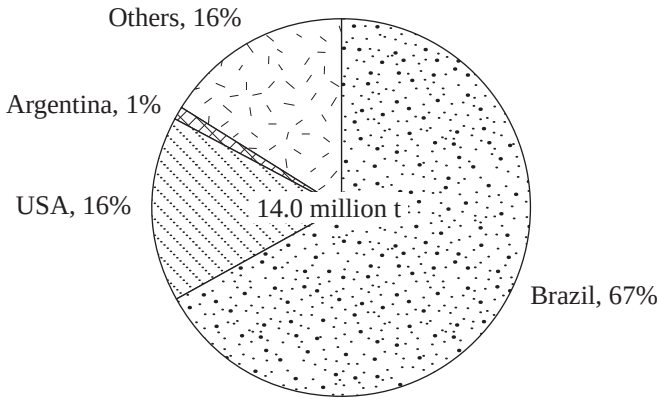


**Figure 1: Source of EU 27 soybean imports (2008)**
Source: Barros (2009)

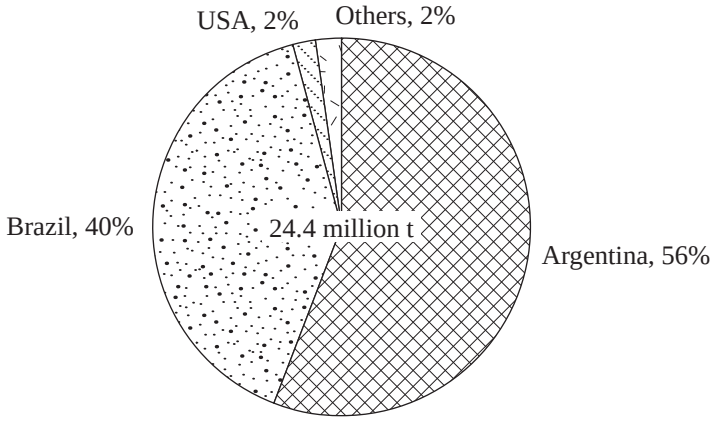


**Figure 2: Source of EU 27 soybean meal imports (2008)**
Source: Barros (2009)

**Substitutes for soybean**

There are limited possibilities for the EU to substitute the North- and South American soybean imports with alternatives because the climatic conditions narrow the scope to grow soybean on large scale in other regions. Besides, the alternative feedstuffs are not competitive enough. Substitutes can be derived from oil crops such as rapeseed or sunflower as well as protein crops like field peas or sweet lupins. But the production of these crops in the EU is costly compared to the soybean imports. (Vahl, 2009) This is a major problem because the production of compound feed is mainly

optimised on the basis of price. Small price differences can have major consequences, mostly on a globalising market. In addition, the alternative feedstuffs have less favourable nutritional composition (Cardy-Brown, 2008). According to DG AGRI (2007), at most 10-20% of the EU soybean import could be replaced by alternative protein-rich feedstuffs.

### 2.2. Soybean imports come under threat

The EU stance towards GMOs may suggest the use of GM products is quite low in Europe. But the reality reveals the opposite, at least when it comes to the feed industry. The EU livestock sector is highly dependent on the import of soybean. This raw material is mainly sourced from Brazil, Argentina and the USA where GM soybean is used extensively. The supply of this raw material in the EU encounters increasing difficulties as the EU GMO policy places a burden on the import of this GM feedstuff.

#### Asynchronous authorisations

In the oilseed exporting nations the approval process of new biotech traits is very quick compared with the EU. For example the authorisation procedure that takes on average 15 months in the USA requires at least 2.5 years in Europe. As the result, GM varieties authorised by supplier countries tend to spread on the global market without having a green light in the EU. In addition, this asynchrony is increasing very fast as the development of new biotech varieties gathers pace.

Until now there has not been severe disruptions on the soybean market due to the fact that there have been only two GM varieties dominating the GM soybean producing areas around the world since 1996. These varieties are called *Roundup Ready* (*RR*) and *Roundup Ready 2* (RR2). Both varieties have received green light for feed production in the EU (GMO-compass, 2010). The real threat draws from the fact that there is a considerable increase in the numbers of new varieties in the pipeline compared to what is presently on the market. There are currently nine new GM soybean varieties in the advanced R&D pipeline that are expected to be commercialised in the near future. Moreover, according to the forecasts the number of "commercialised events" will increase to 17 by 2015 (Stein and Rodríguez-Cerezo, 2009).

#### Zero tolerance stance

The major problem arises from the EU zero tolerance level coupled with the asynchronous approval procedure. This zero tolerance policy does not tolerate any biotech varieties – even as traces in a batch – that has not approved (yet) in the EU. Given the complexity of the soybean production chain, it is very difficult and costly for the operators to guarantee the absence of certain GM traits in the traded commodities. Along the whole supply chain extra measures have to be taken to keep the EU-tolerant GMOs separated from EU-unapproved GMOs (Figure 3). The mixing of products most likely occurs due to cross-pollination or traces left in containers and machines. But co-mingling can happen at any stage from breeding to distribution.

As the EU non-approved GMOs gain market share in the exporting countries, the segregation becomes increasingly difficult for EU-tolerant GMOs. The risk of contamination[3] grows and the sustainability of the EU food industry comes under serious threat. The costs of these extra measures for segregation – or so-called Identity Preservation (IP) – are analysed by a number of studies (Desquilbet, 2009; Lin and Johnson 2004; Brookes, 2002; Buckwell at al., 1999).

[3] The word "contamination" refers to 1. the presence of EU unapproved GMOs in a batch of non-GMO or EU approved GMOs; 2. the presence of EU approved GMOs in a batch of non-GMO

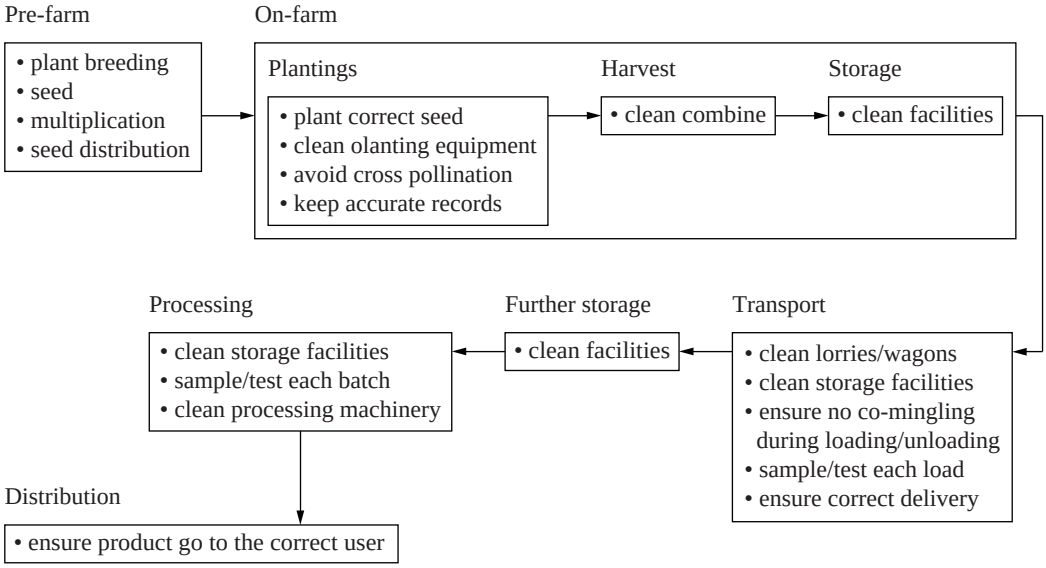


**Figure 3: Stages and necessary measures of segregation**

Source: own drawing based on the figure of Buckwell et al. (1999)

**Emerging Asian markets**

The situation is more alarming at a time when the EU is losing share in the global trade of agricultural products. Until recently the exporting nations took an interest in synchronising their authorisation process with the EU to some extent because the European imports made a great demand on the world market. But due to the emerging consumer markets of Asia (Figures 4 and 5), the suppliers are no longer bothered to match the strict EU requirements because their consignments are rather shifted to Asia.

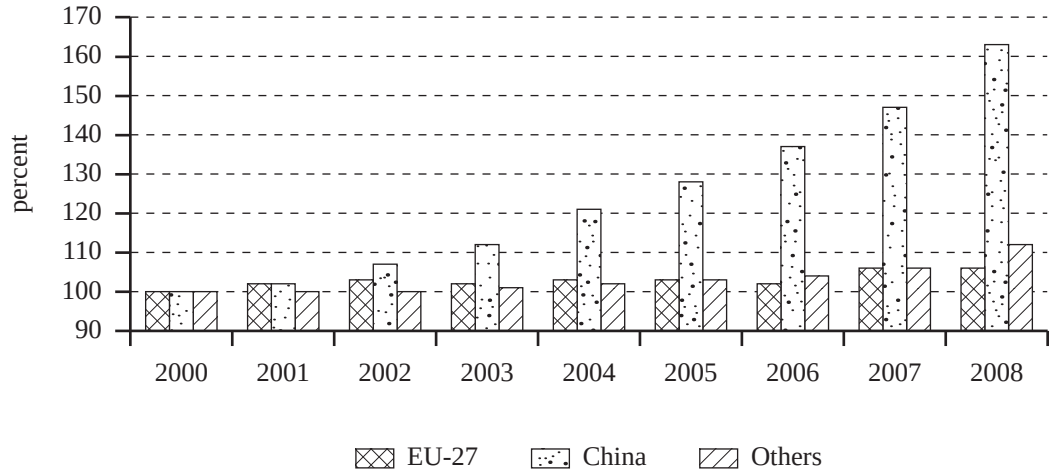


**Figure 4: Evolution of global compound feed production (Index 100 = 2000)**

Source: FAOstat (2009)

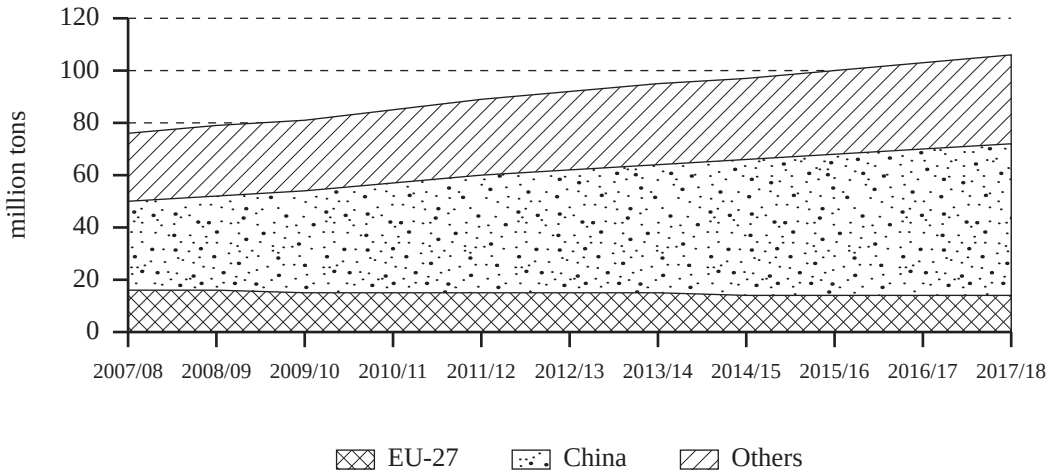


**Figure 5: Outlook (2008-2017) – Global soybean import**
Source: USDA (2008)

**Similar situation with maize products**

Beside soybean, the EU feed industry imports maize products (maize grain, DDG[4] and CGF[5]) from North and South America. These imports account for significant volumes in the years of poor harvest in Europe (including Serbia and Ukraine). But the slow EU approval process of GM varieties affects negatively the maize imports as well.

The USA used to be the major importer of maize products in the EU but the supply from the USA has greatly declined over recent years as the uptake of new GM varieties speeded up in North America. The operators are no longer willing to guarantee the absence of unwanted GM traces in the shipments. The EU can replace the greater part of the missing maize products from Argentina and Brazil where the approval of GM varieties is still in its initial phase. But imports are costlier from these countries than from the USA (e.g. the price premium for maize from Brazil was 50 €/tonne in 2008) (Cardy-Brown, 2008). The difficult import of maize products can further increase the price of feedstuffs in the EU. But this paper mainly focuses on the problems with soybean imports, as maize products have more alternatives for their replacement.

**Uncertainties around the economic effects**

Over the last two years numerous studies (Aramyan et al., 2009; Backus, 2008; Cardy-Brown, 2008; DG AGRI, 2007) analysing the adverse effects of the zero tolerance threshold and the laggard approval procedure in the EU were published. They outlined several scenarios covering a wide spectrum of outcomes. The one thing they have in common is that they all forecast a massive spike in the price of soybean unless the EU policy makers intervene. However, these effects cannot be easily quantified due to a number of unpredictable factors in the main exporting countries. Unforeseeable factors in Brazil, Argentina and the USA include:

- Speed at which the new varieties come to the market;
- Willingness of the operators in the supplier countries to fulfil the strict requirements of the EU;

[4] DDG: distillers dried grain which is by-product of bioethanol and starch production
[5] CGF: corn gluten feed which is by-product of bioethanol and starch production

- Willingness of the policy makers in the exporting countries to synchronise the GMO approval system with the EU regulations;
- Progress of the emerging Asian markets and its influence on the global soybean market;
- Size of area illegally sown to GM varieties that are not approved yet even in the exporting countries;

It would be very important to analyse these factors further in depth because this could help to assess the effects of the EU GMO policy more accurately.

### 2.3. Most affected livestock sectors

To assess the impact of the rising price of soybean on the profitability of the different livestock sectors, we have to examine the soybean meal content of various compound feeds and the share of feed costs in the total production costs in various animal sectors.

#### Soybean in feed

As an important protein source soybean plays a crucial role in feeding most livestock. In addition, its replacement in compound feed is strictly limited – contrary to other feedstuffs like maize. Based on the data by Profundo (Van Gelder et al., 2008), soybean plays the most important role in poultry and pig sectors in terms of soybean content of compound feed in the EU. Soybean meal accounts for 36.8% at broilers and 28.8% at pigs in compound feed (Figure 6).

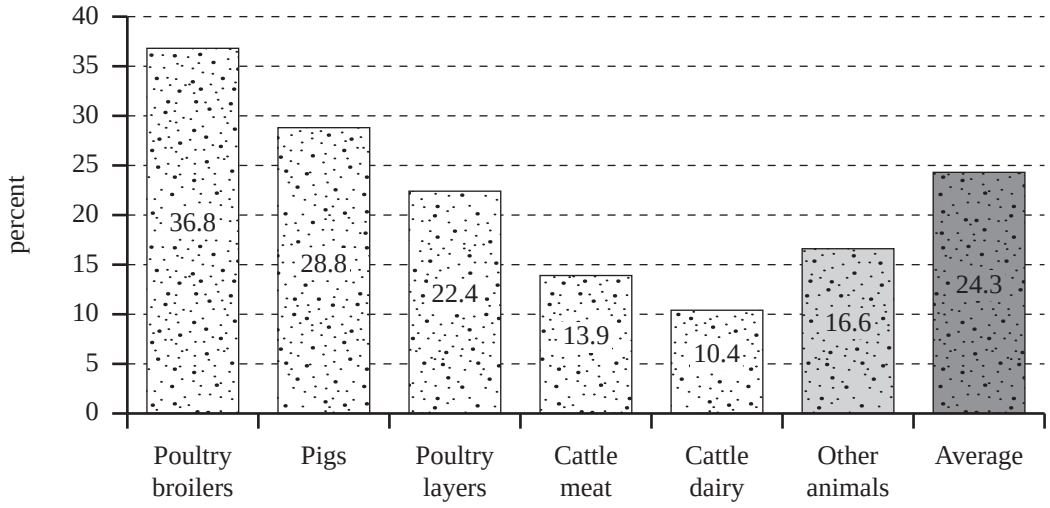


**Figure 6: Soybean meal content in compound feeds in the EU-27 (2007)**
Source: Van Gelder et al. (2008)

#### Feed costs in total expenditure

In general, the feed costs make up the biggest share of the total production costs in the animal sectors. Therefore these costs have the largest effect among the different expenditures on the profitability in the livestock industry. Figure 7 uses data of Hungarian Research Institute of Agricultural Economics (AKI) on the share of feed costs in the total expenditure in the various livestock sectors in Hungary. The numbers show the proportion of feed costs is by far the highest in the poultry sector

(61.6%). Given these numbers, we can conclude that the poultry sector is by far the most affected by the rising soybean price. Pig sector is also highly sensitive to the soybean price fluctuation.

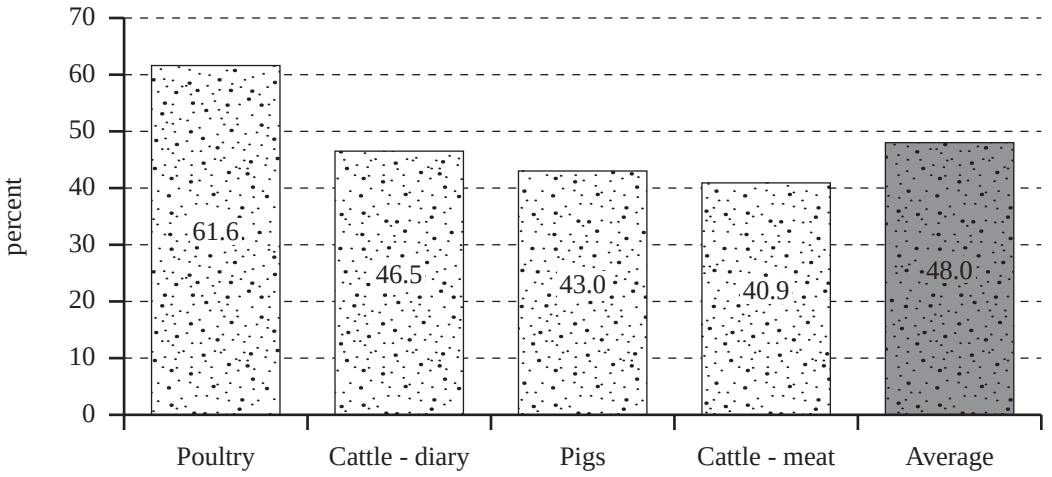


**Figure 7: Feed cost in total production cost in the different livestock sectors in Hungary (2007)**
Source: AKI (2008)

### 2.4. Options to overcome the problem

The analysis reveals the competitiveness of the EU poultry and pig sector is under serious threat. To tackle the problem there is some scope for action for the EU. These measures are listed below with their advantages (+) and disadvantages (-).

1. **Modifying the zero tolerance threshold** – the introduction of a minimal tolerance level for GM varieties that have already received approval in the supplying country but are still under authorization in the EU.
   + A threshold value would assure the suppliers that their shipments can enter the EU even if the consignment contains minimal traces of EU-unapproved GMOs. This could significantly facilitate the import of soybean and maize from third countries.
   - A tolerance limit entails the easing of the EU standards on GMOs. This could increase the health risk of the imported feedstuffs.

2. **Speeding up the approval process of GMOs** – used for narrowing the gap in time of approval procedures in the EU and the supplier countries.
   + Shorter length of authorisation could reduce the number of EU-unapproved varieties. This could encourage the export of feedstuffs to the EU.
   - The faster approval of GMOs could decrease the effectiveness of the EU's risk assessment procedures.

3. **Replacing soybean with alternative feedstuffs** by encouraging the production of alternative protein-rich crops with subsidies.
   + Alternative feedstuffs could decrease the dependency of the EU feed sector on soybean imports from third countries.

- The large-scale substitution of soybean with other oilseeds and protein crops encounters severe economic constraints because the cultivation of these alternatives is not competitive (as discussed in the "Substitutes for soybean" section).

4. **Campaigns for high-quality domestic products** – used for raising the awareness of the consumers that they can support the maintenance of the high-standardised EU food production by preferring the expensive EU meat.
   + Conscious consumers increase the demand of EU livestock products even in the case of their less competitive price.
   - The financial crisis and the decreasing purchasing power of the EU consumers undermine the success of the campaign.

5. **Providing technical support for segregation** in the exporting countries (e.g. improving the sampling and detection of GMOs or facilitating regions where EU-tolerant varieties are concentrated)
   + Technical support could enable the suppliers to meet the strict EU standards.
   - The EU has limited competence to influence the segregation practice in third countries.

The introduction of a tolerance level for EU-unapproved varieties is the most urgent step as it is to counter the negative short-term impacts. In the long run, speeding up the EU approval process is the solution. The other measures can only mitigate the problems.

## 3. Summary and conclusions

The analysis shows the EU livestock sector is under serious threat. This danger is mainly due to two elements of the EU GMO policy: the prolonged approval process and the zero tolerance threshold towards GM varieties that have not received authorisation (yet) in the EU.

The EU is highly dependent on imports of soybean products. There is no alternative but to source these feedstuffs from countries where GM varieties are widely used. The problem boils down to the fact that the authorisation of new varieties is likely to speed up in the supplying countries and the cumbersome EU approval process will not be able to follow it. This situation is exacerbated by the EU zero tolerance threshold.

EU imports have been a great demand on the world soybean market. Brazil, Argentina and the USA have been dependent on the EU market and they have been willing to adjust their approvals to the EU GMO policy to a certain degree. But because of growing demand from emerging consumer markets in Asia, they tend to feel less obliged to comply with the strict regulations of the EU and their consignments can be rather shifted to the Asian countries.

Since poultry and pig sectors are the most sensitive to soybean price fluctuation, they are the most affected by the EU GMO policy. The rising cost of soybean entails a serious adverse impact on the profitability of these sectors. This makes the operation of many EU poultry and pig farms unsustainable unless the present GMO policy radically changes.

The loss of competitiveness poses a severe threat to the EU animal sector. More efficient South American livestock farmers, notably from Brazil, may soon squeeze out the domestic products from the EU market. Hence the consumers in the EU will have to face the dilemma: give up their resistance to GMOs or eat Brazilian meat having been reared on EU-unapproved GM crops.

The current global trends of food industry as well as energy and environmental policy will require radical changes in the mindset of EU policy makers. The demand for agricultural products is projected to double in the next two decades as the result of growing population and the expanding biofuel production. However, the further enlargement of the current arable land areas is severely limited and the changing climate significantly deteriorates the conditions of farming in many parts of the world. These challenges do not leave any other option for humankind but to increase the productivity of agriculture. This will inevitably result in the further rapid expansion of GM crops around the world.

Among these global trends the EU is facing the decision whether to sustain the strict GMO standards by sacrificing a great part of its animal sector. It is a tough decision as the EU animal sector contributes around 40 per cent to the total agricultural income. I expect EU policy makers to ease the strict GMO policy in the coming years forced by the danger of losing a considerable part of the EU animal sector.

## References


1. **AKI (Research Institute of Agricultural Economics)** (2008): Results of Hungarian FADN farms. http://www.aki.gov.hu/
2. **Aramyan L., Wagenberg C., Backus G.** (2009): EU Policy on GM soy. Tolerance threshold and asynchronic approval. Report 2009-052 LEI Wageningen UR, The Hague.
3. **Backus**, G.B.C., **Berkhout**, P., **Eaton**, D. J. F., **Franke**, L., **de Kleijn**, A. J., **Lotz**, B., **van Mil**, E. M., **Roza**, P. **and Uffelmann**, W. (2008): EU policy on GMOs: a quick scan of the economic consequences. LEI Report 2008-070. The Hague: Wageningen University and Research Centre.
4. **Barros**, H. P. (2009): EU 27 soybean and soybean meal imports in 2008. ABIOVE (Associação Brasileira das Indústrias de Óleos Vegetais) Personal communication.
5. **Brookes**, **G** (2002): Identity preservation of genetically modified organisms in the food chain: requirements, methods, and costs. J AOAC Int. 85(3):762-767.
6. **Buckwell**, A., **Brookes**, G. and **Bradley**, D. (1999): Economics of Identity Preservation for Genetically Modified Crops. CEAS Consultants, Wye, England.
7. **Cardy-Brown Co. Ltd.** (2008): Impacts of EU unauthorised GMs on the feed & livestock sectors. Report for submission to the European Sherpa Group. 10th October 2008. http://www.cardy-brown.com/wp-content/uploads/2009/01/impacts-of-eu-unauthorised-gms-on-the-feed-livestock-sectors.pdf
8. **Desquilbet, M. and Bullock**, S. (2009): Who pays the costs of non-GMO segregation and identity preservation? Am. J. Agr. Econ. 91(3):656-672.
9. **DG AGRI** (2007): Economic Impact of Unapproved GMOs on EU feed imports and live-stock production. DG AGRI report. http://ec.europa.eu/agriculture/envir/gmo/economic_impactGMOs_en.pdf
10. **FAOstat** (2009): Online database. http://faostat.fao.org/
11. **FEFAC** (2009): Feed & Food, Statistical Yearbook 2008. http://www.fefac.org/file.pdf?FileID=24622
12. **GMO-compass** (2010): GMO database on the authorization of GMOs http://www.gmo-compass.org/eng/gmo/db/
13. **Lin**, W. and **Johnson**, D. D. (2004): Segregation of non-biotech maize and soybeans: who bears the cost?' In: R.E. Evenson and V. Santaniello. (eds.): The Regulation of agricultural biotechnology, Wallingford, UK: CABI Publishing, 221-230
14. **Stein**, A. and **Rodríguez-Cerezo**, E. (2009): The global pipeline of new GM crops. European Commission, Joint Research Centre, Institute for Prospective Technological, Studies EUR23486EN.
15. **USDA** (2008): USDA Agricultural Projections to 2017. Washington D.C.: United States Department of Agriculture, Interagency Agricultural Projections Committee http://www.ers.usda.gov/Publications/OCE081/OCE20081.pdf

16. **Vahl**, H. (2009): Alternatieven voor Zuid-Amerikaanse soja in veevoer. Vahl Feed and Health http://commodityplatform.org/wp/wp-content/ uploads/2009/08/vahl2009 alternatievenvoor-zuid-amerikaansesojainveevoermrt2009definitief.pdf

17. **Van Gelder**, W., **Kammeraat**, K. and **Kroes, H.** (2008): Soy consumption for feed and fuel in the European Union. Profundo Research Paper. http://www.profundo.nl/page/show/publicaties