



GM and non GM supply chains: Their CO-EXistence and TRAcability

## Outcomes of Co-Extra

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### Empirical analysis of coexistence in commodity supply chains

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#### Introduction

Coexistence refers to the ability of farmers and consumers to make a practical choice between conventional, organic, and genetically modified (GM) products, based on compliance with the legal obligation for labelling and/or purity standards. Adventitious mixing of GM material with a non-GM product can occur at various stages along the product supply chain, from the field where the crop is grown to the handling and processing plant. In the framework of Co-Extra, the organization of different supply chains were analysed and sensitive points and processes were identified with respect to GM and non-GM admixture and traceability. Seven commodity supply chains were investigated in various countries: soybean, maize, sugar beet, rapeseed, wheat, fresh tomato and potatoes.

## **Methodology used**

This empirical analysis of coexistence was based upon supply chain analysis and stakeholders' interviews. Interviews focused upon a general description of companies and processes, and on the solutions currently adopted to deal with coexistence between GM and non-GM products. Supply chains have not been faced to the coexistence issue with the same degree, especially due to the fact that only a few GM varieties have been authorized in Europe. Thus, questionnaires also included questions about existing specialties supply chain (such as waxy maize, upper standard rapeseed, erucic rapeseed, etc) to gain an insight into how some stakeholders cope with the coexistence between different types of conventional products.

## **Results and discussion**

The study of different commodity supply chains enabled the identification of critical points from seed production to retail. Furthermore, different strategies stakeholders may choose were identified, as well as the prerequisites, strengths and weaknesses of different strategies.

### *What are the critical points within the supply chains?*

One of the most crucial points in the supply chain is crop production. Admixture at this stage of the supply chain may be spread over many different end-product batches and should be thoroughly managed. Admixtures at crop production level may be due to seed impurities, volunteers, cross-pollination between GM and non-GM crops, and insufficient cleaning of sowing and harvesting machinery in case a non-GM crop is sown and/or harvested after a GM crop. The level of risk associated with volunteers, seed impurities, and cross-pollination is highly dependent upon the crop biology.

Elevators are identified as one of the main sources of unintended admixture, as in the wheat, soybean, rapeseed, and maize supply chains. There are also risks of admixture the processing level when crushing rapeseed, wet-milling maize and processing potatoes. The risks of admixture increase with the number of operators in the supply chain and product flows. Within the processes of storage, processing and trading various critical points were identified. Therefore, the ex ante perception of coexistence feasibility differs from one commodity to another, and from one stakeholder to another. On the one hand, some stakeholders consider that GMO and non-GMO are just different commodity qualities and can be processed like any other quality as far as an adapted quality assurance system is undertaken. On the other hand, several stakeholders find it difficult to cope with coexistence and consider that ensuring coexistence between GM and non-GM commodities requires restructuring of their process and additional investments.

### *What kind of strategies can be adopted to handle issues arising at these critical points?*

At the moment, there is little experience on coexistence between GM and non-GM products (mainly soybean and to a lesser extent, maize). Interviews showed that downstream stakeholders require conventional (non-GM) products to be compliant with a lower threshold (0.1% or 0.01%) than the 0.9% regulatory threshold. In situations where GM and non-GM coexist, strategies adopted to handle coexistence are different between food and feed supply chains. In fact, no labelling rules apply for products derived from animals fed with (non)-GM feed. On demand of the retailers, food processors have replaced GM soy ingredients with alternative ingredients derived from none GM-critical crops such as sunflowers. For the soybean feed supply chain, systems of identity preservation of non-GM products have been introduced in order to guarantee a purity threshold of 0.1%. As a result, an increased level of contract detail and some vertical integration of activities have been observed in the soybean chain. Furthermore, several stakeholders have introduced books of charge, which describe the conditions of production and delivery of specific products, in order to ensure the

segregation of GM and non-GM flows. Next to production requirements, these books include requirements with respect to sampling plans, GMO detection, registration of activities and management. All activities are inspected by independent third parties. However, as animal product labelling is not possible, the feed industry has trouble in assigning a value to the efforts made by the manufacturers.

At the elevator and processing level, several scenarios for coexistence were identified: (i) spatial isolation (dedicated plants), (ii) line isolation (use of separated production lines), and (iii) temporal specialisation with alternation of products. The dedication of companies or plants to either GM or non-GM production offers the lowest risk of admixture. In the line isolation strategy, dedicated production lines are used in the same plant, which increases the risk for admixture and decreases the overall flexibility in the company. Both strategies however may suffer from under-capacity use because of changing demands. The temporal specialization of process lines is more flexible but requires regular cleaning of equipments or downgrading of non-GM batches. Due to differences in size and structure, the choice for a specific strategy should be taken on a case-by-case basis and is likely to be driven by market demand.