ECONOMIC CONSIDERATIONS ON PRACTICAL IMPLEMENTATION OF COEXISTENCE IN ROMANIA

CONSIDERAȚII ECONOMICE PRIVIND IMPLEMENTAREA PRACTICĂ A COEXISTENȚEI ÎN ROMÂNIA

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Abstract: *Coexistence is a debated and controversial topic within the European Union. In other Member States of the European Union, farmers, and participants within the food chain have expressed an interest on the implications of different coexistence polices on costs, feasibility of achieving segregated supply chains, as well as implications for labeling and traceability. The Romanian farmers have asked the European Parliament the right to cultivate genetically modified soybean to obtain vegetable protein needed for animal feeding. In the light of favorable legislative changes some aspects regarding coexistence, feasible and cost-effective need to be considered.*

Key words: *coexistence, farms, GMO, Romania*

INTRODUCTION

The discovery of DNA structure gave the start of genetic engineering developing. One step further in research was producing of GMO, which are used among others in production of pharmaceutical drugs, gene therapy and also crops production.

The use of GM foods in the human consumption was approved in the beginning in the USA. By 2010 GM crops production was settled in 29 countries from around the world, covering 10 % of the planet's farmland. Considering its high spreading level, the problem of Co-existence of GM and non GM crops started to manifest.

Due its complex implications as being affirmed in a Greenpeace organisation report, the issue of co-existence have to be dealt considering all

aspects, from legislation on agriculture; environment; health and consumer protection; to the necessity of considering additional legislation at the community level as well as in national laws and Regulations.

Beside this, at the farm level as Beckmann and Wesseler mentioned, the problem of co-existence is also a "problem of social costs". Farmers who plant GM crops may cause negative (or positive) external effects to non-GM or organic farmers by cross contamination through pollen drift or other forms of admixture.

On the basis of the model simulations and expert opinions gathered by A. Messean, for the case studies covered (maize, sugar-beet, cotton), coexistence in seed production was technically feasible for a threshold of 0.5%, with few or no changes in current practices. He consider that coexistence of non-GM maize seed production with GM maize crops would need changes in current practices, namely introduction of larger isolation distances (from the current 100-200 m distances to 400-600 m).

The Council for Agriculture and Fisheries did recognize the complexity of the coexistence issues. At the 2730th Council of the European Union Meeting on Agriculture and Fisheries in May 2006, it has been stressed: the importance of purity standards for seeds for coexistence; farmers should be fully informed about their rights and obligations concerning the planting of GMOs; the need for Community guidelines for the development of practical crops specific coexistence measures; transparency and open dialogue with all stakeholders involved is important and should be intensified in the future.

Several projects funded by the European Union, e.g. Co-Extra, SIGMEA, and TransContainer addressed the coexistence issue.

The main objective of Co-Extra was "to provide the different stakeholders of the food and feed chains with fit for purpose tools and methods allowing them to practically implement coexistence and traceability required by the current and forthcoming EC regulations and demanded by European consumers."

The main objective of SIGMEA was "to set up a science-based framework, strategies, methods and tools for assessing the ecological and economical impacts of GM crops and for an effective management of their development within European cropping systems, i.e. to create a practical toolbox."

The goal of the TransContainer project was to "develop efficient and stable biological containment systems for genetically modified plants."

A new project, started at the end of 2011, PRICE, will analyse the benefits and costs of coexistence practices for BT maize in the six Member States planting BT maize: The Czech Republic, Poland, Portugal, Romania, Slovakia, and Spain. In PRICE a farm survey in three countries (Czech Republic, Portugal, Romania) will be conducted to identify benefits and costs of farmers' practices for complying with national coexistence policies. Neighbouring farms will be part of the survey to include their view on coexistence. The information will be used for identifying feasible as well as cost-effective coexistence practices.

MATERIAL AND METHODS

The information presented in this article is the study result of EU and national legislation on co-existence.

Method used has involved economic studies and quantitative research conducted for the project "Practical Implementation of Coexistence in Europe", under a financial scheme supported by The European Commission (Grant no 289157/2011).

RESULTS AND DISCUTIONS

In Romania the economic implication of coexistence is related with costs, feasibility of achieving segregated supply chains, as well as implications for labelling and traceability. These issues are balanced of the idea that GM plant production conduct to excellent yield and high level of profits, mainly generated by low cost of production levels.

Coexistence costs appear and have to be considered at field or farm level and within agro-food chain. At each level different types of costs must be distinguished when assessing the economic impacts of coexistence measures in agricultural production.

The adventitious or technically unavoidable presence with GM material during seed production, cultivation, harvest, transport, or processing generate financial losses that should be covered by insurance costs.

These situations imply costs for decrease or removal of the GM adventitious presence. To avoid this, preventive measures should be considered by implementing monitoring, segregation and labelling systems.

These measures generate among others, capital costs that are being amortized over time.

GMO have been introduced in Romania in 1998, being cultivated several varieties of GM soy, until 2007, when we joined the EU.

At this moment BT maize is the GM arable crop still cultivated, even on small surfaces, so we can consider its costs of coexistence practices.

In Romania the maximum tolerance level of GMO admixture in non-GM production that was taken into account to derive the required segregation measures between GM and non GM production is 0.9 %.

At field or farm level it is necessary to estimate the costs of coexistence, achieved through spatial isolation. In Romania the minimum isolation distances for maize is 200 m.

Supplementary cost will appear if the actual isolation distance will increase to 400 or 600 m in the case of coexistence of non-GM maize seed production with GM maize crops. Other important aspect in estimating the costs of coexistence is the fact that law prohibits setting up genetically modified crops on areas of less than 2 ha.

The costs of co-existence measures have been simulated in some economic papers, but they have to be recalculated based on national actual and future legislation rules on co-existence.

The economic impact of co-existence can be directly revealed by interviewing GM producers or industry companies from the GM agro-chain.

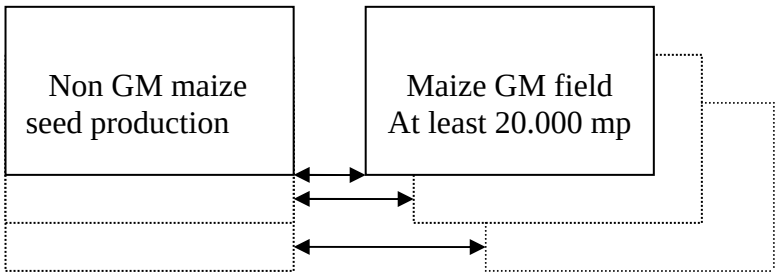
For estimating the costs of present co-existence measures for maize in Romania, can be used the next scenario, based on opportunity cost: a GM maize production seen around the average yield of maize per hectare at country or regional level for the last or a recent agriculture year; a medium GM maize market price that let us calculate the total income per hectare and the variable production costs, based on input prices; three variant of isolation distance.

These let us calculate the gross margin and gross profit (by adding subsidies) and finally the cost per ha in the GM maize production.

The first element of cost related with coexistence is the opportunity cost of the isolation area which can be calculated for the actual limit of 200 m or based of future isolation limits of 400 or 600 m.

We also have to assume the minimum level fixed of the national legislation at 2 ha squared GM maize field.

Fig.1 Isolation distance: present and future forecasted changes



Isolation distance: 200 m; 400 m and 600 m

Source: Authors

The opportunity cost should be calculated for the most efficient non GM crop which farmers could cultivate in the isolation area.

Table 1 Co-existence costs of non GM seed production and GM maize, seen from the opportunity costs perspective

Scenario	Isolation distance	Opportunity costs	Economic Interpretation
I (present isolation limit)	200 m	Calculated for the most efficient non GM crop in the region/area	Best alternative of production that farmer give up in the isolation area, when he make a choice for cultivating at least 2 ha of GM maize
II (future isolation limit - 1)	400 m	Calculated for the most efficient non GM crop in the region/area	
III (future isolation limit -2)	600 m	Calculated for the most efficient non GM crop in the region/area	

Source: Authors

Further measures in Romania include the creation of a buffer area and staggered sowing time. These will also increase the co-existence costs.

For example, changing the flowering time of cultivated maize varieties are generating income losses, which can be around 30 % of the gross margin of maize production.

CONCLUSIONS

Even the organic products and products linked to traditional practices and geographical origins are considered by some consumers more healthy and nutritious, the development of agriculture in the EU has to be seen under competitiveness rules as part of the world markets. In this respect, the role of innovation is capital.

The GMOs are one of the most significant achievements of genetic engineering as part of biotechnology, one of the main vectors of innovation in agriculture. The coexistence which refers to the choice of consumers and farmers between conventional, organic and GM crop production, implies economic effects and costs for farmers when introducing different co-existence measures in genetically modified maize.

Some costs for the GM farmers are generated by the obligation to put in place practices due to GM production. The GM farmers have the responsibility of implementing new farm management practices, adapted to GM production and to cover the additional costs.

REFERENCES

1. BECKMANN V, WESSELER J., 2006, Spatial Dimension of externalities and the Coase Theorem
2. GREENPEACE, 2004, Consideration regarding the Co-existence of GMO, non GMO and organic farming
3. MENARD K, REITMEIER DANIELA, 2006, Economic assesment of co-existence schemes and measures
4. TUMUSIIME E, DE GROOTE H, VITALE J, AND ADAM B, 2010, The Cost of Coexistence between Bt Maize and Open-Pollinated Maize Varieties in Lowland Coastal Kenya, AgBioForum 13(3), 208-221