

A framework for the socio-economic analysis of the cultivation of GM crops: The first ESEB Reference Document

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GMCC-15
Amsterdam
19 November 2015

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- **European GMO Socio-Economics Bureau (ESEB)**
- **The first ESEB Reference Document (general)**
- **The second ESEB Reference Document (Bt maize)**

European GMO Socio-Economic Bureau (ESEB)

- Origin: Directive 2001/18/EC, 2008 council request, 2011 EC report, 2013 ESEB kick-off.
- Mission: organize and facilitate the exchange of technical and scientific information regarding the socio-economic implications of the cultivation and use of GMOs between Member States and European Commission.
- Technical working group: experts from Member States, supported by JRC-IPTS.
- Outputs: Reference Documents containing topics and indicators along with methods to estimate impact of GM crop cultivation in all sectors of the EU economy/society.

Reference Documents

1. General framework (2015). Applicable to all GM crops that have been or might be grown in EU
2. Bt maize (expected 2016)

Procedure for 1st Document

Step	Date
ESEB Secretariat prepares structured table of content	Jul-13
Members submit contributions to each chapter	Nov-13
ESEB Secretariat 1 st drafts reference document	Jan-14
Plenary meeting to discuss the first draft	Mar-14
ESEB secretariat prepares 2 nd draft, final consultation with members (online)	Jun-14
ESEB secretariat produces 3 rd draft, submit to DG SANTE	Jul-14
Consultation of Competent Authorities	Nov-14
Consultation of Stakeholders	Dec-14
Publication	Jul-15

First Reference Document



JRC SCIENCE AND POLICY REPORTS

Framework for the socio-economic analysis of the cultivation of genetically modified crops

*European GMO Socio-Economics Bureau
1st Reference Document*

Jonas Kathage, Manuel Gómez-Barbero,
Emilio Rodríguez-Cerezo
2015



Introduction

- Scope- impacts inside the EU resulting from the cultivation of GM crops inside the EU (but consider trade flow effects)
- Criteria for inclusion of topics (backed by publications if possible):
 - Measurable indicators, qualitative or quantitative
 - Plausible impact mechanism
 - Sound method to assess impact

Methodology

- Approach: define impact and baseline scenarios, predict/explore adoption rates, consider farmer behaviour under scenarios, *ex ante* vs. *ex post* assessment, define time period
- Methods: farm surveys, field trials, welfare economics, willingness to pay surveys/experiments
- Data sources: most assessments require primary data that is not available. Important to clearly define target populations and draw representative samples.

Effects on crop farming

Adopters

- Adoption rates
- Typology (farm size etc.)
- Income effects
- Agronomic practices
- Input use and efficiency
- Coexistence management
- Time management

Non-adopters

- Typology
- Economic impact of GM cultivation (e.g. prices, pest spillovers, segregation)
- Opportunity costs of non-adoption

Example: Income effects, adopter

Indicator: gross margin (€/ha)

Baseline scenario (counterfactual): "What would be the gross margin if the adopter had not adopted?"

GM scenario: "What is the gross margin realized with adoption?"

Method (ex-post): compare the gross margin of adopters with that of non-adopters, adjusting for selection bias

Example: segregation and adventitious presence (due to private standards)

Indicator: Loss of Identity Preservation rent resulting from adventitious presence in €/year

Baseline scenario (no GM cultivation): no losses

GM scenario: "What are the losses with x% adoption of GM crops in the region?"

Method: survey of non-adopters to estimate losses

Effects outside crop farming

Upstream

- Innovation capacity
- Seed industry
- Agro-chemical industry
- Land markets

Downstream

- Exports and imports
- Segregation and IP costs to processors
- Feed industry
- Livestock producers
- Food industry
- Other industries
- Retail sector

Consumers

- Range of products
- Consumer prices
- Consumption patterns
- Public understanding and acceptance

Government budget

Example: Economic effects on livestock producers

Indicator: Economic welfare (€/year)

Baseline scenario: "What is the welfare without cultivation?"

GM scenario: "What would be the welfare if there was x% adoption of GM crops?"

Method (ex-ante): economic modeling

Example: Public Understanding and Acceptance

Indicator: Share of citizens rejecting and supporting the use of a GM crop in EU agriculture

Baseline scenario: "What is the share without cultivation?"

GM scenario: "What would be the share if there was x% adoption of GM crops?"

Method (ex-ante): opinion surveys, experiments

Aggregate consumer and producer surplus

- Total economic welfare can be modeled as the sum of consumer surplus and producer surplus. It is possible to study the impact on different groups of producers or consumers.
- Example: Farmer economic surplus (€/year), disaggregated by income/wealth

Final Remarks

- ESEB has compiled topics, indicators, methodological guidelines and potential data sources proposed by MS
- First ESEB document provides framework applicable to any GM crops that might be grown in EU member states
- 27 topics and almost 100 indicators identified, along with methodological recommendations
- Methodologies have been developed by scientific community for most topics/indicators
- Some evidence of impacts already exists, but very limited for most topics. Main constraint is the lack of data.

Second Reference Document: Bt maize - 2016

- New background sections on the EU legislative context and maize cultivation, pest management and supply chain
- Extend the methodology section
- Adapt general topics to Bt maize (e.g. mycotoxins)
- Review evidence specific to Bt maize

Bt maize – limited evidence (mostly Spain)

- Reduced insecticide use and higher seed cost
- Higher yield and gross margins
- Reduced mycotoxin content
- Seed industry benefits, imports reduced

Thank you for your attention

For further questions and remarks

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TWG contributions to General Framework Document

Invitations sent to 18 countries:

AT, BE, CZ, DK, FI, FR, DE, HU, IE, LT, NL, PT, RO, SI, ES, SE, UK and NO.

Contributions received from 15 countries:

AT, BE, DK, FI, FR, DE, HU, NL, PT, RO, SI, ES, SE, UK and NO.

Consultation with Competent Authorities

- Brussels, 11 Nov 2014
- Presentation of Framework document to Working Group of Directive 2001/18/EC
- Received written comments from AT and HU repeating requests for the inclusion of social topics

Consultation with Stakeholders

- Brussels, 12 Dec 2014
- Presentation of Framework document to Advisory Group of DG SANTE
- Received written comments from IFOAM and EuropaBio
- IFOAM requested more focus on organic farmers
- EuropaBio requested more focus on benefits foregone due to nonadoption/regulation