Socio-Economic Considerations in GMO Decision Making

Georgina Catacora-Vargas
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Some data on genetically modified (GM) herbicide tolerant (HT) soybean in South America
Source of the data

Soybean Production in the Southern Cone of the Americas: Update on Land and Pesticide Use

Georgina Catacora-Vargas
Genet – Centre for Biosafety, Norway

Pablo Galeano
REDES-AT / Friends of the EARTH, Uruguay

Sarah Agapito
Laboratory of Developmental Physiology and Plant Genetics
Department of Crop Sciences
Federal University of Santa Catarina, Brazil

Dario Aranda
Independent journalist, Argentina

Tomás Palau
BASE - Social Research (BASE-15), Paraguay

Rubens Nodari
Laboratory of Developmental Physiology and Plant Genetics
Department of Crop Sciences
Federal University of Santa Catarina, Brazil

[Logos and icons]
Process of approval
Roundup Ready (RR) soybean, event 40-3-2

2004
Approval in Paraguay

2005
Approval in Bolivia

2003
Provisional approval
2005
Final approval in Brazil

1996
Approval in Argentina and Uruguay
Process of adoption of GM HT soybean

**Argentina**

**Brazil**

**Bolivia**

**Uruguay**

nd = No data. Refers to the years when it was not possible to find information from official sources.

Main reasons for widespread adoption

Managerial advantages of HT soybean:
- Ease of weed management
- Reduced price of glyphosate
- Increased availability of glyphosate

Relevant from agronomic point of view

What about other ecological, social, economic and ethical factors of massive GM HT soybean adoption?
Changes in glyphosate use in GM HT soybean production
The example of glyphosate in Argentina
Relationship area planted with GM HT soybean and glyphosate use

The case of Uruguay
HT weeds in GM soybean production

*Campos Novos, SC, Brazil*

Photo: Sarah Agapito (2010)
HT volunteer soybean
San Pedro, SCZ, Bolivia

Photo: Georgina Catacora (2007)
Changes in other pesticides use

*The example of Bolivia*
Use of banned herbicides

*Increased use of Paraquat*

**Argentina**

![Graph showing increased use of Paraquat in Argentina from 2004 to 2010.](image)

**Bolivia**

![Graph showing increased use of Paraquat in Bolivia from 2004 to 2008.](image)
Changes in productivity?

a) Argentina

* Year in which GM soybean cultivation starts to occupy at least 70% of the total soybean area

- Production
- Productivity (national average)

Approval of GM soybean
Changes in Productivity?

b) Bolivia

- Year in which GM soybean cultivation starts to occupy at least 70% of the total soybean area

- Provisional approval of GM soybean

- Definite approval of GM soybean

- Production
- Productivity (national average)

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c) Brazil

- Provisional approval of GM soybean

- Year in which GM soybean cultivation starts to occupy at least 70% of the total soybean area

- Production
- Productivity (national average)

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d) Paraguay

- No official data was available about when GM soybean production started occupying at least 70% of the total area planted with soybean

- Approval of GM soybean

- Production
- Productivity (national average)

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e) Uruguay

- Year in which GM soybean cultivation starts to occupy at least 70% of the total soybean area

- Approval of GM soybean

- Production
- Productivity (national average)
Increase of soybean production in South America
Area of soybean and other economically important crops
Area of soybean and other economically important crops
Deforestation related to (GM) soybean production

*The example from Brazil*

![Graph showing deforestation related to soybean production](image)

Source: Risso et al. (2009).
Relationship forest and soybean area

The example from Argentina

* Year of approval of GM soybean
Deforestation in (GM) soybean production areas

The case of Bolivia

View of deforested areas intended for soybean production

Source: Adapted from UNDP-Bolivia (2008, p. 119).

Photo: Georgina Catacora (2007)
Changes in land tenure and price in (GM) soybean producing countries

The case of Uruguay
Land concentration in (GM) soybean production

The example of Uruguay

a) 2005

- Less than 50 ha: 24% Producers, 3% Share of total area planted with soybean
- From 51 to 500 ha: 64% Producers, 38% Share of total area planted with soybean
- Larger than 500 ha: 59% Producers, 12% Share of total area planted with soybean

b) 2010

- Less than 50 ha: 17% Producers, 1% Share of total area planted with soybean
- From 51 to 500 ha: 57% Producers, 14% Share of total area planted with soybean
- Larger than 500 ha: 85% Producers, 26% Share of total area planted with soybean
Land concentration in (GM) soybean production

Paraguay

![Graph showing land concentration in Paraguay]

Fuente: Elaboración propia con base a datos de CAN (2008).

Bolivia

![Graph showing land concentration in Bolivia]

Fuente: Elaboración propia con base a datos de ANAPO (2010).
Concentration of (GM) soybean production in foreign farmers

The case of Bolivia
• **What / Where** are socioeconomic considerations?

• **Why / When / How** socioeconomic considerations in decision-making?

• Final comments
What are socioeconomic impacts?

- Effects of the changes (rather than only the changes themselves) arising in any action or initiative on:
  - Lifestyle, work, human relationships, self-organization and social functions as individuals and members of a society
  - Psycho-social behavior, values, attitudes and perceptions of oneself, community and the environment

Source: UNEP (2002)
What are socioeconomic impacts?

**Change:** Increase and reliance on one herbicide (the case of glyphosate in Brazil)

**Effects:**
- Increase in herbicide use due to lost of glyphosate efficacy
- More toxic herbicides used (in volume and number)
- Increase in production costs
- Increase in public health risks
Where do socioeconomic impacts take place?

- All interventions (e.g. projects or technology) have socioeconomic implications due to the environment – society relationship.
Why socioeconomic considerations in biosafety decision-making?

- Mutual influence environment and society
- Growing demand for social responsibility by markets and regulations

Sustainable development and use of natural resources
When socioeconomic considerations in biosafety decision-making?

- Based on the precautionary approach, *previous* the intervention
- **Monitoring** and *follow up* also required

- Article 26.1 of the Cartagena Protocol on Biosafety states:
  - “The Parties, *in reaching a decision on import under this Protocol* or under its domestic measures implementing the Protocol, may take into account, consistent with their international obligations, socio-economic considerations arising from the impact of living modified organisms on the conservation and sustainable use of biological diversity, especially with regard to the value of biological diversity to indigenous and local communities.” (Secretariat of the CBD 2000:19).
How socioeconomic consideration into biosafety decision-making?

- Integrated and complementary to environmental risk assessment

Ecological changes with socioeconomic implications
Socioeconomic factors resulting in ecological impacts
• Direct / indirect
• Cumulative / combinatorial relationships

Change: Reliance on one herbicide

Effects:
- Increase in herbicide use due to lost of glyphosate efficacy
- More toxic herbicides used (in volume and number)
- Increase in production costs
- Increase in public health risks
- Direct / indirect
- Cumulative / combinatorial relationships

Intensive production of GM HT soybean → Soil pollution with herbicides and HT weeds and volunteer soybean → Demand of suitable land → Expansion of agricultural frontier → Change in prices and land tenure

* Year of approval of GM soybean
• Direct / indirect
• Cumulative / combinatorial relationships

Change: Increased in area cultivated

Effects:
- Decrease in availability of local crops with nutritional and economic value
- Simplification of local diets
- Undernourishment
- Weakening of food security and sovereignty
How socioeconomic consideration into biosafety decision-making?

- Long-term assessment

Stable volumes of pesticides usage

Massive expansion of GM HT soybean
  Reliance on one herbicide
  Emergence of HT weeds

Increase of glyphosate use in direct relation to increase on area of HT soybean production
How socioeconomic consideration into biosafety decision-making?

- Consideration of ethical issues

What if the technology does not deliver its promises? GM soybean did not contribute to increase or stabilize soybean productivity.

What if the technology results in the use of dangerous inputs? GM soybean is resulting in the increased use of banned pesticides (e.g. paraquat).
How socioeconomic consideration into biosafety decision-making?

- Multi and trans-disciplinary
- Methodological pluralism

Deterioration of soils → Increased demand of land → Increase in prices of land → Land concentration on producers with purchasing power

- Chart showing trends in leasing and selling values over years.
Final comments

• Socioeconomic considerations are inherent part of any intervention ➔ Inherent part of any decision-making process

• Socioeconomic considerations go beyond economic or managerial criteria ➔ Long-term social, cultural and ethical aspects need to be included

• Socioeconomic implications are complex ➔ Multi/transdisciplinary approaches are needed to assess direct/indirect, cumulative/combinatorial, and long-term impacts that may influence sustainability
Final comments

• Socioeconomic considerations are important to work further in the context of the Cartagena Protocol on Biosafety
  – Request of several Parties
  – Need for conceptual and methodological guidance ➔ Ad Hoc Technical Expert Group (AHTEG) on socioeconomic considerations
  – Crucial to achieve the objective of the Cartagena Protocol: Conservation and sustainable use of biological diversity
Thanks for your attention

giorgina.catacora@genok.no
www.genok.no