# GMOs, Food Security and the Right to Adequate Food: Risks and Challenges

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# Introduction

- Genetically Modified Organisms (GMOs): any organism, plant or animal which genetic material has been modified not by natural recombination or reproduction.
- Living Modified Organisms (LMOs): any organism, plant or animal which genetic material has been modified not by natural recombination or reproduction, which is **capable of replication**.

# Introduction

- Modification of a plant to present certain characteristics such as resistance to herbicide or insect or drought or have enhanced nutritional contents or bring higher yields. Livestock or fish can also be modified to grow faster, bigger or stronger.
- The first GM tomato was introduced in 1994 in the USA. In 1996, 1.7 million hectares of GM crops were cultivated and it has become a multi-billion-dollar global industry with 170 million hectares in 2012.

# Introduction

- GM products have increased on the market as foods, food additives and beverages but also biofuels, industrial and pharmaceutical products.
- Modern biotechnology holds a lot of promises however all adequate biosafety measures must be used to ensure the safe development, transfer and biotechnological applications.

# Introduction

- Since it is a relatively new technology, safety tests on GMOs on a long-term basis have not been carried out.
- There are concerns on the adverse impacts of GMOs on human health and animal health, and the environment.

# Introduction

- Main traits approved for commercial cultivation in South Africa (SA) for cotton, maize and soybean are insect resistance and herbicide tolerance, but there is no official breeding, importing or marketing of genetically modified (GM) livestock.

# Outline

- Food security and GMOs?
- The right to food and GMOs?
- Human health and animal health risks
- Environmental risks
- Risks of liability
- Lack of financial mechanism

# Food Security and GMOs?

- The World Food Summit of 1996 defined food security as existing “when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life” (physical and economic food availability, access and use).
- Theoretical solutions for resolving hunger mostly relate to production.
- Biotechnological companies argue in favour of the use of GMOs for an increase in food production and higher food availability.

# Food Security and GMOs?

- Food security in relation with GMOs concerns GM crops, GM fish and GM growth hormones for livestock and not only crops.
- Food security requires good policies, better incomes for small farmers, improved irrigation, stable food prices...

# Food Security and GMOs?

- Existing food politics result in food wastage and unequal distribution.
- Financial sustainability of GM crops in the long run (new GM seeds must be bought every year from biotech companies instead of saved seeds)?
- Increased production for food security purposes or increased profits and advantages for GM seed companies rather than for small farmers and consumers?

# Food Security and GMOs?

- Crop yield failure of Roundup Ready Soybean in the USA and reduced white GM maize yield in South Africa were compensated by biotechnological companies.
- GM seeds must be tested locally and bred for local conditions which is a long process.
- Drought-resistant crops are still being experimented (Water-efficient maize for Africa).
- Impacts on food quality and composition.
- Food security and the use of GM crops to produce biofuels?

# The Right to Food and GMOs?

- International recognition as a socio-economic right. The right to food is legally binding to 160 States Parties (Article 11 International Convenant on Economic, Social and Cultural Rights-ICESCR).
- "Availability of food in a quantity and quality sufficient to satisfy the dietary needs of individuals, **free from adverse substances** and acceptable within a given culture, the accessibility of such food in ways that are sustainable and that **do not interfere with the enjoyment of other human rights**"

(The Committee on Economic, Social and Cultural Rights (CESCR) General Comment 12-1999 on the interpretation of the right to food)

# The Right to Food and GMOs?

- Constitutional value: SA Constitution - Section 27(1)(b).
- Who will be the right-holder and the duty-bearers?
- What would be the practical implementation of the right to food in relation with GMOs?
- There should be no compromise on operational aspects of the right to food if there are risks.

# The Right to Food and GMOs?

- The right to adequate food must :

*Be progressively realised with reasonable legislative and other measures within available resources.

*Respect the exercise of other rights (right to an environment not harmful to the health and well-being (Section 24 Constitution), right of access to information (Section 32(1)(b) for the exercise or protection of any rights).

# Health concerns

- GM crops are being grown and consumed by the public although not enough scientific studies are being carried out about their health risks .
- Use of controversial pesticides for GM crops :

*The highly controversial 2,4-D tolerant GM maize (variety DAS 40278-9).

*In 2010, 50% of the white maize grown and all of the GM soya were glyphosate tolerant in South Africa but there is no testing of glyphosate residues in foods.

# Health concerns

- Adequacy of safety tests assessing their potential harm to human health and animal health in the long run?
- Risk of resistance to antibiotics due to the use of antibiotic resistance marker genes (World Health Organisation (WHO) recommends not to use these types of genes).
- Risk of carrying unpredictable toxins.
- Risk of allergenic reactions.
- Side effects of the use of GM growth hormones in livestock for increased milk and meat production.
- Use of GM crops as feed and their effects on animal health specially poultry or cattle inevitably impacting on human health by entering into the human food chain.

# Animal Health Concerns

- Use of GM grass producing cyanide gas and causing the death of cattle in Texas in June 2012.
- A Roundup-tolerant maize and Roundup were found to have provoked chronic hormone and sex dependent pathologies in rats over a period of 2 years by French scientist, Gilles-Eric Séralini in September 2012.

# Environmental Concerns

- Stability of the transgene in the plant or organism.
- Immediate or delayed impacts of the use of GMOs on the receiving environment and biological diversity may be questionable.

*Capability of the GM plant to affect wild populations.

*Effects of insect-resistant crops on non-target insects (beetles, pollinating agents ...).

# Environmental Concerns

- High doses of chemicals are used for herbicide-tolerant GM plants. Weeds in turn may become more resistant leading to more chemicals to control pests.
- Negative impacts of pesticides on non-target wildlife and land resources.

# Environmental Concerns

- Seeds may get carried away by birds or the wind, causing contamination of conventional or organic crops in the USA.
- GMOs were introduced in 1994 in the USA and in 2010 major biotechnological companies acknowledged environmental risks caused by LMOs and came up with the “Compact”, a contractual compensation mechanism for damage to biological diversity concluded by 6 of the biggest biotech companies.

# Risks of Liability for GMO-related Damage

- Damage resulting from GMO-related activities:

*Personal injury (allergenic reactions, toxicity, use of antibiotic-resistant gene markers..).

*Property damage (loss from contamination of land and crops).

*Economic loss (loss of organic status by GM-free/organic farmers, loss of export market).

*Environmental damage (adverse effects on the land and biological resources due to the use of pesticides for herbicide-resistant GM crops, loss of biodiversity).

# Lack of financial security mechanism

*Availability of insurance for damage resulting from GMO-related activities (GMOs may pose a level of potential clean-up cost for which accurate actuarial assessment may be difficult)?

*Bond retained until such GMO poses no risk?

# Conclusion

- Use of GM crops or growth hormones mainly to have a better yield in view of greater profits for producers and not necessarily for food security or the environment.
- GM producers claim food security purposes for the growth of GMOs but are reluctant to label GM food products.
- Risks of claims for injuries and environmental damage

# Conclusion

- Environmental sustainability issue.
- GMOs alone will not achieve food security or solve the hunger problem.
- Food security and GM crops being used as biofuels.
- Ensuring food security should not lead to compromise on health and environmental risks.
- Food politics more than food production needs reviewing to eliminate food wastage and unequal distribution of food.

- Thank you for your attention