Universität für Bodenkultur Wien

Attitudes towards genetically modified organisms in food production of European and US American students.
A content analysis of chat room discussions during the Global Seminar 2015.

Master's thesis

For the obtainment of the
academic degree „Diplom-Ingenieur"

within the Master's programme
"Agricultural and Food Economics"

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Vienna, October 28th, 2015

Affirmation

This is to declare that myself, using solely the referred sources and support, independently authored the Master's thesis. I additionally assert that this Master's thesis has not been part of another examination process.

Vienna, October 28th, 2015 _____

Place, Date Signature of the author

Acknowledgment

I would like to thank everyone who accompanied me within the time writing this thesis as well as over the whole time of studying at BOKU.

I want to thank especially Ao. Uni. Prof. Dipl.-Ing. Dr. Rainer Haas for his great support while writing my masters thesis.

A special thank goes to my mother Elisabeth and my brother Alexander who always supported me in every imaginable situation within my live.
Furthermore I want to thank my girlfried Julia Norz for her patience and encouragement during the whole time of studying at BOKU.
Last but not least I want to thank Fam. Seebacher for the great support when I moved to Vienna and especially Domink Seebacher for the awesome help over the whole time of study at BOKU.

Abstract

The aim of this thesis is to investigate the possible differences between European and US American students, concerning their opinions about the use of genetically modified organisms (GMO's) in agriculture and in the food value chain. The research points on existing patterns or chains in student argumentation as well as on prevalent metaphors used in the discussion form.

Basis of the analysis are protocols from student chat room sessions. The students are participants from an international course called global seminar. The course engages international student teams in working on solutions for specific case studies in regards to sustainability. Students have to deal in videoconferences and chat room sessions with current global issues related to agriculture and food production. The thesis refers on data collected at a chat room session in summer semester 2015. It contains data of nine chat rooms were a total of forty students participated. Students, as future decision makers reveal their opinions in pro and contra discussions about genetic engineering. In order to organize a proper sequence in the discussion, six specific issues related to GMOs have been described prior to the chat. Data is subject of qualitative data analysis. The differences between European and US consumers in relation to their opinion towards GMO are well known. The analysis of US student's expressions in the chat room data shows very similar results. Most US students strongly support the application of GMO's in any production process, whether it is for food or medical purpose. The analysis of European student statements shows mostly an opponent attitude in regards to GMO's in food production. The research reveals that European students perceive risks in connection to GM much stronger than benefits. Negative effects, weather they are of concrete nature or unknown risks – jet not discovered negative side effects – have been expressed mostly from European students. This indicates the presence of an uncertainty avoiding attitude and correlates also within previousely conducted research in literature. However despite some profound well-known differneces between US American and European students, quite a few similar attitudes emerged.

Keywords: Global Seminar, genetically modified organisms, qualitative data analysis, chat room, uncertainty avoidance attitude, patterns in student argumentation

Kurzfassung

Es ist das Ziel dieser Studie, die Einstellung von europäischen und US amerikanischen Studenten zur Verwendung genetisch veränderter Organismen (GMO) in Landwirtschaft und Lebensmittelproduktion zu untersuchen. In Zusammenhang mit dieser Studie werden Studentendiskussionen auf das vorhanden sein von Mustern bei der Argumentation, sowie auf häufig auftretende Argumentationsverkettungen analysiert. Aufzeichnungen von Chatroom Diskussionen des Global Seminares stehen als Datengrundlage zur Verfügung. Das Global Seminar ist eine fallstudienbasierte Lehrveranstaltung zum Thema Nachhaltigkeit an der verschiedene Universitäten aus Europa und den USA teilnehmen. Internationale Studententeams arbeiten in Videokonferenzen und in Diskussionsforen an Lösungsvorschlägen zu globalen Problemstellungen. Der Datensatz besteht aus neun Chatrooms mit einer Teilnehmerzahl von insgesamt vierzig Studenten. Die Daten werden in eine Analysesoftware eingespielt und codiert. Die unterschiedliche Haltung bzw. Einstellung europäischer und US amerikanischer Konsumenten in Bezug auf genetisch veränderte Nahrungsmittel sind Großteils erforscht und bekannt. Dementsprechende Resultate liefert die Untersuchung der Chatroom Daten. Seitens US amerikanischer Studenten werden überwiegend befürwortende Kommentare in Bezug auf die Verwendung genetisch veränderter Organismen in Landwirtschaft und Nahrungsmittelerzeugung geäußert. Die Argumentationsanalyse der europäischen Studenten zeigt, dass Risiken die in Verbindung zu GMO stehen, stärker wahrgenommen werden als Vorteile. Das Argument „negativen Einflüsse auf Mensch und Umwelt“ wurde fast ausschließlich von europäischen Studenten geäußert. Dies spiegelt ein hohes Bedürfnis an der Vermeidung von unvorhersehbaren negativen Einflüssen (Ungewissheitsvermeidung) wieder. Trotz einiger grundliegender und bereits bekannter kultureller Unterschiede zwischen US-amerikanischen und europäischen Studenten, kann auch auf einige Ähnlichkeiten aufmerksam gemacht werden.

Stickwörter: Global Seminar, genetisch veränderte Organismen, codieren, Chatroom, Ungewissheitsvermeidung, Argumentationsverkettung

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List of abbreviations

GMO	genetically modified organism
GM	genetically modified
DNA	Deoxyribonucleic acid
FDA	Food and Drug Administration
EC	European Commission
EU	European Union
US	United States
CA	competent authority
PIFB	Pew Initiative on Food and Biotechnology

1 Introduction

The domestication and breeding of plants and animals, to increase their utility to humans began several thousand years ago. The use of genetic engineering for food production dates back only a few decades.

Since the first GMO crop – a tomato called Flavor Savor - was introduced to the US market in 1994, more than two decades have passed (GMO COMPASS, 2006). About the same time the actual discussion about permission, restriction or complete prohibition within the European Union began.

European consumer had not much possibility to purchase genetically modified food products so far, as they are not approved for human consumption and simply not available. The attitude towards GMO appears to be on average quite negative among European citizens see Figure 1.

Americans on the other hand, are consuming large quantities of GM food products since its first approval and introduction into their food supply. However, they seem to have either learned to live with it, showing a positive attitude towards GMO, or simply don't know whether their food contains GM ingredients or not. The U.S. American regulatory structure does not include mandatory labeling for genetically modified foods, hence GM foods are not labeled as such.

So what does the term „GMO" actually mean?

The official journal of the European communities (Part A, Article 2) defines it as:

1) „'Organism' means any biological entity capable of replication or of transferring genetic material;
2) 'Genetically modified organism (GMO)' means an organism, with the exception of human beings, in which the genetic material has been altered in a way that does not occur naturally by mating and/or natural recombination" (THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION, 2001, 106/4).

Genetic engineering calls the exchange of gene material between living creatures or in other words, the transfer of genes from a donating to a receiving organism, gene transfer. It is significant to distinguish between two types of gene transfere, namely the vertical gene transfere and the horizontal, also known as lateral gene transfere.

While crossing two organismis on a sexual path means, that their genetical material is handed over to the next generation along the lineage which is defined as vertical gene transfere, horizontal gene transfere implies the transmission and reception of genetical material outside of any sexual reproduction process and independent of any species barriers (BECKMANN, 2009, 46). However under natural conditions, horizontal gene transferes happens very rarely, whereas under laboratory conditions, possibilities of combination appear to be inexhaustible.

According to the Austrian national law (Gentechnikgesetz) techniques accompanying this technology are:

- DNA recombination techniques (§4/3a),
- Direct insert of genetic information provided outside of the organism (§4/3b),
- Cell fusion and hybridization techniques (§4/3c) (BUNDESKANZLERAMT UND RECHTSINFORMATIONSSYSTEM, 2015) (own translation).

Modern biotechnology changes genetic material artificially, in order to create organisms that have a tolerance to herbicides, higher resistance to diseases, insects or droughts. Organisms are also modified to obtain improved quality or nutritional value and increased yields. Despite the benefits, critics of genetically modified plants and animals have raised safety, security and ethical concerns.
The European Commission has established a legal framework to ensure that the development of modern biotechnology takes place in safe conditions. The following argument for having a legislation about GMO are listed on its website:

- "Protect human and animal health and the environment by introducing a safety assessment of the highest possible standards at EU level before any GMO is placed on the market.
- Put in place harmonized procedures for risk assessment and authorization of GMOs that are efficient, time limited and transparent.
- Ensure clear labeling of GMOs placed on the market in order to enable consumers as well as professionals to make an informed choice.
- Ensure the traceability of GMOs placed on the market" (EUROPEAN COMMISSION, 2015a, s.p.).

The European GMO legislation is build by the following main pieces. They are supplemented by a number of implementing rules or by recommendations and guidelines on more specific aspects.

- Directive 2001/18/EC on the deliberate release of GMOs into the environment and repealing Council Directive 90/220/EEC.
- Regulation (EC) 1829/2003 on genetically modified food and feed
- Directive (EC) 2015/412 amending Directive 2001/18/EC as regards the possibility for the Member States to restrict or prohibit the cultivation of GMOs in their territory.
- Regulation (EC) 1830/2003 concerning the traceability and labeling of genetically modified organisms and the traceability of food and feed products produced from genetically modified organisms.
- Directive 2009/41/EC on contained use of genetically modified microorganisms.
- Regulation (EC) 1946/2003 on transboundary movements of GMOs (EUROPEAN COMMISSION, 2015a, s.p.).

European Commission changed it's proposes by the introduction of *Directive (EU) 2015/412*, allowing member states to decide whether to restrict or to completely prohibit the use of authorized GMOs on their territories (EUROPEAN COMMISSION, 2015b, s.p.).

However the situation is quite different in the U.S. On the one hand, United States is the chief producer and consumer of GMOs, and on the other hand consumer seem to know less about its presence in their lives compared to other nations (PEW INITIATIVE ON FOOD AND BIOTECHNOLOGY, 2005).

From the high fructose syrup in soft drinks, to soy protein in energy bars, almost every processed food contains a small quantity of ingredients derived from GMOs. U.S. food industry makes no attempt to label products that contain GMOs, as neither labeling nor traceability is required in United States legislation. The food industry seems rather to hide or disguise it either.

The federal government of the United States established in 1986 a coordinated, risk-based system to ensure that new biotechnology products are safe for the environment and human and animal health. The coordinated framework of biotechnology regulation

describes the federal system of evaluating products developed using modern biotechnology. The U.S. agencies responsible for supervision of GM products are listed below. Depending on the characteristics, a product may be subject to a jurisdiction of one or more of these agencies (U.S. DEPARTMENT OF AGRICULTURE, 2013, s.p.).

U.S. Department of Health and Human Services „Food and Drug Administration" (FDA)

- The FDA ensures that GM food meets the same safety requirements as food derived from traditional breeding. FDA encourages developers of GM plants to consult with the agency before marketing their products. During the consultant process the developer conducts a safety assessment to verify that any new material in food and feed made from the GM plant is safe for consumption (U.S. FOOD AND DRUG ADMINISTRATION, 2015, s.p.).

U.S. Department of Agriculture „Animal and Plant Health Inspection Service" (USDA-APHIS)

- USDA's Animal and Plant Health Inspection Service (APHIS) is responsible for protecting agriculture form pests and diseases. Under the „Plant Protection Act" APHIS has the supervision over products from modern biotechnology that could pose such a risk. Organisms or products that are know or suspected to be a plant pest or to pose a plant pest risk, including those that have been altered through genetic engineering. These are called regulated articles. USDA-APHIS regulates the import, handling, interstate movement, and release into the environment of „regulated organisms" that are products of biotechnology (U.S. DEPARTMENT OF AGRICULTURE, 2013, s.p.).

The Environmental Protection Agency „Federal Insecticide, Fungicide and Rodenticide Act" (EPA-FIFRA)

- EPA regulates the manufacture, distribution, sale and use of pesticides in the United States, including those genetically engineered into food crops. EPA determines that a pesticide meets FIFRA health and safety requirements. The

> Federal Insecticide, Fungicide and Rodenticide Act is the principal law that authorizes EPA to approve a product label that identifies the terms of safe use of the pesticide (ENVIRONMENTAL PROTECTION ACT, 2011, s.p.).

According to a policy established in 1992, FDA considers most GM crops as „substantially equivalent" to non-GM crop. In such cases GM crops are designated as „generally recognized and safe" under the Federal, Food, Drug and Cosmetic Act (FFDCA) and do not require pre-market approval (FEDERATION OF AMERICAN SCIENTISTS, 2011, s.p.).

1.1 Problem description

The difference among European and US American students in relation to their attitudes and opinions towards GMO in food production is described as center of interest in this thesis. Future decision makers reveal their opinions in pro / con discussions about biotechnology. The content of collected data from the Global Seminar, a course collaboratively taught by US American and European universities was analyzed in order to discover similarities in argumentation between chat room participants. Do we find patterns or chains of argumentation we can refer to a certain group of students? The research points also on frequently used metaphors in the discussion forums.

1.2 Research objective

The objective of this thesis is to investigate the possible differences between European and US students concerning their opinions about GMOs in agriculture and in the food value chain. Basis of the analysis will be protocols from chat room sessions.
The students are participants from a course at BOKU called Global Networking. The European students are from BOKU (AT), University of Toulouse (FR) and La Salle (FR); the US students are from Auburn University (AL), Virginia Polytechnic Institute (VA), Florida A&M University (FL), UGA Tifton and UGA Athens (GA).

1.3 Research questions

This master's thesis takes the following research questions into account:

- What differences in GMO opinion do we find among European and US American students?
- What patterns or chains of argumentation do we find in pro / con discussions?
- What are prevalent metaphors used in the discussion?

A Theoretical part

2 Public opinion and attitude towards GMO

This chapter deals with public opinions and consumer attitudes in regards to GMOs and their development in the last years. The focus is directed on Europe as well as on the United States. The Eurobarometer[1] survey and the survey from the Pew Initiative[2] for Food and Biotechnology (PIFB), known as the two most comprehensive surveys in Europe and in the U.S., are specifically analyzed. In addition, survey results from other institutes are considered for approval. As the PIFB did not publish any surveys after 2006, other studies are also used, to update U.S. data collection with more recent results.

2.1 Eurobarometer

The Eurobarometer is basically a series of public opinion surveys, conducted regularly on behalf of the European Commission. The project started in 1973 and addresses a wide variety of topical issues relating to the European Union throughout the EU member states. The Eurobarometer results are published by the European Commissions (*Directorate-General Communication)*.

In this chapter the Eurobarometer reports of the topic GMO are observed. Surveys started in 2001, span over ten years of consumer attitude research about GMO, ending in 2011. The latest Eurobarometer survey between 2012 and 2014 did not include topics related to genetically modification. The survey results are sight for both the whole European community and specifically per member state. Austrian consumer

1 Eurobarometer surveys are published under the command of the European Commission and try to reflect the opinion of Europeans on specific topics.

2 Surveys of the Pew Initiative are done by The Mellman Group, Inc. (sometimes in cooperation with Public Opinion Strategies, Inc.). The surveys include the opinion among 1000 US American citizens.

attitudes are highlight when ever possible. The following Eurobarometer surveys are investigated.

- Special Eurobarometer – *Risk issues, (2006)*
- Special Eurobarometer – *Food-related-risks, (2010)*
- Special Eurobarometer – *Biotechnology, (2010)*
- Special Eurobarometer – *Science and Technology, (2010)*
- Special Eurobarometer – *The attitude of European citizens towards environment, (2005, 2008 & 2010)*

2.1.1 Attitude towards genetically modified food

The following section exemplifies the outcome of several Eurobarometer surveys about the attitudes of European respondents in relation to GM foods. The Eurobarometer report about „Biotechnology“ from 2010 reveals an overall suspicion of GM foods amongst the European public. Attitude of participants was measured, by asking wether they agree or disagree to general statements about genetically modified foods (Figure 1).

A high share of 70% agreed that genetical modification is fundamentaly unnatural. 61% of participants agreed that GM food makes them feel uneasy. In addition 61% disagreed that the development of GM food should be encouraged, whereas 59% disagreed that GM food is safe for their health and the health of their family (TNS OPINION & SOCIAL, 2010a, 18).

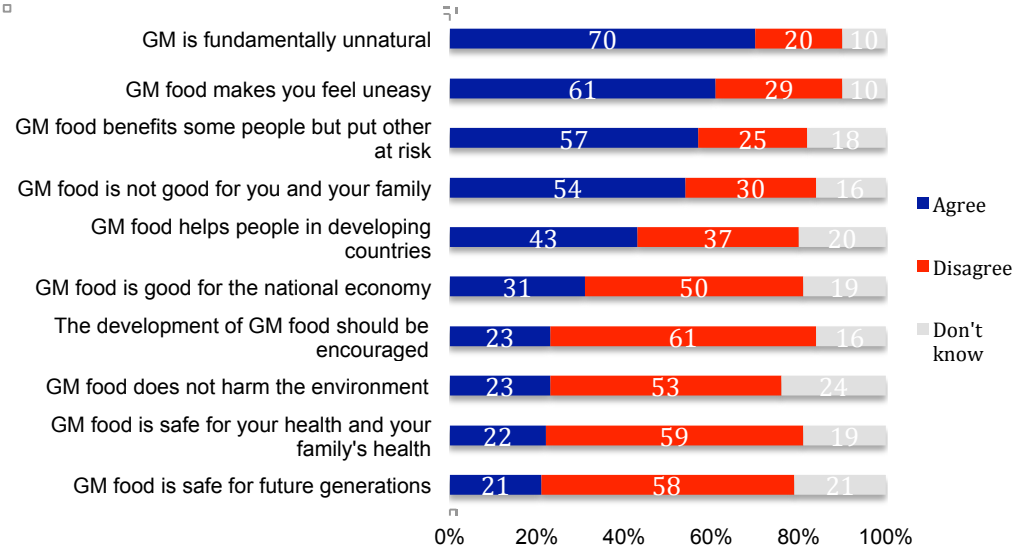

Figure 1: Percentage of agrees /disagrees among European responders in relation to GM food statements (2010 EU-27)

Source: modified after TNS Opinion & Social 2010a, 18

Similarities between the general statements used by the Eurobarometer survey (Figure 1) and our guiding questions from the chat room sessions at the Global Seminar exist. They are brought in comparison in capter 8.

The Eurobarometer surveys „risk issues“ from 2005 and the successive one „food-related-risk“ from 2010, included questions on consumer risk associations in relation to genetically modified organisms in food and drinks (Figure 2).

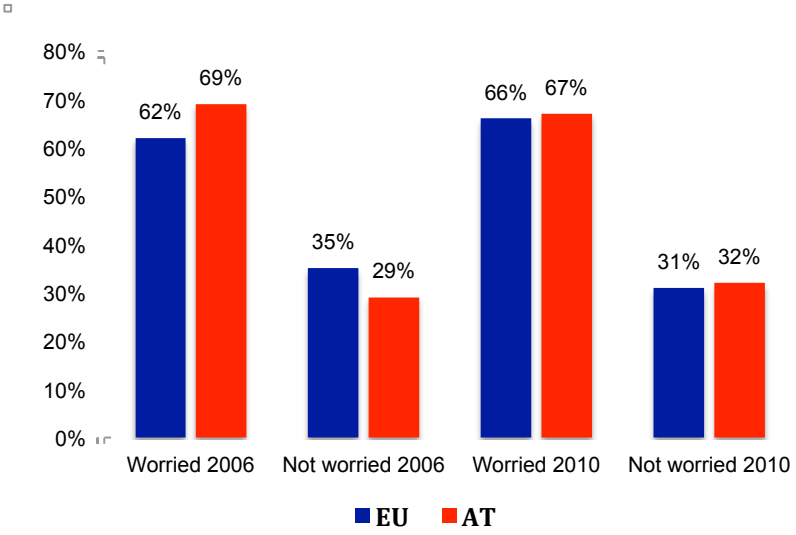

Figure 2: Percentage of worried/not worried people in relation to „GMOs in food and drinks“ on EU average and in Austria (2006 EU-25, 2010 EU-27)

Source: modified after TNS Opinion & Social 2010b, 30; TNS Opinion & Social 2006, 9

In 2005, 62% of Europeans were concerned about „GMOs in food and drinks“, with a slightly increase to 66% in 2010. In the same period the share of not worried Europeans declined from 35% to 31%.

The Special Eurobarometer from 2006 „risk issues“, notified that close to seven out of ten Austrians convey their concern about the use of genetically modified organisms in food production (TNS OPINION & SOCIAL, 2006a, 10). Despite a slight decrease of two percent in worry level perceived by the Austrian population between 2005 and 2010, Austria remains one of the most concerned countries within the EU. It is the only Member State where GMO is ranked as the most serious worry (TNS OPINION & SOCIAL, 2010b, 30).

As mentioned, the level of not worried Austrians rose between 2005 and 2010 from 29% to 32%. In 2005, the level of risk perception in relation to „GMOs in food and drinks“ ranged within the EU from under half of the sample in the Netherlands, Sweden and Finland to over 80% in Greece, and almost 80% in Italy and Cyprus.

In 2010, Greece and Lithuania both on 81% showed the highest level of worries among European countries. Table 1 shows the least concerned countries (Sweden, UK and Ireland).

Table 1: Excerpt of most and least worried countries from 2006 and 2010: Specific results of worry level about genetically modified organisms in food and drinks

Country	2006 worried in %	Country	2010 worried in %
Greece	81	Greece	81
Italy	77	Lithuania	81
Cyprus	76	Bulgaria	76
...	-	...	-
Austria	69	Austria	67
EU-25 average	62	EU-27 average	66
...	-	...	-
Sweden	46	Sweden	48
Finland	46	UK	48
Netherlands	42	Ireland	46

Source: modified after TNS Opinion & Social, 2006a, 76; TNS Opinion & Social, 2010b, 20/78

When comparing the result-tables per country of the Eurobarometer survey „risk issues“ from 2005, with the „Food-related risks“ report from 2010, an increase in level of concern appears in most European countries (Figure 3).

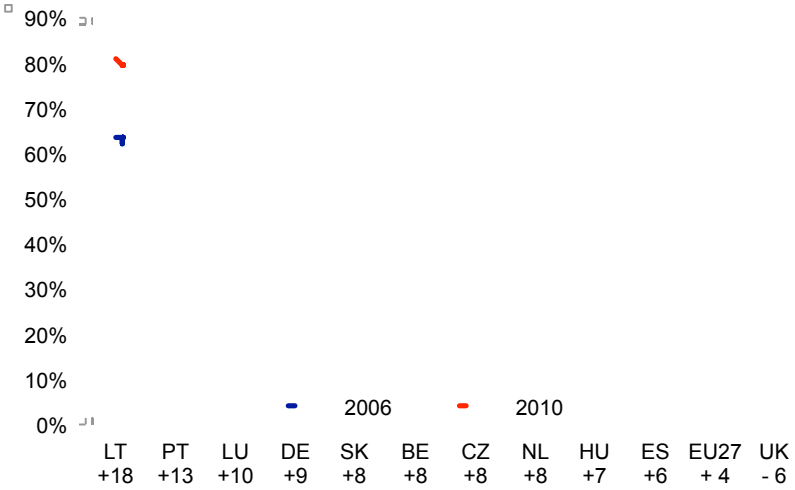

Figure 3: Increase of perceived concerns about „GMOs in food and drinks“ between 2005 and 2010 in 10 European Member States

Source: modified after TNS Opinion & Social 2010b, 30

Since the prior survey from 2005, the concerns about this issue have significantly increased in 10 Member States. Lithuania shows at (81%; +18) the largest shift followed by Portugal at (67%; +13) and Luxemburg at (76%; +10). The United Kingdom is the only country with a substantial decline in level of worry about „genetically modified organisms in food and drink“ since 2005 (48%; -6) (TNS OPINION & SOCIAL, 2010a, 16).

2.1.2 Awareness of GMO

A large majority of Europeans have heard of genetically modified foods. The Eurobarometer survey from 2010 showed that 84% of Europeans (EU-27) had heard about this issue. Just 16% have never heard of them. However, again essential differences between European countries emerged. Norway is the country where most respondents indicated to have heard about GM food (96%), followed by Germany, Finland and the Netherlands. Countries with the lowest level of awareness appear to be Turkey, Austria, Portugal and Malta (TNS OPINION & SOCIAL, 2010a, 14). In Malta not even half of the participants (49%) have heard about the topic (Table 2).

Table 2: Excerpt of country specific results in 2010: Awareness of GM food

Country	Heard about	Talked about
Norway	96	72
Germany	95	78
Finland	93	69
Netherlands	93	69
...	-	-
EU-27	84	66
...	-	-
Turkey	68	45
Austria	68	82
Portugal	59	65
Malta	49	48

Source: modified after TNS Opinion & Social, 2010a, 13 - 16

A further study included respondents, who have heard previously about GM food, to specify whether they have talked with anyone before about it. On average, two thirds (66%) of the respondents on EU-27 level have talked about this issue prior to this survey. It is notable that 82% of the respondents from Austria reported to have talked to anyone before about the topic, whereas 49% of Turkish respondents indicated to have had similar conversations (TNS OPINION & SOCIAL, 2010a, 16). Interestingly both countries are on the same level of public awareness (Table 2).

2.1.3 Knowledge about genetically modified organisms

Knowledge is mend to be one of the central concepts in understanding consumer perceptions of biotechnology. The impact of knowledge on consumer acceptance of GM foods has been measured in several studies with contradictionary results. One explanation of the differences is the manner in which knowledge is measured (HOUSE et al., 2004). In some studies knowledge was measured as awareness, others asked people to self-report their level of knowledge, and still others tried to use objective measures of knowledge by asking a series of true or false questions.

The Eurobarometer survey measured people's level of knowledge about biotechnology and genes, by asking a series of true/false questions. Some of the questions from the report about „Europeans and Biotechnology" have been included in surveys dating back until 1996 (Figure 4) (GASKELL et. al., 2006, 57-59). It enables to gain a view on almost a decade of continuity or change in regards to consumer knowledge within 15 European member states. To maintain a comparability of data, the results of the ten new member states from 2005 are excluded.

While question one, two and six (Figure 4) relate to „text book“ knowledge, dealing with facts that one might have heard in formal or informal education, questions three, four and fife are of a different category. These three questions were formulated in 1996 and developed based on records of focus group discussions with members of the public. Based on the records the questions have been designed in order to suggest a menacing image (GASKELL et. al., 2006, 58).

Despite the decrease of correct answers for the statement about bier and wine production, all other questions, which concern biotechnology more directly, show small increases in correct responses between 1996 and 2005. Almost three quarter of the respondents answered correctly to question one and question two (Figure 4). It is interesting that the amount of correct answers decreased far below half of the sample, when image related questions came into play.

Example of menacing, image related questions

- Ordinary tomatoes don't have genes but genetically modified tomatoes do.
- By eating a genetically modified fruit, a person's genes could also become modified.
- Genetically modified animals are always bigger than ordinary ones.

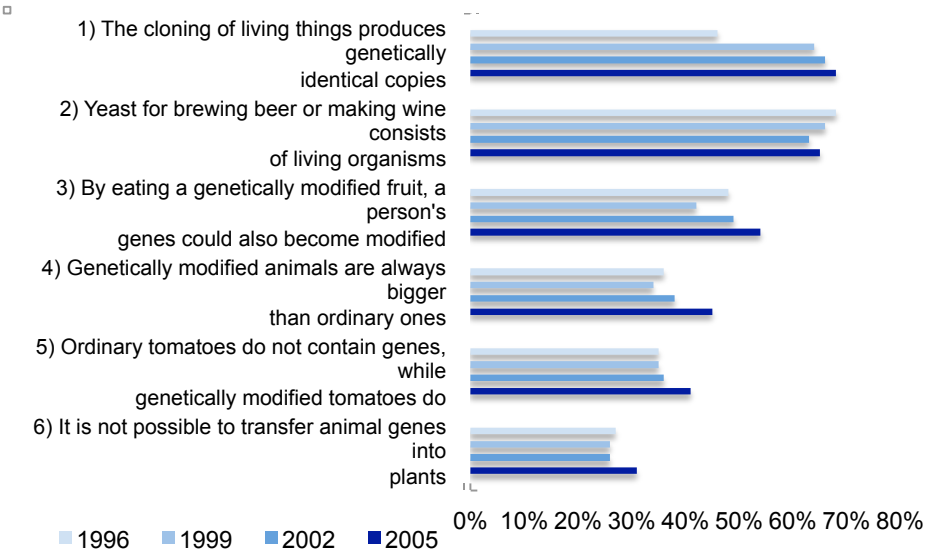

Figure 4: Increase of correct answers about biotechnology between 1996 and 2005 within European Member States (EU-15)

Source: modified after Gaskell et. al., TNS Opinion & Social 2006, 59

While an agreement to these statements indicates the absence of knowledge about genetic engineering, it also shows an approximation to a consent to the idea that biotechnology is associated with fear about adulteration, infection and monstrosities (GASKELL et. al., 2006, 59).

2.1.4 Information about genetically modified organisms

The level of knowledge is generally related to people's involvement and interest in a certain topic. As a consequence the active research for information to increase awareness and knowledge is needed. A subsequent research about respondents who have heard of GM food (Table 2), looked at whether they had themselves actively searched for information. On average only 38% of Europeans have done so. The difference between countries shows, that only two countries are observed where the number of respondents - who have actively searched for information - outnumbers that of those who have never done so (TNS OPINION & SOCIAL, 2010a, 17).

Table 3: Excerpt of country specific results in 2010: Actively searched for information

Country 2010	Searched actively
Switzerland	54
Greece	54
Sweden	49
Island	48
Italy	46
Austria	46
...	
EU 27	38
...	

Source: modified after TNS Opinion & Social, 2010a, 17

In Greece as well as in Switzerland 54% of the respondents have, and 46% have not searched about information on GM foods (TNS OPINION & SOCIAL, 2010a, 17). Sweden and Island are tight below half of the country sample (49% and 48%).

The opinion of Europeans in relation to information about genetically modified organisms was subject in three consecutive surveys conducted by the Eurobarometer. One of these study's is from 2008 „Attitude of European citizens towards the environment" and describes the lack of information in relation to GMO as a consequence of the scientific nature that this issue represents, which makes it hard to understand for the majority. Further investigations of the Eurobarometer reveal, that

there is a link between Europeans perceived need for information and their concerns about that issue (TNS OPINION & SOCIAL, 2008, 63).

Two main issues „the use of chemicals in everyday products“ and „the use of GMO in farming“ appear to reveal consumers perception of lacking information most.

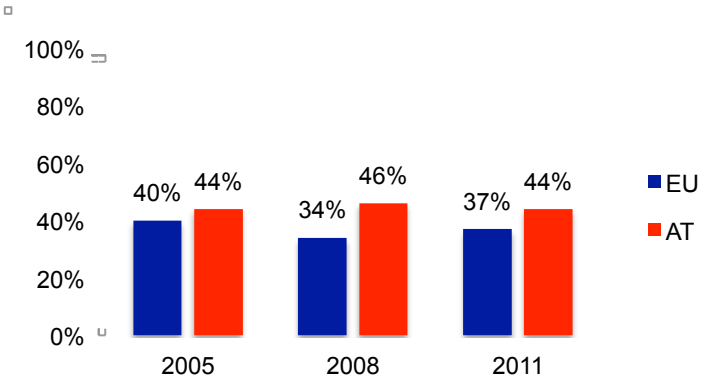

Figure 5: „the use of GMO in farming“ in % under the top 5 issues of lacking information between 2005 within 2011 among European Member States (2005-EU 25, 2008 & 2011-EU 27)

Source: modified after Gaskell et. al., TNS Opinion & Social 2005, 18; TNS Opinion & Social 2008, 63; TNS Opinion & Social 2011, 144;

In 2005, forty per cent of Europeans stated that „the use of GMO in farming“ is the second biggest issue, were an absence of information is perceied, among several other environmeltal concerns (TNS OPINION & SOCIAL, 2005, 18).

Table 4: Top five issues in 2005 about which Europeans perceive a lack of information

Issues of lacking information	EU in %
1 The impact on health of chemicals used in everyday products	41
2 The use of genetically modified organisms in farming	40
3 Loss in biodiversity (extinction of animal species, flora and fauna, etc.)	29
3 Agricultural pollution (use of pesticides, fertilizers, etc.)	29
3 Depletion of natural resources	29
4 Water pollution (seas, rivers, lakes, underground sources, etc.)	27
5 Climate change	26

Source: TNS Opinion & Social, 2005, 17

The report from 2005 shows that more respondents from Finland, Slovenia, Greece, Slovakia and Hungary indicated that they lack information on „the use of GMO in farming“. The feeling of Austrian respondents (44%) in relation to this issue, appears to be 4 per cent points above EU average. On the other hand, Portugal (28%) is the country were lowest rates had been indicated by respondents (TNS OPINION & SOCIAL, 2005, 19). Further studies about „attitude of European citizens towards the

environment“ from 2008 and 2011 indicate a slight decrease in perception of lacking information in a time line between 2005 and 2011(Table 5).

Table 5: Excerpt of country results from 2005, 2008 and 2011: lacking information about “the use of GMO in farming”

Country in %	2005	2008	2011
Finland	66	58	59
Slovenia	54	44	47
Greece	54	47	41
Slovakia	54	44	48
Hungary	53	45	50
...	-	-	-
Austria	44	46	44
...	-	-	-
EU average	40	34	37
...	-	-	-
Portugal	28	17	16

Source: modified after TNS Opinion & Social, 2005, 18; TNS Opinion & Social, 2008, 62; TNS Opinion & Social, 2011, 144.

2.1.5 Environment and genetic engineering

A surveys from 2005 asked European respondents, to name the five main environmental issues they worry about. Averaged results show, that four priorities in concern of environmental deterioration clearly stand out. Issues like „water pollution“, „man made disasters“, „climate change“ and „air pollution“ appear to worry Europeans most. In 2005, 24% of Europeans named, „the use of genetically modified organisms in farming“ to be the most concerning issue (Table 6) (TNS OPINION & SOCIAL, 2005, 8).

Table 6: Excerpt of top environmental issues from 2005: Five most recently mentioned issues among respondents

Environmental issues of concern	EU in %
1 Water pollution (seas, rivers, lakes, underground sources, etc.)	47
2 Man made disasters (major oil spills, industrial accidents, etc.)	46
3 Climate change	45
4 Air pollution	45
5 The impact on our health of chemicals used in everyday products	35
6 Natural disasters (earthquakes, floods, etc.)	31
7 Growing waste	30
8 Agricultural pollution (use of pesticides, fertilizers, etc.)	26
9 Depletion of natural resources	26
10 The use of genetically modified organisms in farming	24

Source: TNS Opinion & Social, 2005, 8-9

According to country specific results from 2005, Greek (43%) and Austrian (43%) respondents stated „the use of GMO in farming“ to be within their top five environmental issues. This is almost twice as often as the average European respondent did. On the other hand, participants from Malta (12%) and Spain (15%) appear to be least worried (TNS OPINION & SOCIAL, 2005, 11).

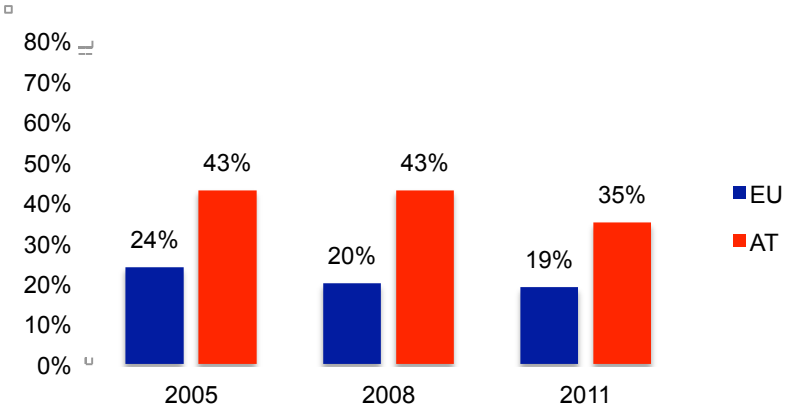

Figure 6: „the use of GMO in farming“ in % mentioned within the top 5 environmental issues among European and Austrian respondents (2005-EU 25, 2008 & 2011-EU 27)

Source: modified after TNS Opinion & Social 2005, 11; TNS Opinion & Social 2008, 102; TNS Opinion & Social 2011, 140;

A later survey about the „Attitude of European citizens towards the environment (2008)“ revealed a general decrease in concerns about „the use of GMO in farming“ among European countries. Within three years, the results of Greece respondents showed a drop of minus 13 per cent points, the biggest drop in level of concern about that issue.

However Austrian level of concern did not change and remained at (43%) about the highest within the whole European Union (TNS OPINION & SOCIAL, 2008, 102).

In 2011, the issue of GMO declined below 20 % on EU average, but it is still of major priority and in the top fife ranking of 35% of Austrians (TNS OPINION & SOCIAL, 2011, 140).

2.1.6 Danger of GMO

In 2006, a notable proportion (42%) of Europeans considered it likely, that the food they eat could damage their health. This was measured by asking a particular question about the possibility of health damages caused by GM food products (TNS OPINION & SOCIAL, 2006, 5). Nonetheless, most Europeans answered to spontaneous questioning

- about the first things that comes to their mind when thinking of food - primarily with positiv assossiations like taste and pleasure. Associations of food with hunger, health or necessity were of a lower priority. According to the Eurobarometer report „risk issues“ from 2006, the factors „taste“ (31%) and „pleasure“ (29%) were the first associations, consumers made when thinking of food. Whereas only one person in five, assossiated food with „health“ (19%) (TNS OPINION & SOCIAL, 2006, 5).

The same report showed that GMO is not of highest priority when people think of possible problems or risks that could occur to food. Among Europeans most mentioned possible food risks were „food poisoning“ (16%), followed by the problem of „chemicals, pesticides and toxic substances“ (14%) within our food. Only few European respondents (8%) considered GMO as a possible problem or risk when thinking of food (Table 7).

Table 7: Possible problems or risks related to food in 2006: Five most recently mentioned issues among respondents

Possible problems or risks in relation to food	% EU
1 Food poisoning	16
2 Chemicals, pesticides, toxic substances	14
3 Obesity, over-weight	13
4 Illness, health problems	9
5 Genetically modified organisms	8

Source: TNS Opinion & Social, 2006, 7

The proposition „ GM food is dangerous“ was used as an open question in surveys conducted by the Eurobarometer in 2001 and 2005. In both years a majority of Europeans agreed to this statement. However a substantial large group did neither agree nor disagree (23%), while 10% indicated to not know about that issue. This lack of knowledge reflects perhaps the uncertainty among European consumers about GM foods being a danger or not, as danger still remains to be proven. Further studies reveal that the feeling of danger varies only slightly according to the level of knowledge and education of the persons questioned. (EORG, 2001, 27).

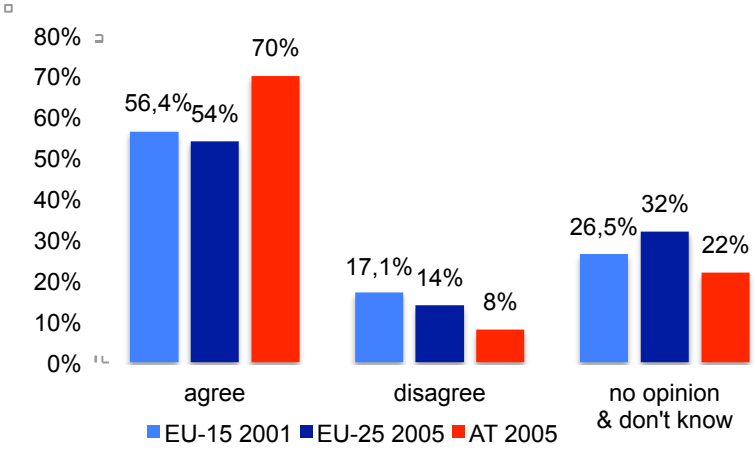

Figure 7: Percentage of agreement and disagreed among respondents about the preposition: „GMO made food is dangerous“

Source: modified after TNS Opinion & Social 2005, 63; EORG, 2001,26;

Figure 7 shows that Austrians appear to be more concerned about the danger in relation to GM foods, compared to the average European (Figure7). Respondents from Cyprus (88%) and Greece (80%) revealed their concerns about this issue most. On the other hand, respondents from the Netherlands and UK seem to be least certain about the danger of GMO foods (TNS OPINION & SOCIAL, 2005, 11).

2.1.7 Future consequences

How optimistic Europeans feel about new technologies, was subject of a series of surveys assigned by the European Commission in 2005 and 2010. Respondents were asked to express their feelings about a range of „new technologies“ and evaluate them whether they have a positive, negative or no effect on people's lives within the next 20 years. In 2005, a slight majority (52%) of respondents felt that biotechnology and genetic engineering would improve their lives within the next 20 years (GASKELL et. al., 2006). The number increased slightly in 2010 on an average of 53%. Respondents believed that most positive effects on people's lives result from solar energy (87% / + 9%) and wind energy (84% / + 10%). Both technologies showed the highest growth between 2005 and 2010 (TNS OPINION & SOCIAL, 2010b, 9). Although more than half of Europeans saw a positive effect in biotechnology and genetic engineering (Figure 8). The high amount of „don't knows“ in nanotechnology, biotechnology, genetic engineering or brain and cognitive enhancement, suggests that many people have still to make up their minds about its prospects (GASKELL et. al., 2006, 11).

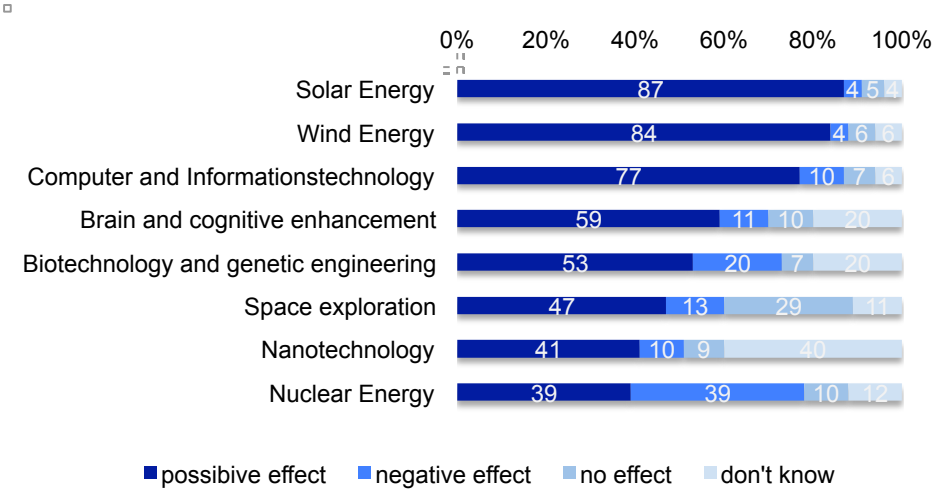

Figure 8: Percentage of people's belief on effects of new technologies within the next 20 years (2010 EU-27)

Source: modified after TNS Opinion & Social 2010,9

When looking at country specific results from 2010 about consumer attitudes in regards to biotechnology and genetic engineering, great variety among European countries turns up. Countries with most positive responses to this issue where Iceland (79%), Estonia (77%), Norway (73%), Sweden (72%) and Finland (69%). Austrians showed the lowest measured positive effect (35%), while at the same time, the highest concern about negative effects /41%).

2.2 GM - regulations and policy in Austria

This chapter deals with GMO regulations and policies in Austria. It starts off with a brief summary about the Eurobarometer surveys from the previous chapter including a short part of possible reasons for Austria's opposing position.

1) The level of worry in relation to GMO foods and drinks remains fairly high in Europe. Concerns of Austrian respondents decreased slightly, approximating to the EU average (TNS Opinion & Social 2010b, 30; TNS Opinion & Social 2006, 9).
2) A large majority of Europeans have heard of GMO foods, hence awareness seems to be quite high. Awareness of Austrian respondents appeared to be lower than EU average (TNS Opinion & Social, 2010b, 13 – 16).
3) Europeans show an increase of knowledge in relation to textbook questions about genetical engineering. However, general knowledge, especially with

„menacing image questions“ is still on a respectively low level (GASKELL et. al., 2006, 59).

4) A lack in information about GMO is widespread among Europeans. Austrian participants consider themselves more poorly informed compared to the average European (TNS OPINION & SOCIAL, 2005, 18; TNS OPINION & SOCIAL, 2008, 62; TNS OPINION & SOCIAL, 2011, 144). Although, the percentage of respondents who actively search for information, is quite low (TNS OPINION & SOCIAL, 2010a, 17).
5) Austrians perceive much higher environmental risks related to GMO than the average European (TNS OPINION & SOCIAL 2005, 11; TNS OPINION & SOCIAL 2008, 102; TNS OPINION & SOCIAL 2011, 140)
6) A slight majority of European respondents acknowledged the danger of GMO food, while nearly three quarter of Austrian participants thought that GMO food is dangerous (TNS OPINION & SOCIAL 2005b, 63; EORG, 2001,26).
7) Half of European respondents have a positive attitude towards the effect of GMO within the next 20 years. In contrast a majority of Austrians belief in a negative impact (TNS OPINION & SOCIAL 2010,9).

However, there is only little literature that explains why Austrians show such an opponent stance when it comes to genetically modified organisms. Torgersen and Seifert explained the low support, compared to the support in the rest of Europe, in a publication from 1997, as a more or less unreflected aversion to biotechnology that precedes risk perception in Austria (TORGERSEN AND SEIFERT, 1997, 131-142).

Data collections from 1994 revealed a relatively low risk perception among Austrians and additionally a low demand of government control. The data suggested, that Austrians small acceptance towards GMO was a product of a very low level of knowledge and a reluctant optimism towards new technologies (TORGERSEN AND SEIFERT, 1997, 131-142).

In other words, a conservative attitude towards new technologies, rather than any developed perception of associated risks. Nevertheless, GMO was not an important public issue in Austria, until the first proposal for releases of GMOs were introduced in 1996, causing a stormy public debate, accompanied by a growing awareness of risks.

In 2005, Torgersen and Bogner explained that one reason for the rough start of biotechnology in Austria, was an absence of attention on part of the industry sector, as non of the global seed companies where rooted in Austria. Industry saw no benefit in introducing it to Austria (TORGERSEN AND BOGNER, 2005, 278). Furthermore, Austria precedes a leading role in organic farming, which may be another reason for a GMO aversion (MIKL AND TORGERSEN, 1996, 195-199).

Within the political structure of Austria there were very opponent opinions. NGOs worried about the broader context of the aim of genetical engineering (MIKL AND TORGERSEN, 1996, 197). The uncertainty in benefits of such a controversial technology, distressed politicians and hindered a coherent approach for a more reflexive way to deal with this subject (TORGERSEN AND BOGNER, 2005, 277). Farmer representatives remained with their common and popular non-GM stance (TORGERSEN AND BOGNER, 2005, 278). The social partners where more worried about the economy and the economic growth, than on environmental issues. When formulating Austria's GMO law, the government wanted to take into account all differing opinions and suggestions of political parties, as well as recommendations from industry and NGOs, which resulted in a so called „yes but" strategy. They say „yes" to GMO in general, but included a bulk of strong restrictions, case-by-case assessment of socio economic effects and protection of agriculture and forestry. In other words, many issues were lumped together for consideration, unrelated to the direct ecological impact of the use of GMOs (MIKL AND TORGERSEN, 1996, 196).

The Austrian Standard

Austria's interpretation of the GMO law and its legal basis, the EC directives 90/220 and 94/15, differs from those of other EU member states. Despite to the fact that EU regulations generally overrul national law, Austria somehow reinterpreted the GMO law beyond a technical understanding of direct risks, including secondary effects or long-term effects not only towards the environment, health and society, but also on the agricultural practice. It referred explicitly to the impact of pesticide use as well as to possible secondary and long-term effects not only on a „natural", but also on the agricultural environment, as an integral part of risk assessment (TORGERSEN AND SEIFERT, 1999, s.p.). Notable, that EC directive 90/220 regulates only primary ecological risks and not secondary risks of the effects of herbicide use, as „averse

ecological effects ... might be caused by all organisms, not just GMOs“ (MIKL AND TORGERSEN, 1996, 199).

Austria’s ban of agro-biotechnological products was justified with a distinctive combination of arguments also named „The Austrian Standard“. The following two examples illustrate Austrian’s approach more precisely.

Austria’s Competent Authority (CA) rejected herbicide tolerant plants, as they could contribute to an increasing usage of herbicide, and because the environmental impact of metabolic products could not be further expulsed. So both, the herbicide tolerant plant and the complementary herbicide had to be assessed together, which goes far beyond that of most other European CA’s, who only restricted the effects of the GM products themselves (TORGERSEN AND SEIFERT, 2011, 209-217).

Another exemplar is Austria’s view on insect-resistant bt plants. The presence of the bt gene was announced as a step towards an environmentally beneficial plant protection. Although there were concerns about a resistance development among pests, causing the biological pesticide preparation to become useless. As a consequence the application of additional chemicals would become necessary, which was considered unacceptable (TORGERSEN AND SEIFERT, 2011, 209-217). It is notable that Austria’s CA demands that a substitutional product needs to be better than traditional ones, rather than no worse, as other CAs in Europe argue.

Austria’s „Gentechnik“ law

The Austrian federal law for gene technology from 1994 regulates the work with genetically modified organisms, the release and marketing of genetically modified organisms and the use of genetic analysis and gene therapy on humans, amending the product liability act. The law is build on five basic principles (BUNDESGESETZBLATT, 1994).

- The precautionary principle;

Austria’s precautionary principle varies significantly from the terms used in the European Commissions version. It basically says that work with GMOs and the release of GMO into the environment are approved only, if according to the state of art, no adverse effects for safety (§1 Z 1 Austrian gene technology law) are to be expected from this.

- The principle of providing for the future;

However the precautionary principle has to be read against the „future“ principle, which prescribes that the research in the field of genetic engineering and the implementation of its results must not meet inappropriate restrictions but are in compliance with security (§1 Z 1 GTG) (TORGERSEN AND BOGNER, 2004, 21). In other words, if safety as determed by the state of art is doubtful, GMOs should not be applied.

- The step-by-step principle;

The release of GMOs may only take place in stages, in which the containment of the GMO eased gradually, and their release can only be raised if the previous stage assessment indicates, that the subsequent stage appears compatible with the precautionary principle.

- The democratic principle;

The democratic principle implies that in accordance with this federal law, public must be involved in the execution to ensure their information and participation.

- The ethical principle;

In genetic analysis and gene therapy on humans, it is to ensure that human dignity is preserved; the human responsibility for animals, plants and ecosystems has to be taken into account (RIS, GENTECHNIKGESETZ, 1994) (own translation).

Precautionary principle

The aim of the precautionary principle is to ensure „rapid response” in the face of a possible threat to human, animal or plant health, or to protect the environment. In EU practice it is also embedded in consumer policy and legislation (EUR LEX, 2000, s.p.). In Austria’s regulatory system, the precautionary principle takes not only scientifical findings into account, but also possible overall impacts, such as impacts on health, environment, landscape and society. Every GMO variety must be in accordance with the law, thereby undergoing a federal oversight (MIKL AND TORGERSEN, 1996, 197). The precautionary principle was seen as blurring the boundaries between science and politics (TORGERSEN AND BOGNER, 2005, 277).

Austria's position

An illegal release of GMOs in the mid nineties caused a public mobilization and kept biotechnology a public relevant issue for the next years. As a consequence it lead to the proposal of a two-years moratorium of all GMO releases, giving assurance that the public would be united in its opinion of GMO. The moratorium was turned down, as it was too expansive and may have included approved commercial products with EU-wide market recognition. The "Directorate General Experty Committee" as well as most national CA's considered Austria's „scientific argumentation" as invalid, claiming that Austria's interpretation of Directive 20/990 was too broad. However, the discussion coincided with the BSE scandals, which may have influenced the debate about agricultural biotechnology in Austria (MIKL AND TORGERSEN, 1996, 199). As a consequence Austria prolonged its ban from 2003 on GMOs, keeping Austria GM-free for a couple more years. In the same time, other European countries where allowed to grow GM-feed. Due to cross-pollination a major threat to organic feed production in boarder regions came up (TORGERSEN AND BOGNER, 2005, 282). The attempt to establish Austria as a GM free area was rejected, as it was not possible in the eyes of the European Commission.

2.3 GMO's in the United States of America

In this chapter, an early US study, conducted by the Mellmann Group on behalf of the „Pew Initiative on Food and Biotechnology" (PIFB) between 2001 and 2006, is analyzed. The study examined health and environmental issues, enhanced by GMOs, as well as the governmental ability, to assess risks and benefits of genetic engineering in agriculture and food production. Mellmann monitored public understanding of and support for different types of biotechnology, in order to verify detailed changes in opinion over time. It was the only institute publishing comparable periodical polls. Unfortunately no further studies where published after 2006. For this reason, studies from other institutes, which had been conducted between 2006 and 2014, are taken into account. It is notable, that all of the other surveys may use different parameter within their evaluation processes. However, survey results are sufficient enough, to establish a trend in average US American consumer attitude towards GMO.

2.3.1 Attitude towards GMO

Continuous research and developments of agricultural biotechnology has raised both, expectations and concerns among US society. Since its commercialization in 1996, developers of biotechnology brought new crop varieties to the marketplace, expanding farmers choices in relation to agricultural utilization. Farmers widely adopted GM crops, notwithstanding uncertainties about consumer acceptance or economical and environmental impacts. Genetically engineered crops, in particular corn, cotton and soybeans, reached about 90% of planted acres in the U.S. in 2013 (U. S. DEPARTMENT OF AGRICULTURE, 2014).

However, during the five years of research conducted on the behalf of the PIFB, support for genetically modified foods appeared to be on a quite low level. In 2001, 26% of US American respondents favored the introduction of GM food into the U.S. market, while more than double of that amount 58% showed an opponent opinion. The number of supporters remained quite stable until 2006 (+/-1%). In contrast to that, opposition declined within five years by twelve percent points to 46% (THE MELLMAN GROUP INC. AND PUBLIC OPINION STRATEGIES, 2001, 2; THE MELLMAN GROUP INC. AND PUBLIC OPINION STRATEGIES, 2003, 2; THE MELLMAN GROUP INC. AND PUBLIC OPINION STRATEGIES, 2006, 3). Figure 6 shows the attitude of U.S. consumers with the introduction of GM foods into their food supply.

Figure 9: Percentage of respondents supporting or opposing the introduction of GM food products into the US food supply

Source: modified after The Mellmann Group Inc., 2006, 3

Americans attitude towards biotechnological R&D

Most Americans would like to see continuous research into GM foods. In 2001, 68% favored further research into genetically engineered food products, with 37% strongly supporting this research, while only 26% opposed it (THE MELLMAN GROUP INC. AND PUBLIC OPINION STRATEGIES, 2001, 3). Americans perceptions in relation to genetic engineering on different types of life forms, was measured in a survey in 2003. A great example of a „plant over animal" dynamic came from a split sample simulation, involving genetically modification to produce more affordable pharmaceutical products. While half the sample was asked whether they support or oppose genetical modification involving plants, the other half had to express their feeling about GM of animals to achieve this goal. A huge amount of 81% supported the idea to genetically modified plants for cheaper pharmaceutical products, with 47% strongly supporting this idea and only 14% opponent. On the other hand, not even half of the other sample (49%) indicated to support gene modification of animals to produce more affordable drugs, while 47 % called it a bad reason to modify animals (THE MELLMAN GROUP INC. AND PUBLIC OPINION STRATEGIES, 2004, 5).

The correlation between genetical engineering and personal benefits resulting from various techniques raises a number of questions among science. There is evidence that underlying ethical constraints are at work, when analyzing the previously mentioned example. Consumers were apparently more likely to support GM on plants, to produce cheaper medication, and they believe that those will help them and their families, than they were supporting the same achievement through GM on animals. A basic concern towards genetically modification of animals seems to cause this inclination. Nevertheless, consumer perceptions of the benefits that biotechnology will directly provide them and their families, seems to be an important driver of support (PIFB, 2004, 5). In 2006, primary important reasons to determine whether to favor or oppose gene modification, were the impact it might have on oneself and one's family (59%) and the trust one has in the people providing information (50%) (THE MELLMAN GROUP INC. AND PUBLIC OPINION STRATEGIES, 2006, 8).

2.3.2 Awareness of GMO

US American consumers underestimate the huge presence of GM food products, sold in American grocery stores. Accordingly a general public lack of knowledge emerged, when respondents were asked whether they believe to have eaten GM foods or not. In

2005, only 26% believed that they have eaten genetically modified food, while 60% of respondents believed, to have never eaten any GM food by now (THE MELLMAN GROUP INC. AND PUBLIC OPINION STRATEGIES, 2006, 2). The numbers have slightly changed within the observed period of time (Figure 10).

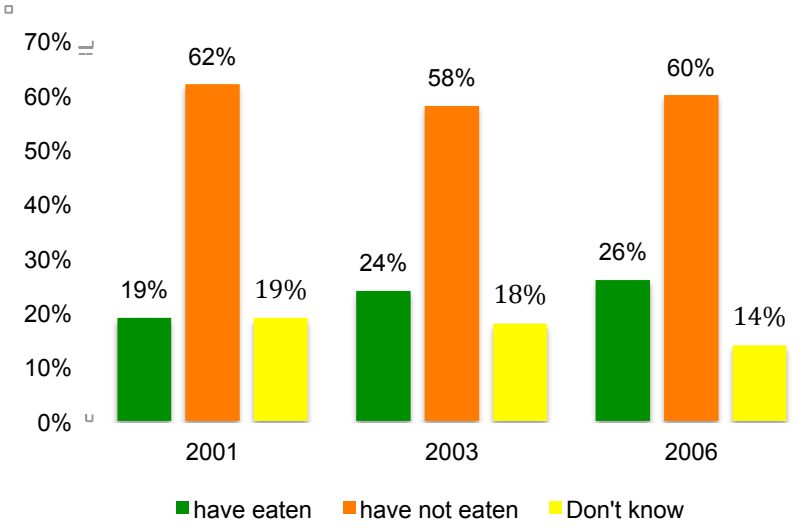

Figure 10: Percentage of people's awareness of eating GM food in the United States

Source: modified after The Mellman Group Inc. and Public Opinion Strategies, 2001, 2; The Mellman Group Inc. and Public Opinion Strategies, 2003, 2; The Mellman Group Inc. and Public Opinion Strategies, 2006, 2

As one might expect, those who claim to have heard most about GM foods, are more likely to believe that they have eaten GM foods. On the other hand, those who heard least about it are least likely to believe they have eaten genetically altered food. However, this is still an underestimation, as most - if not all Americans - have eaten genetically modified foods in one or anther form (THE MELLMAN GROUP INC. AND PUBLIC OPINION STRATEGIES, 2006, 2).

Survey results revealed, that respondent's educational background correlates with the level of awareness in regards to this issue. While 26% of those respondents who had a college degree stated that it is likely to have eaten GM foods, only 15 % of those participants with a high school degree thought so (THE MELLMAN GROUP INC. AND PUBLIC OPINION STRATEGIES, 2001, 2). In 2013, fewer than half of Americans (43%) were aware that products containing GM ingredients are currently for sale in US supermarkets, only about one quarter (26%) believed that they have ever eaten GM foods (HALLMANN et. al., 2013).

How much American consumer had heard, read or seen about either genetically modified food or biotechnology, was analyzed within the research conducted by the Pew Initiative between 2001 and 2006. The survey revealed that knowledge about this issue was relatively low. Figure 11 illustrates the amount of respondents who have heard or not heard about GM foods, which are sold in American grocery stores.

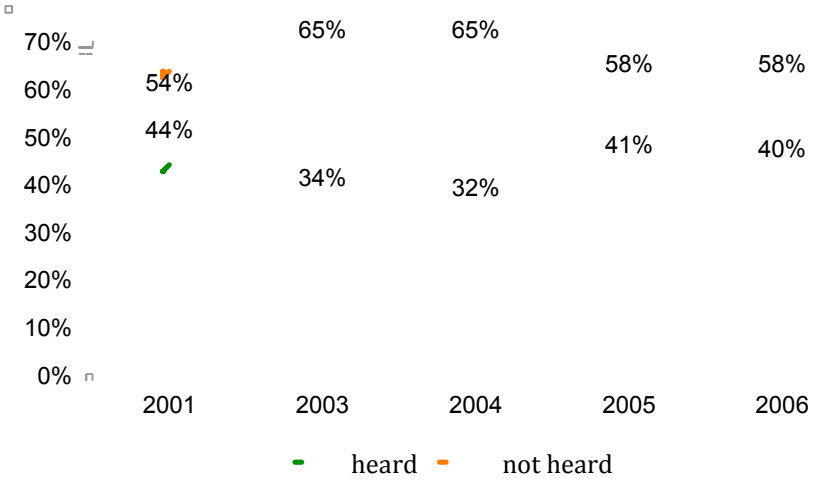

Figure 11: Percentage of American consumers that have heard / not heard about GM food or biotechnology within a time line

Source: modified after The Mellman Group Inc. and Public Opinion Strategies, 2006, 2

In 2001, the highest level of knowledge (44%) about GM food or biotechnology was measured throughout the observed time period. Overall, public's familiarity with GM food showed a slight decrease over the time, rebounding after 2004 at about 40%. On the other hand, the amount of consumers who had heard „not that much" or „nothing at all" appeared to be on a particularly high and stable level (THE MELLMAN GROUP INC. AND PUBLIC OPINION STRATEGIES, 2006, 2). The level of consumer knowledge is mostly driven by the degree of attention paid by media (PIFB, 2004, 1). It is mentionable that the highest measured consumer knowledge from 2001 was strongly influenced by a food scandal, known as the "Star link"[3] corn recall from 2000, which was medially expatiated in order to broadly reach public attention.

3 In 2000, genes from Starlink corn (genetically modified corn from Avensis Crop Science, later Syngenta) was detected in food products that were intended for human consumption. Althought testing for allergenicity was inconclusive, so EPA approved Starlink corn only for use as an animal feed and prohibited it from entering the human food supply (Federation of American Scientists, s.a, s.p.).

A more recent survey from 2013, conducted by the Gfk Custom Research[4] came to very similar results. While 54% new little or nothing about GM food, one in four respondents (25%) mentioned to have never heard of them (HALLMANN et. al., 2013, 3).

2.3.3 Consumer knowledge about GM foods

The same study found, that most US respondents showed an uncertainty about the type of GM foods available in American stores. Even among those who were aware of the presence of GM food, product related knowledge appeared to be limited. Hence consumer perceived availability of food products derived from GM crop did not always accord with reality.

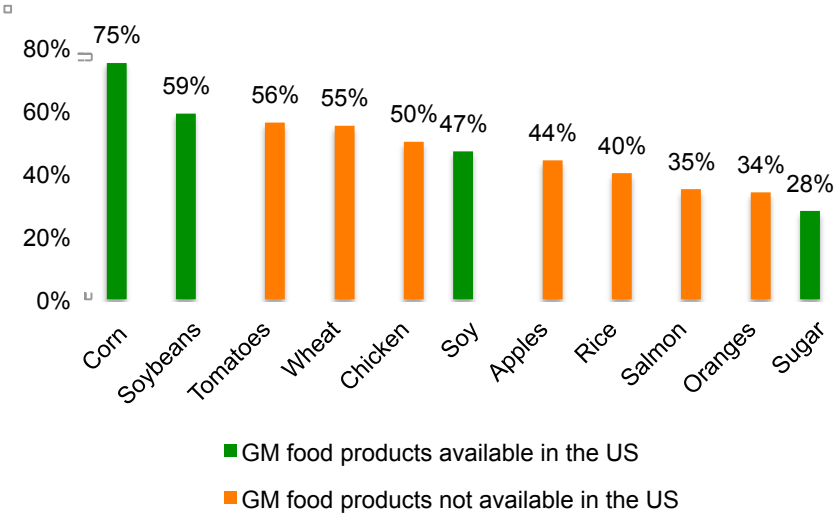

Figure 12: Perceived availability of food products derived from GMO in 2013 among American respondents who were aware of the presence of GM foods.

Source: modified after Rutgers (2013)

While 75% of respondents recognized the availability of GM corn products in American grocery stores and 59% realized that products derived from GM soybeans are available on U.S. American store shelves, more than half of the sample mistakenly believed that GM Tomatoes, Wheat and Chicken products are for sale in

4 The GfK Custom Research evaluated data of an online US national survey including 1.148 participants by using their national internet-based survey response panel (KnowledgPanel®). GfK is a market analyzing company which offers its data to companies (GfK, 2015, s.p.).

supermarkets. More than a third believed that GM rice, salmon and oranges are for sale in U.S. supermarkets. In 2013 these latter products were not available in U.S. stores (HALLMANN et. al., 2013, 5). While writing this thesis, the first genetically modified Salmon „AquAdvantage Salmon“ was approved for marketing and sale by the Food and Drug Administration. FDA announced that the genetically modified fish meets its statutory requirements for safety and effectiveness under the Federal Food, Drug and Cosmetic Act. The GM application was approved, because the salmon is safe to eat, the introduced DNA is safe for the fish it self, and the salmon meet the sponsor's claim about fast growth (FOOD AND DRUG ADMINISTRATION, 2015, s.p.).

2.3.4 Consumer knowledge about regulations

As summarized above, awareness towards GM food or biotechnology appeared to be relatively low among American respondents. According to the results from various surveys conducted by the Pew Initiative, Americans knowledge is even lower, when it came to the regulatory structure around genetically modified foods.

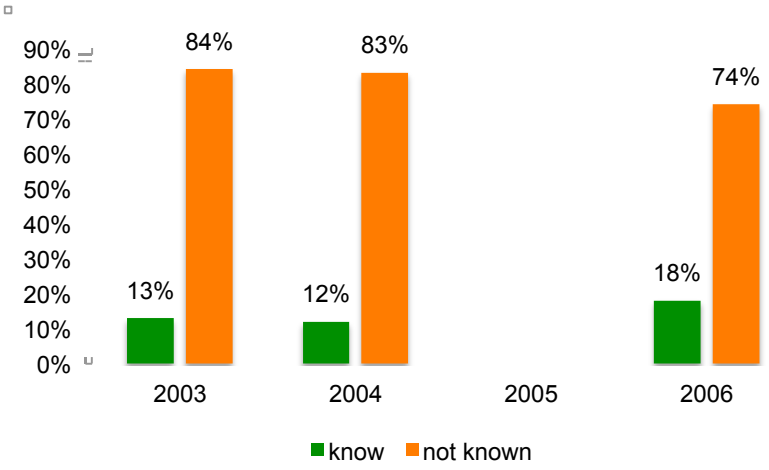

Figure 13: Percentage of respondents who have / have no knowledge about GM regulations

Source: modified after The Mellmann Group Inc., 2004, 2; The Mellmann Group Inc., 2006, 3

In 2003, only 13% of respondents claimed to have knowledge about GM regulations, while 84% indicated to know little or nothing about the GM regulatory system. One year later, the numbers did not change significantly. In 2006, a slight increase of knowledge could be observed, remaining still on a quite low level of 18% (THE MELLMANN GROUP INC., 2004, 2; THE MELLMANN GROUP INC., 2006, 3).

However, in 2013 the situation did not change either. Only about a quarter (26%) of Americans knew that regulations did not require GM products to be labeled. Nevertheless, after direct questioning, 75% of Americans revealed the importance to know whether foods contain genetically modified ingredients. Only 21% of consumers where stating to not care whether their food was genetically altered (HALLMANN et. al., 2013, 4; NATIONAL Research Center, 2008, s.p.).

2.3.5 Safety of GM foods

In 2001, US American respondents where asked to name those issues that concern them most or very, when thinking about food safety (Table 8).

Table 8: Issues of concern related to food in 2001: Percentage of respondents indicating most concerning issues in food safety.

Perception of possible problems or risks associated with food	% EU
1 Food freshness	71
2 Food poisoning	67
3 Salmonella	66
4 Chemicals & fertilizers	46
5 Genetically modified foods	34
6 Biotechnology in food production	32
7 Irradiation	32
8 Listeria	25

Source: modified after The Mellmann Group Inc. (2001, 3)

While 34% indicated that genetically modified food is among those things, concerning them very or most, other issues like food freshness (71%), food poisoning (67%), salmonella (66%) and chemicals and fertilizers (46%) where of a higher priority. The survey showed, that consumer concerns about biotechnology in food production were expressed by only 32% of respondents, being quite a subordinate food safety issue (THE MELLMAN GROUP INC. AND PUBLIC OPINION STRATEGIES, 2001, 3).

Several surveys concerning the personal view of Americans in relation to food safety have shown that consumer opinions are not firm. In 2001, respondents were asked to state their personal views, whether GM foods are basically safe. A plurality of 46% stated to not know. 29% thought GM foods are basically safe, while 25% of the participants categorized GM foods to be basically unsafe. After hearing additional information, that more than half of the products sold in American supermarkets contain GM ingredients, the numbers changed substantially. Then, a majority (48%) thought that GM foods are basically safe. As well the number of respondents, who

initially perceived GM foods to be basically unsafe (21%), as the number of people who initially indicated to not know (31%), shrunk (THE MELLMAN GROUP INC. AND PUBLIC OPINION STRATEGIES, 2001, 2). However, this study conducted by the Pew Initiative, enables to see changings of Americans personal views in regards to GM and food safety within five years (Figure 14).

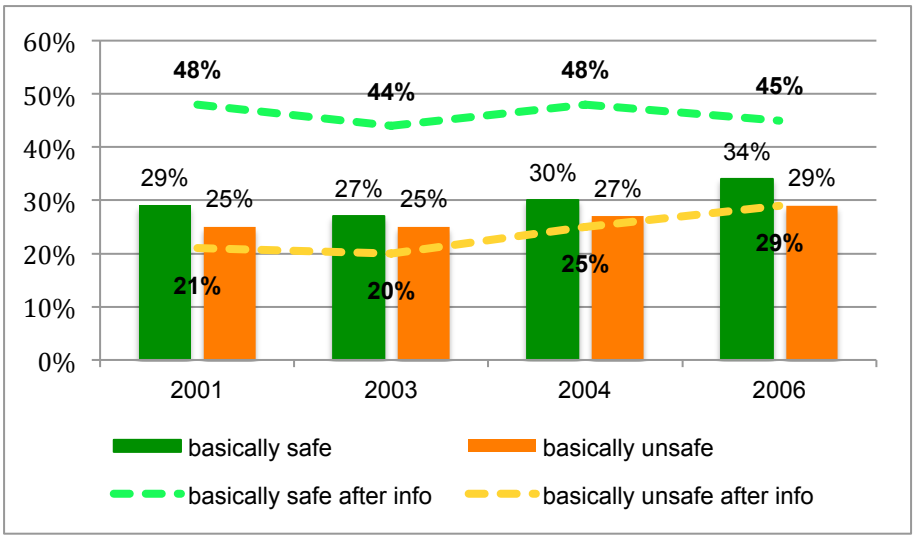

Figure 14: Percentage of consumer perception about safety of GM food before and after receiving information

Source: modified after The Mellman Group Inc. and Public Opinion Strategies, 2001, 2; The Mellman Group Inc. and Public Opinion Strategies Inc., 2003, 2; The Mellman Group Inc., 2004, 2; The Mellman Group Inc., 2006, 4f

In 2003, 27% of respondents recognized GM food as safe, whereas 25% did not consider these kind of foods to be safe. Within the three years, both perceived safety and unsafety increased. In 2004, people who considered GM food to be safe reached 30%, then 34% in 2006. On the other hand in 2004, 27% of respondents showed an opponent view, announcing GM foods as basically unsafe, with an increase of two percent in 2006. After uncovering that most food products on American supermarket shelves contain GM ingredients, the amount of people considering it safe, always increased (THE MELLMAN GROUP INC. AND PUBLIC OPINION STRATEGIES, 2001, 2; THE MELLMAN GROUP INC. AND PUBLIC OPINION STRATEGIES INC., 2003, 2; THE MELLMAN GROUP INC., 2004, 2; THE MELLMAN GROUP INC., 2006, 4f).

3 Qualitative Data Analysis

Qualitative data analysis is a method, that enables a researcher to examine the content of any kind of recorded data, through a systematic and rule guided classification of its key symbols, specific aspects or themes, in order to ascertain its meaning (KRIPPENDORF, 2013, s.p.). In literature, qualitative data analysis is defined as a likewise systematic and valide process, with the aim to abstract and describe data (SCHREIER, 2014, s.p.). The structured qualitative data analysis conducted by Philipp Mayring is perhaps one of the most popular and frequently used methods for the interpretation of communicated records (MAYRING, 2000, s.p.). However, a literature research revealed quite different renderings of the method (structured-thematic, evaluating, scaling, summary, or qualitative content analysis by extraction), and therefore space for irritation and uncertainty among practitioners. Schreier described different methods of qualitative data analysis and compared them to each other. According to her findings, only two approaches namely the structured qualitative data analysis and the data analysis by extraction, differ substantially. All other, in the literature mentioned methods are not reconstructed as discrete versions of the method, but as variations on specific steps in the course of the structured qualitative content analysis (SCHREIER, 2014, s.p.).

Qualitative content or data analysis is a method to systematically describe the meaning of any sort of recorded data. It helps to reduce a huge amount of material, by requiring the researcher to focus on specifically those aspects, that relate to an overall research question (FLICK et. al., 2013, 170). It is not bound to text-based data only. It integrates audio and video material as well as pictographic data. Despite the multimedia revolution over the past decade, texts still represent a dominant type of qualitative data, especially in the field of social science, psychology or educational science.

3.1 Structured Qualitative Data Analysis

The aim of a qualitative text analysis is to reduce material without losing essential parts of the content. Concerning the description of the method, a researcher develops prior to the actual text reading, selected criteria based on the research questions. With these criteria at the back of the mind, the researcher processes the material line by line; in order to create paraphrases of content loaded text parts. These paraphrases are then compound into categories, which are terms or phrases that often date back from the

original text. The category building includes both, inductive and deductive properties. Inductive because as previously mentioned, categories often emerge from the original text, deductive because categories are build “a priori” (MAYRING, 2000, s.p.). Here, pre-determined, theoretically founded evaluation aspects are introduced and included into the process of category building.

Whenever similar meanings emerge within the text passages, they are assigned to a particular category. If new content loaded text passages emerge, which are not related to any existing category, a new category needs to be defined. At the end all content loaded text passages should be assigned to a category. When all categories are determined, which means no new categories need to be defined, the system of categories is revised to check whether the selected level of abstraction corresponds to the text. This means, the content needs to be condensed, but without an excessive loss of meaning.

3.2 Codes and Coding

Coding means categorizing segments of data with a short name that simultaneously summarizes and accounts for each piece of data (CHARMAZ, 2006, 43). According to constructivists, coding consists of at least two phases, namely the initial coding and the focused coding. When researchers perform initial coding (also known as open coding), they compare data with data, move quickly but carefully through the material and keep their codes short, simple and precise (FLICK et. al., 2013, 156). While initially coding, the researcher eventually discovers most significant or frequent initial codes that make most analytical sense. This perception shifts the research into the second phase called focused coding. However, coding is not a linear process, hence researchers move back and forth between the different phases of coding. As someone codes and recodes, the system of codes and categories become more refined. Initial codes may be later subsumed by other codes, relabeled or excluded. Which means, as moving on to focused coding, there may be some rearrangements of coded data into different or even new categories.

Coding for patterns

In large and complete data sets, several to many of the same codes will be used repeatedly throughout the process of coding. This is both - natural because there are mostly repetitive patterns of action and consistencies in human affairs, delibarate

because one of the researchers first priorities is to find these repetitive patterns of action and consistence (SALDANA, 2009, 5).

4 Excursion Global Seminar

"International experience is especially in a globally connected economy an obvious requirement for a successful professional career. "Higher education institutions are facing the challenge to educate students for an increasingly competitive global environment" (HAAS, 2014, 10).

"Despite a growing effort on behalf of the EU and the US to support internationalization, there is still a significant share of students never leaving their home countries for study purposes. To address this issue, a consortium of European and US American universities included in their academic globalization plan, a so called "Internationalisation at home" strategy. Both organisations the E.U. Commission and the U.S. Department of Education are founding this type of educational strategy" (HAAS, 2014, 1).

"The curriculum development strategy of this project has multiple goals. Firstly, to provide "mobile" students with a gateway course that prepares them to engage their mobility prior to their departure for the semester study abroad. Secondly, and equally important, the goal to provide "immobile" students with international experience at home. These two goals are achieved through the Global Seminar a videoconference and case study based course in the curricula of the partner universities" (HAAS, 2014, 1).

The Global Seminar originally started in 1997 when a group of universities (University of Cornell, University of Melbourne, Earth University from Costa Rica, and from Europe University of Wageningen and Uppsala) formed a network of universities which over the years developed and consists today of arround 35 partner institutes. Currently, the following seven universities are clustered into a collaboration group.

European Universities

- Universität für Bodenkultur Wien – Austria
- École Nationale de Formation Agronomique in Toulouse – France

- Institut Polytechnique LaSalle in Beauvais - France

American Universities

- Auburn University - Alabama
- Virginia Polytechnic Institute - Virginia
- Florida A&M University - Florida
- UGA Tifton - Georgia
- UGA Athens - Georgia

It is mentionable that several universities attended at this course, but BOKU (Universität für Bodenkultur Wien) and FAMU (Florida A&M University) have been involved since spring 2005 (UGA, 2015, s.p.).

What is the global seminar?

The Global Seminar is a platform that provides space for students from different cultures, to get together and discuss some of the most headed topics of today's agriculture and food production. Its aim is to educate graduated students to be able to cope with global complex decision problems in the field of natural resources and life sciences.

In spring semester 2015, obesity, **genetic engineering in agriculture** and organic farming were the three topics, students had to deal with. Besides a weekly face-to-face meeting with the supervisor, the Global Seminar brings together agriculture students "future decision makers" from across the United States and around the whole world not only through a teleconferencing system, but also through live chat sessions. In addition, for each of the three semester topics, students have to write reflective papers and finish the course with a final paper. The Global Seminar is a great example for everything technology has to offer to the classroom, as tools for videoconferences and eLC live chat sessions are used to interconnect the students.

The masters thesis uses discussion protocols form the Global Seminar as data. The elected issue linked to this work is genetic engineering in agriculture and food production.

B Empirical part

5 Methods

As mentioned the masters thesis adheres to the Global Seminar and processes the issue genetically modified organisms in agriculture and food production. Data from chat sessions of students from the US and Europe is qualitative analyzed in order to detect possible cultural differences in relation to general attitudes towards GMO and in regards to the way of argumentation in pro and contra discussions. The analysis points not only on single argumentation, but also on possible patterns in student's argumentation. In total forty students participated at the chat discussion about genetically modified organisms in agriculture, food and drug production. It is noticeable that the total number of European participants appeared to be with eleven students much lower, compared to the number of US American students who attended with twenty-three students at the chat session. Five students indicated to come from Africa, Asia, South or Central America. They where exchange students and attended the course at one of the US American partner universities.

The software used for coding the chat room discussions is called MAXQDA, which is a professional software for qualitative data analysis. The category system is arranged by inductive and deductive properties. Inductive categorical properties emerged from the original conversation sequences of various chat groups. Deductive properties on the contrary where determined prior to the chat session and relate to the framework of questions provided prior to the chat session by supervisors. The coding of chat data enables to refer not only on student arguments and opinions, but also on the "quality" of the very chat room, which is not part of this thesis but could be implemented in student's grading.

The research of student's attitudes towards the use of genetically modified organisms in agriculture and food production is realized by structured coding of chat data. The process implies the transmission of codes into a category system and the detection of most frequently used codes in relation to student's origin. The system of categories attained its final shape after several processes of coding and recoding. During the process of coding existing categories were retained, renamed or completely cancelled in order to map the discussion context as clear as possible.

5.1 Data collection

The data set is a record of chat room sessions about GMO, which took place at the Global Seminar in spring semester 2015. As previously explained, besides to the videoconference, one student task was to participate at a chat session with all other international students. Due to the high number of participants, the chat rooms had to be established in groups of a maximum of six students who had to discuss about the elected issue. Students had to work through a number of questions related to GMO's in agriculture, medicine and food production. Previous to the chat session a discussion leader was announced, who was in charge of coordinating the time of discussion per question. Chat room data of each group has been saved for further analysis. The unequal distribution of US American (23) and European (11) students, caused by a dominating number of US chat participants is considered when prospecting the outcome of the research.

5.2 Category system

The category system constitutes an important instrument of the analysis and contributes to the intersubjectivity of the procedure, helping to make it possible for others to reconstruct or repeat the analysis. In this relation qualitative content analysis will have to pay particular attention to category construction and substantiation. However, only little help is given in this respect by standard works on content analysis (MAYRING, 2014, 40).

In this work the category system is split in two diverse sections, namely the categories related to free student discussion or general conversation about GMO called inductive categories. The inductive category system including the number of codings is listed below.

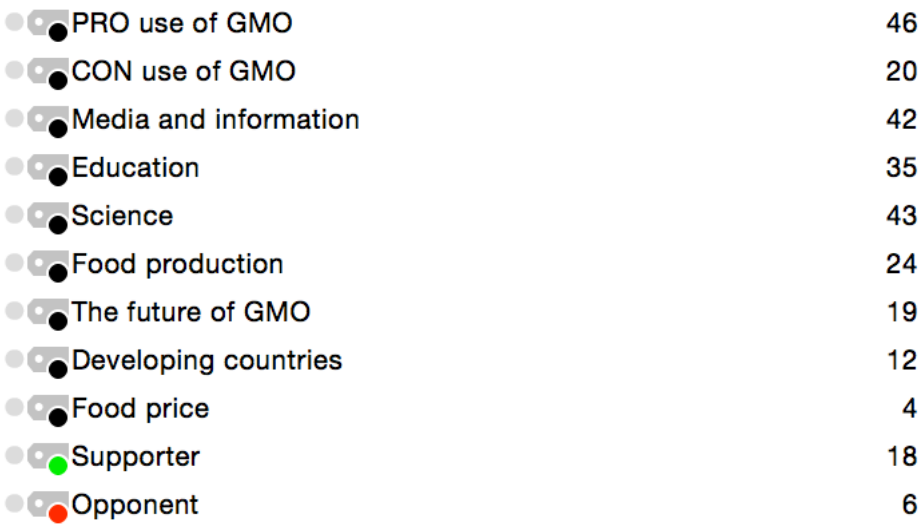

Figure 15: Inductive category system including the number of coding's per category

Source: Excerpt MAXQDA – own picture (2015)

The second section involves deductive categories which where formulated through specific guiding questions. The questions were provided by the course organization prior to the chat session and are hereafter quoted.

- People are either „for" or „against" GMOs. Do you believe that there is a middle ground? What can that be?
- Consumers accept medical GMOs but refuse GMOs used in food and agriculture. What drives that paradox?
- Consumers want labeling in order to exercise their freedom of choice. Who is absorbing the cost?
- The public thinks that GMOs are unnatural. What do you think?
- Consumer demands „zero risk" in their food. How realistic is this? What about the residual quantities of pesticides in our food?
- Do you believe that in the future of GMO's we need to spend more money for regulation or for improvement of the technology?

The deductive category system is listed below and was formulated by these six guiding questions.

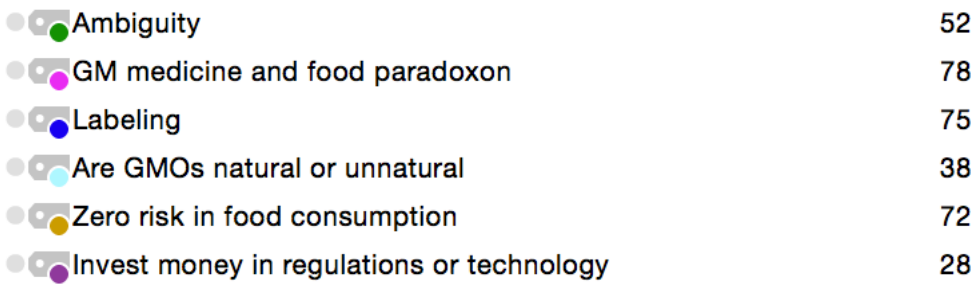

Figure 16: Deductive category system including the number of coding's per category

Source: Excerpt MAXQDA – own picture (2015)

Due to manageability single codes and codings have been excluded from the illustrations above. All used codes and sub codes are displayed in the next chapter.

6 Results

The following section is dedicated to the results of data analysis from spring 2015. Therefor all codes and sub codes including the number of coding's in relation to the relevant category are presented. To depict the structure of the text analysis, every category is separately displayed in a table, followed by student statements that fit as accurate as possible into the formation of categories. From this presentation excluded are statements, which were unusable in regards to their meaningfulness, or those statements which where indeed out of the issue hence not integrable within the available category system.

6.1 Results of inductive categories

Pro use of GMO

The analysis shows that beside one French student solely US students expressed concrete statements connected to the category "pro use of GMO". The contribution to this category on behalf of European students was low and unspecific. By far the most frequently coded argument in the category „pro use of GMO" was the argument of food security for a steady growing world population in connection with the imminent need of GMOs in agricultural practice of further generations.

The association of GMO with food security was a predominant concept in student's argumentation and showed up in several chat rooms. Hence it can be seen as a pattern in argumentation of participating US American student.

Besides the argument of food security, US students mentioned the benefits of innovative and revolutionary technologies to gain higher yields with lower production costs as well as the issue pest control as argument in pro and con discussions. The production of medication and the increasing nutritional value were mentioned only spontaneously and therefore not separately coded.

Table 9: Inductive category „pro use of GMO“ including codes and the number of coding's.

Pro use of GMO	
Codes	Coding No.
Food security	18
Innovative and revolutionary technology	10
GMO increasing output with less input	8
Rather benefits than risks	6
Longer storage due to GMO	3

Source: MAXQDA 12, own modification (2015)

Contra use of GMO

It's not surprising that statements connected to the category „contra use of GMO“ were largely posted by European students. Nevertheless, this category reached compared to the prior category fewer than half of the number of coding's. This circumstance is explained by a much lower number of European participants at the chat session. Most often European students stated the argument about environmental and health risks in relation to GMO in agriculture and food production. The expression, genetically modification in food production is not necessary because enough food can be produced with conventional or organic methods, was a prevalent argument of European participants and the second most mentioned code.

Further the issue food waste due to overproduction and the loss of biodiversity were mentioned in student discussions. Interestingly few contributions to economic effects in relation to GMO emerged within various chat rooms.

Table 10: Inductive category „contra use of GMO“ including codes and the number of coding's.

Contra use of GMO	
Codes	Coding No.
Environmental and health risks, negative side effects	8
No need of GMOs in food production	7
Overproduction and food waste	4

Source: MAXQDA 12, own modification (2015)

Media

The category „Media and Information“ shows again a very one-sided contribution of statements. Besides one expression connected to the last coding „trustworthy information“ which came from an European student, all statements that where

encoded to any other code within this category where addressed by US American students. In the category „media and information“ a high majority of statements where accurately decodable with the code „unknowing people believe what they hear“. However the argument, that media conveys a negative image on GMOs, was stated by a number of US American students see table 11.

Noticeable is the expression about positive publicity of GMO in order to build awareness of its benefits and medical GMOs could help to improve the negative image of GMOs. The sentiment “people perceive risks stronger than benefits” was another point participants agreed about.

Table 11: Inductive category „Media“ including codes and the number of coding’s.

Media	
Codes	Coding No.
Unknowing people believe what they hear	15
Negative publicity made GMO look bad	11
Positive publicity to build awareness of benefits	8
Risks perceived stronger than benefits	7
Trustworthy information	1

Source: MAXQDA 12, own modification (2015)

Education

„Education“ was selected as a category, because the term was obviously present and appeared frequently in student discussions. Student’s estimations about the knowledge of the general publics in regards to genetically modified organisms in food production appeared to be poor. Hence a high number of students stated that proper education of the public through experts (food producers, scientists and farmers) is needed to build awareness of biotechnologies benefits. It further helps to understand the science behind it, shows their safety and it is necessary to make consumers understand GM labels. The code „educate public“ appeared to include primary statements of a supporting nature expressed by US students.

However the code „lack of information, education and interest in the topic“ included more general statements and was by far not as much coded as the previous code „educate public“ see table 12. The tendency of links to the code „middle ground“ within the category „ambiguity“ appeared in the analysis, as participants indicated that the hole misconception of the issue GMO is based on a lack of knowledge and interest into the topic.

Further students mentioned the difficulty for the public to get proper education about biotechnological engineering.

The code „critical consumer“ showed a low frequency. The two statements in relation to this code contained the attitude that the increase in education affects the sensation of fear and results in an extension of regulations. Again very little input came from European students, as in the whole category only two statements of BOKU students emerged.

Table 12: Inductive category „Education“ including codes and the number of coding's.

Education	
Codes	Coding No.
Educate public	21
Lack of information, education and interest in the topic	7
Difficult to get education on that topic	5
Critical consumer	2

Source: MAXQDA 12, own modification (2015)

Science

The category „science“ is the first section, which allows investigating differences between US American and European student statements in relation to the same code „studies about long term effects of GMO“. The number of participants from Europe and students from the US was almost equal, so it is of high interest in which context student statements were expressed. Statements of US American students pointed on the condition, that no scientifically proof shows the harmfulness of GMO. Products are tested and safe and if any medical issue existed, something would have been seen by now.

European students on the other hand, pointed towards the proper lack of scientific long-term studies and the danger of unknown side effects resulting from the use of GMOs. However European students reveal clearly a higher risk perception in relation to the use of GMOs because of possible negative environmental and human health effects.

The code „no trustworthy scientific studies“ showed students sentiments in regards to the trust in scientific studies. As well students form the US as European students stated their feelings and showed a very similar approach. Various statements indicated a deficit of trust into scientific studies, food industry and politicians. Reasons for the distrust are either so called „bought “scientist who are not able to research

independently, capitalistic motivated or politically motivated faulty test results. The sentiments of a poor interaction between science and public were again solely stated by US students and are in strong connection to the code „educate public“ from the previous category.

Table 13: Inductive category „Science“ including codes and the number of coding's.

Science	
Codes	Coding No.
Studies about long term effects of GMO	16
Fear of the unknown	10
No trustworthy scientific studies	9
Poor interaction between science and public for education	7

Source: MAXQDA 12, own modification (2015)

Food production

Student's utterances in relation to the category „food industry“ showed a broad range, hence 6 codes were created to incorporate the variety of arguments. The code with most coded student statements in this category was the argument of global corporations and monopolization. US students mentioned that this might be the only true-grounded opposing argument against GMOs. However, US students qualified that situation by mentioning that every large corporation that is trading on a global level is trying to become market leader producing a lot of money.

One European student expressed her feelings in regards to this issue by claiming the strong dependence of farmers towards companies like Syngenta or Monsanto.

Further coding's were of high interest (see table 14), but only of a very low frequency. Those statements are not further mentioned, however they are accessible in chapter 10 annexes.

Table 14: Inductive category „Food production“ including codes and the number of coding's.

Food production	
Codes	Coding No.
Global corporations and monopolization	8
Dishonest food industry	4
Efficient food production	3
Product variety	2
GMO presence in the US	2
Transparence in food production	2

Source: MAXQDA 12, own modification (2015)

Future of GMO

The next category is dedicated to the future of GMOs. The feeling in relation to this issue showed homogeneity in argumentation, especially among US American students. The total contribution of statements linked to this category was fairly high. A large number of expressions pointed towards a bright future of GMO and an expansion of genetically modification towards other crops. The opinion "GMO will be soon needed" was prevalent and in strong connection to the code *"Food security"* from the category "PRO use of GMO". Despite the lower number of European students who stated their opinion in regards to the future of GMO, a higher variety of arguments emerged. One student agreed to the common US student argumentation prospecting a bright future and the absolute need to invest money in technological research. Basically European students agreed about a bright future of GMO. In contrast to most US voices, Europeans required more regulations with an expansion of GMO applications towards other crops and expressed that the application of GMO could be useful for other purposes than food.

Table 15: Inductive category „Future of GMO“ including codes and the number of coding's.

Future of GMO	
Codes	Coding No.
Future of GMO	18

Source: MAXQDA 12, own modification (2015)

Food prices

European students are prevalent in the category „food price“. Beside one US student statement in relation to the matter that non-GM food products are more expensive,

European students expressed that higher prices for non-GM food products are justified. Additionally higher prices for GM free food would also raise the respect for producers and groceries in general.

Table 16: Inductive category „Food prices " including codes and the number of coding's.

Category – Food price	
Codes	Coding No.
Price for GM and GM-free food products	4

Source: MAXQDA 12, own modification (2015)

Developing countries

The category „developing countries" contained statements of European and US American students. Both groups mentioned the absolute necessity of education and general support to fight hunger. European students mentioned mainly that the problem of food scarcity in developing countries is not the production factor, but the transport, storage and distribution, as infrastructure needs to be improved. One student's expression pointed towards the need of capacity building to support developing countries on a long term and stop their dependency towards developed countries.

US students had a different access in discussions about GMO in developing countries. Those US students who stated their opinion in regards to this issue claimed the necessity of GMOs to prevent starvation and nutritional deficiencies in developing countries. Besides these statements, one US student claimed to be in a middle ground as she struggles with inequalities especially in developing countries, with big GM companies.

Table 17: Inductive category „Developing countries" including codes and the number of coding's.

Developing countries	
Codes	Coding No.
Help developing countries	8
Infrastructure and logistic	5

Source: MAXQDA 12, own modification (2015)

Opponents

This and the following section are dedicated to student statements which where clearly taking a supporting or opposing side. As the numbers in table 18 and 19 show, the category „opponents“ was of a quite low frequency and all expressions except the one of an African exchange student, who argued that we all are victims of an unnatural food production, came from European students and where more of a general nature stating simply that they are against GM food production. However only one European student admitted to be against GM food but supports the use of GM in medicine as it is needed to heal. Interestingly one clear supporter from the US stated, that it scares him to introduce animal genes into plants to improve their traits.

Table 18: Inductive category „Opponent“ including codes and the number of coding's.

Opponent	
Codes	Coding No.
Opponent	5
Scaring gene transfer from animal to plant	1

Source: MAXQDA 12, own modification (2015)

Supporter

The category „supporter“ was of much higher frequency then the previous category and included an expectedly high number of statements from US American students. Most students stated that they are in favor of the use of genetically modified organisms whether in food or in medicine production without any additional quotation. Other student's added expressions like

„*Medical GMO's save our loved ones lives. Agriculture GMO's will prevent our loved ones from another killer, starvation!*“

Or

„*Most people here in the US disagree with the use of GMOs only because of the reason that they don't really know what they are*“.

Solely two European students added a supporting comment. One student expressed his strong support for the use of genetically modification; the other students pointed more towards a supporting attitude of technological research in the field of biotechnology.

Table 19: Inductive category „Supporter“ including codes and the number of coding’s.

Supporter	
Codes	Coding No.
Supporter	15
Especially in agricultural and rural areas of the U. S.	1
No problem with consuming GMOs	2

Source: MAXQDA 12, own modification (2015)

6.2 Results of deductive categories

Ambiguity

The results of the first deductive category „ambiguity“ reveal some uncertainties in student’s argumentations. Despite some volatile students opinion in the course of the discussion, two major clusters appeared in this category.

A majority of students from Europe and the US agreed about the existence of a middle ground caused by misinformation, lacking knowledge and education. Within this group, there were consents about its definition as an unintended middle ground. A majority of attendees from this cluster, agreed on the opinion that as soon as someone is truly informed no more middle grounds appear.

In contrast another “mixed” student group expressed that the issue genetically modified organisms contains a lot of middle grounds as the variety of cons and pros automatically produces at least in some subareas of the issue an ambiguous attitude.

It is noticeable that some students both from the US and from Europe admitted to find themselves in some kind of a middle ground. The following student statements are excerpts from the original chat sessions.

- *“Some people could be against buying or eating a product that is completely GMO but could be ok with eating a product that has a GMO ingredient in it instead of the whole makeup of the product being GMO.*
- *We have this benefit of producing more and more food but I don't think we're really using it to the right advantage.*
- *Honestly I am also against GM-Food, but don't worry too much about GM-Medicine, because it is needed to heal.*
- *I would consider myself in the middle of the issue. GM crops are planted in our fields, but I also struggle with the inequalities, especially in developing countries, with the GM companies.“*

No evidence for any cross-national difference was traceable within this category. Further expressions from the original chat documents, are in the annex.

Table 20: Deductive category „Ambiguity“ including codes, sub codes and the number of coding's.

Ambiguity		
Codes and sub codes		Coding No
Middle ground isn't possible		14
Middle ground is possible		0
	Unintended middle ground	16
	Intended middle ground	22

Source: MAXQDA 12, own modification (2015)

GM medicine and food paradox

The issue „GM medicine and food paradox“ was highly discussed in several chat rooms and showed a variety of arguments explaining why GM medicine appears to be more accepted compared to GM food. Beside statements that medicine is basically associated to something unnatural, which is produced in the laboratory, a number of students explained the reason for this paradox with a higher consumer involvement when it comes to food products and the argument of fewer options for substitutions with medical products compared to food products. Interestingly the trust into doctors prescriptions was present with a statement „you don't question your doctor“ and the fact that in food decisions the consumer has no experts assistance and therefore a higher skepticism or insecurity. The analysis of this category did not allow any cross-national differences as students expressions where equally mixed.

A high number of statements was measured with the code „health“ and its sub codes „solely concerned about health“ and „health effect creates acceptance“. The context of student's statements in relation to this sub codes is quite self-explaining and does not need to be further exemplified. Beside the mentioned arguments, the largest quantity of students declared that the paradox is caused by misinformation, as people don't know that medicine contains genetically modified organisms.

Table 21: Deductive category „GM medicine and food paradox“ including codes, sub codes and the number of coding's.

GM medicine and food paradox			
Codes and Sub codes			Coding No
Acceptance of GMO medication			0
	Medicine associated to something unnatural		8
	Different consumer involvement with med and food		16
	Powerful drug industry, no bad publicity		2
	Health		1
		Solely concerned about health	11
		Health effect creates acceptance	9
	Med. fewer options for substitution than with food		4
		You don't question your doctor	4
Misinformation			5
	People don't know that GMOs are in medicine		18

Source: MAXQDA 12, own modification (2015)

Labeling

Due to the high number of participants who stated their sentiments about „labeling“ and the variety of arguments students contributed to this category, the coding system became quite expanded. The first code „labeling creates awareness“ and its sub codes see table 23, where mostly linked to US student expressions. From a total of fourteen statements, only two European students expressed their feelings in regards to this issue and mentioned basically that a GM label would create awareness respectively increase consumer interest and could be also used for marketing purposes to increase public GMO acceptance. US student utterances contained rather negative sentiments. The following citations show the most engraving US American student expressions.

- *„By not labeling it makes it seem like producers are trying to hide GMOs from the public which makes it seem bad.*
- *Some ideas for the labels are being described as similar to cigarette type labels, which is just negative advertising.*
- *I think producers are also scared to see the consumer to walk away from their products and that's why the process is so slow.*
- *Our GM's are not labeled. So I think more people consume them than they realize. If they were labeled people would probably eat less of them.*

- *With that being said, after living in England and Belgium for a bit, I really appreciate the labels of all sorts. In general, there is soooo much more information on those level, which really gives consumers knowledge and therefore freedom.“*

The second code was dedicated to the financial consequences connected to the adaption of a mandatory GM label in the US and the absorption of these costs.
The number of students who expressed their opinion about the financial expenses (expensive or not expensive) of a mandatory label introduction was interestingly equal. Noticeable only one European student was between these two groups. She stated that the introduction of a GM label would not be that expensive as products are already labeled and the information about GM ingredients could easily be added to the existing label. Students who felt that such a labeling rearrangement would not be very cost intense mentioned the same argument.
Those students who stated that the introduction of a mandatory and reliable GM label would be rather expensive, represented this opinion with the requirement of regulations and the resulting increase of prices for groceries which partly explains the next code „who is absorbing the cost for labeling“ of this category.
Out of all participating students, only one student from Europe mentioned that the government would absorb the cost for labeling of genetically modified groceries. All other voices stated that either the industry or the consumer is absorbing the costs. During the discussion a number of students where influenced by various arguments and changed their initial opinion about cost absorption of labeling. Again no cross-national differences appeared within this section as students from the US and Europe where again quite equally mixed.
The last two codes „labeling is needed“ and labeling isn’t needed“ showed a clear overall majority of student sentiments towards the need of labeling in order to practice the freedom of choice. Nevertheless the arguments of three students who did not require labeling of GM food where reasonable and are hereafter displayed. Student origin within this code where again balanced as two statements came from US students and one from a European participant.

- *„I think that in reality Labeling sounds like a great fix but It can be rather expensive and in my opinion food is already super expensive.....I'm not sure that I would be willing to pay more for my food just for the label.*

- *In America, I think we can just assume that everything has GMOs unless it says specifically that it doesn't.*
- *I don't think labeling as such makes much of a difference either, people who want to buy GMO-free can look for the GMO-free label, and people who want inexpensive products will choose those no matter if it says "contains gmo" on it or not.“*

As previously mentioned this category shows a high variety of interesting arguments and is a very good example for the like-minded perception in relation to fundamental questions that are related to consumer service and transparency in food production. No cross national differences could be extracted from this section as the results of the analysis show quite a consensus between US and European students and no group splitting that correlates with a particular nationality.

Table 22: Deductive category „labeling“ including codes, sub codes and the number of coding's.

Labeling			
Codes and sub codes			Coding No
Labeling and marketing			0
	Labeling creates awareness		5
	Use label for marketing products		2
	GMO labeling is negative publicity		7
Price for labeling			0
	Mandatory labeling in the US not expensive		5
	Mandatory labeling in the US expensive		5
	Who is absorbing the costs for labeling		0
		Government	1
		Industry	13
		Consumer	15
Labeling is needed			7
	Freedom of choice		12
Labeling is not needed			3

Source: MAXQDA 12, own modification (2015)

Naturalness

The category „naturalness“ is basically divided into three groups. The first group compounds students who supported the opinion that GMOs are natural. The argument that genetically modification happens in nature all the time was prevalent and the

expression that those genes that are used to alter crops are natural and not synthetic appeared in argumentation. Interestingly solely US American students supported this opinion.

The second cluster includes students who did not recognize GMOs as natural but unnatural. This group was build by US American and European students. Despite the agreement of US American and European students in relation to GMOs artificiality, most US American students added a supportive expression. Some examples from the chat sessions are quoted hereafter.

- *„It is very unnatural! But so is everything with our foods... from selective breeding for centuries to artificial additives and food coloring. These can also be added to the conversation. However, GM has not been proven dangerous and I don't view it as unethical.*
- *Alex I do agree that it is not natural, but is that a reason to be against them?*
- *We also had a guest speaker and she shared with us that there is no scientific evidence to back up proof of GMOs being harmful. But of course they are not natural.*
- *People make the "unnatural" argument, but in reality nothing consumed in the U.S. is natural.*

Within the second group the tensibility of the term „natural“ was mentioned, as agriculture with its fertilizers and pesticides is very unnatural in the first place.

The third group of this category consisted of students who did not classify GMOs in relation to its naturalness as they had mixed feelings. This group consisted of both, US American and European student.

Table 23: Deductive category „naturalness“ including codes, sub codes and the number of coding's.

Naturalness			
Codes and sub codes			Coding No
Are GMOs natural or unnatural			6
	Unsure about naturalness or artificiality of GMOs		6
	GMOs are natural		14
	GMOs are unnatural		11
		Agriculture is unnatural in the first place	7

Source: MAXQDA 12, own modification (2015)

Zero risk in food production

The guiding question connected to „zero risk in food production“ was of a quite hypothetical nature, as the exclusion of any risks seems to be an unrealistic scenario. The chat room analysis did reflect exactly this opinion.

Despite to the impossible feasibility of „zero risk in food production“, this question contained a lot of discussion potential. This is the reason why the structure of codes appeared again very expanded.

Nearly all participants, no matter which origin placed a statement in relation to the code „zero risk is not realistic“. The number of coding's shows the high frequency of arguments related to this issue see table 25. However the sub codes „GMO poses no additional risk compared to conventional production“ was again solely mentioned by US American students which reflects a very supportive attitude of a group of US American students.

The sub code „products are tested and safe“ reached with eighteen coding's the second highest number of coding's. Interestingly this sentiments where again solely placed by US American students.

Further codes and sub codes showed only scattered comments and are therefore not further discussed.

Table 24: Deductive category „Zero risk in food production“ including codes, sub codes and the number of coding's.

Zero risk in food production		
Codes and sub codes		Coding No
Own responsibility		0
	Consumer can higher or lower the risk	6
Possibilities to reduce risk level		0
	Process level determines the risk level	3
	Own food production	4
	Trustful food production	4
	Products are tested and safe	18
Government responsible for safe food		2
Zero risk is not realistic		20
	There are risks with everything	5
	Accidents happen	2
	Natural level of risk is healthy	1
	GMOs posing no additional risk	7

Source: MAXQDA 12, own modification (2015)

Invest money in regulations or technology

The category „invest money in regulations or technology“ was dominated by supportive statements connected to the investment of money in technological research. Despite a larger number of US American students who favored the investment of money for technological research, only two European students agreed to this opinion.

The code „invest money in regulations“ appeared to be a European approach, as student argued that increasing technological applications require more and stricter regulations.

Only a small group of students stated that both, technological research goes along with an adjusted regulatory system.

Table 25: Deductive category „Invest money in regulations or technology“ including codes, sub codes and the number of coding's.

Invest money in regulations or technology		
Codes and sub codes		Coding No
Money for regulations and technological research		4
Money for regulations		7
	Agricultural policies have to change	1
	Money for labeling	1
Money for technological research		15

Source: MAXQDA 12, own modification (2015)

6.3 Frequency Analysis of qualitative data

This part is dedicated to the most frequently linked codes within both categories. The frequency analysis doesn't necessarily point towards the quantitative factor (number of coding's per code and sub code), but on the qualitative context of student statements linked to the relevant code. A high number of coding's qualifies a code only for further investigation, as the original student expressions can vary in relation to the context of the very statement, hence same coded expressions can differ substantially form each other and need a reassembling.

6.3.1 Frequency analysis of inductive categories

The following codes showed a high number of coding's to student statements, which induced further investigation in regards to the context of the individual expression. Further this section points on those statements that where encoded with more than one code, in the best case the same ones. This should help to further investigate possible patterns in student argumentation and cross-national differences between chat participants. Whenever possible, categories are brought together to better display their interaction

Categories „Pro use of GMO“ and „The future of GMO“

In the categories „Pro use of GMO“ the codes „*Food security*“ and „*Innovative and revolutionary technology*“ where qualified for a deeper investigation.

Both codes where mostly linked to US American student expressions and showed a high coding frequency. Those student expressions that where encoded with „*Food*

security“ appeared to be also frequently encoded with the code “*Future of GMO*“ within the same named category see figure 15.

Pattern in student argumentation

The code „*Food security*“ appeared to indicate a strong pattern in argumentation of US American students. The correlation of statements linked to the codes „*Food security*“ and *„The future of GMO“* appeared to be a chain in US student’s argumentations. It basically contains the idea that using genetically modification in agriculture can only nourish a steady growing world population.

„Con use of GMO“

In contrast most frequently used codes in the category „Con use of GMO“ where linked to European student statements. The relevant codes are called „*Environmental and health risks, negative side effects*“ and „*no need of GMOs in food production*“.

Pattern in student argumentation

Despite the low number of European attendants at the chat session similarities in argumentation between European students could be investigated. More than half of the European participants worried about possible negative side effects as a result of the use of GMOs in agriculture and food production. These unexpected side effects could have a negative impact on the environment, biodiversity and human health. In addition half of European students expressed that genetically modification is not needed in food production as enough food can be produced either with conventional or organic methods. Both arguments where detected as patterns in European student argumentation.

Categories „Media“ and „Education“

The categories „Media“ and „Education“ showed interesting dynamics. On the one hand because almost solely US student expressions where linked to the most frequently used codes in these categories and on the other hand because these codes showed to interact strongly. The addressed codes are listed below:

- *Unknowing people believe what they hear*
- *Negative publicity made GMO look bad*
- *Educate public*

- *Lack of information, education and interest*

Pattern in student argumentation

Further investigations of these formations of codes resulted in the following pattern of US American student argumentation. Referring on US student's opinions, the negative attitude towards GMOs is a result of a lack of information, education and interest within the society, which results in a high amount of unknowing people who have to basically believe what they hear. The huge presence of negative publicity causes this general negative attitude towards GMO in the society. To counteract to this condition proper education of the public is needed. This kind of reasoning was predominant and can be seen as a pattern in US American student argumentation.

Category „Science"

The following section offers for the first time an estimation of cross-national difference between European and US American student comments which where encoded with the same codes. Simultaneously it shows that the number of coding's does not necessarily mean that all linked statements stand in the same context. However, most relevant and linked codes in this category are *„Studies about long-term effects of GMOs"* and *„Fear of unknowing side effects"*. As mentioned, both European and US American students contributed with a comparable number of statements connected to these two codes.

Patterns in student argumentation

Those US American students whose statements where linked to the code *„studies about long term effects of GMOs"* represented basically throughout the opinion that no scientific proof of the harmfulness of GMOs exists and that products are tested and safe for consumption.

In contrast to US Student statements, European students expressions showed a different content. Almost all linked student expressions where also encoded with the code *„fear of unknowing side effects"* which indicates a much higher risk perception. Additionally European students stated frequently non-existent long term studies hence a high degree of uncertainty about negative side effects.

Category „Supporter“

The category „supporter“ has been included to the frequency analysis not only because of its high number of coding’s, but also to indicate that a majority of US American participants revealed their supporting attitude towards the use of GMOs. Most statements in this category where of a more “general” nature, hence data did not allow to further investigation patterns in argumentation. Examples for such statements are listed below.

- *I am strongly in favor of GMO's*
- *Hey guys, I am for the GMO*
- *For me consuming is okay and i don't have any problem of that*
- *I do not see GMO's as a negative but as a positive.*

6.3.2 Frequency analysis of deductive categories

Category „Ambiguity“

A majority of chat room participants expressed their sentiments in regards to the category „ambiguity“ and admitted to find themself for numerous reasons in some kind of a middle ground. The code „intended middle ground“ appeared to show the highest frequents of coding’s, but did not allow to extract any patterns in student argumentation. A cross-national difference between students did not appear.

Category „GM medicine and food paradox“

In the category „GM medicine and food paradox“ students argumentations pointed towards the same direction and appeared to be of highest frequency with the code „misinformation causes the paradox“ and its sub code „people don’t know that GMOs are in medicine“. The argument “misinformation” appeared to be a cross-national pattern in student argumentation as both groups; European students and US American students mentioned it frequently. In addition two more facts appeared quite often among European and American students. Firstly that in live threatening situations people are “*solely concerned about the health*” of themselves and their family members and makes the whole pro and con discussion irrelevant. Secondly the trust in doctor’s prescriptions was a striking argument both groups used for explaining the reason of this paradox.

Category „Labeling“

The code „labeling is needed“ showed a large number of coding's and a high agreement among all participants. GMO supporter as well as opponents agreed about the absolute necessity of a GMO declaration label on food products. The sub code „people should know what's in the product – freedom of choice“ was remarkable and increased the number of total coding's to the highest level in this category. No cross-national differences could be observed. The argument „labeling is needed to practice a freedom of choice“ can be seen as a pattern in cross-national student argumentation.

Category „Naturalness“

This category was strongly divided by two groups. One group contained solely US American student statements; the other group was fairly mixed up. Both groups showed a frequency of coding's and qualified them for further investigations.

As expected solely US students declared GMOs to be natural. One pattern in argumentation about GMOs naturalness emerged within this group of students. It was basically the argument that these gene transfers occur also in nature and that the transferred genes are natural and not synthetic. Not a single statement about horizontal and vertical gene transfer appeared within the discussion forum.

In contrast, most European students and a few US American students stated that genetically modified organisms are unnatural as these genetically modifications would never or only rarely happen in nature. The research in this category indicates a cross-national difference between European and US American students in regards of this essential question.

Category „Zero risk in food production“

The category „Zero risk in food production“ evinced two frequently linked codes named „zero risk is unrealistic“ and „products are tested and safe“.

A high number of students agreed to the fact that nothing in live is zero risk. Statements about the stupidity of such a question emerged in several chat rooms causing a large agreement among all participants that everything in live has a risk. Despite the noise about this particular guiding question „do you think zero risk in food production is possible“ it contained a huge discussion potential.

The secondly mentioned code „products are tested and safe“ appeared to be a statement, only US American students expressed. It can also be seen as a pattern in

argumentation of US students who support genetic modification in food production and it indicates that US students trust governmental authorities in regards to food safety.

Category „Invest money in regulations or technology“

A large number of chat participants mentioned that money should be invested in technological research. As a consequence a majority of statements where linked to the code „invest money in technological research“ and came from US American students. Also two European student statements emerged in this section expressing their positive attitude in regards to this issue. Expressions why money should be invested in technological research where numerous, hence no clear pattern could be discovered.

7 Summary

The issue genetically modified organisms in agriculture and food production proved to be a controversial topic with a huge potential of discussion. The Eurobarometer and the Pew Initiative for Food and Biotechnology, as the most two comprehensive consumer surveys in Europe and the US detected that a majority within the population show a negative attitude about the use of GMOs in food production. Especially European consumers who do not have the prior product experience struggle with this technology, as GMOs are not marketed so far and appear to be frequently in the focus of negative headlines.

Students form the field of agricultural science or related branches appear to be quite open and show a quite supporting attitude towards the use of biotechnology. The following summary gives an overview of the outcome from a qualitative content analysis about GMO, which took place in summer semester 2015 in a private university chat session.

Hereafter the research results of most relevant student sentiments in relation to various issues of this huge topic are condensed and separately introduced.

US American students attitudes towards the use of GMO

A high share of US Students who participated at the chat discussion showed a supporting attitude towards the use of GMOs in agriculture, food and medicine production. Some US students even went further and exposed a defending attitude in pro and con discussions. The following arguments where stated by a majority of US students. These arguments can be seen as patterns in US American student argumentation and examine cross-national differences in student's attitudes.

- GMOs are needed in order to secure food supply for a steadily growing world population.
- Education is a must, as unknowing people believe what they hear.
- No scientifically studies proof the harmfulness of GMOs. Products are tested and safe.
- GMOs are needed to fight starvation and nutritional deficits in developing countries.

- GMOs are natural, as these gene transfers would happen also in nature without human intervention.
- GE poses no additional risks compared to conventional production.
- Money should be invested in technological research and development.

European students attitudes towards the use of GMO

The outcome of European students attitudes in pro and con discussions revealed quite an unsurprising trend. Even if single European students supported the use of GMOs in general and its technological research, a majority showed to perceive risks stronger than benefits. The association between GMO and unknown negative side effects in regards to environment and human health was a prevalent metaphor in several chat rooms. However the number of European participants at the chat session appeared to be due to the absence of almost all French attendees quite low, which doesn't reinforce the significance of these results. Nevertheless the following arguments where expressed by a majority of European students and appeared to indicate patterns in European student argumentation. Additionally those arguments highlight cross-national difference between European and US American students in regards of the use of GMOs.

- The application of GMO in agriculture and food production could cause unexpected negative side effects towards the environment, human health and biodiversity.
- GMOs are not needed, as enough food can be produced with conventional cultivation methods.
- There is a lack of scientific long-term studies about side effects of genetically modified organisms in agriculture and food production.
- Higher food prices for non-GM food products are justified and contribute to an increase of respect for producers and groceries.
- Developing countries don't have a food production problem, but a problem of distribution due to poor infrastructure.
- The extension of GMO applications towards other crops increases the demand and enlargement of regulations.

Cross-national similarities of US American and European student argumentation in pro and con discussions about the use of GMO in agriculture, food and medicine production

Although significant differences between US American and European students in regards to their attitudes and opinions about the use of GMO existed, some similarities appeared also to emerge. A majority of both student groups agreed about the following issues hence used partly the same arguments within the discussion.
Both student groups expressed their sentiments about a lack in trust not only towards scientific studies, but also in food producers and politicians.

- Both student groups predicted a bright future of biotechnology indicating different arguments for this estimation. While US American students estimated the imminent need of GMO for food security, European students stated the need in medicine production and other applications beside food production.
- Both US American and European students realized to perceive ambiguity in relation to some subareas of this huge topic.
- European and US American students expressed with a high majority that the GM-food and GM-drug paradox is caused by misinformation. “People don’t know that GMOs are in medicine.”
- As well US American, as European students declared the need of mandatory labeling in order to enable consumers to practics a freedom of choice, which additionally increases the consumer awareness and knowledge about genetically modified organisms.
- A high majority of course participants declared the statement about “zero risk in food production” as unrealistic.

8 Discussion

This chapter deals with the empirical part of this thesis. First, the methods are investigated and furthermore, the results are interpreted and compared with results of comparable scientific studies.

8.1 Discussion of methods

The discussion of the methods contains the discussion about data collection, chat processing and coding of various chat room data including the category building as one of the main disciplines in qualitative data analysis. The discussion includes also suggestions in relation to the chat session of the Global Seminar, which should help to develop the quality of the seminar respectively the quality of further chat session.

8.1.1 Chat room organization and data collection

The eLC live chat session took place in spring 2015 on the web site of the university of Georgia. In order to participate at this chat session, every student had to login at the UGA web side to enter into the proper chat room. Some students expressed problems with the login. Even student colleagues from BOKU stated some difficulties to log themselves into the eLC chat rooms. This could be an explanation why such a low number of students from France participated at the chat session. However, another reason for the low attendance of French students could be the discussion language, as some students showed already in previous video conferences quite poor English skills, which made it hard to discuss with native English speaking students about such a controversial topic. Nevertheless none of the BOKU participants showed any linguistic disadvantages during the discussions.

The chat rooms had been divided in groups of four to six students to ensure a good discussion flow. Most groups where mixed up with both European and US American students. Unfortunately the chat division did not work smoothly as some students names where missing on the division file, which had been sent out previously to chat session. Anyhow this was spontaneously fixed by the students who independently logged into chat groups of a lower quantity of participants.

The chat session itself was great, as students had to work through a number of questions, which enabled them to stabilize the discussions and follow some kind of a

guiding thread. Some chat groups managed to handle all the questions, while others skipped some issues and focused on a more independent discussion course. It remains to discuss whether the number of questions was to high, as in some cases the time limit did not allow free discussion within the students.
At the end of the sessions data of every chat room was copied and past into a word document. These documents were later imported into the analysis software MAXQDA for qualitative data analysis. All documents are attached in chapter 10 appendix.

8.1.2 Qualitative data analysis and category building

MAXQDA was a great support for data analysis, as it would be very hard to handle such a huge amount of data without any analytical software. The start of the analysis was due to video tutorials provided by the software company quite easy and allowed to pretty much immediately starting with data analysis. The process of data coding was very extensive, as the hole data set had to be recoded a few times in order to figure out which codes fit best to display student sentiments in a very condensed way without losing significant parts of data. The final coding list is exposed in the appendix.
Within the analysis, two types of category systems had been established. The first type is of an inductive nature, which means these categories emerged from free student discussions and did not relate to any of the guiding questions. The second type of categories had a deductive character, in other words these categories where formulated through these six guiding questions that where provided by the course instructors prior to the chat session.

8.2 Discussion of the results

This chapter deals with the results of the thesis and aims to investigate the presumptions that have been formulated in chapter seven. Most outstanding suppositions in regards to cross-national differences of US American and European students are further examined in order to find correlation to significant scientific studies. Finally similarities among chat participants of different cultural background are shown and further discussed.

8.2.1 Differences between US American and European students in GMO discussions

Differences between US American and European student attitudes in regards to technological development vs. regulatory protection of the environment and human health.

The analysis of chat room data shows that there are significant differences between US American and European students in relation to their opinion about both the investment of money for technological R&D, or to invest money to extend GMO regulations to protect the environment and human health. While a majority of US American attendees perceive that the support of technological research is more important, European students reveal a stronger support towards an extension of GMO regulations.

Literature research reveals, that cultural determinants play an important role in consumer's approval of specific technologies. Believes about benefits and risks are rooted in more general knowledge and attitudes towards nature and technology and therefore difficult to change (BREDAHL, 2001). Siegrist (1999) found, that individual's evaluation of gene technology is affected by both their worldview and by their perceptions of benefits and risks of the technology. Because these views are also culturally constrained, it is possible that international differences in opinion towards GM food are embedded in these cultural attitudes (HEBDEN et. al., 2005). A great example for cultural attitudes is Americans great emphasis on man's ability to control outside events, in large parts through his mastery of technology (US IMMIGRATION LAW OFFICES, s.a.).

Another important factor of cross-national differences in relation to genetically modified organisms in agriculture may be connected to the scale and the structures of agriculture in the United States and Europe. In the United States, farms are private properties, often posted against trespass. These huge agribusinesses are set apart from urban centers where most of the population lives, which cause a separation between agriculture and nature among US American citizens. In contrast, many European farms are much smaller and situated closer to the population and often nearby natural areas. This structural difference could explain why many Europeans see what happens on farms and explains the perceived connection between agriculture and nature among most Europeans (HEBDEN et al., 2005).

Another factor may be the source in which consumer place their trust. European public opinion polls suggest that Europeans tend to trust environmental and consumer groups while investing relatively little trust into institutions such as academia and government (ZECHENDORF, 2005). This is important because environmental and consumer groups tend to frame agricultural biotechnology in a highly negative light. In contrast, US Americans tend to trust scientists, medical professionals and universities most, while tending to have little trust in environmental and consumer groups (LANG AND HALLMAN, 2005). These cultural attitudes towards trust can play a significant role in consumer's risk assessment.

Additionally European press has covered the biotechnology issue rather extensively, which has had an effect on public awareness and opinion driving many consumers' to worry about it. Perhaps US American consumer's seem to be more unconcerned about GM food, because they have not been exposed to such high media coverage in regards to this issue.

Finally a factor called „Uncertainty Avoidance Index" which was introduced by Geert Hofstede in his work about „*Culture's Consequences, Comparing Values, Behaviors, Institutions and Organizations Across Nations*" is included in the discussion about possible reasons for the difference between US American and European consumer's in regards to the their opinion about the use of GMO's in food production. The „Uncertainty Avoidance Index" attempts to measure the degree of uncertainty and ambiguity that a society feels comfortable with and has often been employed as a proxy for the diffusion of innovations within a culture. Those cultures that are uncertainty avoiding attempt to minimize the possibility of such situations by strict law and rules as well as safety and security measures. In contrast to that, cultures that are uncertainty accepting cultures are more tolerant of opinions different from what they are used to and typically have as few rules as possible (HOWARD et al., s.a., 4).

The Hofstede Center in Helsinki ranked currently the United States at an index of 46, which is a quite low level, indicating an uncertainty accepting culture, which means openness to the possibility of GMO food. This index correlates with the results of the chat room analysis. In contrast Austria is currently classified to an index of 70, which indicates a rather uncertainty avoiding culture. This classification is matching with the argumentation of European students and points towards a GMO opposing culture. A perfect example for a correlation between a countries GMO aversion and the uncertainty avoidance index is Greece, which is currently classified with a very high

index of 100 points. Greek consumer's perceived the highest worry level about genetically modified food and drinks within all European countries at the Eurobarometer survey from 2006 and 2010 see table 1.

Differences between US American and European student attitudes in regards to their opinion about "GMOs for food security" especially in developing counties.

The chat room analysis showed a clear difference in argumentation between US American and European students. A high majority of US students claimed the imminent necessity of agricultural biotechnology to fight hunger, especially in developing countries. In contrast European students stated that the need of GMOs in food production is not eligible, as enough food is currently produced on a global scale and the reasons for malnourishment particularly in developing countries is caused by a lack of access to food products. A reason about how this differences in student attitudes connected to this issue „GMO and food security" emerged, is possibly explained by cultural determinants that are partly created through the educational and medial environment students are exposed to.

Literature research reveals a huge number of controversial scientific papers in regards to the issue genetically modified agriculture and food security, which makes the selection of appropriate studies quite difficult.

However, literature research enables to reveal some facts about global food production and worldwide food waste in order to put some light on both kinds of arguments.

The research revealed that considerably more foods are produced worldwide than consumed, which makes the balance of global alimentation to a huge degree an issue of political failure. Despite a relative high population growth, there had been up to the early nineties reason for hope, as the number of hungry people had fallen over the decades. For this reason the leaders of 185 nations agreed at the world food summit in Rome in 1996, on reducing the number of malnourished people by 2015 to half, on less than 420 Million people. As we witnessed this promise could not be fulfilled. Since 2007, the number of people who had not enough to eat, did not fall, but increased by 200 million. Although the global situation has improved slightly again in 2010, the numbers and the global ratio remained with 925 million chronic hungry people still on an unacceptable high level. The reasons for the lack of progress since 2005 and the recent dramatic development of global malnutrition lie mainly in rising

food prices. This tendency was reinforced by the energy and financial crisis in 2009 (WEINGÄRTNER et al., 2010, 15).

If agricultural biotechnology would contribute to improve the situation in regards to global food security the trend as previously presented would have shown a different curve. Interestingly the turnover towards a renewal increase of global hunger correlates with the fist introduction of GMOs to the markets, which happened around the mid nineties, see figure 17 (GMO COMPASS, 2006).

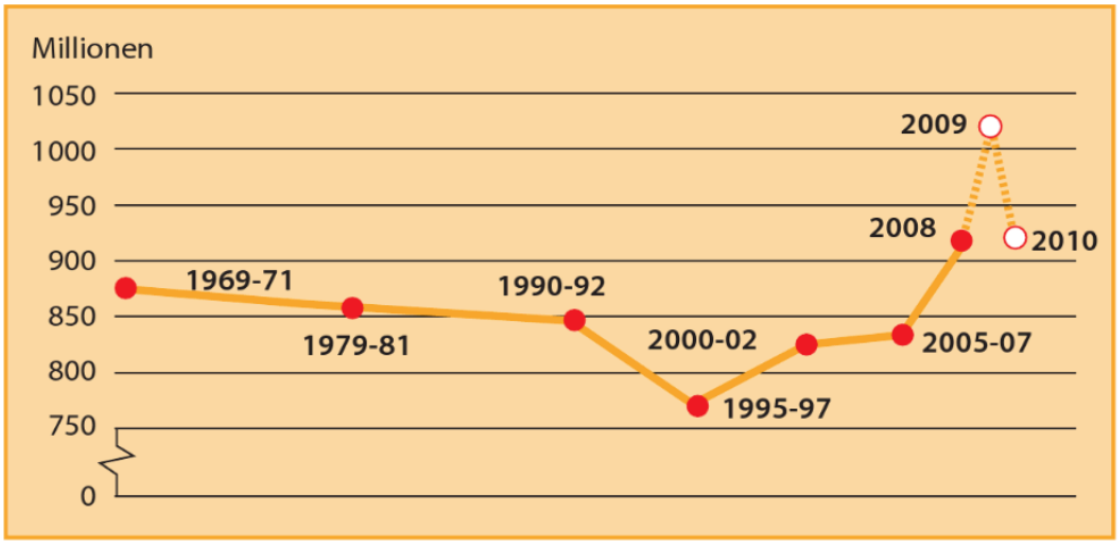

Figure 17: Development of global malnutrition and chronic hunger between 1969 and 2010

Source: excerpt after Weingärtner et al., 2010, 15

It is noticeable that the yield of various agricultural products (grain, maize, soybean etc.) is to a huge share used for other purposes than direct food intake. It is used for fuel production and animal feed, which supports the assessment of a majority of European students. A frequently mentioned statement in relation to this issue is quoted below.

„We can and could produce enough Food without gmo“ (EUROPEAN STUDENT, chat room Nr. 5).

Sherlock and Morrey explained the relationship between the prevalence of hunger in a given country and its population. For every densely populated and hungry nation like Bangladesh or Haiti, there is a sparsely populated and hungry nation like Brazil or Indonesia, which implicates that a countries hunger problem does not necessarily interrelate with its population density. In their work from 2002 they further mentioned

that enough food is available and that the real causes of hunger are poverty, inequality and lack of access to food and land (SHERLOCK et al., 2002, 175).

Students expressed their attitudes about a lacking infrastructure in developing countries, which causes high post-harvesting losses. European students in the chat discussion frequently mentioned this argument. In regards to this matter the following facts about global food losses and waste, not only due to infrastructural deficits in developing countries but also due to the behavior of consumers in medium- and high-income countries are presented.

In developing countries food losses and waste occur mainly at early stages of the food value chain and can be traced back to financial, managerial and technical restrictions in harvesting techniques as well as transportation, storage and cooling facilities. The support of farmers and the investments in infrastructure, transportation, as well as the development of the food and packaging industry could help to reduce the amount of food losses and waste in early stages of the food value chain (FAO, 2016). In developing countries 40% of losses occur at post-harvest and processing levels while in industrialized countries more than 40% of losses happen at retail and consumer levels (FAO, 2016)

In medium- and high-income countries food waste and losses appear as mentioned mainly at later stages in the supply chain. Different to developing countries, the behavior of consumers play a significant role in industrialized countries. A study conducted by the Food and Agricultural Organization of the United Nations identified a lack of coordination between actors in the supply chain as a contributing factor. Agreements between farmers and buyers can be helpful to improve the level of coordination. Additionally, raising awareness among industries, retailers and consumers are useful measures to decrease the amount of food losses and waste (FAO, 2016).

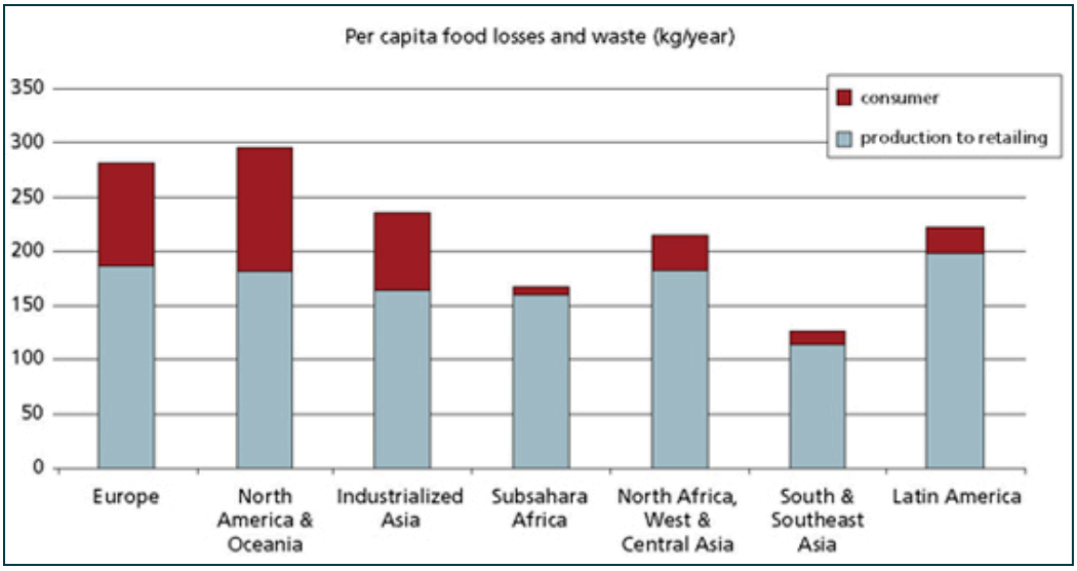

Figure 18: Per capita food losses and waste, at consumption and pre-consumption stages, in different regions

Source: excerpt after Food and Agricultural Organization of the United Nations, 2016

Differences between US American and European student attitudes in regards to scientific studies about long-term effects of GMOs and the trust in various sources of information.

According to the results of the data analysis, participants from the US and Europe showed a completely different access in regards to the key words „scientific studies about long-term effects". While most US American students reveal their sentiments about the proven safety of genetically modified food, European students mention frequently the uncertainty among scientists in regards to negative unexpected long-term effects.

However, these cultural differences are in strong relation to the trust consumer's have in either governmental agencies or non-governmental organizations, which certainly affects consumer's risk evaluation. US Americans show a high level of trust in regulatory agencies like the USDA and FDA (HEBDEN et al., 2005). Even if most American citizens require labeling of genetically modified food products, they remain confident in the current policy of the FDA that does not require such a label (LOUREIRO AND HINE, 2004). The circumstance that US American legislation classifies genetically modified products substantially equivalent to conventional products arouses additional trust towards a safe consumption of GM food among American consumers. This could also explain the frequency in US American student expression as quoted below.

"Genetically modification poses no additional risks compared to conventional food production. GMO products are tested and more than safe for consumption."

In contrast many studies have revealed that for GM technology and especially GM food, „Non-Governmental Organization" (NGOs) like consumer organizations, environmental groups and scientists are considered to be trustworthier than the biotech industry and governments. Interestingly, Eurobarometer data reveals that Europeans most trusted stakeholders are doctors, university scientists, consumer organizations and patient's organizations, followed by scientists working in industry, newspapers and magazines, environmental groups, shops, farmers and the EU. Governments and industry are the least trusted sources of information (Gaskell et al., 2003). In addition the extent to which the issue GMO is present and in which context the issue is proclaimed by European media seems to influence the attitude of Europeans and explains to a certain degree the difference in attitudes between European and US American consumers (HAAS et al., 2009).

People tend to select and interpret information according to their prior mid setting. The initial attitude to genetic engineering appears to be the most important determinant after information provision (FREWER et al., 1998, 24). People who favor the use of genetic modification are more likely to trust a source promoting its benefits whereas those who oppose its development are more likely to distrust the same source providing the same information (FREWER et al., 2003).

Finally the earlier mentioned uncertainty avoidance index is a further factor that is involved in the present divergence of opinions between consumers of different cultural backgrounds (HOWARD et al., s.a., 4).

Differences between US American and European student opinions in regards to GMOs naturalness.

The analysis reveals a clear group splitting within the chat room participants, slightly favoring a cluster of students who represent the opinion that genetically modified crops are natural. Despite this tendency in cross-national difference - as all students who mentioned GMO is natural, came from the US - quite a few US American students represented the same opinion European students revealed about this issue, namely that genetically modified crops are unnatural.

A prevalent argument of students who felt that GMO is natural is quoted below.

- *Genetic modification happens in nature naturally*

- *Would you consider golden rice an example of unnatural*
- *Let the people know that it is a natural thing. It happens in nature and this is just happening in laboratory.*
- *I think they are natural. The changes they make only help to improve the product.*
- *The genes used are natural and not synthetic*

As mentioned in the introduction of this thesis a genetically modified organism is per definition „an organism, with the exception of human beings, in which the genetic material has been altered in a way that does not occur naturally by mating and/or natural recombination" (THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION, 2001, 106/4). Research about this issue reveals that naturalness is not only functioning as a defining instance in legislation, but it also functions as a normative moral concept in public debate. This makes it possible for opponent stakeholders to polarize the issue and to typify genetically modification as an irresponsible technology, thereby blocking the debate. The stalemate in the debate about GMOs demonstrates that naturalness and the depiction of nature as a moral category can quickly become untouchable, overruling arguments (VAN HAPEREN et al., 2011, 799). Within the student discussions, only little specific terms in relation to genetics emerged. This could be seen as an opportunity for a development of the guiding question connected to GMOs naturalness, which could lead to a prevention of superficial student argumentation. In a few chat rooms the discussion about GMOs naturalness became a debate on principles, as a few students argued about the unnaturalness of agriculture in general. The following statements in regards to this issue are listed below.

- *„I'd say anything that is being cultivated to produce a specific outcome by humans is unnatural.*
- *It is very unnatural! But so is everything with our foods... from selective breeding for centuries to artificial additives and food coloring.*
- *But are the plants we eat "natural"? Like we deliberately plant them, they wouldn't grow in such quantities if we didn't have control...what is "natural"?*

- *It depends on what you think of as "natural". Theoretically you could argue traditional breeding and crossing and hybrids are already unnatural, or pesticides and stuff like that*
- *Natural or Unnatural? Any thing that has been altered from nature remains unnatural... all products uprooted from their natural source, to me remains unnatural and I think if we are all victims of this.*
- *People make the "unnatural" argument, but in reality nothing consumed in the U.S. is natural.“*

At this point it is mentionable that agriculture is very unique in the sense as it has a natural and unnatural side united in its core. Without human intervention there would be no such thing as modern agriculture, but we remain dependent on very natural and given systems too, since otherwise no agriculture would be possible. There is no such thing as completely artificial agricultural production, just as there is no agriculture without human intervention. (VAN HAPEREN et al., 2011, 798).

8.2.2 Similarities of US American and European student opinions in chat room discussion about GMO in agriculture, food and medicine production

The following section contains similarities in US American and European student argumentation. They will be briefly discussed in order to investigate possible reasons for these analogies.

Ambiguity

Apparently the question about the possible existence of any middle grounds in regards to the huge topic GMO was not as clear someone might expect, as a number of students obviously misinterpreted the guiding question.

Some students initially stated *„the issue GMO offers no space for any middle ground, either you are for or against it“* but repealed their expression in the course of the discussion. Two European students expressed the most precious examples for this assertion. On the one hand, both students revealed the inexistence of any middle grounds in the GMO issue, on the other hand - in the course of the chat discussion - both expressed their sentiments, indicating to be directly afflicted. This vulnerable attitude can either be explained by a misinterpretation of the question, or by the change in opinion during the discussion.

- *I think for medicine it is really useful. In Food I really don't need it.*
- *Honestly I am also against GM-Food, but don't worry to much about GM-Medicine, because it is needed to heal.*

Other reasons for ambivalent student attitudes can either be explained by the presence of a discussion leader, in other words the frequency of statements from a particular student about an issue, especially when he or she is well prepared and by a general vulnerability of students stances within the discussions, particularly when they are confronted with strong arguments.
Despite the clear and stabile initial ground position of favoring or opposing students, there is reason to believe that such a broad topic like GMO, which contains that high variation of cons and pros and a lot of specific but also superficial information about risks and benefits, is capable to cause a distortion in the current perception of the whole overview.

Labeling

It was remarkable that almost every chat participant revealed the necessity of reliable mandatory labeling of genetically modified products in order to enable consumers to practice their freedom of choice. The Mellman Group found that an overwhelming majority (89%) of respondents from a US survey on GE food labeling favor mandatory labeling on "foods, which have been genetically engineered or containing genetically engineered ingredients" (THE MELLMANN GROUP, INC., 2015). Due to the regulatory situation of GM labeling in Europe, this issue is not further investigated. This analysis and the results of consumer surveys about labeling speak for itself. Labeling is needed and it will be an interesting process how especially US American consumer sentiments will develop over time in regards to FDAs opinion about this issue.

GM food and medicine paradox

Most students expressed their sentiments about an absence of knowledge, education and interest of the public in regards to GMOs in food. This situation becomes even worse when GMO drugs come into play. A huge majority of scientific papers deals with consumer awareness of genetically modified food products. In contrast a literature research revealed an outstanding low share of scientific research in regards to consumer awareness of GMO medicine. The most common student statement that

explained the reason for a GM-food and GM-medicine paradox was named with the complete absence of consumers' awareness and interest in regards to ingredients of drugs. This presumption might not be the falsest, as survey results about the absent consumer awareness in regards to food products show. Considering the limited medial attention dedicated to medical GMOs and the general attitude students reveal about drugs „*something unnatural produced in the laboratory*", the presumptions are further underpinned. It is noticeable that most students, even GMO opponents reveal their support of GMOs for medical purposes, which makes the food vs. medicine paradox a highly interesting issue as it correlates often with participants' sentiments about the inevitable necessity of drugs in order to heal. This opinion might be driven by fundamental concerns about the own healthiness and the healthiness of the most loved ones like family members for example. In other words the attitude towards medical GMOs is mostly driven by the concern of health. Noticeable it is to distinguish if someone has to take drugs unusually or on a daily basis.

Not further investigated student arguments in pro and con discussions about GMO.

For two reasons the following presumptions are not further investigated. Either because they had been discussed in one of previously discussed chapters or because some are lacking in clarification as they are characterized by a to generalized nature, hence discussion would become too extensive.

US American and European similarities in argumentation:

- Both groups expressed that education of the public is a must, as unknowing people believe what they hear.
- The statement "zero risk in food production is unrealistic" was expressed by a huge majority of course participants.
- A majority of chat participants revealed a bright future of biotechnology indicating different arguments for this estimation.

  US American students predict a bright future of GMO in regards to an immanent necessity for global food security.

  European students expect a bright future of GMO for other purposes than food production.

9 Conclusion

Both US American and European students showed differences in their attitudes about GMOs in agriculture, food and medicine production. Although a lot of consent in regards of this broad topic had been detected as well. It is interesting that especially in deductive categories many similarities between US American and European students appeared. Solely the categories *"invest money in technological research or in regulations" and "GMOs naturalness"* showed quite clear cross-national differences, all other deductive categories, did not reveal significant difference in student argumentation.

The discussion was characterized by a certain harmony between the students in the chat rooms. MAXQDA frequency analyses of the term "agree" revels a high number of strikes, which indicates the high consent between students in every single chat room.

Unfortunately only few students did actually counter to direct student arguments using strong counterarguments.

It needs to be mentioned that the much lower participation of European student did not contribute to reinforce the results from this thesis. Amost three quarter of the entire chat attendees came from the US or represented exchange students on an US American university. Accordingly low was the total frequency of European student statements compared to the one of US Americans, which made a direct comparison difficult and creates an uncertainty about the validity of results due to the small sample.

As a consequence there was rarely a chat room in which European students reached a superior number.

The linguistic disadvantage European students have as non native speakers in the chat session did not contribute to the quality of analysis either, as it directly affects the amount of European students statements in general. Despite the fact that all European students did very well, the linguistic part is especially in chat sessions certainly an important factor as the discussion is challenging. Students have to handle quick reading and understanding and equally fast writing of arguments in order to keep up with the chat velocity.

To reach approximately valid results the total amount of students from both continents needs to be as equal as possible. Further it would make sense to reduce the number of

students per chat room on a lower level. This could increase the quality of the chat rooms towards a dialog and adapt the speed of discussion on an adequate level.

Nevertheless the chat session at the Global Seminar is a great opportunity for both student groups to experience the dynamics in an international discussion forum about a highly emotional topic.

Due to the chosen method a high degree of subjectivity from the researcher side is given. It would be interesting to use the same research method, either by a number of encoders to diminish the degree of subjectivity or by an American student to compare both outcomes in order to be able to draw conclusions from such a comparison.

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11 Annexes

11.1 Excerpt of the code system

Code system					612
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			Innovative and revolutionary technology		10
			Rather benefits than risks		6
				Longer storage	3
				Increasing output with less input	8
		CON use of GMO			1
			Overproduction and food waste		4
			No need of GMOs in food production		7
			Environmental and health risks, side effects		8
		Media and information			0
			Unknown people believe what they hear		15
			Negative publicity made GMO look bad		11
			Positive publicity, build awareness towards benefits		8
			Risks perceived stronger than benefits		7
			Trustworthy information		1
		Education			0
			Educate public		21
			Lack of information, education and interest in the topic		7
			Difficult to get education on that topic		5
			Critical consumer		2
		Science			0
			Studies long term effect of GMO		16
			Fear of the unknown		10
			Not trustworthy scientific studies		9
			Poor interaction between science and public for education		7
		Food production			2
			Global corporations and monopolization		8
			Dishonest food industry		5
			Efficient food production		3
			More transparence in production		2

			Product variety		2
			GMO presence in the US		2
		The future of GMO			20
		Developing countries			7
			Infrastructure and logistics		5
		Food price			4
		Supporter			15
			Especially in agricultural and rural areas of the US		1
			No problem with consuming GMO's		2
		Opponent			5
			Scaring gene transfer animal to plant		1
	Deductive categories				0
		Ambiguity			0
			Middle ground isn't possible		14
			Middle ground is possible		0
				Unintended middle ground	16
				Intended middle ground	22
		GM medicine and food paradox			0
			Acceptance of GMO medication		0
				Medicine associated to sth. unnatural produced in laboratory	8
				Different consumer involvement with medicine and food	16
				Powerful pharmacy industry no bad publicity	2
				Health	1
				Solely concerned about health ...	11
				Health effect of medicine creates acceptance	9
				With med. fewer options for substitution than with food	4
				You don't question your doc's prescription	4
			Misinformation causes paradox		5
				People don't know that GMO are i medical products	18
		Labeling			0
			Labeling and Marketing		0
				Labeling creates awareness	5
				Use label for marketing of products	2
				GMO label being negative publicity / economic consequences	7
			Price for labeling		0
				Mandatory GMO label in the US not expensive	5
				Mandatory GMO label in the US expensive	5

				Who pays for labeling		0
					Government absorbing the cost	1
					Industry absorbing the cost of labeling	13
					Consumer pays the cost for labeling	15
			Labeling is needed			7
				Consumer should know what's in the product & Freedom of choice		12
			Labeling isn't needed			3
		Are GMOs natural or unnatural				0
			Unsure about GMOs being natural or unnatural			6
			GMOs are natural			14
			GMOs are unnatural			11
				Agriculture is unnatural in the first place ...		7
		Zero risk in food consumption				0
			Own responsibility			0
				Consumer can higher or lower the risk. Own responsibility		6
			Low risk 0 risk is possible			0
				Process level of a product determines risk level		3
				Risk level known only if producing your own food		4
				Trustful food production		4
				Products are tested and safe		18
			Government responsible for safe food products			2
			Zero Risk is not realistic			20
				Natural level of risk is healthy immune system		1
				Accidents happen		2
				GMO's poses no additional risk than convent. or organic food		7
				There is risk with everything		5
		Invest money in regulations or technology				0
			Money for labeling			1
			Spend money on both technological research and regulations			4
			Money should be spend on regulations			7
				Agricultural policies have to change		1
			Money should be invested in technological research			15

11.2 Transcripts of chatrooms

Chat Room 3

EU
I participate for Nina, she isn't in the course anymore.
US
Hello
US
Hey everyone
US
Are we ready to start?
US
I am ready. I guess the stragglers can join in whenever.
EU
think so.
US
Alright our first question is do you think GMOs are unnatural?
US
I do not think that they are. genetic modification happens in nature naturally.
EU
Unnatural is a strange word. It is natural, but they developed in an not so naural
way
US
I agree with both of you, I feel that when people hear unnatural it becomes a misconception because it has a negative vibe
US
I think that is very
fair to say that they developed in an unnatural way
EU
I am thinking by "
unnatural" about chemicals or something in this way. but not about crops.
EU
Why do u think so Morgan?
EU
Lia would you consider golden rice an example of unnatural
US
joined the chat.
EU
I wouldn't say so.
US
I just wonder the type of person who would think to introduce a gene into a plant to make it ripen slower
US
I am sort of mixed on it now.
EU
Rice is a natural product. It is just not in it's normal shape.
EU
I am Feeling a bit like you Morgan too.
US
Do any of yo
US
Do any of you feel that there is a middle ground when considering GMOs?
US
Furthermore, if there is one how would it be reached?
US
I think there could be. Some people could be against buying or eating a product that is completely GMO but could be ok with eating a product that has a GMO ingredient it instead of the whole makeup of the product being GMO.
EU

I think for medicine it is really usefull. In Food I really don't Need it.
EU
I disegree with u Taylor. I think that is not possible.
EU
Cause the People who are against GMo would eat it in any way.
EU
joined the chat.
US
Hello
US
joined the chat.
EU
U could just try to produce Food with or without GMO and sell them both, so everyybody could buy what he or her prefers.
US
hi
US
I look at it as if I were telling someone I was vegetarian or not.
EU
Your right
US
I don't see a problem with purchasing non GM products, but the cost of production is higher and that is going to translate into higher prices for the consumer
US
Do you think that GMOs are the answer to sustaining a rapidly growing global population?
US
i don't find any problem with purchasing and consuming GMO,
US
But with higher Prices we would also have more respect for our Food or the way how it is produced and at least for the Producer.
US
I not think there can be a middle ground just because there are two sides of the story there are some agriculturalist that thing that it can totally destroy their crops and the original mother crop. then there are those people that are either opposed or unopposed to putting the Gm products in their bodies medical or just food products. while some are totally oblivious that there are even GM products Genetically manufactured
US
what it scaring it when animal gene is transferred into plant in order to improve the plant , the case of strawberries and fish
US
But that takes us into what kyle just mentioned. Can we feed a growing population without the ability to more easily grow food]
US
Possibly, GMOs have definitely increased yield production which makes more food available and accessible.
US
kyle, i think it is an answer to sustaining a rapid growing pop but it can solve everything
EU
But it doesn't help to produce more Food if u can't bring it to those who Need it
US
Not only yield increase, but a decrease in labor. To mechanically remove weeds vs. spraying requires very different investments in time and labor
US
Why can we not bring it to those who need it?
US
Perhaps if money could be saved labor-wise in the fields it could be dedicated to the transport of crops
EU
we would Need a better löogist and infrastructur in the developing countries.
EU
logistic, sry
US

lawson decrease of cost production too i thing, you avoid buying pesticides and insecticides
US
Very true. I think that is main problem with it though. We have this benefit of producing more and more food but I don't think we're really using it to the right advantage.
US
If we are able to produce much higher yields with GMOs what are ways that we can eliminate being wasteful?
US
Would it be possible to create crops that take longer to spoil?
Lia.Backendorf:
Think so.
US
Grains store fairly well as it is, but one of the first gmo vegetable crops was a tomato that had a longer shelf life, so yes it is possible
US
Kyle if i am not mistaken they tried to create a tomato that took on that effect several years ago but it did not make it to the market
EU
Then we would Need less of it
US
Is waste the reason that people are starving throughout the world?
US
i think since most of the food that is going to waste is stuff that can be broken down we could defiantly compost it and put it back into the ground. Unless i am missing something that GMO's cannot go back into the ground.
US
I don't think so. I think it's more of an issue with developed countries.
EU
Not really. So we should actually change the factors that are responsible for it
US
what do you think about the fact that Consumers accept medical GMOs but refuse GMOs used in food and agriculture?
US
It is easy to say no to what we eat, especially when what we have a right now is working
EU
I think so too. It ist needed in some way for the medicine cause otherwise we could die.
US
I think it is an image formed by lack of information. People do not view their food the same as they view "medication" so they think one is ok and another is not
US
But in our Food it is not necesserry
EU
Medication is perhaps already
something unnatural, so GMO as an part of it ist not making it worse.
US
joined the chat.
US
Do you think that if food became scarce that GMOs would become more accepted?
US
Yes, because then there would be fewer options to choose from.
US
Hi, i have just joined chat
EU
I agree with T
aylor
US
I'd say anything that is being cultivated to produce a specific outcome by humans in unatural
US
I think that some people are so set in there anti- GMO state of mind that it would not change their mind in the beginning . but eventually seeing that they have no other option they would ease into eating it
US

I agree with Morgan too.
US
i thinks that GMO is the forward way to go particularly in African countries where people die of hunger..
US
exactly lawson, misinformation, if they do accept GMO in medicine, i dont understand why not in food, since both are entering into the organism
US
How do we shed a positive light on GMOs with all the misinformation?
US
Is it realistic to present a GMO product that presents zero risk?
US
Educate consumers. I think farmers and food producers need to be more open about GMOs too and help consumers really understand what GMOs are and their benefits instead of trying to hide it.
US
No, nothing is zero risk, but before GM products go to market they are put through nutritional testing for vitamin content and toxin levels, as well as feeding tests to check for unexpected side effects. Can you imagine the fall out to a large corporation if any scientific evidence pointed towards their product having a negative effect on people
US
Good point Taylor
US
i think also people have made GMO be seen in such a negative view that some people , even if they dont understand what is it really just follow the crowd
US
kylie, no but even in conventional breedind , do we have a product zero risk? what about pesticides used all th time
US
I think do exactly what we said in the first question, let the people know that it is a natural thing. It happens in nature and this is just happening in laboratory. This is even happening with children when they are still in the womb. you can go to the doctor and select for traits that you want in your children. Granted you are not eating them but it is something that is happening and it is coming with technology.
US
I agree with that too Pamela. People really don't know but just because others perceive it as a negative thing they think they should too.
US
Exactly I just find it odd that people pay extra attention to GMOs being possibly toxic while what they eat everyday can produce similar results
US
I tend to think that people would care less in situations where hunger bites @ Kyle.Williams
EU
It is really funny, as Kyle said.
US
yeah james, some countries started to consumed GMO after disasters, when there is no other possible way
US
So if there is a future for GMOs do we need to invest in improving the capabilities of the crops or regulate what we already have? Where would the starting ground be for growing the crops?
US
and what about the labelling of GMO products? what do you think?
EU
In my opinion, labling is a good Thing. So everybody can buy what he wants.
US
agree with you Lia, it should be done
EU
And I think it is just fair to respect the wish of some consumers not to buy and eat GMOs
US
but what about the cost of labelling?
US
I agree. I think people have a right to know what's in their food but by not labeling it makes it seem like producers are trying to hide GMOs from the public which makes it seem bad. But if we educate

consumers better they would understand what the label means.
US
Yes their is a bright future..more developing countries are changing their policies
US
It would be no different than a vegetarian wanting to know if there is meat in their food
EU
Should be carried by the foodproducers. They have already to Label so many thzings, so labeling the GMOs is not such a big Thing for them. And it is not that expensive
US
If it were mandated here in the US it would not be excessively expensive to label everything that had GMOS ingredients, though I do think making it look positive would certainly help
US
Yes I agree with that
US
yeah, it has a cost and since there is already labelling as in organic foods, i think it is not impossible to label GMO, i think it is necessary
US
I do think that consumers should be able to see what is in their food, but some ideas for the labels are being described as similar to cigarette type labels, which is just negative advertising
US
I believe the cost of labelling should be taken care by the producers, labelling would be important for consumers to choose what they want
EU
joined the chat.
US
I think producers are also scared to see the consumer to walk away from their products and that's why the process is so slow
US
foods are already labeled so the cost of the actual label would be no more than it is currently, the real cost would be the economic consequences of consumer reaction
US
Great point Lawson
US
i stand for labelling irrespective of the cost to create awareness to the consumer...
US
even if labelling is expensive, consumers who are agree to buy GMO product will be able to pay for it, as in organic food
US
I would support the inclusion GMO information in the ingredients list, but not plastered across the front of every product
US
I agree with Lawson
US
I agree with Lawson too, that seems like it would be the better solution as far as labeling goes.
EU
I agree.
But it should be easy to see and understand.
US
It looks like time is up, thanks for the great discussion everybody! Lots of excellent points brought up.
US
Bye everyone!
US
Good bye..
EU
Yeah. Made fun. Bye
US
bye thanks for the discussion
US
bye everyone

Chatroom 4

US
joined the chat.
EU
joined the chat.
US
Hello
US
is it just the two of us?
US
joined the chat.
EU
I hope the others will join us soon.
US
Hey! Where is everyone from? I'm UGA Athens
US
UGA Tifton
EU
I am from Lasalle Beauvais in France
US
Awesome! Well we can go ahead and get started if you all would like! People are either 'for' or 'against' GMOs... Do you believe that there is a middle ground? What can be?
US
I personally am for GMO's
EU
Yes, some people are not entirely against GMO's but have issues regarding the transfer of genes from animals to plants.
US
joined the chat.
EU
on a personal note, I think is either you are for or against GMO.
EU
and I am strongly in favor of GMO's.
US
hey guys, I am for the GMO
US
My undergrad course of study is biological sciences, research I've been involved in personally, as well as published research articles I've read, do not show any harm of GMO's... the slander and fear of GMO's can be stopped by proper education
US
I do not know if there is a middle ground. I agree with Shaibu, you either accept or decline them
US
Im from Florida A&M
US
Consumers widely accept medical GMOs but refuse GMOs used in food and agriculture. How can we fix this pardox? Is proper education the only way?
US
A note to think on when answering this questions is that often, consumers demand "zero risk "in their food. How realistic is this?
EU
for me its more of a political problem than a scientific one.
US
I think the whole misconception about GMOs isnasna result ofpoorninformation,people just accepted tye tthe negative sode of it,without actially thinking about orfinding outnwhat GMO really is
US
We can fix the paradox of the medical and food segregation by informing the masses on the advantages of GMOs.The advantages outweigh the disadvantages.
US
Great point Tolulola! Shaibu, the political point you bring up is very interesting, could you elaborate on that some?

US
afterall, the medical and food GMOs enter our body system snyway
EU
for instance in Africa the anti-GMO campaigners use the rhetoric of a foreign imperial power trying to take control of their food system.
US
I mean when GMO was initially discovered, many organisations were against t, like greenpeace and the friends of the earth.
US
Yes, medicine, whether oral or injection, conclude in the same pathways of our body as consumed food does
US
So yes, education is a must. Consumers need to be properly educated by those with scientific backing. Too many cite faulty testing scenarios and use it scare consumers. You can show the safety of GMO's over and over, but it only takes one scare to make consumers question GMO's again
EU
the science is clear
US
And people just felt if they say is not good, then its not good,and this wrong concept has spread over the years
EU
If it was
US
So true Matthew! It just takes one small scare to undo so much progression! Unfortunately the uneducated or easily persuaded individuals are the masses
US
you are so right, Tiffany
US
and these masses are the most ignorant, they just accept what they are told,and I dont blame them
US
Even though I am completely for GMOs, I am also completely for consumer freedom. Every person should have a right to choose what goes in their mouth. How do you all feel abou Consumers wanting labeling in order to exercise their freedom of choice. Who is absorbing the cost?
EU
It's not only the uneducated who are against but a substantial number of educated elite are also against it
US
also true. Osman
US
and zero risk is not really possible, there are always risks, but GMO's pose no additional risks than non-modified to humans
US
Very true Osman, but I can't help to feel that those educated elite are only speaking against GMOs for personal financial or political gain
US
GMOs are the only effective way of ensuring food security
US
Yes!!! GMOs are our future!
US
and they have come to stay, because those who are against it now,will definitely need it in about 50 years from now
US
By 2050, farmers will be expected to produces as much as 50% more food with as little as 30% less farm
US
land, due to the growing population
US
produce*
US
yes Tiffany,and the people who are against it cannot even farm in any way,yet they complain about people who have come up with great ideas so as to create a balance
US

Such a great point! People are very quick to feel negatively about situations they know absolutely nothing about!
US
It is a derivative of fear of the unknown
EU
Even in europe where they claim to be against GMO's, each year they import tons of GMO products
US
Why do you all think Europe remains publicly claiming they are against GMOs?
EU
the developing world lost out on the "Green revolution" we cant afford to lose out on the GMO revolution too
EU
It lack of political will
US
THEY WANT THEIR CITIZENS TO FEEL PROTECTED
US
That would make great article title Osman! And yes, political WILL is a huge deal... It's a lot easier to fear something, shrug it off, instead of taking the time to educate themselves properly on it
EU
the rise of the far-right also makes the issue more complicated
US
It's so true that we can't afford to loose the GMO revolution... what can we do to ensure this won't happen? Is there anything we can do as just students?
US
Think of the word protection like Adeyewa brought up!
EU
I think the pioneers of GMO's and most scientists in the past made the mistake by not interacting with the public on scientific issues
US
WELL, I think as students we can help in our own little way,these masses are our friends, cousins, nephews,grandparents,parents...we can help by informing them about what it is and its benefits
EU
we can change that by trying to translate our scientific research into a form that the ordinary consumer can understand and not by being content with our papers published in journals
US
exactly, Osman, in a very simplified way,we can even tell them about drugs help us get better when we are sick and most of them are made from GMOs
US
joined the chat.
US
also, people can pay to be published. Therefore, the average science journal cannot be very trustworthy.
US
because, you wouldnt believe how the older ones believe so much in drugs
US
Wow, great points/ideas!! Just the sheer fact of how much us 4 are agreeing and speaking with maturity and professionalism, when we come from very different backgrounds truly gives me hope for GMOs!
EU
I agree with you Tolulola we can use the success of medical GMO's in saving millions of lives around the world as a good point
US
left the chat.
US
Yes, Tiffany we are professional students, glad to be in this group of professional students....smiles
US
Medical GMO's save our loved ones lives. Agriculture GMO's will prevent our loved ones from another killer, starvation!
EU
Most people all over the world seem to be obsessed with Monsanto rather than debating on the merits of GMO's
US

I think that is the only true ground of opposition of GMO's. Many oppose large corporations like Monsanto and when they are the main producers of GMO's, it would only make them larger. However, that happens with a lot of businesses and corporations so it is nothing new
EU
the point is that varietal registration and development is an expensive venture and as such smaller companies find it difficult to compete with these multi-national companies
US
Exactly! It is easy to look at situations that are producing big money as negative threats... claiming that those situations are just money producers, not healthy. But in all reality, anything that is on a mass or global level, is going to produce a lot of money naturally
EU
the turnover of the major seed companies cannot be even compared to the turnover of a single company like Nestle
US
So right
US
It is time to start wrapping up the conversations today. Thank you all for participating. It has been a true pleasure talking to you all today!
US
your right Mr Osman
EU
it really was a nice time
US
nice one today guys,till next time

Chatroom 5

US
Where is everyone from?
US EX
Nicaragua
US
I am from Athens, GA USA
US
I
m from Tifton, GA USA
US
Want to get started?
US
sure
US EX
we are six in the room right?
US EX
yeah maybe we should start
US
Yeah, there is supposed to be 6. I guess we will start without them and they can just join in
US EX
it is ok for me
US
sounds good!
US
1. People are either 'for' or 'against' GMOs. Do you believe that there is a middle ground? What can be?
US EX
i think there is a misinformation problem instead of middle ground
US
I don't necessarily believe there can be a middle ground. It's either genetically modified or it's not. There is not a between. I guess I could see where some people could agree with using GMOs in some cases, but not others.
US
Definitely misinformation!!
US

I agree with Kathryn. I believe that once every one is truly informed there will be no gray area
US EX
some of the people don't even really know what a go is and are against it
US EX
gmo*
US
I think that that is where the problem is
US EX
for example in my country we are not allowing go's and if you do a survey on the streets they will tell you its a bad stuff but they really don't know the benefits or what it is
US
Yeah, I think it all comes down to lack of education and people just not knowing how GMOs can be beneficial
US EX
what is the situation in your countries?
US
Well, if you come from an agriculture based background or rural area, GMs are widely accepted and appreciated. Some others have no opinion, and then some that are on the "all-natural" bandwagon are against them
EU
Hi, we had to come from Chatroom 9, because some students are missing
US
Hello! I also joined from room 9. I'm in Athens, Georgia
US EX
ok welcome
US
I would say most people here in the US disagree with the use of GMOs only because of the reason that they don't really know what they are. However, there are many people that are in support of GMOs and can see how they would be beneficial
US EX
so the middleground floor its just a problem of information,education? agree?
US
yes I would say so
US
Agree
EU
Yes I agree. we also discussed about it in the ither Chat, and I think that there is no middle ground, because those who aren't for or against it even don't know what GMO is or that their Food is produced with GMO
US
Kathryn, I think that view point is common. I would consider myself in the middle of the issue. GM crops are planted in our fields, but I also struggle with the inequalities, especially in developing countries, with the GM companies
EU
There are only 40 min. left, should we go on with question 2?
US EX
yes question 2
US
Good idea!
US
I think what drives the paradox is, again, misinformation
EU
So what do you think about it? I think it is the same Problem like in question 1. that a lot of People don't know abour medical GMOs
US EX
exactly
US EX
people don't really know what vaccines are made of or any other medicine
US
Insulin is one of the largest medical GMO's in production and nearly everyone knows someone that uses

US EX
but they are afraid of "eating"
US EX
a gmo
EU
And they also accept it, because they really Need some medicine
US
But, we also need food to survive?
US
I can agree, that most people have no idea about the medical use of GMOs. It comes down to the fact that ppl NEED medicine...good point Mirjam
EU
honestly I am also against GM-Food, but don't worry to much about GM-Medicine, because it is needed to heal
US EX
from a cultural point view putting something in your body that will heal you its better than eating something that people who are against it tell you its bad
US
I think it's hard for people to accept the fact that we are making advancements in technology which are making it easier to produce. I agree, when people need something, they are going to go along with whatever to get it. Right now, I don't think we are to a point where producing with GMOs is required but I believe it will be soon!
US
If GMOs can help us heal through medicine, then how are they being harmful to us if we eat GMO food?
US
Theres no scientific proof that GM's are harmful to the body. And we need them to sustain our ever growing population, whether it is medically or nutritionally.
US EX
Healing>feed?
US
Is there evidence or research that proves GMOs are bad. I have no idea, I haven't researched
EU
Why sould we produce GM-Foods, if there is no Need?
US EX
there its no need?
US
There is a need
US
No, there is no valid, repeatable studies that prove GM are dangerous to health
US
How can you expect to feed 3 billion+ people with old technology
US EX
do you know about the impact of golden rice in some populations in lack of the vitamin contain on it?
EU
why? we can and could produce enough Food without gmo
US
joined the chat.
US
There will be a need soon I believe with growing population. Also, I think right now we don't even know if our food is made with GMO because of labeling issues
US
GM crops help us produce higher yields with less pesticides and costs, but I think people should have a choice of whether they want GM or not
US EX
Mirjam: so tell me how do you expect to improve agriculture without the use of these technologies?
US
I agree Emily.
EU

The Problem is, that there is not enough Food in the developing countries, rigth? But feeding them is not a solution, we should better Show them how they can 'feed' theire own Country sustainable without beeing dependent from the developed countries
US EX
yeah but politics are the other hand of the body where the developing countries are in this situation
US
560 thousand children worldwide die every year of a vitamin A deficiency, and we are producing a GM to combat that. However it is still being rejected because of fear of the unknown side effects. That might not even exist.
US EX
i got Mirjam position and its good to debate
US EX
but we have to move to the next question i think
EU
ok
EU
It would be interesting to hear from the US students here, what they think about question 3, because in Europe we have a strong labeling yet
US EX
yes im not from Europe, but im studying in France
US
Our GM's are not labeled. So I think more people consume them than they realize. If they were labeled people would probably eat less of them
US EX
but i would say that the ones absorbing this are the transformers(industry)
US
So the producer would absorb the cost I believ
US EX
people can choose what they eat
US
*believe
US
I agree with Hannah
EU
Cairo, what was your first Impression/experience of the food labeling when you came to France ?
US
It would be industry absorbing this cost. I think they have the right to label them as non-GMO to attract those type of consumers.
US
But, I can agree with Emily's point, because the industry is in control of the labeling so they have the power and the cost would be on them.
US EX
Mirjam: im not against GMO food and to be honest i never check if its go or not, i check other stuff like the nutritional value, as i said people can choose, but i know labeling in Europe its very compulsory and its good
US EX
for me as i said before industry absorbs the costs
US
With that being said, after living in England and Belgium for a bit, I really appreciate the labels of all sorts. In general, there is soooo much more information on those level, which really gives consumers knowledge and therefore freedom
US EX
move on to the next question?
US
good idea
US
Yes
US EX
of course its unnatural, but we have the case of cisgenesis where you can put genes from the same specie(wild) and use transgenesis to make it faster than conventional breeding
US EX

but there is not doubt for me its unnatural
US
It is very unnatural! But so is everything with our foods... from selective breeding for centuries to artificial additives and food coloring. These can also be added to the conversation. However, GM has not been proven dangerous and I don't view it as unethical
US
Well after looking up an exact definition of unnatural… which is: different from how things usually are in the physical world or in nature. Yes, it is unnatural because we are changing the normal DNA
EU
yes, I also think that it is absolutely unnatural because we are chaning and mixing genes and Play god
US
I believe that GMO's are natural. It happens all the time, breeding a desirable specimen to another to achieve a desired result. I can see where people would believe it to be unnatural, but it isn't anything that I am uncomfortable with.
US EX
breeding is natural, transgenesis its not
US
But look at all the medicines...they are often 'unnatural'.
US EX
no doubt about it Emily, we talked about it
US EX
next question?
EU
yes
US
yes
US
Unfortunately, even if we individually produce our own food, there will be a risk. As consumers, I feel that we have to be given a clear freedom of choice to determine how much risk we want to take
US EX
i think as i said before people can choose what they eat, "organic" food is an example, and everybody i think knows about the residual "stuffs" that are in our food
US
joined the chat.
US
Yes, with that being said, I think there is more 'risk' with non-organic foods that GM foods
EU
I also think that it depends on how much a prduct is processed, to say there is Zero risk or not
US
There is risk with everything… But i do believe some ways are more risky
US
With as paranoid as we as a world have become, I feel like no matter how much our food supply is regulated, someone will always be talking about a risk
US
Good point Hannah.
Last question quick before our time is up?
EU
So like we said a few times before it is good, that everybody can choose on his/her own, what products he/she will buy and eat, because everybody defines Risk different
EU
okay
EU
Last question: both is important, spending Money for Regulation and for improving the technology
US
I believe that we have no other choice than to use GMs in the future. Money should be spent on technology advances in order to cope with the expected population increase.
US EX
i really believe in the future of GMO's and many applications to come, and of course we have to spend more money on regulations
US EX
there will always be two sides of the coin

US
Right now, the only ones investing in GM technology are the ones going to make a profit...the companies. We do not have a right to regulate a companies research.As far as equality is concerned, if a public entity held the patents for GM, if would reduce the monopoly on the market; however, for that to happen, research would have to take place at the public level
US EX
and regulations are the best line to separate them
US EX
or join them
EU
by improving the Technologies there might be more ways to use GMOs, so the regulation is very important
US EX
at the end politics as i said before play a huge role on it
US
I think GM is important for global food security, but not in every case. There are also strong arguments from the other side that I support. There will always be a spectrum of views on this issue...why must it be a YES or NO debate?
US
Regulations are very important!!
US
Emily made a very good point. We are not going to research GM unless there is something to come out of it.
EU
Emily thats a good Point of view, with the Yes or No debate
EU
Although I am against GM-Food, I am sure that there is a future of GMOs, but maybe for other purposes
US
Any other points before we close?
US
Good thought Mirjam
US
That's all for me!
EU
For me too, thanks for this interesting discussion
US
Bye everyone!

Chatroom 6

US
Hello Ariel!
US
Hi everybody!
EU
hey
EU
is it just the three of us again :-P
US
There should be a couple more, but we can wait a few minutes and see if they come on.
EU
ok....
EU
how are you two today?
US
I am doing well, how about you both?
US
I'm doing well. Just trying to get all of my classwork done.
EU
yeah...i am trying to finish my papers. but its so nice outside :-)

EU
i think we can start?? don't you?
US
I'm okay with starting.
EU
me to
US
What do you think Ariel? Since you are the group moderator
US
Dr. Duncan is about to talk to us about a couple of things. We can start, but I may be in and out.
US
Okay that's fine. We can wait on you, if Katharina doesn't mind. Just in case our other group members join us in the meantime
EU
yep
US
People are either for or against GMOs. Do you believe there is a middle ground? What would the middle ground be?
EU
i do not think that there is a middle ground. you either are against it or for it, but i think that a lot of people do not know that they are consuming GMOs. especially in the States
US
I feel like for the people who understand GMOs they are polar opposites. Often with this group of people they are either for or against. For most of the general public I feel like there is a middle ground because they don't know anything about it.
US
I agree. If there is a middle ground at all, I believe it would be unintentional. Like say someone is against GMOs, but unknowingly consume GMO fruits on a daily basis.
EU
yeah, but then you can define the middle ground as people who do not know what GMO is or what it stands for?!
US
I suppose the middle ground could be not caring or just being obliviously to GMOs.
US
yes thats true
US
All in all, I do agree with both of you. It's one of those issues where it's hard to find a middle ground. But I believe in order to find that, both ends would have to compromise, but that is easier said than done.
US
Good point Emily.
US
The next question is consumers accept medical GMOs but refuse GMOs used in food and agriculture. What drives that paradox?
US
I believe is that the public does not realize it. Take for example insulin. (I don't know if I spelled that right).
US
joined the chat.
EU
yes, i honestly did not know about medical GMOs. i have never thought and heard about it
US
Hello Digna!
EU
and I think as long as it is helping your HEALTH it is ok for people
EU
but consuming GMO food is not guaranteed that it is good for your health
US
hellow
US
Why do you believe that, Katharina? If you don't mind my asking.

US
The part about consuming GMO food
US
and even that we are yet have evidence
if it is bad
US
I think people are even more unaware of medical GMOs than they are about GMO foods.
US
for me consuming is okay
and i don't have any problem of that
EU
well....I read some studies and they are all saying it is not bad for your health...but how long have we been consuming GMO products?? i think to say that it is not bad for you health you have to wait longer....
US
I agree. I also didn't consider the possibility of medical GMOs until we began discussing this section in class.
US
You make an interesting point, Katharina.
EU
and...i read studies which actually say that consuming medical GMO is increasing health problems, cancer.....
US
We have been consuming GMOs for more than 20 years. I feel like if a medical issue existed something would have been seen by now.
EU
I am not really thrilled about GMO...i have a negative attitude
US
people need to be told and and understand the science behind that nothing is bad.
EU
you don't know how much power pharma industry has!!!
US
I agree, Digna, there needs to be an increased public awareness about this issue, from all sides. Livestock, crops, medicinal, etc.
US
I don't know what study you are referencing Katharina, but I feel like a lot of medical studies like that one week one study will say that and the next week another study will say something else. Like today chocolate is good for you and the next week it causes cancer.
EU
yes...you got a point there!!!
US
I agree with Emily and Digna. People need to be made more aware, but people have to be invested in it. People just don't want to spend the time and en
US
energy to find out more.
US
yes Emily.politician are destroying our science development
US
True. They want to be told it easily and form their opinions from there, despite what it fact and what is fiction.
EU
no they don't, but don't you think that some people do not care at all?
US
Yes I would say so.
US
And a lot of sources only show their opinion which makes it more difficult for people to hear both sides because once they hear one they form their opinion on that.
US
I agree most people don't care at all.
US
I think they don't care because they think this GMO is economic monopoly

US
Next question - Consumers want labeling in order to exercise their freedom of choice. Who is absorbing that cost?
EU
yes, i think scientists have their opinion either against or for GMO and then make their study?!
US
Absorbing as in who benefits the most?
US
I think that is a great point
US
Who has to pay that extra cost? I think is what it's wanting.
EU
i think so.
EU
well, the consumer pays the costs, don't we?
US
consumers
US
Oh okay. Then I believe it would have to be the consumer.
US
The consumers will be absorbing any added costs because the companies won't want to lose any profit.
EU
no not at all. and i think that supermarkets can demand a higher price on food without GMO
US
joined the chat.
US
The next question - The public thinks GMOs are unnatural. What do you think?
US
Hi Lindsey!
US
Hey everyone!
EU
I think it is unnatural. because those changes would not happen in the nature.
US
yes but GMO seed are very expensive
US
I think that question really goes back to what we said about the lack of understanding about the topic.
EU
why would you say that emily?
US
I think they are natural. The changes they make only help to improve the product
US
they are natural
US
The changes would have been made but it would have taken longer. People have been selecting crops for thousands of years to have higher yielding and stronger crops. That's why I think it's natural but it just greatly speeds up the process.
US
the genes used are natural and not synthetic
US
I read this article about GMOs a while back about public misconception of GMOs and compared it to a science fiction horror film. Like people hear of GMOs being synthesized in a laboratory and what not. Honestly, I can see where people would think it is unnatural. But I do believe it is a natural process. I see more as Darwin's natural selection theory, survival of the fittest.
EU
you good a good point there ariel, but what about the resistance against vermin
US
We can pick and choose the traits we want out of the crops. That's what I'm trying to get at it.
US
Vermin resistance is just another trait that naturally protects the crop against pests, if I'm not bad mistaken. It's more natural than the insecticides and sprays we see in stores.

US
Katharina I'm not sure about the resistance part. Emily may be right, but I don't know for sure. I would think the plant would adapt overtime to pests as well.
EU
i am not quiet sure about that. emily could be right, but i do not really know.
US
I'm glad you pointed that out, Ariel, because there's also the chance that the pests would adapt.
US
Right pests will adapt overtime as well. Nothing will remain the same over time.
US
The climate is also changing forcing pest to move their habits and crops to be grown in other places. Pests are a big part of crops but they are also not the only problem
US
Next question - c
onsumers demand zero risk in their food. How realistic is that? What about quantities of pesticides in their food?
EU
ok. the GMOs are just happen faster - the process
US
I don't see that as being realistic.
US
Good point Lindsey
US
Accidents happen and sometimes your food may not be zero risk.
US
It goes through several processes to reduce the risk, like cleaning, but things happen.
US
i think they don't know the risks
EU
yes, it is not realistic.
US
I do not believe zero risk food is possible
US
For example, on the processes. For milk every milk tank is tested to make sure antibiotics are not in the milk and each truck is tested before it is delivered to the plant.
US
yes i agree with Lindsey
US
One of my professors told me at my old college that you don't know how many bugs have been ground up in your food. It's pretty disgusting, but an example.
US
I think consumers see the one instance in the media about the one accident and don't step back to realize how much food is eaten each day and how that food is safe.
US
It goes back to the misconception of the "perfect plant." You drop the seed in the ground, you water it, and that's it.
US
I just think if I spray pesticides on my field how am I going to keep the wind from moving them onto my neighbors field that has no pesticides?
US
Therefore, Lindsey, your neighbor's food will no longer be "zero-risk"
US
Some of the pesticide will go onto the neighbor's field, but you can make sure to spray on less windy days and the neighbor can have a barrier to help add more space between the crops.
EU
but if you have more space between the cropy you have less quantity...less yield
US
And that's not good for production
US
Also I feel like with taking away pesticides and such our food supply will drop!
US

it is difficult to be safe interm
of food chain
EU
why would you say that lindsey! there is an overproduction in the States.
US
yes that is for sure
US
I agree with your points about less production, but if the neighbor is determined to have minimal pesticide residue on their crops they have to choose what they will do to achieve that.
US
But overproduction in the U.S. is sent to other parts of the world that can't produce enough.
US
I didn't realize there was an overproduction but if there is then that goes to so many different problems but still what about places that don't over produce and need the chemicals to sustain a life.
US
for developing country people complain that their low production because of lack of input,pesticide is one input
EU
yeah, but there is enough food supply at the moment. normally, the farmer does to spray the pesticide all the way to the border of his field. so that it is not going to the neighbors field
US
But what if it was a novice farmer?
EU
for example africa: they need education in general, improve roads, logistic....
EU
good pint emily, i have no idea.
US
I agree more education needs to be done in developing countries to improve their production.
US
farmers has no voice and no decision at all, for Africa not only education to empower them to know want they is also importany
EU
yes, but also agriculture policies have to change - Europe and U.S.
US
education the public is very important when it comes to agriculture I do agree with that
US
This is the last question on the list, but we can ask our own later. What do you believe the future of GMOs is? Do we need to spend more money on regulations or for the improvement of the technology?
US
I think we need to spend more money on technological advances.
US
So far, there hasn't been a reported problem with GMOs, so why not further the research so we can uncover more?
US
I think the future will involve continuing to produce GMOs and expand GMO technologies to other crops. I think educating the public needs to be a component of the future to, just so people can have a been understanding.
EU
well....i think that in the future everyone will consume GMO food. and i agree with emily that we have to spend more money on technology
US
I think GMOs
will continue to be in our food and in more of our food. Also we should take pride in what we are consuming therefore we should spend more money on research
US
yes,because it is the best way to feed the growing population in 2050
US
I think we have to continue to test GMOs just to show the public they are safe.
US
You make an excellent point, Digna.
US

And we need to use some of those finances for educating the public: that needs to be a must.
US
I like Lindsey's point about people needing to take more pride in their food choices, so more money should be spent on research.
EU
the government is supposed to do that
US
The research? Or educating the public?
EU
but i think that labeling should exist.
EU
to educate the public
US
Yes, Katharina, but consumers should show they are passionate about the research and education so that the government will take notice.
US
I feel that we need to educate the public so they can at least make valid arguments to support their sides, just as I feel that we have done today. And not only make valid arguments, but also be open to understanding the other's viewpoints.
US
I think it is apart of the government to give the public safe food
US
yes but what do you this of African country do you think their government can afford this investment ?
US
Another excellent point. That is something I didn't consider.
US
I don't care if things are labeled or not. The research that I have read has shown that GMOs are safe, so I don't see the need to label them if they have been tested and are safe.
EU
africa is a continent...so you have to look individually on it.
US
I do not believe they can afford it but I do believe some other countries could make trades with them
US
joined the chat.
US
Thinking beyond major developed countries, what will we do about developing countries who are willing to adopt GMOs into their foods?
US
I don't know if African countries can afford the investment. I think the research on food safety that is done in other parts of the world can be used by African countries to show if the food is safe.
US
Do we use some of the developed countries' finances to help them, or do things just continue the way they are now?
US
Using GMOs has a much higher input cost that many small farmers cannot pay, so that will be a major issue moving forward if GMO crops are adopted in developing countries.
EU
if GMOs would be to fight hunger in african countries than they should adopt it. and if they can't finance it then developed countries should help them
US
yes katharina current the big company are doing GMO for Africa market, they don't have choice,they have to accept.
US
I think developed countries have to step in, but I don't know how much their involvement should be
EU
thats a good point ariel
US
that is the point Ariel
US

I agree Ariel, countries already do help those who are behind and it is just a matter of when to stop but that should be determined by the government and how the other countries actually need
EU
but on the other side, have you ever heard about land grabbing in africa??
US
No I have not
US
Please explain Katharina.
US
At least that I remember
US
yes, i heard
US
I have not
EU
companies, or even countries like china, saudi arabia are paying fruit able land in africa to export it to their own country. so some countries like kenia would have fruit able land to fight against hunger but the land is owned by foreign companies and countries
EU
are buying fruit able land in Afrika - i meant
US
it is the market future of the big company, every one is taking his part now,it is like scrape and partition for Africa
EU
yes, a corrupt government.
US
I had not heard of that. So are the companies/countries buying the land first? Or are they taking it?
US
Wow that's morbid.
US
yes, most of their government they have no choice
EU
i think its different. some a buying it and others are renting it for 100 years. so even if African countries have GMO - they might not have the fruit able land for it
US
I did not consider that.
US
So the government is using this money for their benefit and not for the people.
US
This is new to me.
US
I think that if GMOs were truly helping everyone out then the counties would be planting them there as well
EU
yes, you can say that.
US
this is what happen now like chines is finding solution to feed
their population this is what they do
EU
yes digna
US
I didn't know that. You would think research would be done in China and other places to learn ways to use the land they have or they would just pay to import the food and not "buy" other country's land.
US
yes,
thanks every body,i have to get to class.
US
I think we can wrap it up for today. Have an awesome day everybody!
EU
have a great day everyone

Chatroom 8

EU
Hi Katharina, how is it going?
EU
Hi Claudio, I'm fine thanks
EU
What do you think, we should wait for the others. It does not make sense to start just the two of us!
US
joined the chat.
EU
Hi Lauren, I'm not listed in chatroom 8 as I'm generally missing in that list.
EU
Hi Lauren, I'm not listed in chatroom 8 as I'm generally missing in that list.
EU
Never the less I do the chat with you guys.
EU
perfect Claudio
US
Hi. No problem. We might end up with a few more people in a few minutes.
EU
ok cool - so we wait for them...
EU
or should we start the 3 of us
US
I can't get the GMO questions to open on my computer right now--they're still downloading. So if either of you have them we can start otherwise we'll have to wait until they finish downloading.
EU
yes I have them I can post every question one by one
EU
yes we should do it like this
EU
So for you guys the first question:
EU
So for you guys the first question:
EU
1/People are either 'for' or 'against' GMOs. .Do you believe that there is a middle ground? What can be?
EU
I do believe that there is a middle ground when it comes to gmo s in food production.
EU
why do you think this only for food production?
EU
i think you have always a middle ground because people often won't to say yes or no
US
joined the chat.
US
I think there can be. GMO cotton could be used in making clothes, for example
EU
You are right not only in food production, generally when it comes to GMO s
EU
yes that's right and you often don't have a labelling
EU
What I ment was, higher yields with GMO s is a benefit to producers, but the environmental and health risk is a critical point. Thats a midd ground
EU
joined the chat.
US
We don't know if there is or is not a health risk though, right? Isn't that what some of the controversy is all about?
US
joined the chat.

EU
yes but you don't have long term studies so you can't be sure if there are no risks
EU
yes right, but there are definitely some risks related to the environment.
US
there are many health risk that are health/environment related but its not evident as of the minute so they don't see it as a issue until it is to late
EU
cross polination, super weeds, destruction of harmless insekts or plants that are necessary for biodiversity by the use of roundup.
EU
So a few risks are already known.
US
yes a few of the common risk are known due to a few studies
EU
Lauren you are the chat leader, please tell us when you want to move to the next question. I can post it!
US
So how long is long enough, do we think, until we really understand if there are severe and long-lasting health risks?
US
there is no real time limit until there is a apparent trend coming into play
EU
I mean there are corn products since 20 years in production, so thats quite a long time to consider health risks.
US
left the chat.
US
Right, but you guys pointed out that we don't have enough long term studies so is 20 years long enough? Or should we set up actual scientific studies, maybe that would be better?
EU
i think the scientific studies are missing in this case
EU
So do I
EU
I think we should go to the second question what do you think?
US
Consumers accept medical GMOs but refuse GMOs used in food and agriculture. What drives this paradox?
EU
so do I
EU
and that might be the problem by discussing the health risks, we just don't know yet, how it is going to influence our lives
EU
let's move on :)
EU
My opinion is that you can't compare the medical consumption with your every day food consumption
US
I agree. But maybe I think that way because I'm not on any medications that I have to take everyday. Maybe I wouldn't be okay with that if I was taking medications made with GMOs everyday.
EU
medicine is always a impurity for your body
EU
Maybe because medicine is in some case not replaceable. And also that consumer don't simply know that gmos are in medicine. In general medicine is something lets call it chemic anyway.
EU
medicine is always a impurity for your body
EU
Maybe because medicine is in some case not replaceable. And also that consumer don't simply know that gmos are in medicine. In general medicine is something lets call it chemic anyway.
US

Does anyone have anything else they want to say about medicine?
EU
when it is important for research i am for gmos that is my point
US
I agree.
EU
Medicine is related to laboratory, which is in distance to food which should be related to nature
EU
thats it from my side ..... to question 2
EU
let's move on
US
Consumers want labeling in order to exercise their freedom of choice. Who is absorbing the cost?
EU
I think it is the responsibility of the companies because they earn also the money
EU
and when everybody has to do
EU
I think that most major corporations should be able to cover the costs considering how much they're making
EU
I find that labeling in general is very important. Especially regarding the freedom of choice. As a reliable label is connected with additional costs, the consumer might be the one who is absorbing the costs
EU
I also think the government should be absorbing some of the costs
EU
sorry and when everybody has to pay the labeling costs you have the same conditions on the market, in the end the consumer has to pay it
EU
The companies will always find a way to transfer costs on the consumer
US
I'm not really sure who should cover them when it happens with smaller companies. They'd probably have to pass the cost along to consumers.
EU
If the govnerment absorbs costs, it means that the consumer is paying.
EU
the consumer has the advantage of gmo products related to the costs so the consumer has to carry the disadvantages
US
How would that work in Europe? Would governments be willing to take over the cost of labeling? I don't think it would happen here in the US.
EU
I agree Lauren.
EU
it wouldn't work in Europe Lauren
US
Is there anything else anyone wants to say about this?
EU
It simply would make the first cheaper prices of GMO goods higher.
EU
I'm fine with question 3
EU
me too
EU
same here
US
The public thinks that GMOs are unnatural. What do you think?
EU
I don't have a problem with the genetics of GMOs but I have a problem with the resistances which are caused by the fertilizers and round up

EU
There is something unnatural growing natural. :-) I personally thinks a modification of dna, happens in nature over decades in order to prevent extinctions. Done by humans hand changes the whole thing in our favor. So it is unnatural for me
US
So do you think it's fair to say that some
people may be more anti artificial pesticide and insecticide than anti GMO?
US
That's an interesting argument, Claudio. I see where you're coming from with that.
EU
No no Lauren I'm quite distant to the topic.
EU
What do you thinks Lauren Natural or unnatrual
EU
Maria what do you think natural or unnatural?
US
I'm not really sure. I see your argument in terms of unnatural due to human intervention, however I can also see natural because there's also genetic modification through evolution.
EU
ok I see your point. Thats fine - I see it quite similar. Which brings us back to question 1 middle ground. :-)
US
Agreed! Middle ground :) What does everyone else think?
EU
we can go on
EU
:-) ok for me it is ok to go on.
EU
sorry my computer just stopped working for some time!!
EU
let's go on
US
Consumers demand 'zero risk' in their food. How realistic is this? What about the residual quantities of pesticides in our food?
EU
this is an interesting question, I think you have to see the social risks, because pesticides are pesticides and they are always bad
EU
I think zero risk is not achievable. Not with or without GMO's. So that question does not make sense to me. Physical, Chemical, Biological and now transgenetic risks will always appear with food consumption.
EU
I think zero risk food is unfortunately not very realistic. Let's just think about all the food scandals over the last years.
EU
but for me the hardest thing is how dependent the farmers are from companies like syngenta or monsanto
US
I totally agree. There's a huge spinach recall going on right now that has nothing to do with GMOs or pesticide use--so there can clearly still be risks involved.
US
I agree Katharina.
US
Is there anything else anyone want to say?
EU
I thinks this makes the number of scepticism among the consumers rise. To EU
EU
Not only in europe but also in america.
EU
I agree with claudio
EU

Thanks Maria :-)
EU
Lets move to the final question
EU
what do you thinks guys
US
Do you believe in the future of GMOs? Do we need to spend more money for regulation or for improvements in technology?
EU
perfect
EU
I think we have to develop technologie, because we (as global inhabitants) are facing different climate circumstances in the coming decades. Droughts, salinity, climate in favore to pests. So technology has to be improved and put on a next level. Regulations are for my opinion in the same way important. So both have to progress....
EU
i think we need more money for regulation because the consumer will more and more critical and topics like labeling and protection of food without GMOs would stand first
US
I think more regulation and more testing. I'd like to see mandatory labeling so that people who want to avoid them are able to.
EU
I totaly agree Lauren :-)
EU
Regulation need to grow, to protect the customers and the environment
US
Okay does anyone have any final comments before we wrap up for today?
EU
We should not stop technology but we should adapt regulations in favor to the population and not in favor of global companies.
EU
I would like to have that i know it when i have to consume GMO food so i can decide if i want or not
EU
more money for labeling :-D
EU
I was hell of discussion with you guys. Thanks and have a very nice rest of the day.
EU
it was...
EU
agreed, everyone should know what they are eating!
US
Agreed. Have a great day everyone!
EU
see you soon guys bye and thanks
EU
thanks
EU
Thanks guys :)

Chatroom 10

EU
Hey Alexandra! How are you?
US
Hi! I'm good. my professor said we might move chats since no one else is joining ours :(
US
How are you?
US
where are you from again?
EU
Fine thanks! Again the same problem with chat room 10 :)

EU
From Boku, Austria
US
Cool! Is it pretty there ?
EU
Yes. Already feels like spring!! You're from the U.S?
US
Yes from UGA Athens campus. It does feel like Spring. So nice.
US
Have you ever been to America?
EU
No, but would like to...
US
Well you have the language down! Now all you need is the transportation!
US
and maybe a place to stay and some money
US
joined the chat.
US
Hi Catherine!
US
Hey guys!
US
Hello.
US
Hi Melea!
EU
Hey all!!
US
Catherine and I had already dove into the first question. how do you guys feel about that?
EU
The middle ground question??
US
People are either 'for' or 'against' GMOs. .Do you believe that there is a middle ground? What can be?

US
yes =)
US
I guess the middle ground would be one who is not as educated on the issue. But also there are so many pros and cons so that may make people unsure about the issue as well
US
what did you guys say about it?
EU
Well, I think that middle ground could mean people who just don't care/ or as you said, lack of education.
Or what we discussed with our class, that GM technology can be seen as something good, but maybe the applications are not so perfect.
US
That was basically what we concluded. people are not always informed
US
We agreed with that. We feel that only those who do not understand the concept are the ones considered to be on middle ground.
US
Education seems to be the key to success its just not always readily available.
US
I agree.
US
yeah and i also agree with Christina about how some people just don't care, so would that be considered the middle ground or as "for" GMOs?
EU
good point!

US
I feel that would be considered middle ground because they are not choosing a side.
US
I think you pegged it!
US
Do we want to move on to question 2?
EU
sure
US
Sure!
US
Consumers accept medical GMOs but refuse GMOs used in food and agriculture. What drives that paradox?
US
yeah true...although they are consuming GMOs so from an economic standpoint they are consumers who support it
US
joined the chat.
US
I think that kinda moves into the next question too, Alex.
US
they view medical GMO's as being more help than harm
US
I think they don't really think about the GMOs included Iin the medical side of things.
US
Sometimes I don't think they even think about it!
US
They are solely concerned with the health of family members
EU
people are already so familiar with the fact that medical goods are also chemically made, whereas food for many people means something more natural.
US
They don't only because they see the right now effect of the medicine and not long term
US
great point christina
US
I agree ebony
EU
yeah, and medical goods we don't need probably every day as food, so we're maybe more concerned about food
US
Exactly Catherine, most people don't take the time to find out what is in their medicines while they are more likely to be concerned with their daily food choices
EU
Exactly!
US
Yes and with the food being consumed everyday that's a lot of GMO intake but in different quantities
US
I mean rarely do I question my doctor haha
EU
:)
US
And no one will all they see is that they will be better
US
That's true, Ebony.
US
yeah that's a good point, like we trust our doctors so we readily accept the medicine, whereas when it comes to food we are more likely alone and make our own choices
US
agreed, Alex!
EU

Melea, good point - when it comes to medicine someone, professional, is making the decision for us, but food we choose our
self
US
So true! I don't consult a professional when buying my food
EU
sorry for repeat Alexandra :)
US
I think we all tend to agree on the reasons why for this issue, shall we move on?
US
Sure.
US
Consumers want labeling in order to exercise their freedom of choice. Who is absorbing the cost?
US
We are!
EU
First of all, I really think that the labeling is good and if it means that I at the end as a consumer must pay more, it would be fine. But the manufacturers would also benefit, even if they have to pay, because they can use the labeling for marketing.
US
The consumers
US
I think that in reality Labeling sounds like a great fix but It can be rather expensive and in my opinion food is already super expensive.....I'm not sure that I would be willing to pay more for my food just for the label
US
there are requirements and regulations that come with labeling so it is more expensive for the producers, who make their product more expensive to cover those costs
US
I totally agree malea
US
even with proper labeling one has to actually understand that there needs to be a cut off point on how much GMO should be used in a product but as studies show that number is continuing to rise due to resistance
EU
I think with the labeling there's big difference between US and Europe
EU
*bit off topic
US
yes absolutely, Christina
US
I feel that the government already regulates this, well in the US anyway, Each product must pass inspection.
US
Exactly!
US
in America, I think we can just assume that everything has GMOs unless it says specifically that it doesnt
US
Thats probably true as well Alex
US
if you didn't personally grow the product in question youll never know
US
I agree with that as well. We are aware that there is more GMOs used than not so it is easy to assume theey are present in US products
US
But in reality have we found that GM products are actually harmful?
US
yeah like how honest is our food system? Pretty sure I can't trust the one we have in America
US
That is true as well

US
yes there is proof that the GMO products can cause harm
US
I agree Alexandra
US
What kind of harms do you think they have
US
They have been evident in causing miscarriages in certain areas in animals, some animals would be born and die shortly after as well
US
interesting
US
I think this leads us into our next question...The public thinks -that GMOs are unnatural. What do you think???
US
from what I have been able to find, there are no reputable sources that say for sure GM products are harmful. The products that we use have all been tested to ensure they are safe.
US
Of course they're not natural. It's genetic alteration...this would not occur in nature if man didn't interfere
US
well I should say products that we have access to.
US
"safe"....
EU
I agree Alexandra!
US
I had a class seminar with a guest speaker who specializes in GMO's and he showed us the pros and cons
US
no they aren't natural .... they are man made
US
Alex I do agree that it is not natural, but is that a reason to be against them?
US
We also had a guest speak comer I. And she shared with us that there is no scientific evidence to back up proof of GMOs being harmful. But of course they are not natural. There is no way it could be
US
What I mean is that sometimes those modifications make these things easier and better
US
but are the plants we eat "natural"? like we deliberately plant them, they wouldnt grow in such quantities if we didn't have control...what is "natural"?
US
im not for or against GMO's that would be hypocritical of me
US
That is true.
US
I agree malea.
US
That's true to an extent because they do grow from a natural seed we may just change its natural habitat
US
i mean there is apparently no proof that they are harmful, but is there proof that they are harmLESS
US
Exactly!
US
Not all seeds are "Natural" Technically, GM's start as a modified seed. I agree Alex, that is true too. ultimately I think the consumer must decide
US
good point ebony
US
I agree it's ultimately the consumers responsibility
US

Consumer demands "zero risk "in their food. How realistic is this ? What about the residual quantities of pesticides in our food ?
US
I mean the best way to ensure you're safe is to completely take yourself out of the system and grow your own food!
US
I don't think zero risk is possible....farming as an industry is a risk
US
I agree completely. How is zero risk even possible.
US
to cut out the guessing game become your own source
US
I come from a farming family and I can tell you first hand, the farming is like playing the lottery lol
US
yeah, or have an honest source
US
But in reality can all of us become our own source?
US
So true. Good point Alexandra.
US
maybe if we all lived in small communities
US
I rather play the lottery than to have something sneak up on me outta nowhere that I didn't even know I was a part of
US
not each individual on his/her own i dont think
US
I agree Alexandra.
US
same, ebony
US
I agree Alex, Like here in Athens that would not be feasible.
US
I think the most dsihonest industry is the animal agriculture industry (we can't forget that GMOs are used there as well).
US
Good pint.
US
Point.
US
GMO's are used in all parts of our lives, but I really think this goes back to the consumer. everyone has a different set of ethics
EU
consumers can higher or lower the risk level by deciding what they eat - for example when it comes to animals, if you're concerned, become a vegetarian/vegan. Yes, it's about ethics, eating habits, ...
US
yes and our consumption choices reflect our ethics but also when there are limited options we may be unknowingly funding an unethical industry.
US
I think ethical beliefs are a huge part of it
US
My biggest concern isn't what people believe as much as that they are educated about what they believe.
EU
so over all there should be more (honest) information over the whole chain from the farm to the plate for the consumers
US
Exactly. They just believe what they hear and aren't as educated as they could be
EU
the chain of the product I mean...
US
I agree Catherine!

US
i agree as well
US
yeah i agree with all of you. it's just hard because there's so many people to feed so they have to make an "efficient" production line which can be harmful and unethical as well as hidden from consumer
US
Good point Alexandra
US
It all goes back to the choices each consumer makes, What I see as ethical might not be what you see but we must make our decisions and try to proactively make a difference
US
True!
EU
'so many people to feed' is a funny example, especially when it comes to GMO...in US most of the food goes for fuel production and animal feed to get meat.
US
For instance I was raised on a large beef cattle farm, I know that my animals are treated better than some humans however there are other cases that this doesn't happen. I just feel that sometimes the bad is shown to the consumer more than the good in the ag industry.
US
Thank you Christina!!! very true point.
US
I think it's good if the animals are treated well...but wouldn't it maybe be even worse to take away the life of an animal who has grown to trust you and love life than an animal who lives a miserable life and is better off dead anyways? just a thought..
US
also, the slaughterhouse is a horrible place no matter how humanely the meat is raised. just saying.
US
Hmm. That is something to think about
US
Once again, it all goes back to the consumer and what they feel is ethical.
US
Exactly.
US
left the chat.
US
It's also about educati
on and being aware
US
I agree Alex.
US
Thanks for chatting guys! =)
US
Thanks!!
EU
Danke!

Chatroom 12

US
Good Morning.
EU
Good afternoon.
EU
looks like it's just the two of us today
EU
Yes, where are you from?
EU
university of BOKU in Austria
EU
what about you

EU
?
US
Have we chat before? I dont remeber but your name sounds familiar
US
I am from UGA Athens
US
Yes, think just the two of us today, do you want to get startet?
EU
yes! and yes I think that we were thgether in the chatt last time as well
EU
first question:1/People are either 'for' or 'against' GMOs. .Do you believe that there is a middle ground? What can be?
US
Yes,
US
i can talk for myself
US
I am agree with GMOs but I am againts Monsanto totally hate monsanto but I think and I believe GMOs are good
US
what about you?
EU
i am more abainst it (tipically for an European)
US
Yes thats why I tought
US
and tell me why?
US
joined the chat.
US
joined the chat.
US
it would be interesting to hear your personal opinion.
EU
however, I think if one uses it the right way it has very positive effects as well
EU
I think we still do not know that much about the long term effects!
US
Honestly I'm kind of middle ground.
US
Kind of like alex said, I am technically for them, but I wish that there was more information out there about them
EU
and I red several papers about the influence of GMO on bees and other useful creatures
US
What did you find out about the effects on bees?
US
And the other creatures that you mentioned
EU
well... bees die of several things which come from using GMO
US
Such as?
US
I have never heard of information about this. I know bees can obviously be eaten and also die from stinging things.
EU
one hears so often that you need less pesticides if you use GMO, but mainly one does not!
EU
that kills bees and also soil organisms
US

We have a student in another class who has honey bees. He claims that the pesticides and chemicals that his neighbor used on his cotton caused his bees to die. They would do and pollinate the cotton and come back to the hive and spread it to the others. I dont have any more information on it I have not looked it up myself.
US
guys if you find information about
US
please send it over her I would love to see that and read about it cause I believe can be true.
US
I'm looking up something right now about it. This is interesting. I had never heard about this before.
US
I had never heard about it either until a fellow student brought it up during class.
US
when I was doing my undergrad in Zamorano University in the greenhouses when they were ready to spread pestices, the supervisor used to take the bees boxes out just in case.
EU
the articles I red were mainly in german newspapers.
US
so I am wondering that there is something true about it.
US
Interesting. Thanks for bringing that up Franziska.
US
Since I think we have answered question one, Alex, do you want to move on to the next one?
US
I think yes.
US
2/ Consumers accept medical GMOs but refuse GMOs used in food and agriculture. What drives that paradox?
US
That poses a question. What exactly are medical GMOs?
US
from my point of view, I think is because medicine is something that this is a good question I would say there is a big difference in the way that medicinehas been on the market longer thatn GMOS so thats why Medicine with GMO is more accepted and sometimes people does not reallize there is GMO in the medicine they just think is quimicals
US
Nevermind. Haha.
US
joined the chat.
US
well any medicine that comes from an GMOs
US
I know that insulin is one of the main
medical GMO.
US
It really is a paradox
US
insuline
US
is GMOs
US
yes you are right Roseana Insuline is GMO
US
Honestly in my opinion the only way the medical field can improve is through the use of GMOs
EU
cancer and the HI-virus can be diagnosed with GMO also earlyer! but do not ask me how
US
And also Alex I agree with you, many people probably do not realize that there are GNOs in medicine
US
the tPA for heart attack or stroke is also GMO
US

from example in Central America where I am come from , i am pretty sure people who use insulin do not know is GMo
EU
yes! I think so to! people do not know about it
US
I wonder what would happen if more people did?
US
Would the "non injection" movement grow?
US
Would people choose to suffer rather than use the innovative medicine that could save their lives and cause less damage in the long run
US
?
US
You would think that they would start to protest against it like they have the GMO food, but for some it would be a life or death situation. Would some go as far as dying because they are refusing GMOs?
EU
the risks I heard abour: you use the animals protein for GMO medicine and because its not ident to the humans protein it can couse trouble
US
perfect,
EU
next question?
US
guys lets move to the next one for the time
US
3/ Consumers want labeling in order to exercise their freedom of choice. Who is absorbing the cost?
US
I think there should not be anymore cost, in the sam label they can add, this product contains gmos
EU
difficult question!
US
I agree Franziska. It is difficult
EU
in Europe we already have a very strict labeling-system!
US
Something I mentioned in a previous talk before, I would want a better labeling system, but in my opinion that can not happen until there is more and better education about it
EU
I do not know how the europeans pay for that!
EU
Well, dont you think that the education and the interest for it (to know what that label on the food means) would come if there were labels on the food?
US
That was the question I was just about to ask you Franziska. I'm not sure who would pay for it.
US
I guess in reality the companies will have to absorb the cost, which is going to affect consumers
US
cause to continue making a profit, they would have to raise prices
US
I know in Europe, you have a more strict labeling system, but everything is more expensive
US
in any case companies will absorbe labeling it would not be that expensive.
EU
thats true! and when it is about money people want to spend as less as possible
US
Exactly
US
next question
US
4/ The public thinks -that GMOs are unnatural. What do you think???

US
4/ The public thinks -that GMOs are unnatural. What do you think???
EU
what costs a liter of milk in the US?
US
Like two dollars and something I believe
EU
in Europe it costs about 1,09 dollars (thats 1€)
EU
haha! thats funny!
US
Interesting
US
Actually take it back, I'm not sure how much a liter is, cause we use gallons for milk
US
A half gallon of milk is about $2
US
a gallon runs about 3-4 dollars some times more. there's around 4 liters in a gallon so $1.70-$2.00 would be about right I would think.
EU
the price I said was for one litre
EU
wow!
US
yeah
US
4/ The public thinks -that GMOs are unnatural. What do you think???
US
Honestly the milk here, it depends on where you go and what you get
US
I think they are natural, but of course inside the genetics has been modfied but still being as natural and same taste as other food.
US
it is just one part of the genetics that has been modified
US
Honestly I still feel as if they are natural
US
GMO is technically selective breeding in plants so I believe that they are natural. It's still natural genetics just selected to be put into another plant for the better.
US
I agree with Roseanna. I mean there are many crops that have been altered in slightly that we don't even realize
US
yet they are still naturally grown in nature
US
I mean the crops are still naturally grown
US
we just have 5 more minutes to go....
US
5/ Consumer demands "zero risk "in their food. How realistic is this ? What about the residual quantities of pesticides in our food ?
US
Not very
US
I mean too much of anything could be a bad thing. That's true for medicine, food, etc
US
I don't believe there is food out there, whether its plants or meat that is 'Zero Risk'.
US
Exactly
US

I think thee is alays the risk of residual things in the food, well organic maybe not cause they dont use quemicals
US
There are risks is everything you eat and do
US
but even then you have potential food allergens that are naturally occ
urring from those crops
US
that are organic
EU
of course it is! but I think the dangerous riscs are the ones we do not know...
US
That is also a good thought
US
I agree, we dont know risk, and there are many things that are on food that cause cancer.
US
there are many things in this world honestly that could lead to cancer outside of food
US
lets jump out the last one..... good comments everyone
US
we just don't know
EU
and I am afreight that we do not know about hte long therme effects of GMO
US
I wish we would have more time for this...
US
6/ Do you believe that in the future of GMO's? Do we need to spend more money for regulation or for improvement of the technology?
US
Same
US
But to move on to the final question
US
franziska your recent comment apply for the last question
US
6/ Do you believe that in the future of GMO's? Do we need to spend more money for regulation or for improvement of the technology?
US
Yes I believe there is still a future in it
US
in my opionion more research should be conducted for GMOs and if not lets use it in Africa and save lives.
US
I too believe we should be spending money for regulation and improvement
EU
I think so to! because it can be really useful
US
I don't see GMO's going anywhere. They could do more regulation on them if they wanted too. But I do see a future of GMOs.
EU
but one has to be very careful about it
US
B/c whether you agree or not, there are potential improvements out there that could result from the technology we have learned abotu GMOs
US
Yes caution is always best
US
But that's with everything we do
EU
right
US

There is always room and time for improvements in everything!
US
Amen!
US
guys good discussion all
US
was nice to talk to you all.
US
I am looking forward next chat session
US
many blessings
US
Agreed! Have a good rest of the day!
US
Same to you guys!
US
Bye!
US
left the chat.
EU
indeed! and for such a big thing like GMO one needs a lot of time! humans learn by making mistakes! I hope we do not make a very big one which cant be irreversed
EU
bye!!!

Chatroom 13

US
Hello I´m sorry forthe delay I had some technical Problems
EU
joined the chat.
US
joined the chat.
US
Hello! Georg and I moved in from chat 7
EU
hi everybody
US
Hi, it's Jasim and Adrien here, we also moved from chat 7. Let's start !
US
we discussed early for number 1 (People are either 'for' or 'against' GMOs. .Do you believe that there is a middle ground? What can be?)
US
We said that the middle ground are the people that who do not care to be educated
EU
any comments on that?
US
Yes it could also be people that need some additional prove and study on GMO effects to be convince.
US
Are we ready for the next question?
US
It´s also not that easy to be educated about that topic if you don´t study it. Just superficial knwoledge often leads to misunderstandings
US
People would have to go out of their way to educate themselves about it which is why I think it needs to be taught to the public because most people do not want to spend the time themselves to learn about something that they currently do not care for
US
so next question: Consumers accept medical GMOs but refuse GMOs used in food and agriculture. What drives that paradox?
US

Yes it's right Rachel but how can we teach people if don't want to ? By advertisement on TV ?
US
For the second question we think it is the same problem, people don't know that there is GMO in medical purpose.
US
I feel like that would not work because a lot of people switch in between shows for commercials. I would say have it in the class as part of a lesson. For the second question, I said because medical is helping they are more accepting of it as opposed to changing food that in some peoples eyes do not need to be changed
EU
and people "know" or have been told whats negative about gmo in food and agruculture products but in the medicine nobody talks about it or its not in the media like side effects or it not not discovered yet
US
yes another point would be that food is a daily concern for everybody when medicine is usually more occasional and not for everyone.
US
misunderstanding for GMO's will always be the problem regardless of what it is used for
US
are we ready for question 4?
US
Ok so if TV is not a good way maybe a web campaining could work ? But who will support that unless the private companies ?
US
i feel like the best thing we can do to educate others is to have lessons in class where if we educate the youth then it will help educate the parents as well as the future generations
US
Jasim is coming from Bangladesh and his country population is highly populated and they have to ensure daily food supply before thinking about longivety?
EU
is there enough knowledge about long term effects and is it def. true it is bad for us or the environment? thats the thing a campaign need true informations and a neutral channel for giving informations
EU
otherwise it is a distorted attitude
US
I think the US has a different opinion on GMO's as compared to the European countries
EU
but we need a neutral opinion who shows the pros and contras to find a global conlcusion
US
Yes for sure. Europeans are mainly against GMOs
US
I do not see GMO's as a negative but as a positive. We have yet to see long term effects from GM products. We have a growing population and feeding them is possible with GM products
US
to answer question 4, GMO's are unnatural but it has so many benefits which i listed above
US
In France (where we are) publics are definetly against cultivation of GMO but they accept the cattle feed like as transgenic corn or soyabean from USA or Brazil
EU
it sounds a bit hard, but the goal of each country should be to feed their own citizen and not the "world". of course i do not want that anybody on this planet suffers from not having enough food!!! and the fact that with our food waste we could feed easily everybody on that planet is insane
EU
and if gmo could help to solve that why not but with the side effects for the environment it is not the right way
US
but it´s not possible for every country to feed their citizen
US
especially not regarding a balanced nutrition
US
Rachel this is your personnal opinion but the "world" can also be feed without GMOs according to other people.

EU
it is definately. stop importing fruits and stuff in seasons from other countries and buy the food which is given u by nature in your country
EU
and when u buy your own products its helps the farmers, lowers the prices
US
We agree with you George about countries that should think more about their own population but does this people are ready to stop eating banana for example...it's not sure.
EU
we need to stop producing corn for ethonal production and stop feeding it to animals which we sell to other countries
US
but if nobody imports anymore there can´t be anymore export and then the price in the country will decrease nd the farmers get less money for their work
EU
i do not htink so but a farm with 20000 acers is able to produce more than corn and canola for example.
US
we should not forget that some countries cannot feed their population like some small devel
oping countries over populated where they need to import to survive.
EU
but the other way around u would buy regional products and consume more from your farmers
US
i completely agree that farmers need to move away from corn but with the subsidy they are given, it is hard to compete
EU
sry i think becasue of my staements we are moving away from gmo and the questions :)
US
but it´s also an interensting discussion ;-)
US
is everyone okay if we move to the next question?
US
yes
US
Consumer demands "zero risk "in their food. How realistic is this ? What about the residual quantities of pesticides in our food ?
US
which is not unrelated because if GMOs could for example help some countries to produce crops that are not
yet been grown in their countries. It could help for self suffisance
US
There will never be completely 0 risk because everything has a risk
US
organic foods can still use organic pesiticides
US
yes I´m agree with that. and I think consumers just get more and more educated and thats why they get more feared of everything
US
Consumers don't know where the food is coming and the risk can come ei
ther from GMOs but also from contaminated soil, fungus or virus development in the product and many other sources
US
the environment will still be changed in a way because of the way humans are constantly altering it
US
and in USA organic plants can also be GMOs
US
Sorry to come back on developping countries but some of them don't care too much about risk but only about having enough to eat.
EU
i worked for a company who trades fruits, vegetables and spices and tea. we controlled 60 % of the material in a laboratory of the risks we know about
US

I do not think that USA organic plants can be GMOs since they are organic and the GMO companies would not spend their time on it
US
so we all agree that it is not possible to have 0 risk, correct?
EU
that costs a lot of money and time. so 40 % of it we do not know anything about it and thy could harm us. so we are depending of our producers in the spezific countries that they do their job properly
EU
it is a trusting business based on profit
US
Right George, we should have more analysis on Tthe residual quantities of pesticides and their toxicity first because it can be prove easily
US
money controls a lot of things and makes people blind to other things
EU
but than the prices will increase and nobody wants to pay that...
US
which leads us to our last question: Do you believe that in the future of GMO's? Do we need to spend more money for regulation or for improvement of the technology?
EU
the clue is to be sure about the quality of the products in the producing countries by controlling the producers and showing them the quality standards we need by law and want in our country.
US
Yes of course, world always go forwar with new technology and if GMOs is not the right solution we will need alternativ techniques like cisgenesis.
US
I say that we need to improve technology and not get rid of it completely
US
I think yes GMOs have a future. Especially reg
arding Disease resistances they are really important
EU
jasmin, could u explain me what cisgenesis means?
US
if we improve technology we are able to catch the negatives or bad effects it may cause
US
Yes George but in France farmers already have a lot of constraint on their cultivation way which is leading to a decrease of efficiency and some dead end. Cisgenesis is the transfer of genes into a variety from a relative species.
US
yes but for this there hast to be more investment and mor experience and that you only can achieve if people start to accept (in Europe)
US
Cisgenesis is usefull for disease resistances transfer from wild relative species which is usually taking 20-30years by onventional way depending on the species
EU
thanks jasmin, and who can do that? farmers or a laboratory which u need to pay
EU
sounds very interesting and i never heard about it
US
so in a sense its kinda like hybrids?
US
I would say a breeding team with a breeder that really the species and a laboraty able to do that.
EU
and where is the differents between gmo and that?
US
The problem of in this technic is that you use nearly the same as transgenesis (use of agrobacterium tumefaciens)
US
so in a sense its more natural?
US
yes

US
our time is up: is there anything else yall would like to say?
US
Yet it is considered as a gmos but from our point of view regulation should create different group according to the technic used.
US
Thanks everyone for this chat and hope to see you soon ! Have a good day
US
left the chat.
US
Bye!
US
Bye
EU
bye thanks everybody

Chatroom 15

US
Sure, lets go! So do you think there is a middle ground on GMO's
US
joined the chat.
EU
i don't think there is, no. people who have any kind of opinion on gmos are very passionate about those, and it's hard to discuss the topic because of this
EU
hello logan!
US
Hi
US
Hi Joel!
US
I agree. People are either for them or against them, and a lot of that depends on where you are from and how your country views them.
US
Hey Logan!
EU
yes, absolutely, we saw this in the video conference too i think
US
joined the chat.
US
Hello
EU
hi!
US
I think that there may be a few people that could care less either way, and a few people that are completely unaware of the debate all together, but i agree with you too, most people are very passionate in their stance with GMOs
Joel.Smallwood:
Hey Oluwatoyin! Welcome!
US
Thanks
US
Where are you from Oluwatoyin?
US
I'm so sorry I had difficulty in getting to the chat room last time
EU
no problem, you're here now! :) what do you think about the first question?
US
I think there are a lot of middle ground on GMO's
EU

really? do you know people who can talk about gmos without arguing only for or only against it?
US
The influence is based on both the economic, political and social status of people in dealing with which side to be
US
I do! I know a few that could care less either way
EU
well yes apart from those who don't care at all
US
How do you guys feel about the GMO issue as a whole?
US
Most people do not care like Fruzsina highlighted, so far they can get what they want whenever they want it
US
I personally think that GMOs are revolutionary, and are a great way to provide more yeild with less input.
EU
i think in the long run, a completely gmo-free production is not realistic, but that's just my opinion. also i think it's different to ask "should the eu cultivate gmo crops" or "should gmo be grown anywhere in the world", and the answers can be different too
US
Not just yeild, but GMOs help with a variety of things
US
Depending on the genes inserted
US
My overall feelings about GMO is that, GMOs should be protected, environment and
nature should be protected so far the effect of GMOs will solve the problem of food insecurity and spare food for the next generation and beyond
EU
can we move on to the next question?
consumers accept medical GMOs but refuse GMOs used in food and agriculture. what drives that paradox?
US
In respect to health (medical GMOs), of course, a lot of people don't place close attention in regards to life and death decisions: Most people have no choice in such situation, they want to live by all means
US
Most people are unaware that a lot of medical products contain GMOs, but put in a situation where they are needed, the fact that they are GMO may be overlooked
US
Correct!
EU
i think firstly, people don't know much about gmo in medicine, and secondly, they are more accepting towards medicine being developed in labs with the help of thechnology, while they look at food as something that should be natural
US
I think its simply a lack of education. They probably have no clue that medical products contain GMO's (such as Insulin). They hear the horror stories about clones and eating genetically engineered food and automatically think that we are eating some sort of horrible cancer. Most people have no idea what they even are or how they are made.
US
I agree with you Fruzsina!
US
What do you think about someone dyeing of diabetics and the only alternative is insulin? Even if the person is a professor of ANTI GMOs?
US
I think that they better take that insulin!
US
I think some are educated yet, they were influenced by religion and some other political propaganda
US
It would be fairly ignorant to die instead of taking GMO insulin
EU

i think they will doubt that is honestly the only alternative and try to find a different solution :D but yeah i agree, they will probably take it in the end
US
Every bit of insulin that is prescribed is created using recombinant DNA (GMO's). I think that it is their choice if they want to die or not.
EU
i agree with oluwatoyin, i think gmo is just as much a political issue as it is an agricultural one
US
That's exactly my view: IGNORANCE! The word itself is a disease: when you ignore the knowledge that will probably save you!
EU
this is a very interesting discussion, but we nee to get through the questions! :) so next question: consumers want labeling in order to exercise their freedom of choice. who will absorb the cost?
US
The companies that are producing the GMO products have to pay for the labeling in order to deregulate their new technoligies
US
I think the cost will go back to the consumer, either through higher medical prices or higher taxes. The consumer is always the one who takes the blow. It would be the same with labeling.
EU
this is fairly easy - if they decide everyone has to label if they want to sell something, then it will be the companies making the products that contain gmos
US
There are a lot of GMO products that do not get labeled because the smaller companies that develop them cannot afford a 100 million dollar labeling fee
EU
but if it was the only legal way to sell products, they would have to.
US
exactly, the GMO products that do not get labeled are not on the market, they are simply unused technology
US
I agree, then it becomes a political issue of the definition of a GMO and what would be considered worthy of a label.
US
its a shame, because a lot of great GMOs have been created, but are not available to the public because of affordability issues
EU
but i don't think it would be the consumers who pay the price - we just had a new labelling law instated at the beginning of this year in the eu that includes non-packaged items, and food didn't get more expensive
US
Who do you think is paying for it?
US
I'm a food science major and I
must confess to you that its so hard for me to check the food label or whatever label when I'm hungry or in need of solution to any problem, so far it is capable of solving it. GMOs product is more of profit maximization than been concern about the consumer. Most Non GMO products inscribed labels to their product so as to make more profit and compete effectively in the market. I don't think it makes much difference...
EU
I don't think labelling as such makes much of a difference either, people who want to buy gmo-free can look for the gmo-free label, and people who want inexpensive products will choose those no matter if it says "contains gmo" on it or not
US
I agree with that Fruzsina. So what about question 4? Do y'all think GMO's are unnatural?
US
Yes! Fruzsina, people will rather go for something cheap, much
and at least safe to certain extent
EU
joel, as to the new allergen labelling, it is the restaurants and the shops who have to pay for it, bc it's non-packaged food, but if it were packaged then like i said i think the companies making the products

would pay. also, big companies wouldn't really mind - they already have people hired whose only job is to monitor what country requires what kind of labelling and how the legislations change, it's just the smaller companies that would suffer under this.
EU
in my opinion this is a silly question, it depends on what you think of as "natural". theoretically you could argue traditional breeding and crossing and hybrids are already unnatural, or pesticides and stuff like that
US
People make the "unnatural" argument, but in reality nothing consumed in the U.S. is natural.
US
If the label is on the packaged GMO products only, what will be our concern for the fast food restaurant that uses GMO products in whatever they produced?
EU
oluwatoyin i think in the eu at least restaurants and such would be required to label too
! :)
US
It all came from natural products to begin with. Its not like humans have created a gene from scratch. Everything started becoming "unnatural" back during the domestication of plants and animals. Nothing we eat now is natural.
US
Natural or Unnatural? Any thing that has been altered from nature remains unnatural... all products uprooted from their natural source, to me remains unnatural and I think if we are all victims of this
EU
okay so we all agree on this one, the unnatural argument makes no sense! :) what about "zero risk" food? is it realistic that consumers demand this? what about the residual quantities of pesticides in our food ?
US
I agree with bot of you, these genes already existed, what is so wrong with inserting genes from one organism to another
US
The excess of a thing is a poison, this balls down to government regulation agencies which has already been adulterated...
US
To live life means that you are going to have risks. I have a risk that my heart will stop beating while I'm typing this sentence. It is impossible to have zero risk in food. Many studies have proven that pesticides do not go into the fruit of a plant, and other natural pesticides such as the Bt genes is only deadly to certain pests, which does not include humans.
EU
zero risk as such doesn't exist. to live means to be faced with risks - driving, travelling, walking down the street already bears a risk. you might get mobbed, run over... also, we have an immune system for a reason. you don't need to eat sterile food, a natural level of risk is healthy even
US
There is no Zero risk but at least, there is a tolerance level
US
i agree completely, Zero risk is unrealistic
US
Pesticides are tested in parts per billion, and they are applied in rates that are atleast ten times less than the safety requirement. The pesticides that are sprayed on our foods are more than safe.
EU
i agree that there has to be an agreed upon level that is still okay, but that brings with it a whole another set of problems (e.g. how high is too high, over what period of time, what to do if the levels are higher for a short while...) and once again people are misinformed about these things very, very often
EU
quickly, we should discuss the last question: Do you believe that GMOs have a future? Do we need to spend more money on regulation or on improvement of the technology?
US
GMOs are completely safe, there is no scientific evidence to prove otherwise, so putting money toward regulation would be a wasted and unfortunate effort
US

I do. I think they are required if we are to feed the growing population. I think that any money going to research or technology improvement would definitely be well spend. More importantly, I think advertising and education for the "common man" would be well spent.
EU
i disagree - i think most of the points that people have against gmos (cross-contamination, reduction of biodiverstiy,...) could be solved with more strict regulation
US
However, there is always room for improvement, GMOs are always being improved, We have a lab here at UGA where they are developing and improving GMOs
US
The future of GMOs is more than bright because GMO researcher are not relenting in their research and I think sooner or later, everyone will accept GMOs later
EU
i think advertising would be very difficult in the eu, our system works very differently from the us. there is basically no lobbying culture and the status quo is very much organic and natural
US
The same thing here in FAMU, we have a tissue culture laboratory that's using recombinant DNA in research work
EU
do you guys agree that organic agriculture, at its very core, means non-gmo?
US
I think that most people assume that organic includes Non-GMO when they are purchasing them
US
No, some of the organic agriculture uses pesticide
US
Pesticide and GMO are two different things
US
Fruzsina, I guess that is one thing I take for granted here: the ability to lobby and advertise just about anything. I think most people assume that is what it means. I tend to view organic as more of a "non chemical" agriculture. GMO's are of natural origin, so I could potentially have a different view then the norm.
US
But they do have "organic approved" pesticides
EU
well here in the eu organic does mean non-gmo, they are even thinking about going as far as to say okay, cows that produce organic milk can't be fed with gmo foodstuffs
US
thats pretty extreme Fruzsina!
US
I'm not sure if GMO variety crops can be considered organic here in the US or not. I know organic describes more of the pest management and fertilization techniques while the plant is growing.
EU
i know logan, especially considering that non-gmo soya
is so much more expensive than the gmo one, but the eu is very strict with these kinds of things