Proceedings of BledCom July 2002 in conjunction with Euprera Annual Congress, Bled, Slovenia
Published in 2003

# Image formation about genetically modified food & the communication by the companies involved

by Marita Vos Ph.D. and Iris Wassenaar M.A.

*School of Communication Management, Faculty of Communication and Journalism,*
*Utrecht University of professional education, The Netherlands.*

## 1. Abstract

Genetically modified food is an example of a complex issue that is connected to uncertainties. In the future we will probably encounter more of these issues in society and communication experts should attempt to find ways to communicate about these issues in a responsible way.

Desk research provided a theoretical framework that explains why it is so hard to communicate about this subject. Familiarity with this new technology, and with modern agricultural production techniques in general, is still low. There are different interests at stake and the various parties try to influence the framing of the subject. In risk-perception emotions play an important role.

An analysis of the field of power that has evolved around GMOs is given. A model is explained that links the company policy and the communication policy to the societal debate in the media, on the Internet and in personal networks. This is influenced by other parties in the field of power, journalistic standards and social-psychological factors.

An additional content analysis (with a limited scope) is done focussed on newspaper articles in The Netherlands and in the U.K. and comparing websites of international companies.
When companies are mentioned in free publicity this is often related to incidents or actions initiated by pressure groups. The companies put forward their point of view, but there is no real dialogue about the uncertainties mentioned by others.
The companies that develop genetically modified crops give much background information on their websites, whereas companies in the food industry and in retail are reluctant to participate in the discussion.

A more pro-active communication policy is advised to the companies involved. New crops with direct consumer advantages will need marketing communication in which the benefits are explained without evading a dialogue about uncertainties connected. Endorsement, communication via intermediaries, will be an important strategy in regaining trust of the publics.

## 2. Subject orientation

In this paper we focus on genetically modified food, a category of GMOs. GMO stands for genetically modified organism. To the DNA of this organism a gene is added that comes from another organism. This is done in a laboratory and the purpose is to improve the species. It is a form of biotechnology: analysing organisms to improve development and production of food and pharmaceuticals, also called ‘life sciences’ by the industry.

### *Pros and cons*

To understand image formation about genetically modified food it is important to know the advantages and disadvantages connected. For the audience the subject is difficult to overview. The differentiation in corps is great and the pros and cons of each category vary.

Some examples: Soy plants that need less insecticide for crop protection. Corn that makes its own insecticide against the corn borer. Strawberries with more taste, that stays fresh longer because you can put it in the refrigerator. Tomatos with flavonoles that prevent heart and vascular diseases. Crops with additional vitamin A for Asean countries where the lack of this can cause blindness. Corn that can grow in a very dry climate, or crops that endure irrigation with salty water because good water is scarce in many countries.

This all seems very advantageous to society. But there might be side effects. Modified plants could influence the natural vegetation. The insecticides that some plants make might also destroy other insects besides the harmful ones. Because antibiotics are often used as gene markers, people who eat the crops could maybe become resistant to some medicines. And there might be allergies caused by the slightly changed new plants.
So this clearly is a complex subject. To sum up the chances and uncertainties surrounding it:

| | ***chances*** | ***uncertainties*** |
|---|---|---|
| *biology* | + less insecticide, toxic materials | - possible decrease of biodiversity |
| *economy* | + harvest from dry or acid grounds<br>+ product quality | - dependence on crop developing companies |
| *health* | + medical options | - possible increase of allergies |

Next to the uncertainties mentioned there are also ethical objections to genetic modification. Some people think that humans shouldn't interfere in genetic materials. Classical methods also change genetic material, but this stays within the boundaries of a species. Now genes of another species can be introduced (ethically a bigger problem for animals and humans than for crops).

***To conclude this section***
The diversity of genetically modified crops makes it difficult for the public to overview the subject. The public wants to find out if genetically modified food is acceptable, but also in which forms and under which conditions. The complexity of the subject must be taken into account when deciding about the communication strategy.
However, decisions about the company strategy are even more important and especially the choice of the crops to develop. Most of the first generation genetically modified crops are either herbicide-resistant or insecticide-resistant crops. They were developed by chemical crop protection companies to increase their market share. These crops have advantages for farmers and for the environment, although the latter is being discussed. They do not have any direct benefits for consumers, however. Other kinds of genetically modified crops, for instance with medical advantages, are not yet fully developed.

The choice of the crops developed in the first ten years greatly influenced the pros and cons perceived by the public. If the companies involved want to stimulate public acceptance of genetically modified food, they will have to do more than communication alone. Communication advice in an early stage could have made this clear to the management. It seems, however, that this expertise is made use of fairly late in the process, when problems occurred. By focussing on one kind of genetically modified crops financial goals were met, but acceptance by the public for the category as a whole was damaged.

## 3. Theoretical basis

To clarify why it is so hard to communicate about genetically modified food, we looked for theoretical concepts in communication literature. Firstly, we think this can be explained because it is a new technology. Secondly, we must look at the process of image formation. Thirdly, risk perception must be taken into account.

### 3.1 New technology

***Familiarity*** with this new technology still is low. A study of 1999 shows that 21% of the consumers is aware of genetical modification, but half of them cannot mention any concrete example of a crop (Hiel, 2000: 24). Another investigation in the same year indicates that 40% can mention no advantages and 36% no disadvantages of genetic modification of crops (ibid). An American study shows that half of the respondents agrees with the statement that 'Normal tomatos don't have genes' (Email Nieuwsbrief Biotech, 37/2001).
How far should information about such a subject go? According to Achterhuis information is important, but insufficient. He suggests that a learning process is necessary for new technologies. Consumers should participate in decision making (Achterhuis, 2000: 78-79).

Knowledge of the new technology is limited, but this also goes for ***involvement*** with it. In fact, people became estranged to the production of food in general. Because of specialisation processes and an increase in scale in society, as well as in agriculture, fewer people understand how their food is produced (Bogaerts, 2001).

Nowadays, in a society of ***'information overload'***, people often delegate the societal debate to intermediaries. They notice the behaviour of scientists, industry, governmental and other public organisations (Grove-White, 2000). It's not the knowledge as such that counts, but rather trust. For instance, trust in the way retail organisations act with regard to these products.

### 3.2 Image formation

Image formation goes together with distortions of which people usually are not aware. Images consist of related associations in the brain, also called schemes (Vos, 1992:28). When GMOs are mentioned, for every individual a different set of schemes becomes active. When one of the associations is dominant a person will perceive GMOs in the light of this dominant association. This will 'frame' the person's perception. ***Frames*** offer a context to interpret information. Other parties involved will try to frame the subject their way, adding ***context*** to it to make people see the subject in this light (Hallahan, 1999).

Activists of Greenpeace arouse associations with danger by covering a field of genetically modified crops with plastic, dressed in white laboratory clothing. How a problem is presented has consequences for the way in which people attribute meaning to a situation and how they see cause and effect relations. Supporters and opponents of genetically modified food both might try to influence the public in this way. Pressure groups can be very creative in this respect.

The behaviour of biotechnology companies also caused ***labelling***, that is to say, they connected the subject to certain associations. They did so, knowingly or unknowingly, by the choice of the crops to develop. If the first crops used would have had clear medical advantages, less emphasis would have been put on possible risks for the environment and people's health.

Framing and labelling processes make the societal debate more emotional, influencing the way in which opinions and facts are presented. When forming an opinion people rely on friends and relatives. Interpersonal communication and rumours make public opinion difficult to predict (Van Ginneken, 1999). The issue of genetically modified food is complex, it has economical, technological, political and ecological aspects. This in general makes an issue difficult to influence (Ferguson, 1999: 205). It explains why the course of the societal debate about this subject is hard to grasp.

Many consumers have become more critical, but most of them are still quite open minded with respect to genetically modified crops. The majority is neither a declared opponent nor supporter, according to a European study (Grove-White, 2000). A Dutch study of 1999 about biotechnology has the same conclusion: 18% of the Dutch consumers is positive, 29% negative, 53% neutral and 1% undecided (VROM, 2000: 28). A study of the University Twente reaches a different conclusion: more than half of

the population rejects genetic manipulation, about a quarter is relatively positive, and a quarter is ambivalent (De Jong e.a., 2000). The latter study, however, is not only about crops, but also about genetic manipulation of animals and humans; this might explain why the respondents are more critical. According to a NIPO-study (initiated by the newspaper Volkskrant) more people accept genetic modification in crops than in animals or humans: 42% versus 13% and 4% (Nijland, 2001).

A European study shows that more than half of the Dutch people expect new technologies, such as genetic modification, to improve the quality of life. The acceptance of the new technology is much lower in Great-Britain. Genetically modified crops are rejected by 25% of the Dutch and 53% of the British people. In 2000 the Dutch were slightly more critical than before (European barometer study; Volkskrant, 1-9-2000). Many people lack a thorough knowledge of genetic modification, but the feel ***uneasy*** about the subject.

### 3.3 Risk perception

A risk is an insecure outcome. When people estimate a risk they don't take the facts for granted, but they add their personal interpretation. Gambling can make people eager to win and cause them to take big risks. The prospect of a possible positive outcome blinds them and induces them to ignore less positive scenarios.

Risk perception is not a rational weighing of the pros and cons. In people's perception some elements tend to ***dominate***; which ones depend on the person and the situation. We tend to overestimate risks that involve situations we are not familiar with, that we cannot control or that we can blame someone else for (Cohl, 1997).
When we discuss the pros and cons of biotechnology, medical advantages can shift the balance. The first genetically modified crops lacked clear consumer benefits. As a result all attention went to the possible risks (Hiel, 2000: 23). It will take some time before products with direct consumer benefits are available on the market.

***Emotions*** influence risk perception. Fear makes people less open to information and mythological images can increase this emotion. Opponents of biotechnology talk about 'Frankenstein food' to arouse feelings of fear. This is strengthened by the fact that GMOs don't easily fit in with current categories (Achterhuis, 2000: 77). Also, trust in the safety of food has decreased, because of BSE, FMD and other affairs. Trust in the role of the government to control food safety has been damaged too.

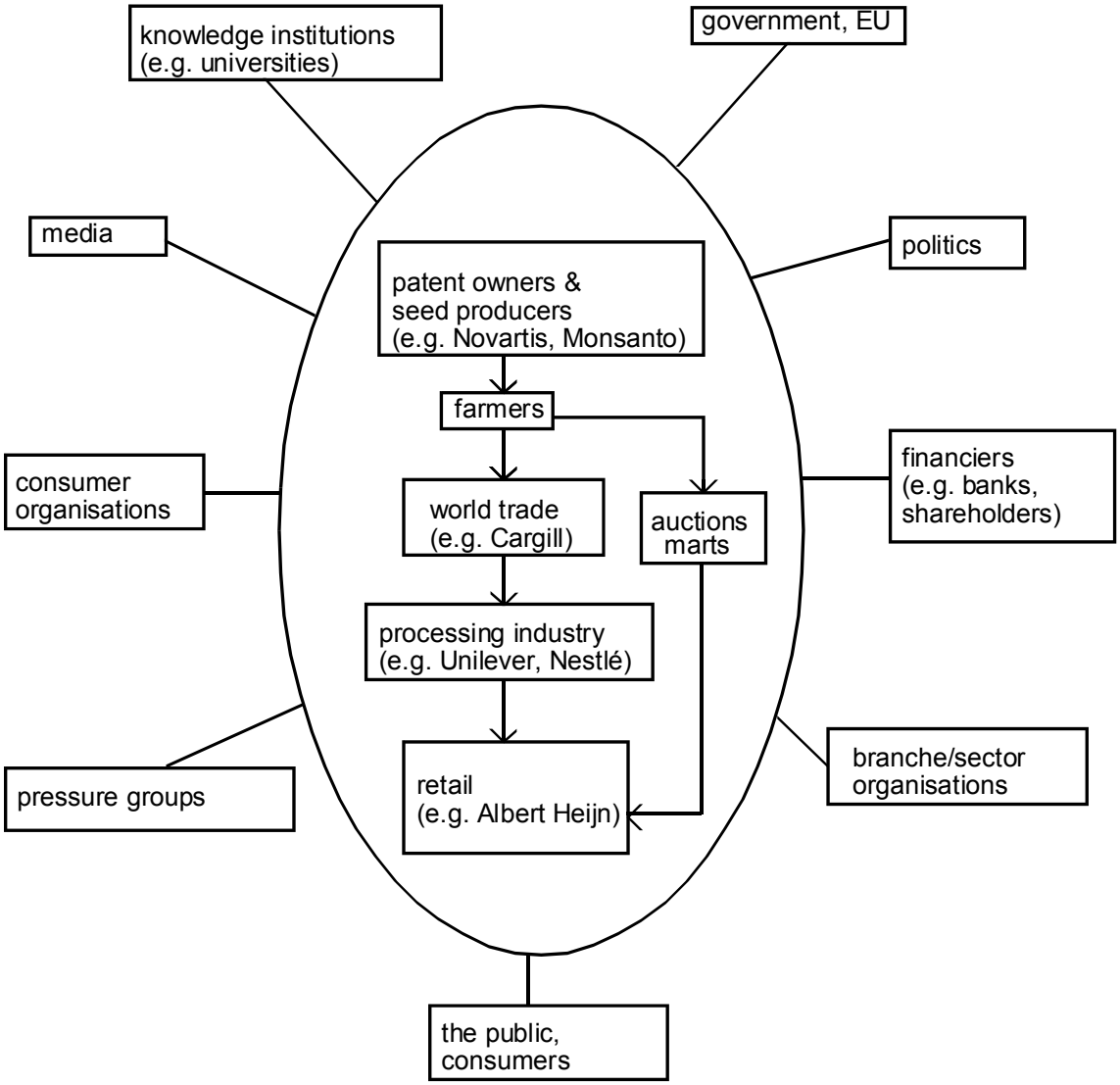
Hofstede points out that cultures have a different level of ***risk-avoidance*** (Hofstede, 1991). With a growing standard of living, risk-avoidance increases also; one who has more, stands to lose more. This might explain why experts in third world countries are more positive about the chances biotechnology offers than many Europeans. They need to increase food production and they are afraid that restrictions in rich countries will make it impossible for them to use the opportunities biotechnology offers.

The outcome of many decisions in life is more or less uncertain. And the complexity of the situations involved increases. When are risks socially acceptable? Should we make use of a new technology, knowing that we do not yet understand it fully? We may never be able to guarantee that there will be no side-effects at all.
Not acknowledging uncertainties, however, can cause loss of trust. Many people who provide information think they should take away uncertainties, but they had better point out and clarify the uncertainties involved (Grove-White, 2000: 17, 34).

***To conclude this section***
People don't know much about genetically modified food, but they feel uneasy about the subject. New technologies often cause resistance. Consumers don't feel involved in modern food production processes. This hampers communication about genetically modified food.
Image formation about the subject is influenced by framing processes. Opponents and supporters, both, add context to the subject in order to evoke specific associations. Emotions make public opinion difficult to predict. In risk perception some of the elements will dominate. Without clear consumer benefits the risks became the dominant feature of the first generation of genetically modified crops. To obtain credibility information providers should not avoid addressing the possible risks involved.

## 4. Analysing the field of power

To gain insight into the public debate we should analyse the ***field of power*** and the actors that play a role in it. The public understands nowadays, that information is usually not objective and therefore tries to compare information from different sources (Grove-White, 2000: 27).
In this case a number of actors is active, within the production chain as well as outside of it, often operating on an international level.




***Biotechnology companies***
The relatively quick introduction of herbicide and insect resistant crops strengthened the market position of biotechnology companies. The communication with the public was lagging behind, however. There were several incidents when traditional en genetically modified products were mixed during transportation. This led to negative publicity for the British-Dutch Advanta and claims as well for the French-German Aventis Crop Science (now part of Bayer that, by the way, didn't take-over the claims).

***Pressure groups***
The lack of communication by companies provided many opportunities for pressure groups. Greenpeace was very active in obtaining free publicity. In the Netherlands it ran advertisements: 'Your

cornflakes are crispy because we add scorpio genes to the corn'. The name of Greenpeace was not mentioned, but Novartis was (the agricultural division of this company now is part of Sygenta). The advertisements were judged misleading in many ways, the product didn't exist.
In 2001 Greenpeace published a black list of food producers and supermarkets that couldn't guarantee that their products were free of GMOs; a name was also mentioned when a company had not reacted to the questionnaire. Occasionally other pressure groups violated test fields.
Consumer organisations are very interested in the subject (Hofstra e.a., 2000). They criticise the unclear rules for admitting products on the European market, as well as a lack of transparency in procedures across Europe (Email Nieuwsbrief Biotech, 19/2001).

***Governments, EU***
In 1996 the European Commission granted permission for the import of genetically modified soy and corn. In 2000 producers had to mention the use of these crops on the product label if it amounted to more than1% and if it could be detected (exceptions were made for enzymes and food for cattle). In 2002 the rules for admission and product labels will be stricter. A European food safety institution will be set up. Some countries have a very restricted policy for new GMO-products; this caused a moratorium for new product admissions in the EU since 1998.

***Industry***
Numico was the first to refuse genetically modified ingredients. Unilever is in favour of the new technology, but it will only use it after the safety of the products is proven and when consumers can make a choice. Nestlé uses GMO-ingredients only in countries were the population accepts it: in the US but not in Europe. The industry is quite visible in the market and therefore has a vulnerable position. It is reluctant to connect brand names to this tricky issue.

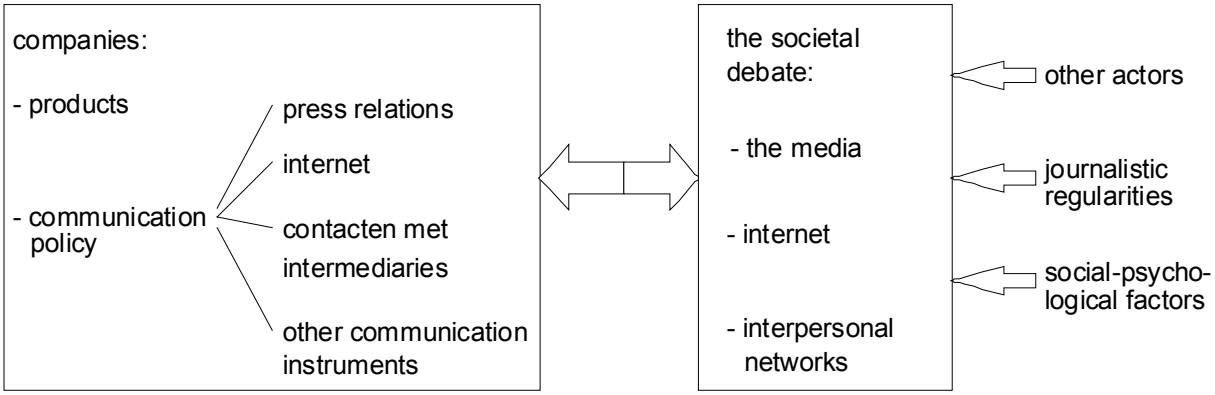
***Retail***
Retail organisations are important too, especially on a local level. Supermarkets are confronted with questions from consumers. Albert Heijn tries to give information from both sides and pleads for a free choice of consumers by means of product labels. The supermarkets state that they are not a party in the societal debate, they don't want to become compromised in the subject.

***Financiers***
In the Netherlands Rabobank introduced an ethical code of biotechnology. The bank doesn't want to finance companies that use genetically modified materials of animals or humans, and there are rules for companies that develop or produce genetically modified crops.
For biotechnology companies shareholders are an important target group. Some years ago agricultural biotechnological activities were quite promising. They were combined with pharmaceutical activities to share knowledge. Now these divisions are made independent, to make sure that the vulnerable image of the divisions is not a threat to the holding.

***To conclude this section***
The number of actors involved and the international scope don't make setting up a communication strategy easy for the companies. In the beginning the biotechnology companies underestimated the importance of communication with the public, primarily paying attention to their direct clients in agriculture. Other companies in industry and retail were rather passive with respect to this subject. The lack of communication with the general public gave pressure groups the opportunity to set the tone of voice in discussions in the media. Companies will have to evaluate their communication policies.

## 5. Content analysis

To gain a better understanding of the role of international companies in the societal debate about genetically modified food, we did a content analysis. We presume that companies develop a communication policy in which they decide how to participate in the ***societal debate***. The communication policy also is a starting point for advice about the company policy. Next to participation in the societal debate companies will communicate directly with clients, financiers and other target groups.




The pivotal question in the content analysis is: do the companies involved participate in the societal debate and how do they do this? Firstly, we will address the presence of the companies in the media. In this public arena the companies are not the only actors and they depend on the way in which their messages are presented by journalists. Secondly, we will look at the websites of the companies.

In ***newspaper articles*** we studied:
- which actors are visible in the public arena;
- which aspects of the subject and which arguments get attention.

The content analysis had a limited scope. The articles were selected in the newspapers : Trouw, Volkskrant, Financial Times and Independent (over a period of 3 months, September to December 2000). We focussed on the presence of the companies in the public debate and did not study the news coverage as such (Caljé, 2001; Oegema e.a., 2000).

In addition to this we did a content analysis of ***websites*** to find out:
- how much information the companies give about the issue;
- what kind of information they give and how they address uncertainties.

This content analysis was done for 9 websites of international companies active in The Netherlands and Great-Britain (in December 2000, and updated in May 2001).

Checklists were developed to facilitate the evaluation. We summarise the main results here.

### 5.1. Newspaper articles

In the period concerned the two Dutch newspapers had 25 articles and the two British newspapers had 27 articles that were mainly devoted to genetically modified food. These articles were studied further (Bruggeman e.a.; 2001). We will specify the actors, the subject aspects and the arguments mentioned in the articles.

***Actors***
In the articles usually at least two actors were mentioned. The subject is looked at from different perspectives (see table 1). Actors mentioned are mainly: governments/ politicians and pressure groups/ consumer organisations, followed by scientists.
Biotechnology companies are often mentioned related to incidents. Food industry and financiers are mentioned reacting to consumers.

Table 1.
***Actors in newspaper articles:***

| | |
|---|---|
| - governments/ politicians | 31 |
| - pressure groups/ consum.organ. | 23 |
| - scientists | 19 |
| - biotech companies | 14 |
| - food industry | 12 |
| - suppliers (e.g. banks) | 10 |
| - farmers | 7 |
| - consumers | 5 |
| - miscellaneous | 10 |

***Aspects***
We wanted to know which aspects of the subject were discussed in the media (see table 2).
The newspapers primarily wrote about health, environmental and scientific aspects. Economic aspects got less attention.

Table 2:
***Aspects of the subject:***

| | |
|---|---|
| - health | 19 |
| - environmental | 13 |
| - scientific | 11 |
| - economical | 9 |
| - ethical/ third world | 9 |
| - miscellaneous | 6 |

***Arguments***
The pros and cons presented in the articles are diverse (see table 3). The diversity of opinions might be difficult to interpret by the readers. Much attention is given to uncertainties.

Tabel 3.
***Pros often mentioned:***
- chances (third world, medicines)
- economy and scientific progress
- the subject is handled carefully

***Cons often mentioned:***
- health risks (mainly allergies)
- ecological risks
- division of welfare
- export problems

***To conclude this section***
The companies are often mentioned in a reactive way. Other actors mainly emphasise the uncertainties connected to the subject. Economical aspects get less attention.

5.2. Websites

To get an impression of the information offered, we looked at the international websites of: Monsanto, Syntenga, Aventis, Cargill, Unilever, Nestlé, Numico, Tesco, and Ahold. The companies cannot control the coverage in the newspapers, but the websites show how they want to be presented. Here we shortly summarise the results.

On the websites of the biotechnology companies Monsanto, Syntenga, and Aventis ***much information*** can be found. The information is not only meant for the clients in agriculture but also for a broader public. The tone of voice is usually rather ***persuasive***. Advantages of the new technology are explained. There is no direct response to points of criticism or uncertainties mentioned by others. The same holds for Cargill.
The websites of food industry and retail provide ***little information*** about the subject.

***To conclude this section***
Biotechnology companies are generous with information but don't go into the discussion about uncertainties. Food industry and retail hardly give any information about the subject, maybe because they don't want to be associated with the hazardous issue.

Evaluating the input of the companies in the media and on the Internet, we can conclude that until now the companies have had a limited impact on the societal debate about GMOs.

## 6. Conclusions

The public has ***difficulty to grasp*** the subject of genetically modified food. The diversity of crops makes the pros and cons difficult to comprehend. The first generation of genetically modified crops has ***no direct consumer benefits***. It seems that communication expertise is called upon late in the process, when problems occurred.

***Knowledge*** about the new technology is limited and people are uneasy about it. ***Involvement*** with modern agricultural production methods in general is low. In image formation ***framing*** is an important process. Opponents and supporters add context to the subject and evoke specific associations in doing so. Emotions influence ***risk perception***. Certain elements dominate in the perception; medical advantages for instance can shift the balance, but such products have not been fully developed yet. Now the uncertainties were emphasised. Information providers should not avoid the uncertainties connected to the subject.

The communication with the general public has ***lagged behind***. There were ***incidents*** when traditional and genetically modified crops were mixed during transportation. This gave pressure groups opportunities to influence the media agenda. The EU now has a moratorium for admission of new crops.

To regain consumer confidence biotechnology companies should focus on species with ***unequivocal benefits***, such as crops that offer medical advantages or crops that increase yield on dry or acid grounds. Claims must be supported by independent research. Reliable information on product labels is important too for consumers. Companies must evaluate their communication policy.

Most of the consumers still have an open mind concerning the new technology. This might give the companies a new chance to start a dialogue. They should, however, avoid the following ***pitfalls***:

a. the complexity of the information and the number of details puts people off;
b. increasing knowledge is not enough, the attitude of intermediaries matters more;
c. endorsement increases credibility;
d. uncertainties should not be denied but addressed properly without feeding feelings of fear;
e. incidents should be avoided, they form a magnet for uneasiness about a new technology;
f. media attention should not only be sought in a reactive way;
g. this is not the time for a restricted communication policy but for engaging actively in a dialogue.

***This case teaches us*** that communication about subjects that are closely related to risks certainly is difficult. We can understand this better by looking into: knowledge about new technology, image formation, and risk perception. An analysis of the field of power and the actors involved is of paramount importance, just like monitoring the news coverage. Chances can be found in a pro-active media policy and collaboration with intermediaries. The emotional aspects of the subject should get enough attention.

## Literature


- Achterhuis, H., Maatschappelijke acceptatie nieuwe technologieen; biotechnologie als monster. In: J.H.J. Spiertz e.a., *Biotechnologie; wetenschappelijk en maatschappelijk verantwoord*. KLV, Wageningen 2000: 73-80.
- Barsky, A. J. en J. F. Borus, Functional Somatic Syndromes. In: *Annals of Internal Medicine*, 1-6-1999.
- Bogaerts, G.J., Eten met beleid. In: *de Volkskrant*, 27-1-2001, R1.
- Bruggemen, F., J. V.d. Geijn, J.Renskers en M.Visser, *Genetisch gemodificeerd voedsel*. Scompany, SCOM Utrecht, januari 2001.
- Bruin, W. De, Er woedt een soort oorlog tegen de biotechnologie. In: *de Volkskrant*, 15-4-2000: 3R.
- Caljé, H., Pluriforme berichtgeving over milieurisico's, In: *Tijdschrift voor Communicatiewetenschap*, 2001, Jrg.29, nummer 1.
- Cohl, H.A., *Are we scaring ourselves to death; how pessimism, paranoia, and a misguided media are leading us toward disaster*. New York, 1997.
- Grove-White, R. e.o., *Wising up; the public and new technologies*. Centre for the Study of Environmental Change, Lancaster University, 2000.
- Ferguson, S.D., *Communication planning; an integrative approach*. Sage, London, 1999.
- Ginneken, J. Van, *Brein-bevingen; snelle omslagen in opinie en communicatie*. Boom, Amsterdam, 1999.
- Hallahan, K., Seven models of framing; implications for public relations. In: *Journal of Public Relations Research*, 11,3, Lawrence Erlbaum Associates, 1999: 205-242.
- Heselmans , M. e.a., *Tumult om transgenen; de introductie van genetisch gemodificeerde soja en maïs*. Schuttelaar & Partners, 1998.
- Hofstede,G., *Allemaal andersdenkenden; omgaan met cultuurverschillen*. Contact, Amsterdam, 1991.
- Hiel, R.T.R, Communicatie-uitdagingen ten aan zien van genetische modificatie. In: J.H.J. Spiertz e.a., *Biotechnologie; wetenschappelijk en maatschappelijk verantwoord*. KLV, Wageningen 2000:23-27.
- Hofstra, H. e.a., Voedselmoet weer leuk worden. In: *de Volkskrant*, 29-4-2000, 3R.
- Jong, J.M. de, e.a., Genetische manipulatie: maatschappelijke reacties en communicatieprocessen. In: *Tijdschrift voor Communicatiewetenschap*, jaargang 28, nummer 2 2000:165-180.
- LNV, *Agrarische ketens en biotechnologie*.Ministerie van Landbouw, Natuur en Visserij, 2001.
- Nijland, R., Planten manipuleren kan, dieren niet. In: *de Volkskrant*, 17-2-2001.
- NZO, *Het oordeel van de Nederlandse Zuivel Organisatie t.a.v. het vervoederen van GGO gewassen.* augustus 1997.
- Oegema, D. e.a., *De mediamonitor; zijn effecten van persaandacht meetbaar?* Samsom, Alphen aan den Rijn, 2000.
- Peters, H., *Mass Media as an Information Channel and Public Arena.* Franklin Pierce Law Center Home Page, 1997.
- Ragan's Interactive Public Relations. *Marketing Communications and Public Relations in the Age of Cyberspace*, 2001, www2.ragan.com.
- Ruler, B. van, *Carriere in Communicatie. Feiten en cijfers, perspectieven en ervaringen.* Boom, 2000.
- Siebendaich, D., *Grunzeug des Grauens?* In: Prmagazin, nr.10, 2000.
- St.Consument en Biotechnologie, *Email Nieuwsbrief Biotechnologie*. Den Haag, Biotech@consumentenbond.nl.
- Timmermans, H., "Als we ergens over moeten praten, dan is versluiering zeker niet de methode". In: *Chemisch Weekblad*, 30-8-1997.
- Volkskrant, Nederlanders positief over gentechnologie. In: *de Volkskrant*, 1-9-2000.
- Volkskrant, de, Negatieve houding publiek remt groei biotechnologie. In: *de Volkskrant*, 7-3-2001.
- Vos, M.F., *Het corporate image concept; een strategische benadering*. Lemma, Utrecht, 1992
- VROM, *Integrale Nota Biotechnologie*. Ministerie VROM, september 2000.