Farm Animal Industrial Platform *(FAIP)*

Farm Animal Breeding
and the Consumer

Arie van Genderen & Huib de Vriend

EC-ELSA project

4th Framework Programme for RTD

November 1999

Farm Animal Breeding and the Consumer

Arie van Genderen[1] & Huib de Vriend[1]

1. Introduction

In general, the breeding of farm animals is not exactly an issue that appeals to the regular consumer because it is an activity that is not clearly visible at the very beginning of a production chain. The quality of the end product, the meat, the milk or the eggs is of more importance to them than the way in which those products are produced. Discussing the future of farm animal breeding is even more out of sight. On the other hand, consumers all around the world have clear opinions about the large-scale introduction of genetic modification. Through the genetic modification of farm animals the farm animal breeders find themselves on the brink of a whole new era in their sector. It is exactly this development that could trigger a dialogue on farm animal breeding at large.
This creates an opportunity for more consumer involvement in a debate about the future developments and animal breeding techniques including genetic modification and cloning. Those subjects are the main areas of expertise of our organisation.

2. Hypothesis

Looking into the future is tricky business. Especially when it comes to issues about which one can only speculate. There is a lot of information available about the research that is going on in regard to farm animal breeding. Nevertheless, it is extremely difficult to predict which application will reach the point of large-scale introduction and how and when.
With the introduction of the genetically modified (gmo) soy and maize in several European countries, a debate is triggered on several aspects of farming and food security. Aspects which are not always directly related the technology of genetic modification. Questions that arise are on sustainability of modern agriculture, the role of seed companies, the use of pesticides, environmental and ecological safety, food safety and the possible allergy of gmo's. The genetic modification as such does create some concern with consumers and is the focus of the discussion at this moment for a relatively small, but rather noisy group.
Although genetic modification of farm animals for production purposes seems far away, the modifications aimed at production of medicines and organs already started and are gaining momentum. Very recently the set up of a flock of 10.000 sheep in New Zealand, for the production of a medicine in the milk, was announced. The sheep are genetically modified and cloned. And also in New Zealand they are planning to set up a herd of cows, genetically modified to produce milk that equals human breast milk. Also recently the company Genzyme announced the cloning of goats. And last but not least the genetic modification of pigs, aimed at producing organs for xenotranspantations, is coming up strongly.

[1] Arie van Genderen & Huib de Vriend. Consumer & Biotechnology Foundation. P.O. Box 1000. 2500 BA The Hague The Netherlands

It is not very clear whether those sheep, goats, pigs and cows are a special breed to be kept separated from the 'ordinary' animals or just plain farm animals. Further questions that will arise concern the wool, the meat and other products that can be derived from those animals. Will the animals be destroyed after lactation or when the organs are taken out? Or will the wool and meat get on the market? And if so, shall those products be labelled then? Is destruction ethically and morally acceptable to citizens and consumers, let alone animal welfare organisations? The same questions apply to all genetically modified animals to come, be it for medical, pharmaceutical or plain production purposes.

The hypothesis with regard to the future of farm animal breeding is that the genetic modification of farm animals will trigger the same type of broad discussion on animal production at large, as is the case with gmo crops. The additional ethical aspects with regard to animals will increase the complexity of the debate (see also the article of Stine Christiansen and Peter Sandøe).
This leads to the following questions:
How to define 'consumers';
is genetic modification of (farm) animals an issue that concerns consumers;
is it possible to distinguish between different purposes (plain production or medicines) of the modification;
is it possible to influence the direction farm animal breeding is taking through dialogue between the sector on the one hand and consumers on the other hand.

3. Methods

Assuming there may be a parallel with developments in crop production, it is interesting to take a closer look at the market introductions and the reactions these triggered.
Several years ago, Monsanto took the world by surprise with the Roundup Ready Soya Beans. All of a sudden the product was on the market, without any preliminary discussion or introduction. Moreover, it entailed a commodity product and the gmo-soy was not segregated from the non-gmo products, thus limiting consumer choice, to be used in a whole range of consumer products and without any adherent consumer benefit. At first the US government tried to block any discussion on segregation and labelling products that contained gmo-soy. A fight they lost. The perceived environmental benefit (using less herbicides) was not confirmed by an independent source. Finally, at the moment consumer and environmental organisations started to mobilise public opinion, the soy sector was very reluctant in starting a dialogue and supplying the Non Governmental Organisations (NGO's) with independent information. By the time it became clear that openness and dialogue was probably the best strategy, it was too late. The NGO's have lost all confidence in companies like Monsanto and other biotech companies. Which makes it hard to have an open, frank and reasonable dialogue on new applications and products.
On the other hand, having such a dialogue between the industry and the NGO's does not mean that all applications are to be accepted. Dialogue should be a two-sided sword and just trying to pursuade the NGO's to accept all gm-products and applications, as is the case, will not work.

The interesting point in this case is that even Greenpeace, one of the fiercest opponents of the soy, hardly ever speaks out on genetic modification of plants as such. Which does not mean that they have no eye for the inherent risks that genetic modification of plants could pose. What they do say in their campaigns is that the soy may pose health risks to the consumer (especially allergenicity), that the use of herbicides should be banned and that consumers should have a choice, which means segregation of the crops, labelling of the products and a clear supply of gmo-free products. Those are the discussion topics, or in other words 'the consumer concerns'.

In the next chapters an attempt will be made to get the right picture of the consumer, the consumer concerns and consumer demands (Chapter 4). The results of a number of consumer surveys were collected, studied and framed together. The most important surveys are mentioned in the References. They form the basis of this article.
In addition a written survey was conducted among 50 European consumer organisations and 10 animal welfare organisations. The results are presented in Chapter 5. Chapter 6 contains the general conclusions.

4. A mosaic of surveys

In this Chapter the results of various consumer surveys that were conducted on genetic modification of plants and several surveys which (partly) have genetic modification of animals as subject, will be discussed.
Consumer attitudes towards genetic engineering and breeding technologies are complex, often ambiguous and diverse. First of all, different applications can trigger a wide range of reactions. Secondly, variations in social and cultural background may also lead to adverse reactions. This means that talking about "the consumer" is not very fruitful. It is necessary to clarify how consumer groups can be distinguished and in addition try to find out how those different groups react to genetic engineering in general and genetic engineering of farm animals in particular.

4.1. Consumer typology

There have been many attempts to classify or categorise consumers. In this article we look at two different classifications. The Dutch professor Meulenberg from Wageningen Agricultural University. made the first one (Meulenberg, 1996). The second one was reported by Leslie Gofton et al in the "Studies on the socio-economic impact of Biotechnology (Gofton *et al.*, 1998).
In his report 'Market and Consumer', Dr. M.T.G. Meulenberg developed the following 'seven pure consumer types':

1. *The environmental friendly consumer:* has a preference for fresh products, from biological (organic) agriculture and has an ambivalent attitude towards technology;
2. *The nature and animal friendly consumer:* is interested in animal welfare, nature conservation and ethics;
3. *The health consumer:* is primarily interested in his personal health, goes for products with specific traits like low calories, rich in …, and health protecting or health improving agents;

4. *The convenience consumer:* chooses for snacks, ready to eat meals (microwave), easy and fast to prepare meals at home, take away meals or eating out;
5. *The hedonistic consumer:* prefers (exotic) specialities, delicacies, refined products with added value, eating out in the better restaurants;
6. *The variation seeker:* chooses for diversification in meals and ingredients, takes ready to eat meals as well as spends long hours in the kitchen to prepare a special dinner;
7. *The price conscious consumer:* does his own cooking, chooses ingredients with the best price quality ratio (in relation to his income).

If all consumers could be categorised like this, life would be easy for marketers and policy makers. In the practice there may only be a limited number of consumers that fully fit the description, whereas large numbers move between the categories at will. An additional complication is that incidents (BSE, swine fever, etc.) may create panic reactions amongst all categories and cause (often temporary) switches in categories.
Still, the categorisation can be helpful when assessing the possible impact of new products or technologies. At least one can more or less predict what the reaction could be from one or several of the groups. For example, genetic modification of pigs aimed at creating very docile, fast growing animals with extremely lean and very cheap meat, might appeal to the groups 4, 6 and 7, but definitely not to 1, 2 and 5. If the meat was also extremely low in cholesterol it might also appeal to 3.

For breeders, farmers and retailers it is important to know how big (in numbers) the various groups are and how big their influence is in the media and in society as a whole.
To assess that in detail is outside the scope of this article, but should be tackled when making decisions for future developments.

A different classification, used in the survey 'Studies on the socio-economic impact of Biotechnology' (Gofton *et al.*, 1996) is the triplet 'Triers', 'Refusers' and 'Undecided'. This study focuses on the acceptability of biotechnology in relation to food products, with special reference to farmed fish.
The smallest group they identified is those of the *refusers*. They will refuse any product made with genetechnology.
Slightly larger was the group of *triers.* Within this categorisation the authors found two noticeable typologies. The first is the 'enthusiastic' trier who is more predisposed to the perceived benefits of technology in general, and the belief that it has a role in economic and personal progress.
The second type of triers was typified as those with low incomes and traditional dependence on price. They have a rather fatalistic view of the world around them. But if the price is right they will try hightech products anyway.
The third and by far largest group is those of the *undecided*. Within this group, many influences will impinge upon the process of product acceptance. They assess the perceived benefits and risks of hightech products and compare them with alternatives on the market. But then, even when a technology or product is accepted, it does not guarantee purchase.

Combining the two systems is a bit tricky and should be read with some predisposition. The refusers are to be found in the groups 1 and 2 of Meulenbergs categorisation. And the groups 4, 6 and 7 could be the undecided. Groups 3 and 5 might try gmo products.

4.2. Some results of the survey 'Studies on the socio-economic.....(Gofton et al, 1996)'

In this study surveys were made (by telephone) in 6 European countries and in the pre-stage of the project focus discussion groups were set up in every country.
The outcome of the quantitative part, the telephone survey, corresponds largely with comparative surveys like the Eurobarometer (1997), see paragraph 4.6., and will not be discussed in this article.
In the discussion groups 'Method of Production' was one of the focus points. The outcome of the discussion showed that methods of food production are an important attribute for many of the discussants. However, despite the perceived importance of the production method to the discussant, it was not necessarily salient in the purchase decision. The production method often takes a secondary role to higher-level product attributes such as price and quality. For example, gene technology was generally perceived as the antithesis of organic farming. However, if organic produce does not meet expectations, the purchaser will look to non-organic products to meet their demands.
Nevertheless, many discussants expressed concerns that the existing foods they consumed were perhaps not as natural as they would like to think.

When it comes to the 'acceptance of genetically modified farmed salmon' the outcome of the discussions lead to the following percentages of 'willing' or 'not willing to try'.

Acceptance of GM farmed fish	%
Definitely will try	9
Probably will try	16
Might try	30
Probably will not try	25
Definitely will not try	20

Easily identifiable are the consumers who refuse outright any suggestion of buying any GM product (20%). These consumers reject the technology for reasons of perceived dangers to the environment or their own or societies health. They are the typical 'refusers'.
The other group, the triers (9%), represents a typical pioneer's characteristic. Although their choice could be based on insufficient information, they perceive the new technology or product as extending choice and thus are willing to give it a try.
The third group, the undecided (71%) forms a majority. In general, they have a weak understanding of the (gm) technology and uncrystallised attitudes towards it. According to the authors their attitudes are likely to be influenced by the nature of the modification and the nature of the product being modified and of course the price. But they could also be influenced by the refusers or the triers. For a small group the flavour is a very decisive argument. In their perception the flavour of wild salmon is superior and whenever available this will be their first choice (this corresponds with the 'hedonistic' consumer from Meulenberg).

The author's conclusion of this part of the study: there is a need for product by product research to identify the factors affecting consumer acceptability of gm foods.

A more general conclusion to the studies as a whole reads as follows:

1. There appears to be a well-defined group of straightforward 'refusers' in regard to genetically modified food products, including fish. This corresponds to a large extend with consumer types 1, 2 and 5 of Meulenberg.
2. A relatively small group of 'triers' may have a positive attitude towards genetically modified food products in general. Meulenberg types partly 4 and perhaps 7.
3. The majority is 'undecided'. Their attitudes and purchasing behaviour may easily be influenced by: other groups, price quality ratio, media attention, incidents, etc..
   Meulenberg types 4, 6 and 7

4.3. A small selection of other surveys

In 1995, Prof. Steenkamp of the Wageningen Agricultural University did a survey amongst Dutch consumers on the animal welfare issue (N=500). The question was: which aspects are decisive when buying meat.

From this survey he distilled the following graph:

Quality	%
Sensory quality	35.9
Easy to prepare	28.4
Speciality	21.6
Natural production (includes animal welfare)	14.1

He compared the outcome of his findings with surveys from Belgium, Spain and Greece. In this comparison animal welfare was down to place thirteen on a 17-point scale. Good quality, fresh, healthy and tasty were on top of the list.

Italy

In 1995 the RSPCA (UK) did a survey (N=1000) in Italy on the consumption of veal (European Brief, 1995). The main question of this survey was: *what the public in Italy thinks about veal production and consumption.* The answers read as follows:

- What are the main reasons for consumption: taste 32%, healthy 21%.
- Are you aware of the veal crate system: heard of it 22%, people concerned after getting the story 70%.
- General attitude towards animal welfare issues: acceptance of veal produced in more animal friendly manner 70%, prepared to pay a higher price 71%

France

The same survey (N=950), with the same questions, was conducted in France. The French answered as follows:

- Reasons for consumption: taste 51%, variety diet 33%, healthy 11%.

- Awareness of the veal crate system: heard of it 70%; concerned about it 35% (percentage did not alter after extra information).
- General attitude towards animal welfare issues: colour of the meat is important, under 50% are likely to change their eating habit.

Eurogroup for animal welfare

"Public attitudes in France, Great Britain, Spain, Italy, Germany on egg purchasing and labelling" (MORI poll, June 1998, N=1000). Below, some parts from the survey (Eurogroup for Animal Welfare, 1998). One of the main questions was whether the labels stood for battery eggs or free-range eggs. In fact they were all battery eggs. Whereas the majority of the respondents thought they were free-range eggs:

Confusion about labelling

Country	Label	Wrong answer/ Don't know %
Britain	Farm Fresh	81
	Good Country Eggs	88
France	Oeufs Fermiers	97
Germany	Eier Frisch vom Bauernhof	96
	Bauerneier	96
Spain	Heuvos Fresco	75
Italy	Fresche	76
	Extra	84

Willingness to pay more for free range eggs
(up to 35% more, except Spain, not more than 1-20%)

Country	Willing to pay more %
Spain	78
Germany	79
Great Britain	77
France	60
Italy	57

Survey summary:

- The public is prepared to pay more for free-range eggs.
- The labelling of eggs is unclear and causes confusion about the way in which the eggs have been produced.
- A majority in each country feels that eggs from battery cages should be labelled as "battery eggs".

The Eurogroup concludes that there is serious evidence that the public awareness regarding the welfare of animals in food production is increasing and that people are willing to pay more for free range, welfare-friendly produced eggs. The figures seem to support this conclusion, but it is likely that a fair number of respondents gave the political correct answers.
The Consumentenbond survey (Van Genderen, 1997) shows the following results: 47% of the respondents always buys free-range eggs, 19% regularly and 16% sometimes. The Dutch egg wholesalers claim that the market for free-range eggs is about 30-35% of the total sales. So the

conclusion is that a large majority of the consumers is potentially interested in free-range eggs, but only a relatively small percentage is actually buying them.

4.4. Consumer attitudes

In the survey "Consumer Behaviour Towards Meat" (Becker, 1998), the topic of attitudes was viewed in the light of the question whether it is possible to identify a correlation between consumer attitudes towards the origin of meat, animal welfare, the status of meat and so forth, on the one hand, and the intensity of meat consumption on the other.

In the interviews, conducted in six European countries, respondents were confronted with a series of general statements concerning food and meat, which they had to rate separately according to their choice. Below you will find a small selection of those statements and the answers.

The first statement was *"I would never serve a meal without meat for visitors".* With the exception of the Irish (big meat eaters) and to some extend the Italians, the respondents disagreed fairly strongly. The Swedish disagreed most strongly, which corresponds with low average meat consumption in Sweden. At the same time, the majority of the respondents in Sweden, Spain and Ireland agree with the second statement *"meat is an essential part of a meal".*

This is partial contradictory to the above mentioned outcome, but it shows that, although most consumers can imagine serving a meal without meat, many feel that meat is essential food.

II prefer to buy meat from animals which I know have been treated well", was the third statement. Nearly 90% of the respondents agreed strongly or slightly with this statement. Ireland and Sweden ranked highest (92%). Next came Germany and Italy (88%), Spain (87%) and finally United Kingdom (84%). More or less the same figures can be found for the statement, *"We should have more respect for animals".*

This brings the researchers to the conclusion that, since in each country, information on animal welfare is seldom available for a specific meat product, the respondents seemed to refer more to a general vague interest in animal welfare rather than to their actual purchasing behaviour.

4.5. The consumer and genetic modification of animals

Most of the surveys come to the same two conclusions: the general public is poorly informed about genetic modification (plants and animals) and tends to be very sceptical about the application. But, as Sandøe and Holtug (1998) write in their article on ethical aspects: "it would be a mistake to believe that the scepticism of ordinary people arises simply from a lack of factual knowledge". The Eurobarometer (1997) on Biotechnology underlines this statement with a simple graph which shows that in countries where the factual knowledge is low (e.g. Portugal), people are less concerned than in countries with a reasonable informed population (e.g. Denmark).

The survey "Publiek en genetische manipulatie (*Consumer attitudes towards genetic manipulation)* (Koopman *et al.*, 1998), contains two chapters that are of interest to this article. One chapter deals with the question which groups in society have a lot of influence regarding decisions about genetic engineering. First the respondents were asked which group had the most influence and secondly they were asked which group should have more influence. The results are as follows (first the percentage

what people expect and between brackets what seems more desirable): scientists 90% (65%); companies 75 (25); government 70 (90); media 40 (21); NGO's 28 (61); general public 20 (70).
It is quite clear that people think that scientist, the media and the companies have too much influence on the decisions. Government, the general public and the NGO's should have more influnce.
The chapter deals with the genetic modification of animals. In general, a mere 50% is against genetic modification. When it comes to the more detailed questions there is a slight shift. In favour of higher milk production is 17%, whereas 77% is against it. Production of medicines through the milk of genetically modified animals is acceptable to 41% and exactly the same percentage is against it (the rest don't know). The production of donor organs for xenotransplantation is favoured by 46% and only 37% are against. But, if animal welfare is at stake 82% is against.
People tend to 'vote' different when the benefit of the modification is adherent. Like the modification of animals for the production of humane medicines or in the future perhaps tissues and organs for xenotransplantations. Another Dutch survey (Smink, 1998) shows that a small majority (52%) would approve the modification of cows for the production of lactoferrins (medicine) through the milk. But the same trait just for the benefit of a higher milk production was rejected by over 75% of the respondents.

The Consumentenbond survey (5) amongst 2.500 members (representative selection out of 650.000), shows the following figures (N=1872, 75%):

- g.m. of animals for medicinal purposes: 9% fully acceptable, more or less acceptable 35%, more or less unacceptable 19%, unacceptable 33%, don't know 4%.
- g.m. of animals for production purposes: 3% fully acceptable, more or less acceptable 12%, more or less unacceptable 23%, fully unacceptable 60%, 2% don't know.

In this survey the members were also asked which aspects are decisive when buying meat:

Decisive	price %	Freshness %	Housing of animals %	Killing mode %	Meat exterior %	Environm. aspects %
Never	6	1	39	64	1	34
Sometimes	25	3	42	24	5	43
Regularly	40	16	15	9	28	17
Always	29	80	4	3	66	6
Average*	2.9	3.7	1.8	1.5	3.6	2.0

*4 points scale: 1=never, 4=always
Freshness (3.7), exterior (3.6) and price (2.9) are clearly the most important aspects.

Interesting also is the question on factual knowledge:
do you know that…….

	Yes	no
Chicken feed standard contains medicines	47	53
From all chickens (free range and battery) part of the beak is cut off	48	52
Horns are cut away from all young farm animals (cows, sheep, goats)	37	63
Although forbidden, many meat animals are administered growth enhancers like hormones	91	9
Modern biotechnology is the same as genetic manipulation	64	36

4.6. The Eurobarometer (Eurobarometer, 1997; Durant et al., 1998)

The Eurobarometer on Biotechnology is probably the most cited report when it comes to assessing the impact of modern biotechnology (genetic modification) in the food production and the market. The Eurobarometer is periodically repeated, providing an opportunity to chart shifts in opinion since earlier surveys in 1991 and 1993.

A comparisson of the outcomes of the three consecutive Eurobarometer surveys shows that the number of 'optimists about the technology' is dwindling (Nielsen, 1997). In 1991 the percentage of optimists was 51%. The percentage of pessimists was 11%. In 1996 the percentage of optimists had

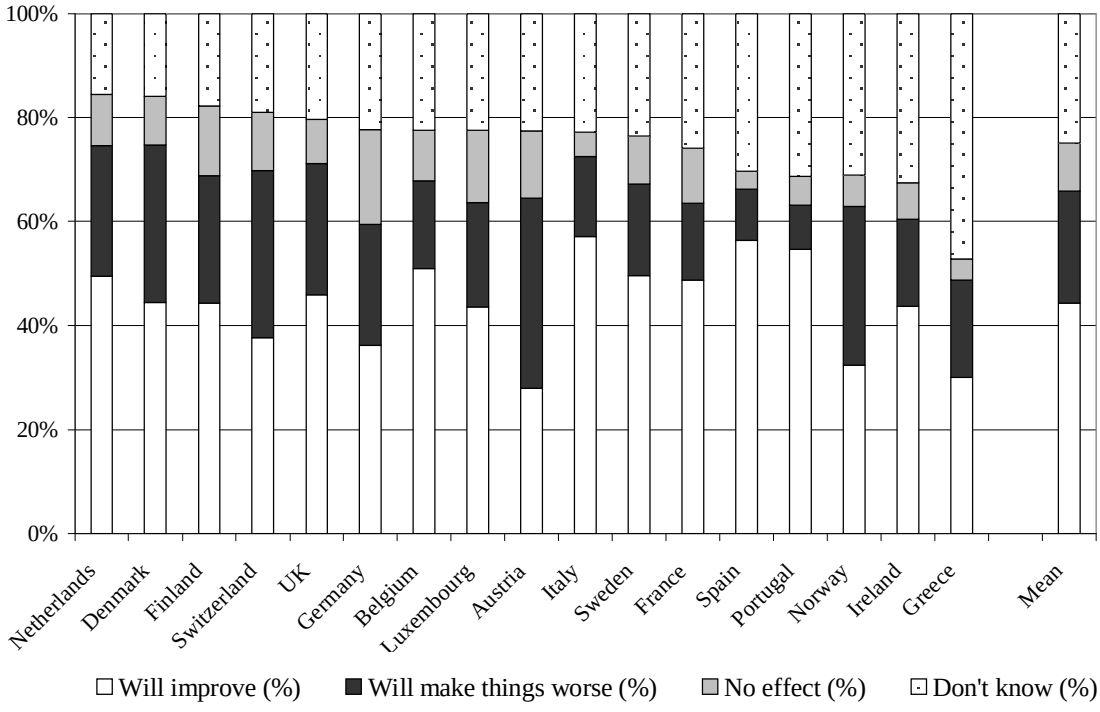


Figure 1: Results by country of the question: 'Do you think biotechnology or genetic engineering will improve quality of life, make things worse or will make no difference? (Eurobarometer, 1997)

dropped to 44% and the number of pessimists had grown to 21%.

An analysis of the beliefs about the effects of genetic engineering in general can explain differences in attitudes between countries (Figure 1). The results seem the contradict the idea that increased knowledge will create a more rational, thus positive attitude towards genetic engineering. There is even reason to conclude the contrary: the more people know, the less they seem to like it. Especially for applications in animals, agriculture and food, high levels of knowledge correspond with low levels of acceptance (Durant *et al.*, 1998). However, John Durant thinks it is not solely the level of knowledge that defines the general attitude of the public. Public expectations of biotechnology are generally highest in those countries where the technology has been applied the least, such as Spain, Greece and Portugal – and vice versa.

Nielsen (1997) thinks the large number of "undecided" (no effect, don't know) in all the European countries might represent realism on the part of the public, rather than ignorance (Nielsen,). An "intuitive" public understanding of "declining marginal utility" might explain the public expectations to biotechnology. The public seems to understand that the consequences of modern biotechnology are uncertain because they depend on the politics of regulation and on market attitudes to applications. It states*: "The classical argument that beneficial technological innovation will diffuse in society stand to be contradicted or falsified by a persistent and widespread mobilisation of opinion against the technology. And the antipathy may be all the more effective because of its dual nature.*

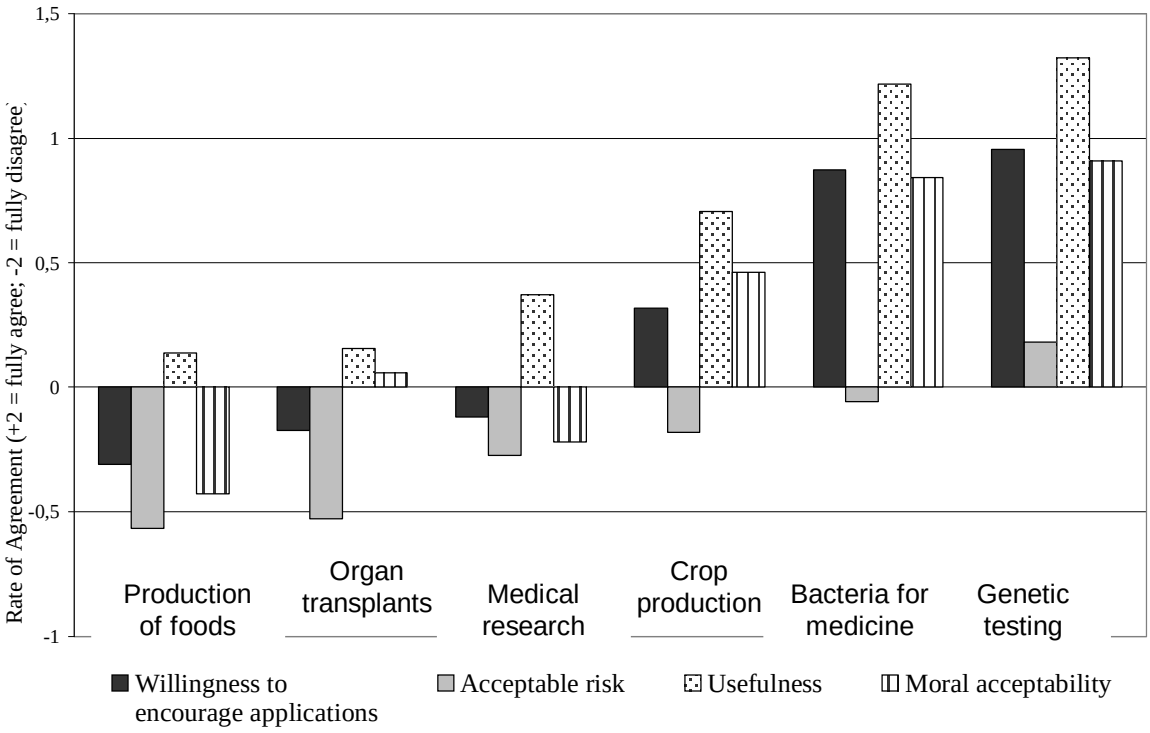
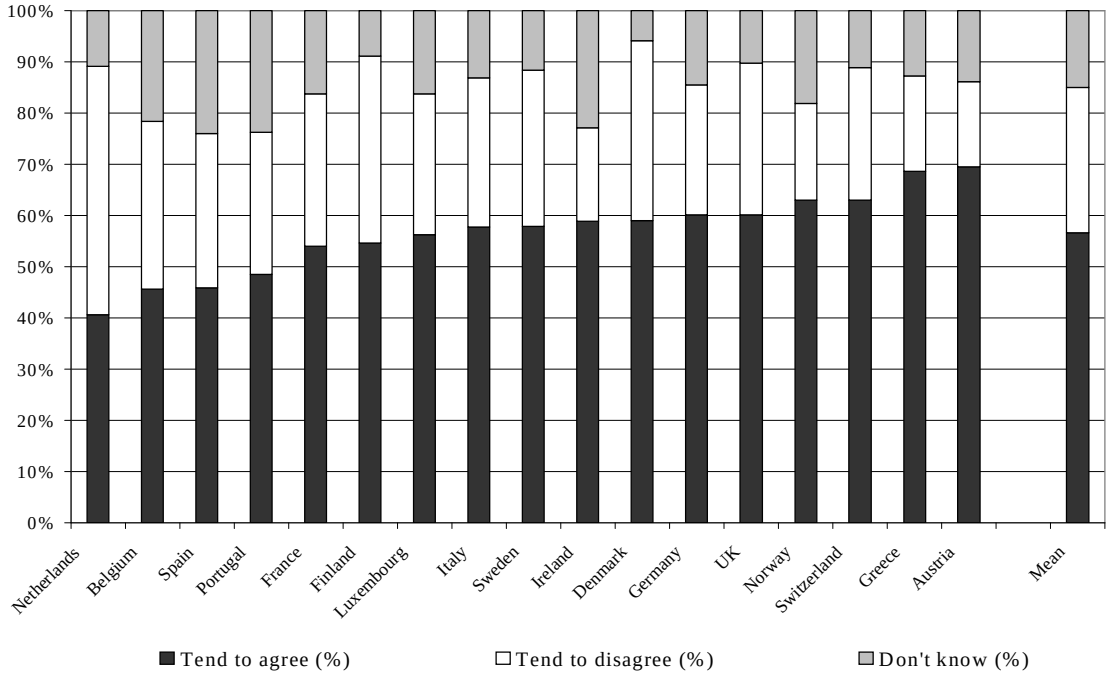


Figure 2: Responses to questions about encouragement of further development, acceptablity of risks, moral acceptability and perceived usefulness (Eurobarometer 1997, average for all countries)

There is a profound difference between preserving the old order, and hesitating in the face of future risks. Until those in biotechnology recognise that, changing public attitudes will continue to be a source of perplexity."



Another analyses of the Eurobarometer was made by a team of researchers working as part of a Concerted Action of the European Commission (DG XII) in 1997. They conclude that large sections of the European public seem deeply ambivalent about much of modern biotechnology. The prevailing focus of this ambivalence appears to be moral, a collection of anxieties about unforeseen dangers that may be involved in a range of technologies that are commonly perceived to be 'unnatural'. Their conclusions are best illustrated in Figure 2. The willingness for encouragement of further development of an application, which could be considered an indication for the level of acceptance, depends upon the nature of the application. The differences can be explained from a combination of the factors risk, moral acceptance and usefulness: Low perceived risk, moral acceptability and perceived benefits/usefulness correspond with more positive attitudes towards the applications.

A final general remark concerns the situations in which opinions tend to be quite polarised. Figure 1 shows this is the case in most countries: equal groups with outspoken positive and negative opinions and an often rather large group that has no clear opinion (yet) or does not know. The members of the most positive and negative groups are not very likely to change their minds. New developments, incidents, the media and opinion leaders can make the people that do not have an outspoken opinion shift to either the group. It is practically impossible to forecast the moment, the direction and extent of such shifts.

One question in the Eurobarometer survey focussed specifically on plant and animal breeding: 'Only traditional breeding methods should be used, rather than changing the heriditary characteristics of plants and animals through modern biotechnology' showed the following reactions.

Figure 3: **Responses to question: 'Only traditional breeding methods should be used, rather than changing the heriditary characteristics of plants and animals through modern biotechnology' (Eurobarometer 1997, by country)**

5. Survey amongst consumer and animal welfare organisations

Although the influence that consumer and animal welfare organisation have on the factual purchasing habits of consumers is limited, they certainly do have influence on the public perception in regard to meat quality, meat (animal) production systems and animal welfare systems. Through their lobbyists they also influence the legislative process. This means that it is important to breeders and producers of animal products to take into consideration the demands those organisations put forward in regard to the whole production chain (from feed to food).
The Consumer and Biotechnology Foundation (C&B) did a survey that consisted of two parts. The first part was made up with questions regarding the interest (consumer) organisations have in the subject of animal breeding, keeping of animals and the quality aspects of animal food production. The second part focussed on three future scenarios which were put forward to them.
On 10 December 1998 a questionnaire was sent out to 50 consumer organisations and 11 animal welfare organisations. The questions were related to a number of scenario's in regard to the future of farm animal breeding. On January the 7th 1999 a reminder was sent to the same addresses.
On the 3rd of February 1999 13 completely filled out questionnaires have been received. So the score is 21%.
The questionnaires received came from:

1. De Verbruikersunie, a Belgian consumer organisation
2. The Farm and Food Society, a British organisation of family farmers
3. Talis/Aequalis, a French animal welfare association
4. EKPIZO, a Greec consumer organisation
5. GAIA, a Belgian animal welfare organisation
6. Verein für Konsumenteninformation, Austrian consumer organisation
7. Kuluttajaliito, Finnish Consumer Association.
8. ADDA Association, Spanish animal welfare organisation.
9. OCU, Organizacion de Consumidores y Usuarios, Spain
10. CLCV, a French Consumer Organisation
11. Eurogroup for Animal Welfare, Brussels, Belgium
12. National Consumer Research Centre, Finland
13. Dutch Society for the Protection of Animals, Den Haag, the Netherlands

This ads up to the following conclusions:

- a questionnaire is perhaps not the best way to get information from this type of organisations, or
- the subject is of minor importance to those organisations.

5.1. Review of the answers Questionnaire part 1, general questions

The first question was about the involvement of the organisation in the subject of animal breeding and or the sale of animal products. Of the consumer organisations 2 are actively involved, 2 are not actively involved and 3 have some involvement. Of the animal welfare organisations 5 are actively involved and one answered with “some involvement”.

One of the most important general questions was: “Do you consider animal breeding and live stock production important consumer issues?” The answer was a clear “yes” from 12 out of the 13 respondents. This needs no further discussion. Next they were asked to be more specific on the various aspects of live stock production. The ethical aspects of animal breeding are considered to be important consumer issues by 4 consumer and 6 animal welfare organisations. Two consumer organisations thought it to be of some importance and one did not answer the question.

The question about the ethical aspects of animal keeping (factory farming) resulted in almost the same score, respectively 5, 6 and 2.

The safety of animal products is an important consumer aspect according to all respondents, as is the use of growth promoters. The irradiation of meat (or other animal products) and the genetic modification of farm animals are also important consumer issues. Strikingly, one consumer organisation thought both subjects to be of minor importance to consumers as long as the safety of the products was guaranteed.

Some conclusions from this part of the questionnaire:
The two consumer organisations that said ‘no’ to the first question are not actively involved in the subject, but nevertheless do test animal products en publish about it. One of the two organisations also answered ‘no’ to question number two, which is a bit strange as later on they do agree on most of the aspects from question 3.
The overall conclusion is that consumer and animal welfare organisations are rather unanimous in their answers. They do agree on the fact that animal breeding and live stock production are definitely ‘consumer’ issues, including the more specific aspects of animal production.

5.2. Reviews of the answers Questionnaire part two: scenarios

In this part of the questionnaire, after a short general introduction, the organisations were confronted with three possible scenarios for the future in farm animal breeding. In brief the scenarios read as follows:
A) conventional path: more or less a continuation of the current system, with emphasis on perfect animals and products for a reasonable price.
B) welfare path: emphasis on animal welfare, moderate production levels, but resulting in higher consumer prices.
C1) high tech path: emphasis on maximum production levels and efficiency, special product traits and fairly low prices.
C2) high tech path: emphasis on maximum production levels and efficiency, special product traits and fairly low prices, including the use of biotechnology and cloning.

The organisations were questioned in detail on all possible aspects and choices in respect to the three scenarios. To start with the scenarios, C1 and C2 are definitely rejected by 10 out of the 13 organisations. Only one consumer organisation is willing to discuss it to some extend. Two organisations did not answer this question. The Scenarios A and B are more or less acceptable. For Scenario A the score was acceptable 6, not acceptable 2, to some extend 4. Scenario B scored respectively 7, 1 and 4.

Which of the following breeding technologies are acceptable to your organisation?

1= no problem; 2 = acceptable; 3 = acceptable for product quality and healthy products; 4 = only acceptable for welfare and disease resistance; 5 = not acceptable; 6 = don't know.

Technique	1*	2	3	4	5	6
Reproduction:						
Artificial insemination	2**	4		1	3	1
Freezing of semen	2	4			3	2
Heat induction		1			5	4
Embryo Transplantation	1	1			6	3
Ovum Pick-up		1			6	4
In Vitro Fertilisation	1	1		1	5	3
Cloning: embryo splitting	1				9	1
Cloning: nuclear transfer	1				9	1
Sperm sexing	1			1	4	5
Embryo sexing	1				6	4
Monosexing (fish)			1		6	4
Inter specific hybridisation (fish)	1				7	3
Triploidisation (fish)	1				8	2
Cytogenetics (fish)				1	6	3
Selection:						
Gene mapping	1	3		1	3	2
Marker assisted selection	1	2		1	2	4
Genetic. Modified animals						
With DNA introduced from The own species	1			1	8	2
Transgene animals (DNA From other organism)					10	2
Transgene animals for Xenotransplantation			1		8	3

* = rating, ** = number of respondents

6. Discussion and conclusions

6.1. Discussion

In 'Agrarisch Dagblad' of 24 December 1998, an article was published under the heading '*Ballot paper or cashier ticket'* (Vullings, 1998). The major statement of author Jan Vullings reads*: "The public goes shopping with two hats on. As good citizens they like to follow the lamentations of the animal protection organisations about the so-called abuses in animal keeping. But as soon as this good citizen enters the supermarket, he no longer acts as critical consumer. He looks at the cashier ticket instead of the ballot paper. A double standard. And it is just this double standard that wreaks havoc on the farmer'.*

This article describes the problems the farmers have with the demands for safe, healthy, welfare friendly and environmentally sound products: *"Demands aired mainly by the consumer and animal welfare organisations. It is no problem to the farmers to deliver those products, but it has a price. And as long as the consumer is not willing to pay a fair price and keeps looking for cheap foods nothing will change".*

Apart from this ‘double standard’ amongst consumers it is obvious that the whole situation in regard to animal production systems is highly polarised, with a fairly large segment of the population ‘undecided’. The latter may, depending on incidents and media attention for the subjects, develop a more polarised attitude. This development will depend on a great number of factors. One factor is the influence groups with more extreme attitudes in the field of animal production systems may have on the debates and the legislative system. Another factor is the type of application and the perceived benefits to the consumer. Also the media could play an important role in the process. Highlighting incidents, the headings of articles and the general ‘tone’ could create a very negative image to new developments like genetic modification and cloning. On the other hand, a more positive attitude from well trusted sources like consumer and animal welfare organisations could create a more positive attitude amongst the ‘undecided’.

In Chapter 2 it was presumed that the genetic modification of animals will trigger a discussion on animal products at large (breeding, housing, product segregation, labelling) as an analogy with the introduction of gmo-crops.
The question is: does the studied literature support this hypothesis? To be honest, a clear yes or no is not possible because of lack of clear data. The reason for this is that most of the material was on the genetic modification of plants and the material on animals focussed primarily on animal products and not on the breeding of animals.
On the other hand, some surveys give at least some indication that there is reason for a cautious approach of the matter. The SWOKA survey (Smink, 1998) indicates that, at least in the Netherlands, a large portion of the respondents is weary about the genetic modification of animals for improved production traits. Only a small majority would accept the genetic modification if the benefit was clear, i.e. the production of life saving medicines for example. A result close to the outcome of the (also Dutch) Consumentenbond survey (Van Genderen, 1995). And in the case of the gm-farmed-salmon (Becker *et al*, 1998) a mere 55% of the respondents said that they would or might try the fish. Which leaves 45% saying no.
The weariness of large numbers of consumers will undoubtedly lead to a debate on the genetic modification of animals. But what shape this debate will get remains to be seen.
By parity of reasoning the question whether genetic modification of animals is an issue that concerns consumers (Question 2) is more or less answered. In addition, the results of the questionnaire amongst the consumer and animal welfare organisations show clearly that the genetic modification of animals is definitely an aspect that concerns them. And they are the organisations that may set the stage for a debate.
The question whether it is possible to distinguish between different purposes of the modification, can only partly be answered. Again the SWOKA and Consumentenbond surveys (Smink, 1998, Van Genderen, 1995) give an answer: yes, consumers do look at the type of modification and the purpose. If the benefit to society is seen as important, less opposition can be expected as is the case when this benefit is not so obvious or absent. And on basis of the Eurobarometer there is little reason to expect really fundamental differences in this aspect between the EU member states.

Question number 4, is it possible to have a fruitful dialogue between breeders and the public, is most difficult to answer. The soy-case has taught us that the introduction of gm-products, without any consumer benefit and no communication and dialogue, will backlash on the sector. On the other hand, no one can guarantee a smooth introduction of genetic modification of animals, for whatever purpose, by having such a dialogue.

From the questionnaire, how limited the response may be, we can learn a few things. First of all, as said before, genetic modification of animals does concern the consumer and animal welfare organisations. Which means that the average consumer will hear about it. Also, the animal welfare organisation, and to a lesser extend the consumer organisations, opt for scenario number two. This is the scenario in which the breeding is focussing on animal welfare and health aspects. Some consumer organisations are in favour of reasonable priced, good quality and safe end products and do not have such clear-cut ideas of how to reach this goal. Although, the genetic modification of farm animals does not have their preference. Remains the question whether the average consumer is prepared to pay the price for welfare friendly products.

6.2. Conclusion and recommendations

When introducing new, sophisticated techniques like genetic modification of animals, the following should be taken into account:

- the benefits of new product(s) or techniques should be evident and clearly demonstrated to the general public.
- there seems to be little public support for the genetic modification of farm animals.
- the genetic modification of farm animals for medical purposes seems to be more acceptable to the general public than for production purposes. However, a large scale destruction of gm-farm animals, or the use of carcasses from gm-animals for feed and/or food purposes may easily trigger a discussion on the sector as a whole.
- segregation of the products derived form gm-animals and labelling of the end product will give the consumer the opportunity to choose.
- general consumer concerns are to be taken serious and tackled with openness and, whenever possible the will to comply with those concerns (demands) in terms of R&D.
- in order to become familiar with those consumer concerns and to create a future scenario, which has support in society, an open pro-active discussion should be started at an early stage. The breeders should preferably base their policy on the outcome of a dialogue with the consumer and animal welfare organisations

References

Becker, Tilman; Benner, Eckhard; Glitsch, Kristina (1998) - "Consumer behaviour towards meat in Germany, Ireland, Italy, Spain, Sweden and the United Kingdom"- Dept. of Agr. Policy and Agr. Economics; Universities of Hohenheim and Göttingen.

Durant, J. et al (1998) - Biotechnology in the public sphere, Appendix 2: Eurobarometer 1996, survey results, Science Museum, London.

Eurobarometer (1997) – The Europeans and modern biotechnology. Eurobarometer 46.1. October and November 1996. EU Study EC DGXII. 87pp.

European Brief (1995) - "Veal and Animal Welfare – what the Public Think in Italy and France" RSPCA (UK).

Eurogroup For Animal Welfare (1998) - MORI Survey. Public Attitudes in France, Great Brittain, Spain, Italy, Germany on Egg Purchasing and Labelling.

Gofton, Leslie; Kuznesof, Sharron; Ritson, Christofer (1996) - "Consumer acceptability of Biotechnology in Relation to Food Products, with Special Reference to Farmed Fish" - EU Study EC DGXII, University of Newcastle Upon Tyne.

Koopman, B.; de Jong, J.M.; Gutteling, J.M.; Seydel, E.r. (1998) - Publiek en genetische manipulatie 1998: meningsvorming en informatievoorziening, Twente University (Enschede, The Netherlands).

Meulenberg, M.T.G. (1996) - "Market and Consumer" -, Wageningen Agricultural University (in Dutch)

Moses, V. (1998) - "Looking at the Biotechnology Consumer"; EU Study EC DGXII, King's College, London 1998.

Nielsen, Torben Hviid (1997) - Nature Biotechnology, Vol. 15 December 1997; "Behind the color code of "no". Based on Eurobarometer on Biotechnology, 46.1.

Sandøe, P.; Holtug, N. (1998) – Ethical Aspects of Biotechnology in Farm Animal Production. Acta Agric. Scand. Suppl. 29

Smink, C. (1998) - Maatschappelijke Acceptatie van genetische modificatie bij dieren – SWOKA (in Dutch).

Van Genderen, Arie W. (1995) - "Animal Welfare and the Environment"; study on behalf of the Consumentenbond. Consumer & Biotechnology Foundation (in Dutch).

Vullings, Jan (1998) - Stemkaart of kassabon? - Agrarisch Dagblad, December 24,1998.