

Considering consumers' food safety perceptions at the WTO –level: a survey-based analysis

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Abstract

The WTO frame for food safety policy follows the structure of risk analysis, i.e. consists of rules regarding the three components of risk assessment, management and communication. The analysis of the WTO rules and of the findings of closed disputes identifies a strong orientation on science as well as an approach to harmonise food safety standards by basing them on the standards of international organisations like the Codex Alimentarius Commission. This scientific perspective and the harmonising approach leave little scope for enforcing different levels of food safety between WTO members by help of Non Tariff Barriers. A theoretical overview on the limits of the scientific approach and on consumers' risk perception reveals why the WTO approach can conflict with consumers' needs for a food safety policy. A survey carried out in Germany for the case of GMOs identifies the relevance of the individual components of the risk analysis for consumers' trust.

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1 Introduction

The WTO faces increasing criticism and is one of the most controversial international organisations (STIGLITZ 2002: p. 21):

“[...] we have a system that might be called global governance without global government, [...] in which those affected by their decisions are left almost voiceless.”

More specifically this criticism regards deficits in transparency, in democratic legitimacy and control, in accountability and participation of civil society (ALEXOVICOVA, VAN DEN BOSSCHE 2006).

The SUTHERLAND REPORT (WTO 2004), written for the 10th anniversary of the WTO, is one reaction on this debate. It developed a set of recommendations to strengthen the acceptance of institutions by inter alia means of improved legitimacy and participation. The very recent opening of WTO disputes to the public in order to support public confidence in fairness of the system is an example for the implementation of these recommendations.

Confidence in institutions plays an outstanding role in the context of food safety policy because most food safety attributes are credence attributes: for such attributes asymmetric information may lead to inefficiencies and the New Institutional Economics identifies trust as key parameter for solving this problem (NELSON 1970, AKERLOF 1970).

This paper will contribute to the overall debate on how to increase public confidence into the WTO system by analysing the scope for integrating public demands in national food safety policy and the impact on trust in food markets.

The case of GMOs is selected for the empirical survey as this example of a new technology can highlight some problems regarding safety perception.

2 Risk analysis as WTO-frame for food safety policy

Food safety policy is ruled by WTO provisions only if standards are required as precondition for market access (BAGWELL, STAIGER 2002, p. 126). WTO rules on food safety can be interpreted as balancing the two objectives of (1) granting national sovereignty with respect to implementing a food safety level that deems appropriate to a country and of (2) avoiding unnecessary and arbitrary trade barriers.

The relevant rules of the WTO for food safety policy are structured according to the concept of risk analysis that includes three components: *risk assessment*, *risk management* and *risk communication* (CODEX ALIMENTARIUS, 2004, Section III, par. 1 – 41):

- *Risk assessment* comprises a quantitative or qualitative description in terms of damage and probability. It comprehends the four steps of hazard identification, hazard characterisation, exposure assessment and finally – based on the first three steps – risk characterisation.
- *Risk management* addresses the political decision on the accepted level of risk and on the choice of measures to implement this risk level. Risk management considers the results of risk assessment as well as other factors relevant within a society.
- *Risk communication* includes an informative and a participatory element: the informative dimension requires the submission of all relevant information on risk assessment and management decisions. Participation addresses the involvement of all interested parties in the risk analysis process.

This chapter identifies how the components of risk analysis are specified in the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS-Agreement) and how respective rules are interpreted in disputes.

2.1 The rules for risk analysis in the SPS-Agreement

The SPS-Agreement defines the margin for national food safety policy within the conflict of national sovereignty and free trade.¹ The scope for a sovereign national policy is limited by the following rules for the elements of risk analysis (JOSLING, ROBERTS, ORDEN 2003, p. 40 ff):

(1) Risk assessment

A risk assessment is required to justify national standards which deviate from international ones, an issue discussed below in the context of risk management. Specific requirements for an appropriate risk assessment refer to the recommendation to use assessment techniques developed by relevant organisations and to fulfil general requirements like the consideration of all relevant sampling methods (Art. 5.1 Art. 5.2).² The dimensions of risk that can be included in a risk assessment cover the traditional scientific dimensions of probability and damage amount that have to be considered either quantitatively by figures or qualitatively by description. The evaluation or damage amount covers adverse effects on human health as well as biological and economic consequences (Annex A 4).

The possibility to take into account a lack of scientific evidence e.g. for new technologies is considered in the context of allowing a timely restricted provisional trade measures by requiring the submission of a risk assessment at a later stage (Art. 5.7).

¹ The other relevant agreement is the “Agreement on Technical Barriers to Trade” (TBT-Agreement) adopted in 1994, which addresses all general technical regulations for products without a specification of food issues. The Tokyo Standards Code existed as predecessor already prior to that date since 1979.

² The relevant organisation for food-related risk assessment is the Codex Alimentarius Commission (CAC) which develops specific guidelines on how to conduct a risk assessment related to different risks, e.g. for microbiological risks (CODEX ALIMENTARIUS 1999).

(2) Risk management

The core rule for risk management in the WTO context is that members shall apply sanitary and phytosanitary measures only if they are based on scientific principles and sufficient scientific evidence (Article 2.2).

In order to achieve harmonisation WTO members shall base their sanitary or phytosanitary standards on international standards, guidelines or recommendations, where they exist (Article 3.1).³ If imports do not meet those standards, trade barriers are accepted. The CAC is defined as the reference organisation for food safety standards (Annex A 2-3).⁴ If members consider it necessary to introduce higher standards than the ones developed by the CAC, their justification is required by a scientific risk assessment that meets the described criteria (Art. 3.3).

If scientific evidence is identified as insufficient, provisional border measures may be allowed (Art. 5.7); however a risk assessment must be submitted at a later stage.⁵

In addition to the choice of a safety level, the SPS Agreement rules the selection of trade barriers for enforcing the level of food safety: the core principle requires *least-trade distortion* of a measure (Articles 5.4, 5.6). Scope for deviating from this core rule is conceded by the criterion of feasibility that considers the technical and economic burden of alternative non tariff barriers (NTB) (Art. 5.6). This principle offers individual scope for selecting a specific measure as feasibility may differ (1) among countries due to certain domestic administrative conditions and (2) among different issues of food safety that demand for specific measures of implementation.

Some specific rules exist for the management measures of approval, inspection and control (Art. 8, Annex C): the undue delay of import due to control and inspection shall be avoided and these measures shall not be applied in a less favourable way to imports compared to domestic products.

Regarding the relation between these two elements, risk assessment and communication, the CAC recommends their functional separation in order to ensure scientific integrity and to reduce any conflict of interest (CODEX ALIMENTARIUS, 2004, Section III, par. 9).

³ For many issues so far no standards have been developed. Because the standard setting process of the Codex Commission is lengthy there is an enormous potential for issues without existing standards. For conflicting positions on such issues findings of the dispute bodies may only be relevant as far as similar risks are addressed for which analogies could be drawn: this was the case for Melengestrolacetat as one of the six hormones at stake in the *Hormone Cases* for which the Codex Commission had not developed a standard but the dispute bodies nevertheless derived some conclusions (RUDLOFF forthcoming).

⁴ For other objectives different organisations are named as responsible: for animal health the International Office of Epizootics and for plant health the Secretariat of the International Plant Protection Convention are recommended (SPS-Agreement Annex A 2-3). This given list of organisations makes the SPS-Agreement different from the TBT-Agreement, where only general criteria for accepted standard-setting organisations are defined (TBT-Article 2.6).

(3) Risk communication

Provisions for risk communication in the SPS-Agreement regard only the informative dimension, i.e. the exchange of information on SPS measures between the Members: all SPS measures and related changes have to be notified in a reasonable time and consistent manner (Art. 7 and Annex B). Additionally, enquiry points have to be built up in order to facilitate the dissemination of information. (Annex B). Participation as an important aspect of risk communication is not addressed by the SPS-Agreement.

For the case of GMOs some specific recommendation on risk assessment and management exist (CODEX ALIMENTARIUS 2003), whereas no special guidelines are developed for risk communication although several studies emphasise the necessity for communication with respect to new risks (INTERNATIONAL COUNCIL FOR SCIENCE 2003, p. 44):

- Regarding risk assessment the progress in technology is considered by stressing the need of regular reviews of scientific information.
- Regarding risk management it is explicitly mentioned that uncertainties of risk assessment should be taken into account in management decisions.

2.2 Interpretation of the rules for risk analysis in WTO disputes

Out of overall thirty cases since the entrance into force of the SPS-Agreement in 1995 only a minority of eight cases has reached the final judgment of the responsible WTO bodies:⁶

(1) the *Salmon Case*, in which Canada accused Australia for having implemented an import ban on salmon that did not fulfil Australia's heating treatment requirements (WT/DS18), (2–3) the *two Hormone Cases* in which both the US and Canada complained against the import ban of the European Community on beef produced with growth hormones (WT/DS26 and WT/DS48), (4) the *Fruit Case* where USA complained against Japan for applying domestic quarantine requirements on imports of certain fruit products and nuts in order to avoid the spread of codling moths (WT/DS76), (5) the *Apple Case* in which the US complained about the Japanese application of certain quarantine requirements on imports to avoid the spread of fire blight (WT/DS245) and finally (6–8) the three *GMO cases* brought by the US, Canada and Argentina against the EU's approval and marketing of biotech products in 2003.^{7 8}

⁵ This option is discussed intensively in the context of the precautionary principle. Most often Article 5.7 is defined as being different from the precautionary principle due the terminally limitation and the need for scientific risk assessment at a later date (GUPTA 2000, SCOTT, VOS 2001).

⁶ The others either have reached the status of bilateral compromise or were suspended (RUDLOFF, forthcoming).

⁷ These respective complainants were all about the EU moratorium of 1998 on GM crops leading to a de facto import ban for GMO crops. Though the European legislation changed in 2004, some European Members States still ban GMO approvals (Austria, France, Germany, Luxembourg and Greece), an issue relevant still

Only the two *Hormone Cases* and the three *GMO Cases* are explicitly linked to issues on human health whereas the others refer to animal and plant health.

The analysis of closed disputes in the area of SPS-Agreement shows what elements of risk analysis were used as major arguments for findings and how the existing SPS-rules on risk analysis were interpreted. Table 1 summarises the findings related to the specific components of risk analysis:

- *Risk assessment:* The assessment techniques used by the defendants play a dominant role in all disputes and respective deficiencies were the major reason for condemning the defendant's measure as not being properly justified: Submitted risk assessments were often criticised regarding the insufficient evaluation of the likelihood of entry, of establishment or spread of a disease (see e.g. *Salmon Case*, Report of the Appellate Body, par. 134). Only in the two *Hormone Cases* insufficient scientific evidence was conceded and therefore provisional measures were allowed in these cases.⁹
- *Risk management:* In all cases the results of risk assessment presented by the defendants was a relevant issue to be evaluated. But only in the two *Hormone Cases* the assessment was used for the findings and was explicitly rejected as insufficient for justifying stricter standards as those recommended by the SPS-Agreement. In the other cases this requirement was excluded from the final findings as the risk assessment techniques as such were evaluated anyhow as inappropriate. Regarding the choice of a specific measure to enforce the chosen safety level, flexibility can be identified in the findings: economic feasibility was considered in all cases and was in most cases as well an accepted criterion to justify measures, even if they were not least trade distorting (e.g. import ban in the *Hormone Cases* and *Salmon Case*). For the *GMO cases* this argument was not used for the final findings as they were based on the control, inspection and approval procedures. The findings on these issues resulted in a condemnation because of the undue delays in the EU's approval system and therefore delays in market access.
- *Risk communication:* The dissemination of information between the members is an issue in the *Fruit, the Apple* and the *GMO Cases* but only the findings of the *Fruit Case* refer to this subject and both, panel and appellate body condemned Japan's deficits on notifying all relevant measures.

for the complainants. Additionally, the complainants accuse the EU of still having implemented a trade-distorting approval system even after the changes in legislation.

⁸ As the respective report of the panel decision on 7 February 2006 will not be published before June 2006 all relevant information is based on preliminary information of press releases (WADDINGTON 2006).

⁹ In the *Hormones Cases* this led to the allowance of the provisional establishment of the import ban for the restricted period of 15 months.

Table 1: Interpretation of risk analysis in findings of closed disputes¹⁰

Provisions of the SPS-Agreement			Dispute findings
Risk Analysis component	Core rule	Scope for flexibility	
Risk assessment			
(1) Appropriate assessment techniques	Use techniques of respective organisations (Art. 5.1, 5.2, Annex A4)	National parameters considered (ecological and environmental conditions) (Art. 5.2)	(-) Condemned assessment methodology in <i>all cases</i> . In <i>GMO cases</i> excluded from final findings.
(2) Precaution	Timely restricted provisional measures if justified by a lack of scientific evidence (Art. 5.7).		(-) Option rejected in <i>Fruit Case</i> because not all available information was obtained. (-) Option rejected in the <i>Apple Case</i> as scientific evidence interpreted as sufficient. (+) Option accepted in <i>Hormone Cases</i> .
Risk management			
(1) Harmonizing safety standards	Recommendation to use international standards (3.1, Annex A 2-3).	Stricter standards only accepted if scientifically justified by risk assessment (Art. 3.3).	(-) Condemned explicitly in <i>Hormone Cases</i> . In <i>all cases</i> excluded for final findings.
(2) Choice of specific NTBs	Objective of least-trade distortion (Art. 5.4, 5.6).	Considering economic feasibility (Art. 5.6).	(+) NTB at stake accepted in all cases. In <i>GMO cases</i> excluded from final findings.
(3) Control, inspection and approval	Ensure undue delay and national treatment (Art. 8., Annex C)	Confidentiality regarding firms can be considered but according to national treatment	(-) Condemned due to undue delay in <i>GMO cases</i> .
Risk communication			
Transparency	Prompt publication and notification of changes in SPS measures, establishment of enquiry points (Art. 7, Annex B)		(-) Missing notification of all related measures condemned as inconsistent in <i>Fruit Case</i> .

Source: Own composition based on respective panel and appellate body reports.

Note: (-): condemned as WTO-inconsistent, (+): accepted as WTO-consistent

¹⁰ The findings in the GMO cases refer to information on the preliminary results of the panel meeting at 7 February 2006 (WEDDINGTON, 2006). The official report will be published not before June 2006.

Although the sample of only few concluded cases is limited, some tendency can be recognised:

- The findings were mainly related to risk assessment. They support the scientifically based approach of WTO food safety policy and strengthen the role of the international standards for defining the national level of food safety. The harmonizing effect is strengthened, too, as no deviation from international standards was accepted.
- As far as the selection of specific NTBs is concerned, the findings accept deviations from least trade distortion to consider economic feasibility even for rigid measures like import bans.

3 Creating a trustful risk analysis

Consumers' risk perceptions and their risk cultures may differ among countries (JASSANOFF, 2000) and result in different demands for safety at national level. The scientific perspective and the harmonizing tendency of WTO provisions define the scope for a national individual food safety policy. This may lead to deficits in trust into the WTO frame and as well into imported products as far as consumer demand for deviating safety levels.

This chapter confronts the harmonizing mode of the WTO with the demand for flexibility in national risk management. In this context the limits of the scientific approach becomes obvious if it comes to integrating consumers needs into risk management. The following theoretical reflections are based especially on behavioural sciences (chapter 3.1) and are supplemented by empirical results of a survey on GMOs that focuses on consumers' perception of the three components of risk analysis and how the respective perception influences trust (chapter 3.2).

3.1 Theoretical reflection: limits of the scientific approach to build up trust

Problems for the scientific perspective of the WTO may result from (1) the limits of science to prove safety, (2) the differences between the scientific approach and consumers' risk perception, and (3) the credibility of scientists.

3.1.1 Safety and scientific evidence

Though the scientific approach aims at creating a neutral basis for policy measures, it has to be considered that science can hardly provide all information required for political food safety decisions. Limitations of the scientific approach arise especially for new risks that miss historical evidence on the kind and amount of damage as well as probabilities:

- Scientific risk perception can be characterised as “theory-based, computed, probabilistic, statistical, actuarial, estimated and predicted” (ROHMAN, RENN, 2000, S. 16). The validity of results is especially restricted in case of new technologies and related new risks (INTERNATIONAL COUNCIL

FOR SCIENCE, 2003) because a lack of data and empirical evidence requires models, assumptions and analogies that help to apply past experience to new problems (BELTON, 2003, S. 18).

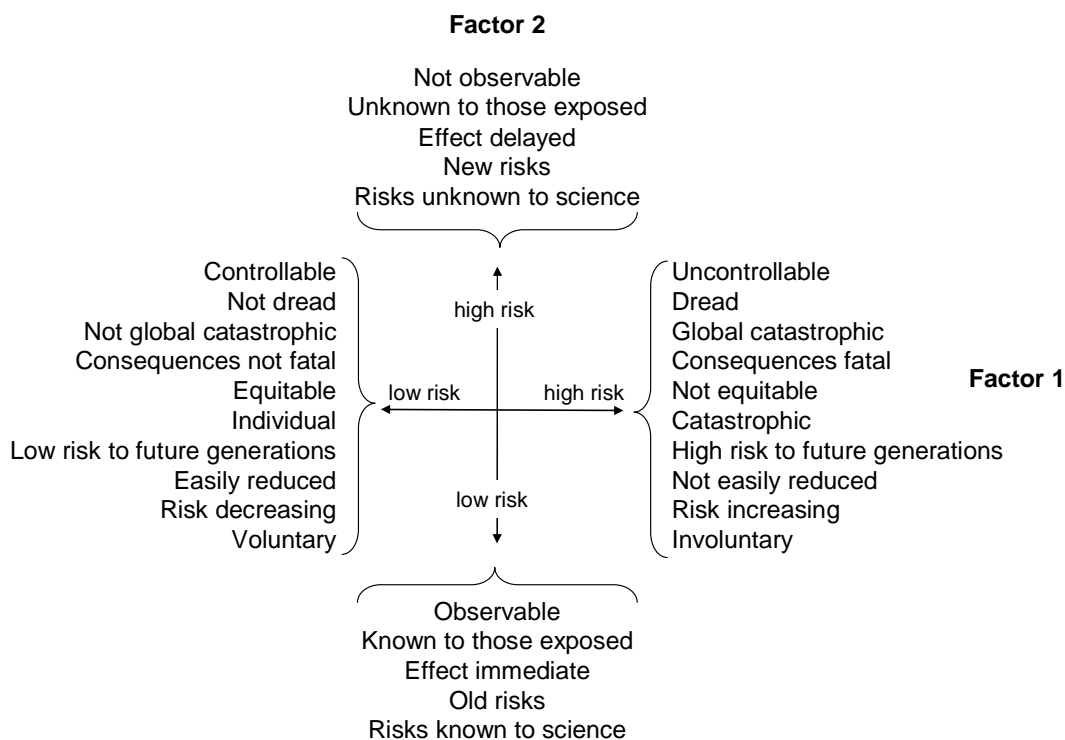
- Time constrains make a comprehensive risk assessment difficult. Especially long term effects cannot be detected. This is of special relevance in case of urgent decisions (RENN, 1995).
- Regarding human health risks scientific risk assessment focuses on the impact of a single food or food ingredient. Difficulties and uncertainties arise from the complexity of the human body. Additional challenges occur if dose and response of an agent, susceptibility of different groups of the society as children, pregnant and breastfeeding women, interdependencies between different hazards, and long term effects have to be analyzed.

In general, science does not take into account all aspects of a risk and cannot proof food safety. The absence of scientific evidence is not equal to the proof of safety as indicated by the BSE case: for a long time no scientific evidence for a risk on human health could be recognised but it emerged later.

3.1.2 Contradictory risk perception of scientists and lay people

The comparison of scientific and lay people's risk perception is based on behavioural sciences. SLOVIC'S ET AL. (1980) reveal the drivers for lay people's risk assessment along the line of three major influencing factors (Figure 1).

Figure 1: Parameters influencing lay peoples' risk assessment



Source: Based on SLOVIC ET AL. 1980.

Note: another factor 3 (not shown in the figure) refers to the number of people exposed to the hazard.

Many of those drivers are not compatible with the scientific approach that only refers to damage and probabilities: lay people have to simplify their personal risk assessment due to bounded rationality, time constraints and information overload. Their risk perception can be described as intuitive and including non scientific, qualitative aspects (ROHMAN, RENN, 2000, S. 16). According to SLOVIC such qualitative aspects cover for instance the perceived controllability of a risk, the observability in terms of individual control by avoiding consumption and voluntariness (Figure 1).

In addition to those parameters the following factors lead to differences between scientists' and lay people's risk perception:

1. Scientific risk assessment tries to accumulate knowledge and to explain reality but for lay people risk assessment is close to decision making: lay people are especially interested in personal consequences and they want to know what to do and what to desist from. Hence information on averages (like on acceptable daily intakes) is of minor interest and both probabilistic assessment and developing knowledge complicate the process of the consumers' decision making (HÄRLEN ET AL, 2004, BELTON 2003).
2. Lay people's processing of information is linked to specific patterns that deviate from the scientific approach:
 - Different biases influence the information processing (BENNETT, 1999, p.11): the *availability bias* leads to the assessment of probability according to the ease of recalling related experiences. Hereby the probability is evaluated as being higher with an increasing number of individual experiences. Thus the appraisal of probabilities is biased compared to the use of statistical data in scientific risk assessments. This affect is supported by the media's coverage of risks as the tendency of stressing bad news increases their awareness compared to that of good news. According to the *confirmation bias* information on hazards are processed in order to confirm personal views, opinions, and attitudes. Information conflicting with these personal considerations is rejected. The *overconfidence bias* leads to an overestimation of the individual ability to assess probabilities which amplifies the effect of the availability and the confirmation bias.
 - "Framing" describes the context in which information is presented what may influence the perceived risk even if the statistical risk is unchanged (TVERSKY, KAHENMANN, 1982; SLOVIC, ET AL, 1982; ROTHMANN, SALOVEY, 1997; LEVIN ET AL, 2001).
 - Another factor of information processing is relevant in the context of choosing political measures: the psychological effect of "affective heuristics" influences risk perception by some key words due to their connotations. As for food safety, risk perception is highly influenced by the term "natural". It is common opinion that natural food is good and an intervention in nature by chemicals is bad. "Natural is good" is one of the most common rules of thumb for judging on

food quality (HÄRLEN ET AL, 2004, p 25; HARPER, 2001, p. 10f; BELTON, 2003, p. 9). The consideration of such “affective heuristics” is relevant for implementing informative strategies like establishing labels. In the context of GMOs the popular connotations of “genetic” are dangerous, relating to inherited disease and unnatural manipulation (BELTON, 2003, p. 9). Therefore the mere mentioning of the word “genetic” creates a negative image of food.

3. Other factors refer to the origin of a hazardous effect as the risk perception depends on the perceived attitudes and motives of those persons that are responsible for the risk (WIEDEMANN, SCHÜTZ, 2000, pp 19): depending on the assumed attitudes and motives people react with leniency or outrage and the ratings of risks are higher if people feel outraged. This could be a relevant issue for food-related hazards if food or biotechnology companies are regarded as only driven by economic interests. Such aspects of the social and cultural context are not addressed by scientific risk assessments as required by the SPS-Agreement.

3.1.3 Credibility of science

Scientific risk assessment addresses credence attributes which hardly can be controlled by consumers. Therefore trust in the outcome of science and in scientists as actors is an important driver for accepting a science-based policy. However there are several factors limiting trust in science:

1. Linked to the described differences in risk assessment between scientists and lay people the “public ignorance” model describes general communication problems (BELTON, 2003, p. 3; IRWIN, WYNNE, 1996, p. 215) and identifies limitations for communicating science to the public: experts assume that their own values and beliefs are superior to those of the public and they take ignorance of scientific information as proof of the inability to understand them. Additionally, experts assume that lay people aim at a risk free environment and conclude their disability to prioritize different degrees of risks. The public ignorance model implies that experts do not take into account the different aspects of food safety policy that are of importance for consumers. In that way an expert-driven policy runs the risk of missing legitimacy and thereby trust in institutions like the WTO may be diminished.
2. Science is not only regarded as a neutral institution that provides information but as an institution involved in social conflicts and acting on behalf of specific interests. The latter aspect becomes obvious in controversial public discussions that reveal the heterogeneity of scientific opinion and the way scientific opinion can be used to support special interests (MARRIS ET AL, pp. 61).
3. Performance of science is difficult to be evaluated as science cannot provide a prediction of the future but only – in case of reliable data – the probabilities of different outcomes. But negative outcomes of a science oriented decision based on missing scientific evidence for risks (e.g. in the BSE case) can be interpreted as flaw scientific assessment and risk managers can be blamed having relied on incompetent advice (RENN 1995).

4. A general problem of building up trust is the asymmetry between creating and destroying trust: SLOVIC (1993) points out that (1) negative (trust destroying) events are more visible than positive (trust building) events, (2) negative events achieve much more attention than positive events, (3) in general sources of bad news are more credible than those of good news, and (4) distrust tends to enforce distrust.

The possibility to establish science as a trusted and reliable institution for food safety policy is restricted. Especially for new risks, when scientific opinion is ambiguous and the determination of risks cannot be derived from empirical evidence on frequencies, trust in and acceptance of a science based policy may be low. In this context risk communication can be regarded as relevant to build up trust despite of the identified problems and especially the participatory elements are evaluated as relevant (WIEDEMANN, SCHÜTZ, 2000, pp. 15-17).

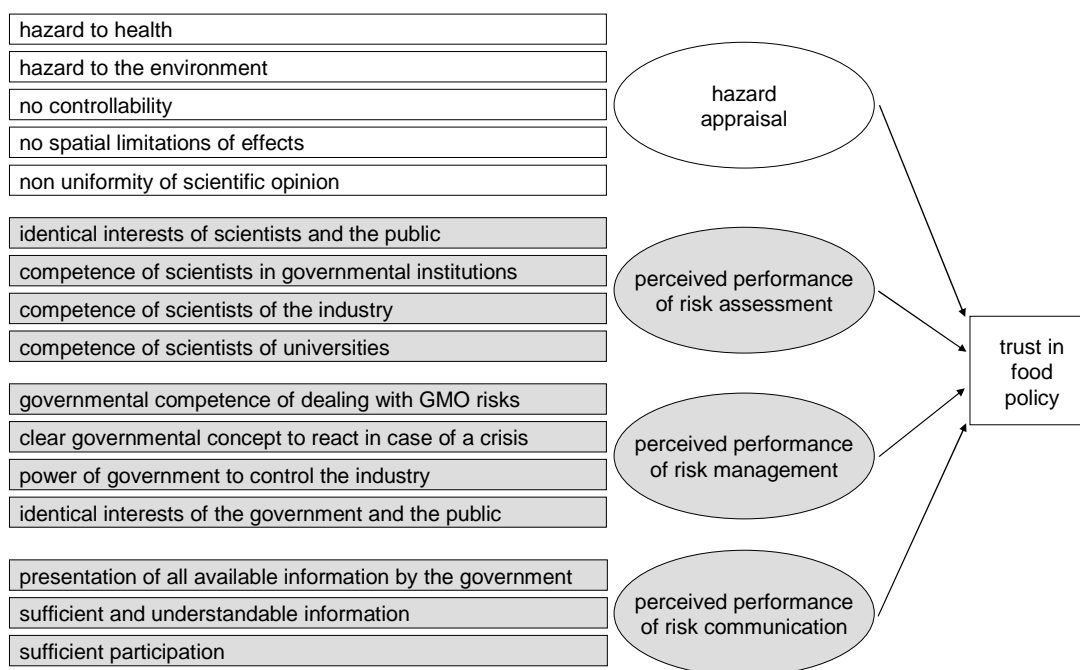
3.2 Empirical results for GMOs: the influence of the components of risk analysis on trust

The survey aims at identifying how the perceived performance of the individual components of risk analysis influences overall trust in food policy. It was carried out for the case study of GMOs, as an example for a new technology. The case of GMOs reveals the limits of the scientific approach to prove safety: European consumers are comparatively highly afraid of GMOs according to several surveys (SOLEM, GAIVORONSKAIA 2004) though up to the present scientific evidence for a hazard seems to be missing.

The survey (Figure 2) was structured in a way that allowed identifying not only the perceived performance of science but as well that of other relevant components of risk analysis. Additionally the perception of the hazard effects of GMOs was addressed as this was identified as relevant trust-building factor (SLOVIC ET AL. 1980).

- The statements referring to *hazard appraisal* focus on dread and controllability and the perceived knowledge of scientists. By that they take into account important factors that influence hazard appraisal according to behavioural science (compare Figure 1). “Knowledge of scientists“ was surveyed by the perceived uniformity of scientific opinion.
- The perceived performance of *risk assessment* is operationalised by the surveyed evaluation of competence and by the perceived identity of interests between scientists and the public. Against the background of the results of MARRIS ET AL. (pp. 61) perceived competence is surveyed dependent on the institutions that scientists work for. Perceived identity of interests considers the problems described in the public ignorance model (compare chapter 3.1.3).

Figure 2: Structure of the survey parameters



- *Risk management* is addressed by statements that focus on the power to control and on identical interests. Governmental power to control is regarded as a substitute for personal power to control. This reflects indirectly controllability as criterion influencing trust in SLOVIC'S model (compare Figure 1). Identity of interests is surveyed as it reduces distrust against the background of information asymmetries between risk management and the public.
- As for *risk communication* both dimensions information and participation are included. Especially the latter is regarded as a driving factor of trust building (WIEDEMANN, SCHÜTZ, 2000, pp. 15-17).

We base our analysis on data drawn in a sample of German consumers of $n = 356$.¹¹ The poll was conducted in April 2005 in Bonn, Germany, in a shopping mall near the city centre. The respondents were asked to fill in the questionnaire by themselves. In case problems they could consult some students of the institute.

With respect to the educational level there are deviations from the average distribution in Germany towards higher education degrees, but the analysis of the data did not show significant influence of socio-demographic indicators on the results of the survey.¹²

The respondents were asked to their agreement to the statements on a five point Likert scale. Mean and standard deviation of the results are summarised in Table 2.

¹¹ Data were collected from 425 persons but only 356 datasets were completed sufficiently.

¹² This is comparable with other studies; see e.g. KJAERNES, POPPE, (2004).

In general, the results reveal that the hazard potential of GMOs is perceived as high and the performance of the government as low. Additionally the perceived competence of sciences is regarded as low and confirms the limits of the scientific approach for establishing a food policy accepted by consumers. However some differentiation is needed: the evaluation of science depends on the specific institutional background. The competence of science at universities was scored high whereas competence of scientists in governmental institutions or at the industry was scored lower.

Principal component analysis

The results of the principal component confirm that the statements of the questionnaire (Figure 2) refer to hazard appraisal and the three components of risk analysis (Table 2). Just the variable “identical interests of public and scientists” loads the component “perceived performance of risk management” and not – as assumed – “perceived performance risk assessment.”

Table 2: Results of principal component analysis

	mean	stand. dev	loadings of components (communality h^2 : 0,58)			
			perceived performance of risk management	hazard appraisal	perceived performance of risk assessment	perceived performance of risk communication
hazard to health	3,7	1,31	,222	,711		
hazard to the environment	3,8	1,26	,215	,778		
no controllability	3,4	1,41		,607	,285	
no spatial limitation effects	4,3	1,07		,684		
non-uniformity scientific opinion	4,0	1,16	,267	,516		,255
identical interests of scientists and the public	2,4	1,23	,555	,348		
competence of scientists of universities	3,9	0,98			,821	
competence of scientists in governmental institutions	2,9	1,06	,280		,778	
competence of science of the industry	3,0	1,27			,482	,391
Governmental competence of dealing with GMO risks	1,9	1,01	,682	,366		
clear governmental concept to react in case of a crisis	1,7	1,02	,741			
power of government to control the industry	2,0	1,11	,705	,243		
identical interests of public and government	2,3	1,17	,713			
presentation of all available information by government	2,1	1,09	,582			,510
sufficient and understandable information	2,2	1,16	,284			,739
Sufficient participation	2,2	1,28		,221		,744

OLS regression

Based on factor scores an OLS regression was conducted in order to analyse the influence of overall trust in safety of purchasable food. The depending variable “trust” was addressed by the statement “All food you can buy is safe”.

The results of the OLS regression reveal that perceived hazard appraisal, risk management, and risk communication have a significant influence on trust. No significant influence is asserted for perceived performance of risk assessment, which backs up the result of behavioural sciences that other dimensions than scientific evidence are relevant consumers' acceptance of a policy.

Table 3: Results of OLS by factor

$R^2_{\text{corr}} : 0.291$		independent variables			
dependent variable: trust in safety of purchasable food	constant	factor 1: perceived performance of risk management	factor 2: hazard appraisal	factor 3: perceived performance of risk assessment	factor 4: perceived performance of risk communication
	Coefficient	1.695	0.346	-0.252	0.061
stand. dev.	0.046	0.046	0.047	0.046	0.046
p-values	0.000	0.000	0,000	0,182	0.000

As the survey refers to GMOs, the results on hazard appraisal and the perception of the individual components of risk analysis cannot be generalised to the whole field of food safety policy. Nevertheless the findings support the hypotheses that considering consumers' interests is relevant for building trust in food policy.

4 Conclusions

The results of the survey give evidence for the relevance of the perception of risk communication and risk management for building trust instead of the scientific dimension stressed at the WTO-level:

Risk communication at multinational level is limited to the informative element. The WTO submits all notification requirements to members and the CAC publishes all meeting reports which are available for all interested parties. But participation of consumers is hardly implemented in international food safety policy: participation at the CAC is implemented by opening the sessions to consumer groups as observer without voting right. The CAC clearly emphasises the relevance of participation as priority to build up trust: “Given the strong public interest in food safety and regulatory issues, the involvement and input of consumers and non governmental groups at the international and national levels is essential to build public confidence in international standards and assure the strong public input, acceptance and support for Codex standards, guidelines and recommendations as a basis for domestic regulation and trade” (CODEX ALIMENTARIUS 2002, par.17; CODEX ALIMENTARIUS, 2004, Section III, par. 37 – 41). However, in the 20th session the CAC recognised that strong consumer participation can better be implemented at the national level (SECRETARIAT OF THE JOINT FAO/WHO FOOD STANDARDS PROGRAMME, 1993, par. 56). An example for the implementation of risk communication at member state level is the European design of strengthening participation in the different fields of risk analysis

(RUDLOFF, SIMONS, 2006). But even at WTO level participation has very recently been introduced for example by opening of disputes to the public (ALEXOVICOVA, VAN DEN BOSSCHE, 2005).¹³

Referring to *risk management* little scope for deviating from the harmonised level of safety exists within the WTO frame. Cultural differences in risk perception and risk acceptance do not justify the introduction of NTBs. Not considering different demands for the level of food safety may lead to a loss of trust in the food safety system and in the safety of food available on the markets.

More scope to take into account consumers' preferences exist in the context of voluntary and private standards like the European retail standard system (e.g. EUREPGAP 2004). However, an increasing number of private standards may lead to problems for consumers as a broad variety of different standard faces problems of processing information due to information overload (HÄRLEN ET AL, 2004).¹⁴ Supplementary, even for private standards on food safety the problem of trust occurs as they normally refer to credence attributes: in spite of trust in the WTO frame trust in certifying and controlling institutions is required.

In addition to problems with private standards a more general conflict remains: Although the theoretical reflections and the empirical results may suggest participation at national level, this cannot be evaluated as silver bullet to solve the problems of designing a trustful WTO food safety policy. If participation really leads to a demand for considering non scientific criteria in risk management it conflicts with the WTO frame as identified in the analysis. Though participation is recommended and identified as an important factor for building trust, it is incompatible with the WTO frame.

As a final way out of this conflict WTO members may not fulfil the provisions and rules of the agreements. In this case they have to face the consequences foreseen in the WTO-frame: not implementing the dispute's findings on lifting condemned NTBs can result in countervailing measures such as penalty tariffs imposed by the complaining party. Hereby national flexibility towards stricter safety levels can be realised by accepting penalty tariffs and the consequences for the affected trading partners. This institutionalised option within the WTO framework is hardly used but was chosen by the EU whose import ban was condemned as unjustified in the Hormone Cases.¹⁵

¹³ A first example are the meetings of the WTO panels on the EU's challenge against continued retaliatory sanctions on its exports imposed by the US and Canada within the long history of the Hormone Case which were opened to the public in September 2005 (DS320).

¹⁴ Even though the label for organic products is widely known in Germany, many consumers do not know exactly the standards of that label (BEUKERT, SIMONS, 2006).

¹⁵ The sum of about 120 million \$ is imposed as penalty tariffs per year on European products imported to US and Canada till today as the EU still implements the condemned import ban on beef produced with growth hormones (RUDLOFF forthcoming).

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