

2. Descriptive Findings of the Baden-Württemberg Risk Survey 2001 (Michael M. Zwick)

2.1 Introduction

»One is always exposed to some kind of risk«. We repeatedly came across this, or similar statements when carrying out the 62 handbook interviews on risk perception and assessment. It goes without saying that a semantic field with such a wide scope forces selection: the interviewees' limits of endurance must be respected when using qualitative approaches, even more so when using standardized survey instruments. This survey's average interview length of 45 minutes represented a clear tolerance limit which unmistakably showed in the tendency to break off the interview, a tendency which increased towards the end of the interview session.

The thematic focus was the surveying of attitudes to the risks of nuclear power plants, cellular phones and their associated transmission facilities, genetically altered food, the risk of global climate change, crime and smoking. This selection represents a compromise which was to consider equally habitual risks - the risk associated with smoking -, social risks - crime -, ecological risks - the risk of global climate change -, and technological risks. The latter include risks - in the case of cellular networks - caused by communications and product technology, risks caused by conventional large-scale technology - nuclear power plants -, and novel food technology - genetically altered food. The risks were selected in order to rouse the interest of the persons interviewed as well as to touch upon current sociopolitical topics. Moreover, this data was to counteract the lack of basic research in the field of risk sociology: A report by the official Enquete-Commission into the »Protection of Mankind and the Environment« by the German Bundestag which was to assess the state of the research on the »acceptability of risks and technologies in Germany« (Renn/Zwick 1997), brought to light that Germany had surprisingly few studies on the subject of risk perception and assessment, some of which were obsolete and not rarely based upon small-scale or non-representative samples. In order to meet these basic research needs, comprehensive sets of questions were compiled, permitting a kind of »empirical comparison« of stigma-theoretical, psychometric, culture-related theoretical and intermediary items, revealing the performance of, and confidence in institutions from the field of risk communication and management.¹ By asking open questions the interviewees were in addition given the opportunity to speak freely on the individual risks.

1 The complete questionnaire is included in the appendix.

The data set at hand is based on a three-stage stratified random sample, as an ADM-master sample, of the Baden-Württemberg German-speaking resident population over 16 years of age. Between the 12th of February and the 30th of March, 2001, *Inra Deutschland* carried out a total of 1.508 interviews.² The data set includes a weighting variable which permits analyses representative for individual persons, made possible by adjusting the sample to characteristics of the official population structure statistics. All subsequent analyses were carried out with the weighted set of data.

2.2 Risk perception and assessment among the public

Based on descriptive analyses this first empirical section will determine how the public assesses the individual risks. For this purpose, the so-called psychometric characteristics ascribed to risks by the public are introduced³.

Subjectively experienced threat

As can be seen from Fig. 1, Baden-Württemberg's public does by no means appear apprehensive or panicky. Considering the fact that with respect to the prospects of the economy the population is frequently reprimanded as being averse to technology and prone to a certain risk-shyness, it may come as a surprise that, with only one exception, hardly more than one in six people are afraid of one of the listed risks. The problem of interior security, a favorite of the public which can attain election-deciding dimensions, the long-lasting debate of the safety of nuclear power plants, the transportation and storage of nuclear waste and not least the discussion of the BSE risk which was just easing off at the time of the survey, were factors which could have substantiated a dramatization of the perception and assessment of these risks. However, at 40% and more respectively, the proportion of those not feeling threatened is amazingly high, just as the proportion of those feeling considerably frightened is surprisingly small.

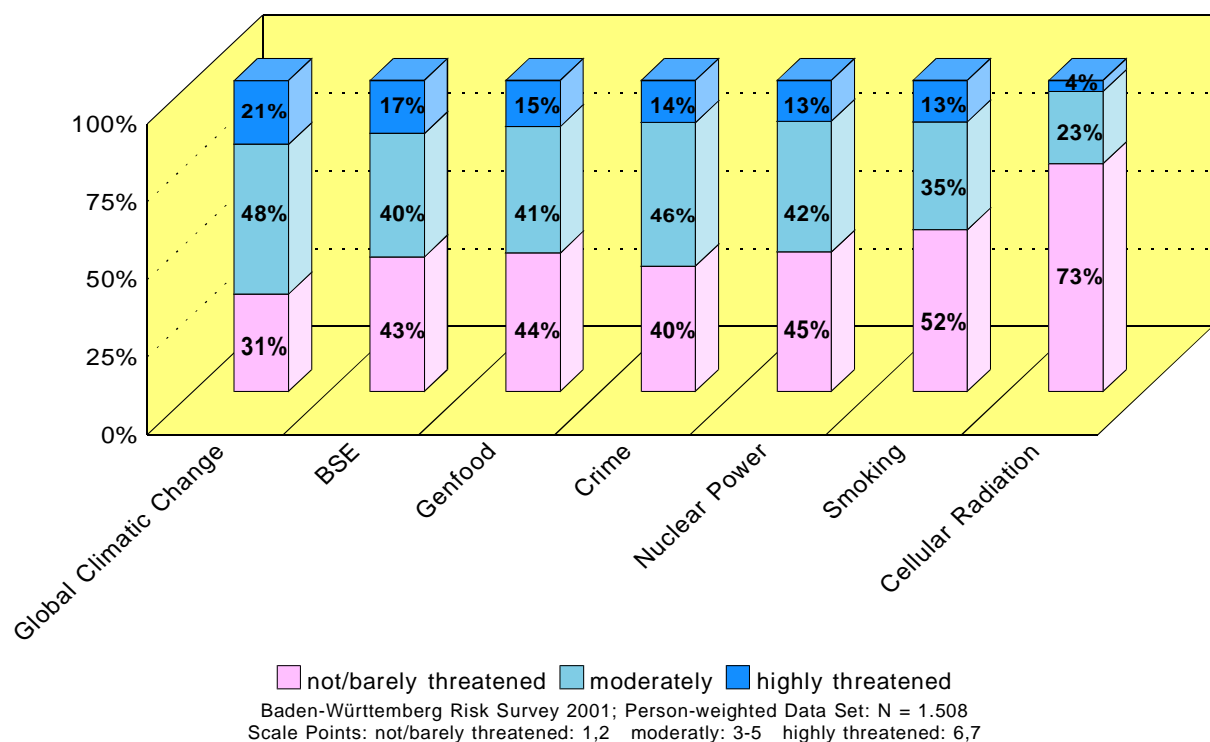
What is even more surprising is that it is global climate change which causes the most worry and concern in those interviewed, for several reasons: for one, it could have been expected that those risks which present an acutely threatening hazard to health or life of the persons interviewed are considered threatening. For another, it would be easy to assume that the subjectively perceived threat of risks varies with the density

2 Sample rate of response amounted to 64%.

3 Smoking and crime were covered by shorter question sets, as it could not be precluded that some aspects of these risks, such as personal or social benefit, could have caused irritation with some of the persons interviewed.

of mass-media coverage on a certain subject; during the period of the survey this certainly did not apply to climate change and its effects: the world climate summit in Bonn, which attracted considerable media interest, even a heavy thunderstorm over Bavaria and the flooding of the Oder in Poland took place in July 2001, long after the conclusion of the data collecting period. After all, it could be assumed that mainly those risks are dramatized which take effect in the living area of the persons interviewed, the effects of which can either be experienced with one's senses or directly communicated and thus triggering, as does crime, a more subjective affectedness than abstract and latent risks. Disregarding the Christmas hurricane »Lothar«, which struck Baden-Württemberg on Dec. 26, 1999, neither Germany nor Baden-Württemberg are among those regions afflicted by storms to a noteworthy degree.

Fig. 1: Subjectively Perceived Degree of Threat of Various Risks



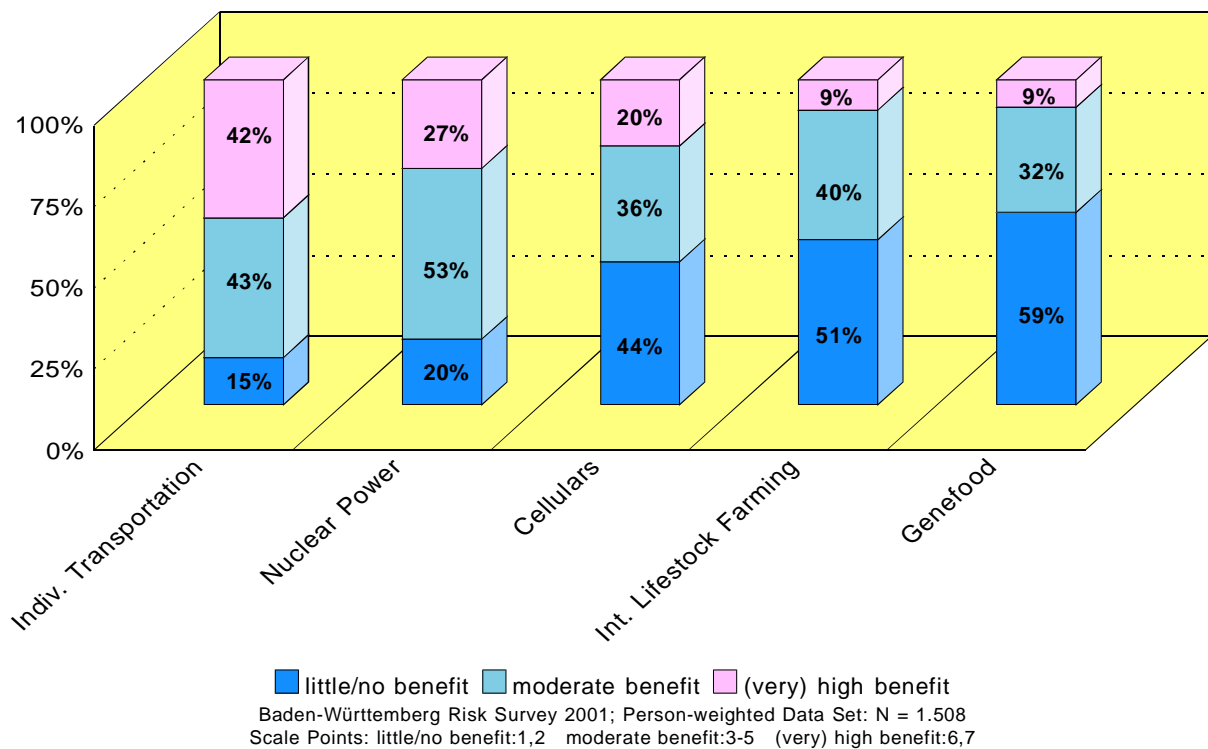
Due to the special significance this subject is obviously given in public perception, global climate change will be accorded its own chapter in this working report. The semantics of the world climate risk will then be developed from the qualitative data material.

Looking at the alternatives shown in Fig. 1, it is not surprising that the risk of cellular networks merely triggers comparatively little concern in comparison. The level of response behavior however is surprising. Only 3.5% are afraid of cellular phone radiation and almost three-quarters of the persons interviewed consider this risk unproblematic. The media echo to citizens' initiatives against cellular network transmitting stations does of course suggest other proportions - we are obviously dealing with an example of how a small group of persons, who know how to mobilize a subject and turn it into a political issue, can have an effect considerably more staggering than its actual size. Analogous to cellular phones, smoking is also an ›everyday risk‹ where the individual - due to decisions in purchase and pleasure - has a high degree of autonomy and control over pleasure and risk, causing him or her to assess the risk, which moreover directly concerns only part of the population, as being relatively small.

For the synoptic summary of the perceived or ascribed risk characteristics at the end of the chapter, it can be noted that the risks of smoking and cellular networks are perceived as being particularly low, and the risk of global climate change is perceived as being comparatively threatening, whereas the remaining risks hardly differ and occupy a medium level position with regard to their degree of perceived threat.

Individual benefit and benefit-threat balance

In many cases risks have a Janus-faced appearance: sources of harm can simultaneously be the sources of personal or social benefit. This is also true for all of the risks investigated by us. It must be noted, however, that benefit and risk source can diverge in each case, for example when a technology or mode of behavior promising benefit, such as individual transportation, leads to external effects such as global climate warming, which in turn harbor potential harm. Fig. 2 shows the benefits analogous to the risks shown in Fig. 1. Fig. 3 attempts a benefit-harm balance. The latter seems obvious as individual benefit and threat potentials were measured on the same scales; however, subjectively perceived threat and benefit potentials may not necessarily be on the same factual level, it may even be that different standards are applied to them in the perception of the individual; it therefore seems appropriate to look at the balancing attempt in Fig. 3 with a certain critical distance, as a rule-of-thumb as it were. The majority of people sees little or no benefit in industrial food production, neither in genetically engineered food nor in large-scale livestock production.

Fig. 2: Assessment of Personal Benefit by...

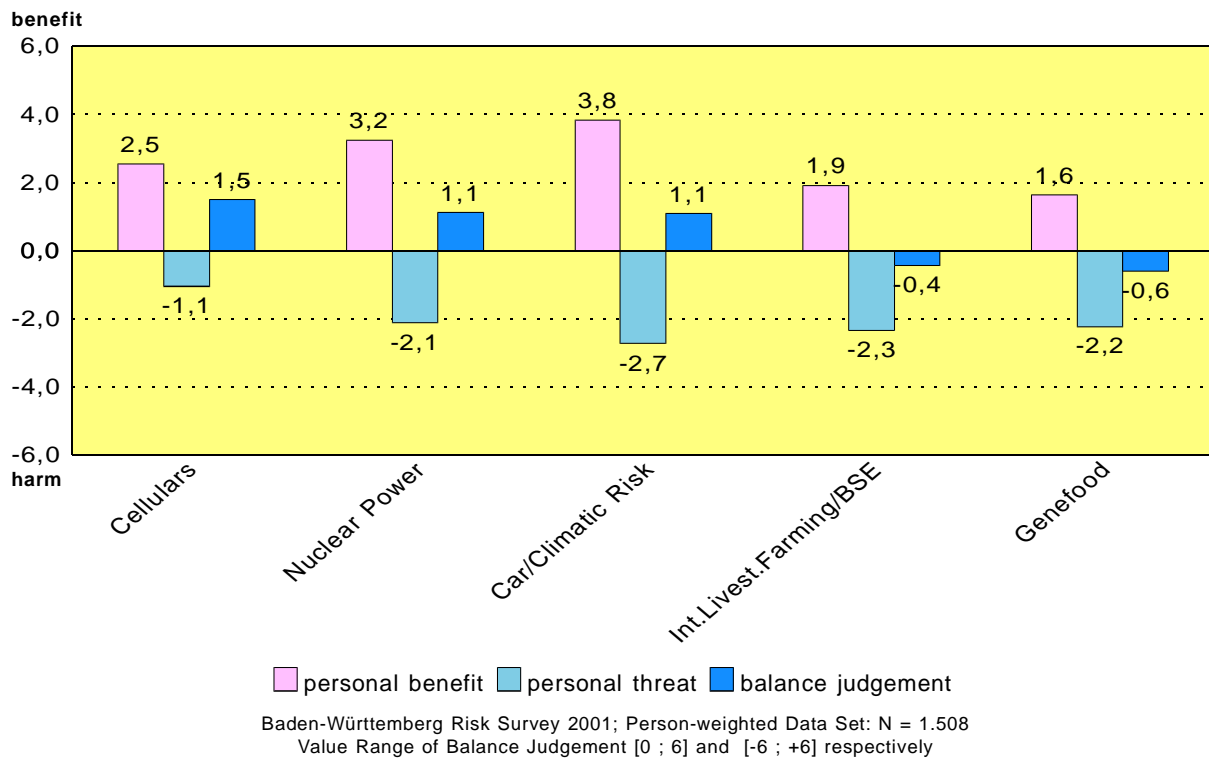
Considering the estimate according to which about 70% of all Germans will own a cellular phone by the end of 2001⁴ (cf. Plica 2001), it is surprising that only 20% of the persons interviewed ascribe cellular network technology a benefit worth mentioning.

Possibly the discrepancy between cellular phone utilization and benefit can be explained by the »fun factor« of cellular phones: possession and utilization of this technology are possibly not based on the importance and concrete benefit of communication, but on the gain in status and fun. Nuclear power and above all motorized individual transportation can amass relatively high benefit potentials: only one-in-five people cannot see any real benefit in nuclear power and only one-in-seven in motorized individual traffic.

4 During the last years, in Germany the sale of mobile phones boomed. According to the »Statistische Bundesamt« (2002), at the beginning of 1998 9.5% of all German households owned a mobile phone, in January 1999 16.5% and one year later already 29.8%.

Fig. 3 shows in what way benefit and threat potentials can be balanced. To this end the mean values of the scales, which originally comprised 7 characteristics, were compared with each other. Cellular phones show the best balance. The medium benefit level is opposed by only low risk potentials, thus yielding the best overall balance. But even with nuclear power the assumed personal benefit clearly surpasses the perceived threat. The same is true for the benefit of individual transportation - none of our other examples yields such high benefit assessments! Regardless of the considerable threat perceived in global climate change, which is in part caused by individual traffic, the persons interviewed here too provide a positive balance.

Fig. 3: Perception of Personal Benefit-Threat-Balance in the Case of...



That the risks, some of which are assessed as threatening, are compensated by even greater benefit potentials does not apply to mass-livestock farming resp. BSE and genetically engineered food. The risks - which are assessed to be higher than those of nuclear power in both cases ! - are faced with only low expectations of benefit. Both cases thus yield a negative balance of personal benefit and threat potentials.

Social damage and catastrophe potentials

Not only can the extent of the subjectively perceived threat or benefit potentials be critical for the perception and assessment of risks, but also the assessment of their positive or negative consequences for society. Earlier investigations even showed that social damage potentials are generally assessed more dramatically than the individually experienced threat of risks. Moreover, they are considered as being more significant indicators for the acceptability of risk sources compared with personal concern. Incidentally it seems justified to deal with global damage and catastrophe potentials en bloc: in the variables listed in Figs. 4 and 5 both dimensions are correlated to a high degree. The correlation measures r are between 0.57 and 0.77, so that it can be assumed that the semantic differences in the public perception of social damage or the catastrophe potential are small. Accordingly, both Figures show the same ranking of the individual risks.

Fig. 4: Social Hazards Caused by Various Risks

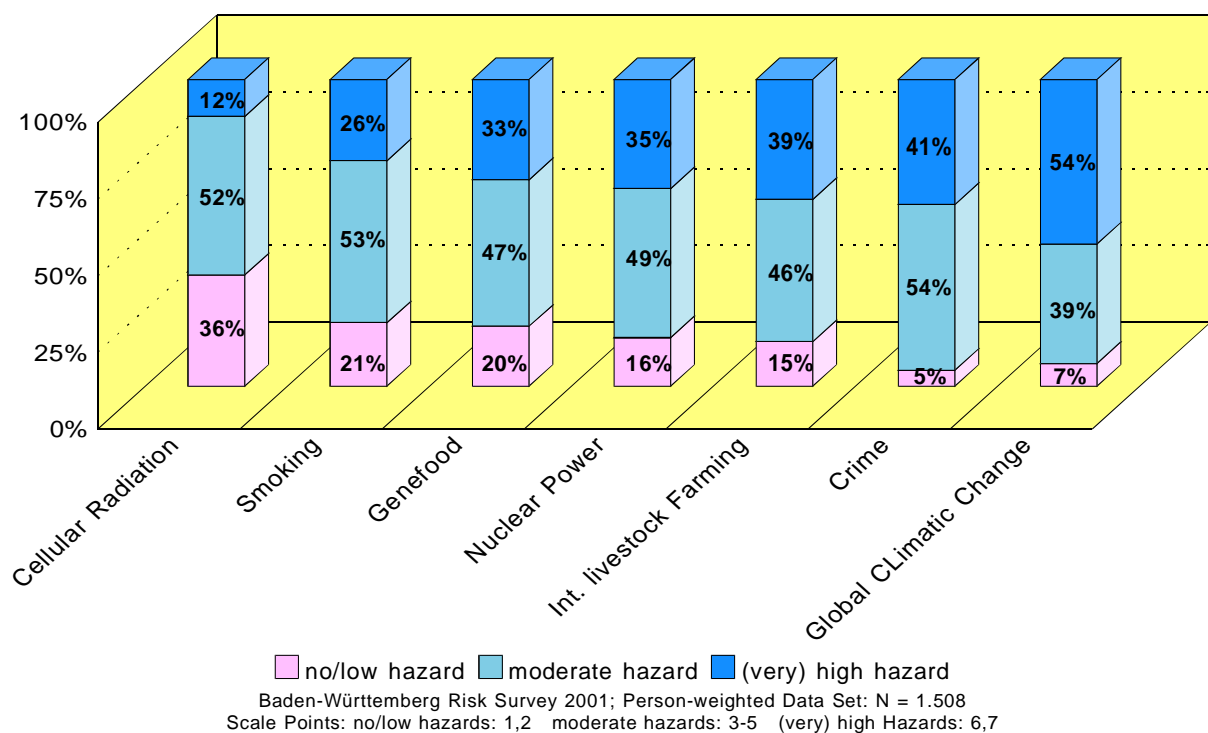


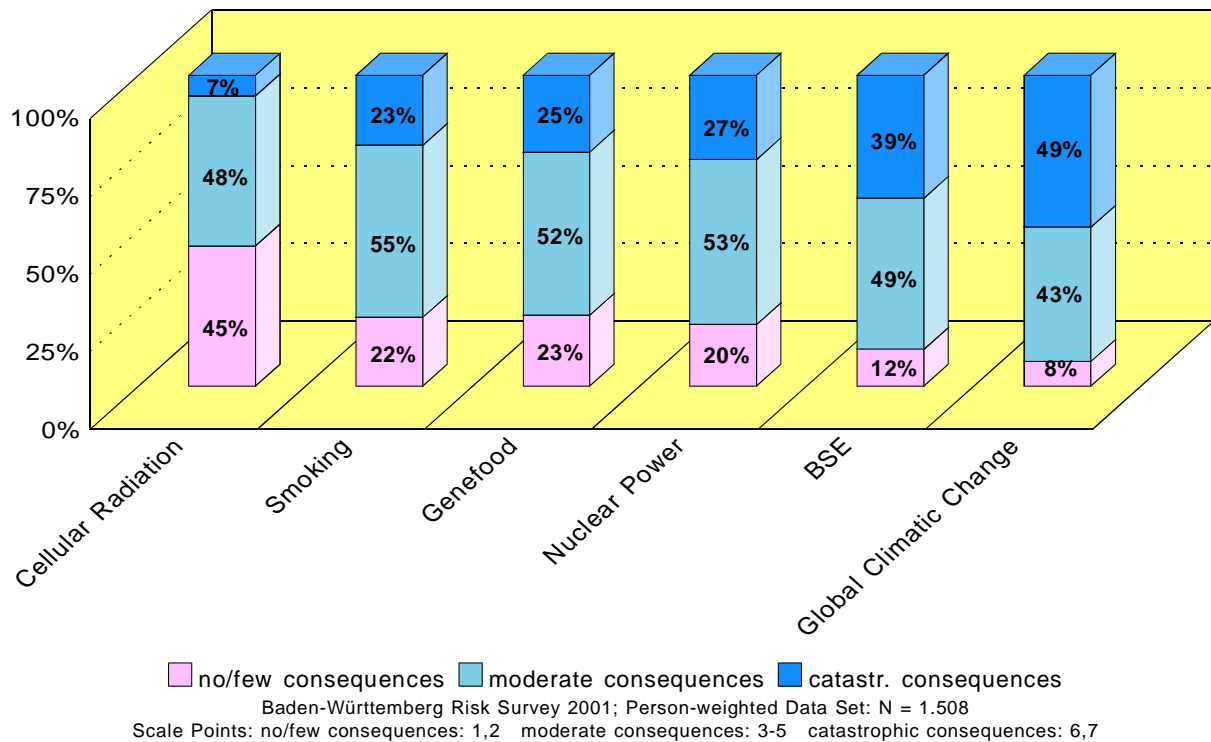
Fig. 4 moreover shows that the social hazards of risks were assessed as being more dramatic by a distinctly higher proportion of the persons interviewed than the perso-

nally perceived threat represented in Fig. 1: a mere 21% feel personally threatened by the effects of climate change, but 54% make out a potentially high degree of social harm and 49% even a catastrophic potential! How can these in part extraordinary differences be interpreted? For one, personal exposure to risks could be an important factor: As qualitative findings show⁵ the consequences of global climate change are expected first of all in particularly exposed countries and for subsequent generations, not for the German society of the present. Vegetarians need not fear the BSE risk, but can all the same expect considerable social consequences. Also, the perception of significant social consequences caused by crime do not necessarily coincide with personal experience and the perception of the situation ›at home‹. For another, divergence in perception can arise from convictions of control, namely the assumption that risks can be sufficiently determined by oneself or others, or that one could elude threatening harmful events more easily than others. Finally, harmful events are conceivable which are predominantly or wholly insured or compensated by the state's social institutions, so that private persons - regardless of the social damage - would be exposed to hardly any disadvantages by those events.

While genetically engineered food, large-scale livestock farming and nuclear power are ranked at a medium position, the cellular network risk is ascribed a lower potential for social harm. Surprisingly, the same applies to the social consequences of tobacco consumption. Risk potentials which are higher than average are assumed for crime and above all for global climate change.

Assessing catastrophe potential basically does not require special interpretation, as it essentially follows the perception of social damage potentials as shown above. Fig. 5 shows the same ranking of risks as Fig. 4. Merely the proportion of those assuming catastrophic consequences is somewhat smaller respectively, compared to Fig. 4. Considered in this way, the catastrophe potential is merely a critical development of significant events of social harm carried to the extreme. Nuclear power, genetically engineered food and smoking take a medium ranking. Cellular networks are ascribed a particularly low catastrophe potential, an especially high one is attached to the risks of BSE and global climate change.

5 See also the contribution of Hhle in this paper.

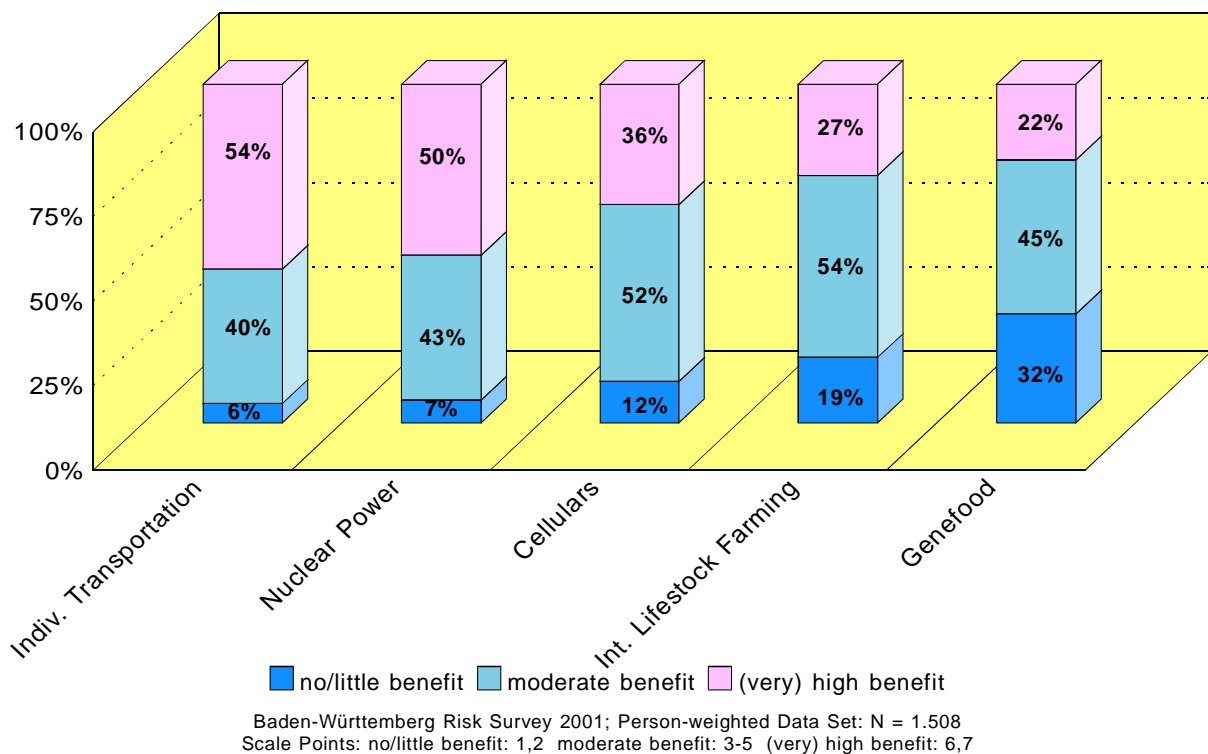
Fig. 5: Perception of the Catastrophe Potential of Various Risks

Social benefit potentials of risks

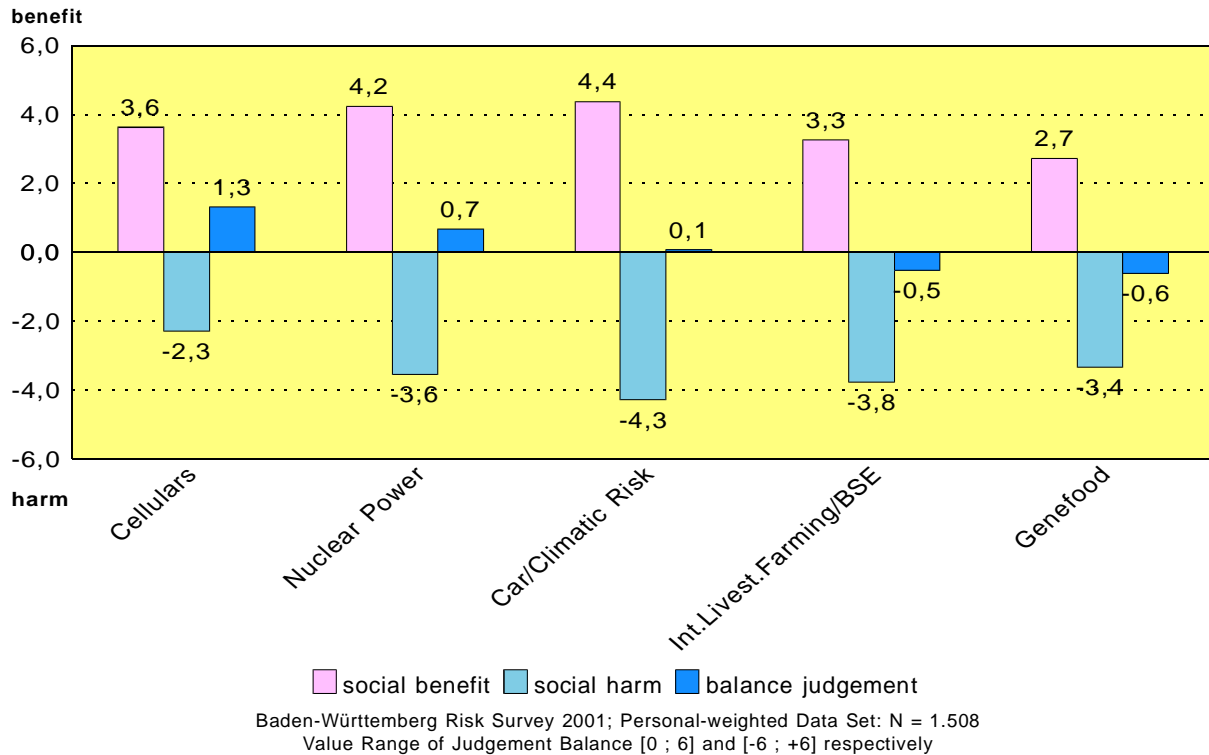
As in the individual case, benefit and damage potentials can also correspond on a social level and lead to a positive or negative balance in the interviewee's risk perception. The rankings of individual - Fig. 2 - and global benefit perception - Fig. 6 - correspond exactly. More than half of the persons interviewed see great social benefit potentials with personal mobility and yet every second person sees them in the utilization of nuclear power. Cellular phones take a medium ranking in both personal and social benefit; only one in four sees a social benefit in intensive livestock production and above all genetically engineered food. The main difference between Fig. 2 and 6 is in the level of benefit assessment. Regarding genetically engineered food, social benefit aspects are recognized on average by 11% more of the persons interviewed and by 23% more regarding nuclear power, compared to individual benefit aspects. From this point of view, the social significance of nuclear power is especially emphasized, whereas in the development of genetically engineered food, both benefit dimensions show particularly poor results. Two explanations can be offered: Possibly, public perception associates the development of genetically altered products more with

compact laboratories where few highly specialized biologists are at work, than with labor-intensive production facilities. For another, poor individual benefit perception could suggest the conclusion that genetically altered food is assumed to have only very poor chances on the market and that it is thus ascribed only little economic and labor-market significance.

Fig. 6: Assessment of Social Benefit by...



When looking at the benefit-risk balance in Fig. 7 we will find complete correspondence of the individual and global dimensions, at least as far as the ranking of risks is concerned. Again, cellular networks and nuclear power have an especially high ranking, large-scale livestock production resp. BSE and genetically altered food an especially low one. It is surprising that global balances do no better in any of the cases than the specific ones, in personal mobility and climatic change even significantly worse! This is caused mainly by the fact that here the *individual* benefit and the *global* threat potentials are assessed as being particularly high.

Fig. 7: Perception of Social Benefit-Risk Balance Concerning...

At this point already there is an indication that the majority of citizens are quite able to understand the dialectics of individual automobile usage and long-term global damage and catastrophe potentials. The fact that both global and - even more - individual benefit-risk balancing are in the positive range, permits the pointed conclusion that the public considers itself a ›prisoner‹ of social modernization. A Janus-faced modernization, which is associated by at least half of the people with enormous threat potentials and horror scenarios, however whose benefit potentials - resource-intensive consumption, mobility and living habits - one can not or does not want to do without. In this paradoxical situation Beck's theory of the potentially self-destructive consequences (1986: 28ff.) of a globalizing ›world risk society‹ (Beck et al. 1996: 44) seems to be reflected to some extent. The processes of individualization also diagnosed by Beck seem to express themselves in the shape of benefit-oriented market individualists: with no other risk the individually perceived benefit expressed in the balance result has a weight comparable to that of motorized personal mobility! The ›symbiotic‹ relationship of global horror made up for by the even greater, immediately realizable personal benefit makes it clear that the implementation of a sustainable

development⁶ based on intergenerational justice providing the chances for living and self-fulfillment for future generations meets with little acceptance.

Fair distribution of benefit and risks

It has already become obvious that the perception of benefits and risks is important for the assessment of risks. Important differences can apparently be found in how individual and global cost and benefit aspects are balanced. The question of whether benefits and hazards are perceived as being distributed fairly or unfairly deals directly with this point.

Fig. 8: Fairness of Distribution of Benefit and Risks

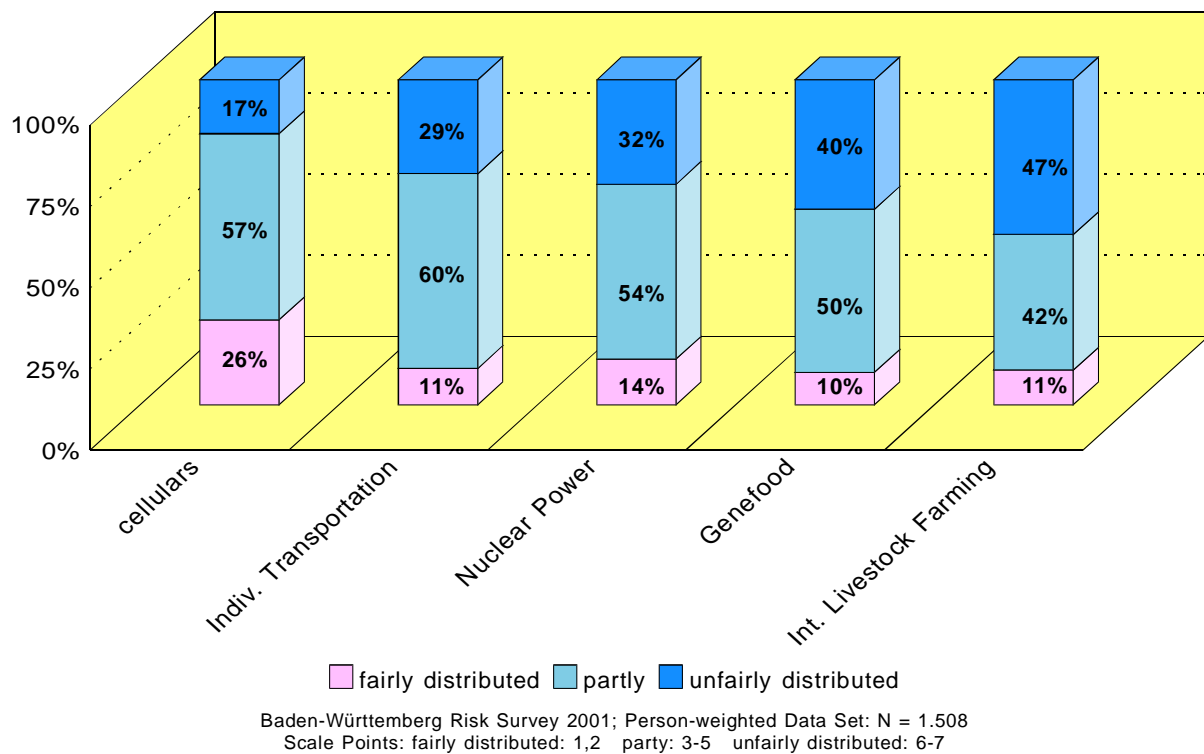


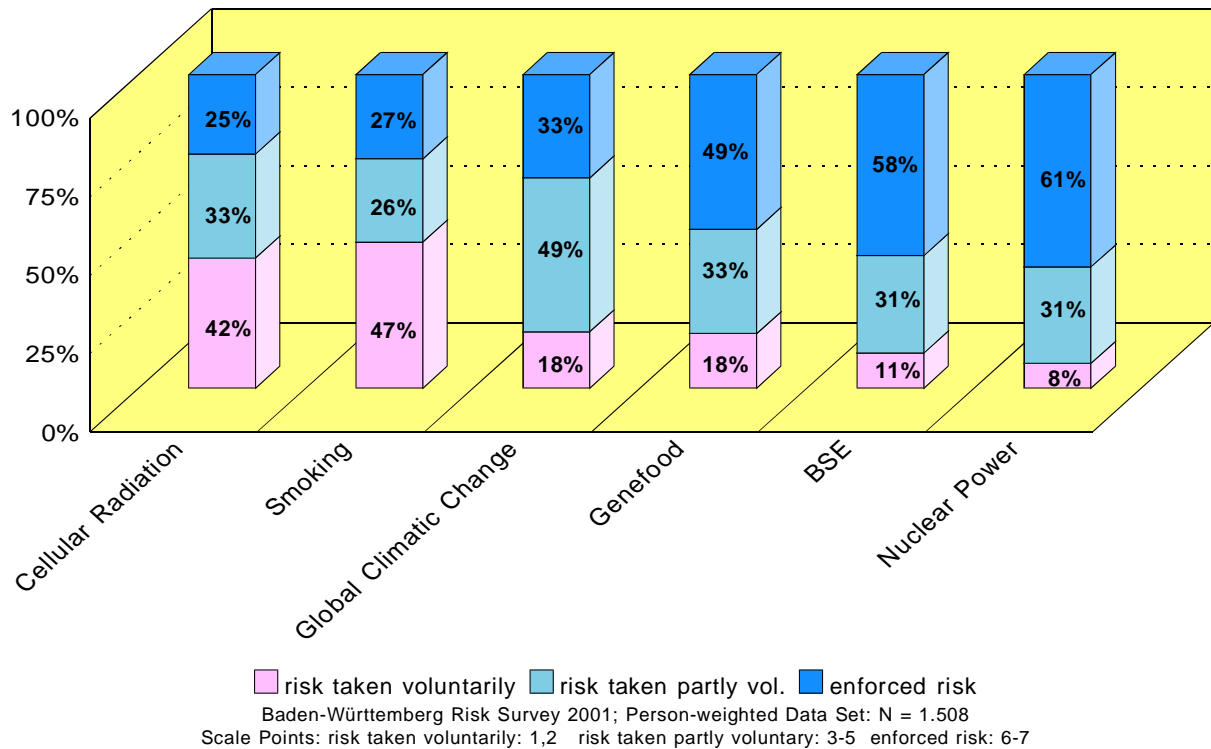
Fig. 8 contains a result which is at first surprising: All in all and especially in the case of genetically altered food and large-scale livestock production the fairness of distribution of benefits and detriments is clearly assessed negatively. Merely with cellular phones the picture is somewhat more well-disposed. Altogether, however, skeptical-

ambivalent opinions prevail here too. Again it is industrial food production - represented by large-scale livestock production and genetically engineered food - which is rated particularly negatively. Unfair distribution entails burdening the public with risks and the monopolization of benefit by others. Seen from a correlation-analytical point of view, the perceived unfair distribution does indeed involve particularly high correlation with the perceived social hazard and catastrophe potentials ($r \approx 0.40$ respectively), but also with the involuntary nature of risk taking ($r > 0.30$ respectively). On the one hand, the relatively dramatic assessment of social risks, as could be seen in Figs. 4 and 5, with the exception of the risk of cellular phones and smoking, explains that the distribution of benefits and detriments was perceived as highly unjust. On the other hand the voluntary nature of risk taking could be interpreted as an indication that the issue is not only the dimension of potential harm, but possibly *how* those risks are dealt with. Earlier research has shown that a ›creeping‹ introduction of technology - in the case at hand the involuntary exposure to risks - without sufficient citizen participation can cause irritation and negative attitudes (cf. Renn/Zwick 1997: 3.2.3.2).

The voluntariness of risk taking and subjective control of the risk

It can be assumed that enforced risks will create resentments towards sources of risk rather than risks taken voluntarily. At the same time, the perception of voluntariness and the conviction of subjective control possibilities correspond to the typology of risk sources described by Renn (cf. Renn/Zwick 1997: 24): Voluntariness - combined with extensive belief in control - can frequently be found in everyday and consumer technology, whereas these properties are only weakly pronounced with risks associated with external large-scale technology or mass production.

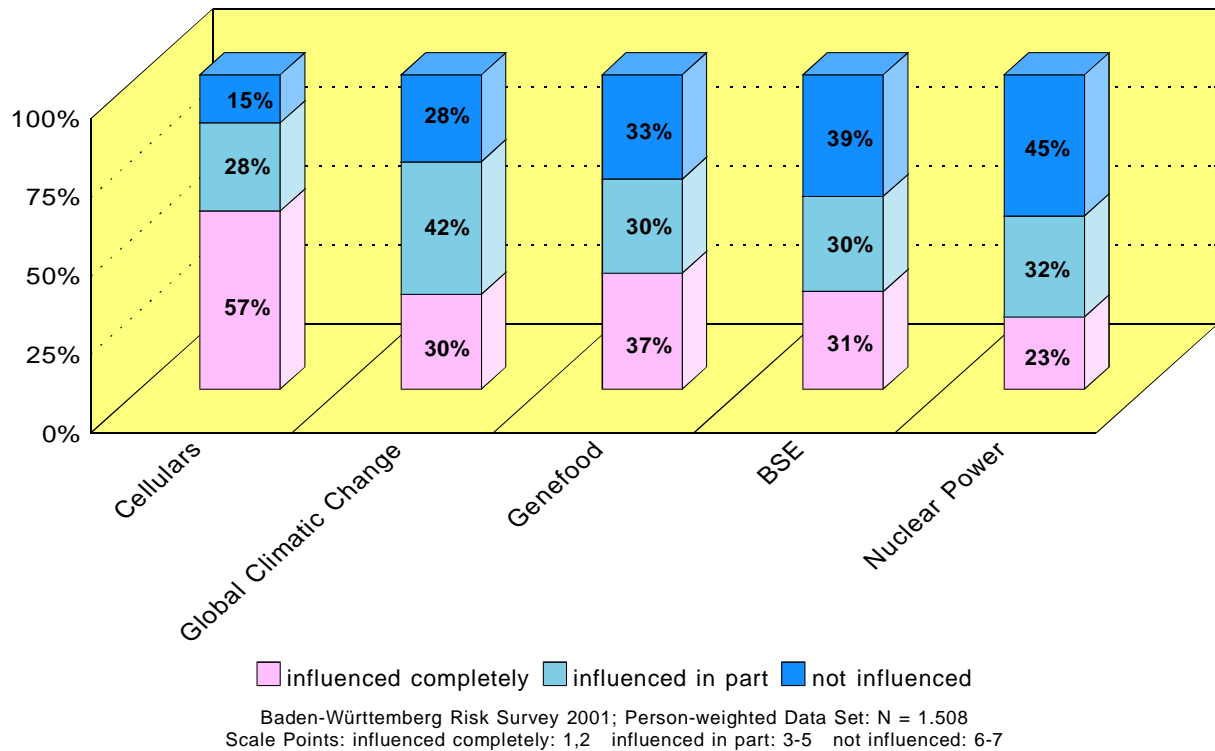
Indeed, we find the lowest perceived voluntariness in risk taking with the ›classical‹ external risk technology, the utilization of nuclear power, followed by nutritional risks caused by BSE and genetically altered food ›enforced‹ by food producers; whereas smoking and cellular phones are risks which can be handled largely voluntarily due to the purchase and utilization or avoidance of the products in question. The climatic risk is obviously considered by the public as caused and accounted for by its own acts but also by external global influences. Consistently, it takes up a medium position.

Fig. 9: Risks - Voluntarily or Enforced?

The subjective ability to influence risks is also linked to voluntariness.⁷ It is therefore no coincidence that Fig. 10 shows the same ranking of risks. The more sources of risk arise from products within the individual's power of influence, the easier is the subjective control of those risks. Risks forced upon the individual from the outside and above all those risks encountering people as a »neighbour« in the sense of an external risk technology, largely elude the realm of personal influence.

7

In the individual risks voluntariness and influenceability are correlated with $0.24 < r < 0.34$.

Fig. 10: Subjectively Perceived Ability to Influence Risks

Perceived responsibility and the performance of institutions

Who is responsible for avoiding the exposure of the public to inappropriately high risks? Table 1 shows the distribution of those institutions identified by the interviewees as being those mainly responsible with 1st and 2nd priority.

Politics, and to an even greater extent industry are made responsible almost universally for controlling and regulating risks. Merely where crime is concerned, 7 out of 10 persons interviewed admit to have joint responsibility for their protection against risk. Industry's particularly high responsibility for the risk due to cellular network technology supports the theory that the persons interviewed have in mind much more the ›cellular phone‹ risk source rather the electromagnetic fields radiating from transmitting stations. In the latter case the assumption that the state could be made largely responsible for independently controlling threshold values would be plausible. Where ›new‹ risk subjects like cellular networks or genetically altered food appear, science is made responsible with the second highest frequency: People demand experts to sort out uncertainties about risk potentials, and supply robust knowledge.

Table 1: Institutions Mainly Responsible (1st and 2nd Priority) for Controlling and Reducing Risks (*multiple answers*)

<i>Institution</i>	<i>Risk</i>					
	BSE	Nuclear power	Gene-food	Crime	Cellular phone transm. facilities	Climate change
Industry	71.3%	66.4%	63.2%	3.4%	71.2%	52.1%
Politics	53.7%	64.2%	45.2%	92.5%	32.0%	50.2%
Science	26.4%	42.5%	49.0%	5.3%	38.4%	42.0%
Individual person	22.4%	8.2%	19.3%	70.6%	30.6%	27.8%
Environmental agencies	21.4%	16.6%	21.0%	1.8%	15.4%	23.7%
Media	3.0%	2.3%	2.2%	20.9%	6.2%	3.3%
No-one	1.7%	0.9%	1.0%	3.7%	4.1%	2.2%
Baden-Württemberg Risk Survey 2001; Person-specifically weighted Data Set; N = 1.508						

Due to the fact that responsibility is to be provided by three institutions - industry, politics and science - it is subsequently sufficient to list the assessment of the performance of these three institutions. Performance criteria were included in the survey instrument in order to assess the effectiveness of institutions using the degree of confidence in these institutions, however with only four risks being applied:

Table 2: Confidence in institutions: the assessment of selected performance criteria of industry, politics and science on the basis of various risks

<i>Institution/ Criterion</i>	<i>Risk</i>			
	BSE	Gene- food	Cellular phone transm. facilities	Climate change
The industry ...				
provides for adequate precautionary safety measures for the protection of the citizens concerning ...	20.6%	14.2%	18.0%	15.4%
in addition to economic interests, takes seriously the concerns of the public regarding ...	22.0%	11.0%	12.3%	16.1%
The politicians responsible ...				
protect the citizens from the risks caused by ...	22.7%	14.2%	16.2%	15.3%
take seriously the fears and apprehensions of the public concerning ...	32.5%	15.6%	14.4%	22.5%
and the authorities provide for adequate legal control concerning ...	39.1%	22.1%	18.6%	26.4%
The scientists ...				
are independent of economic and political interests concerning ...	26.8%	19.7%	21.3%	31.5%
fulfill their responsibility for the social consequences of their work concerning...	38.7%	29.3%	29.2%	42.8%
Baden-Württemberg Risk Survey 2001; Person-specifically weighted Data Set; N = 1.508				

Apart from the assessment of scientists' responsibility for their acts, the three institutions listed received a poor rating in the public's judgment. If the specific performance of these institutions is interpreted as an indication of their credibility and trustworthiness with respect to risk communication, prevention, control and management, it becomes obvious that the public feels largely left alone in matters of risk, one can hardly speak of a deposit of trust. If the extent to which these three institutions are made responsible for dealing with risks is compared with the degree of their

assessed effectiveness, then a profound lack of credibility and trustworthiness becomes apparent.⁸

Institutional handling of the BSE risk is the item that comes off best in Table 2. Many people no longer considered BSE an acute topic at the time of data collection. Despite an ever increasing number of BSE cases also in Baden-Württemberg, food was assessed as being well under control and safe, this was also shown in the answers to open questions. However, the assessment that the authorities provide sufficient legal control in the case of BSE is only a good one when seen in relation to the other risks; when seen in absolute numbers, just about 40% in agreement, a profound dissatisfaction within the population is signaled.

On the whole it is obvious that the population considers politics and industry as largely insensitive towards the concerns of the public and that both institutions provide the citizens with only insufficient protection against risks. These findings could be interpreted as a kind of »system-specific conclusion« and concentration on institution-specific problems and programs⁹, while at the same time being unable to adequately recognize and solve problems of the system environment in question.

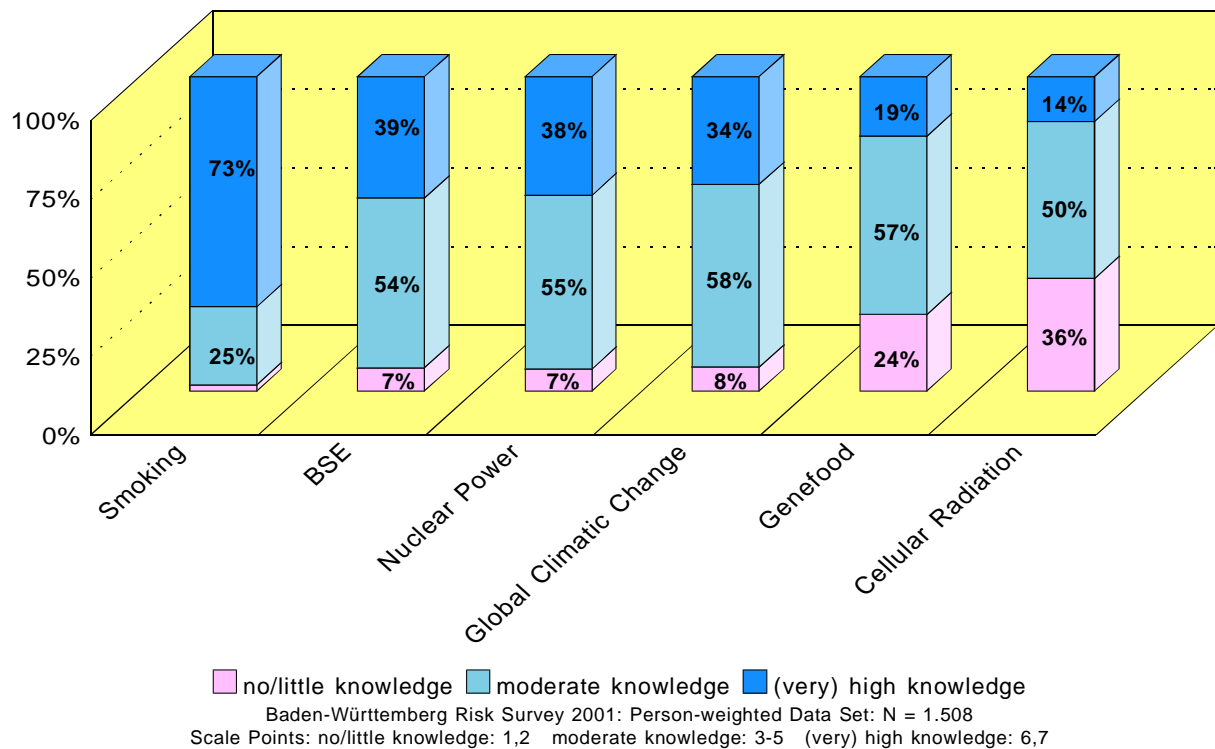
Subjective state of knowledge

The knowledge about risks should depend largely on two conditions: How old or new is the risk and in what way did the mass media deal with it.

Fig. 11 shows that hardly a doubt seems to be harbored in the public about the risks of smoking. The ›old‹ and much discussed risk of nuclear power is in the medium range, as are the topics of ›global climate change‹ and BSE, which are represented equally highly in the media. Risks from genetically altered food and cellular network technology are new and relatively unknown, a markedly higher number of those interviewed complains about uncertainty here.

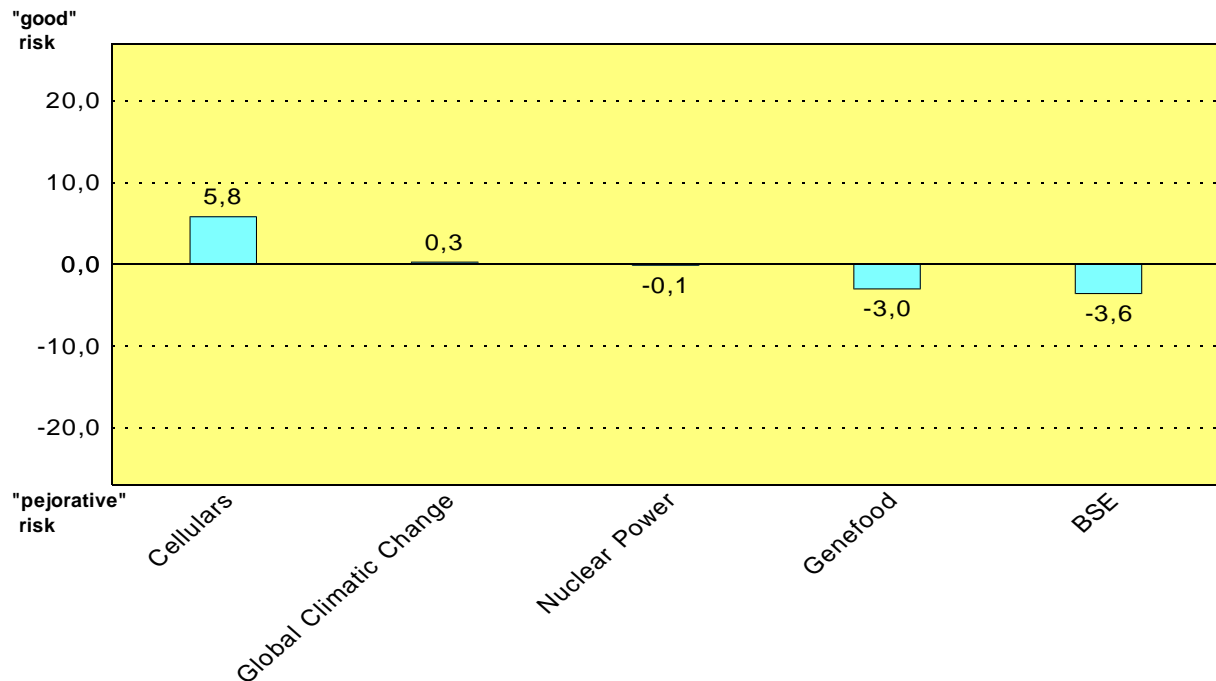
8 Similar results were found in the 1998 ›Baden-Württemberg Survey on the Acceptability of Technologies‹ (Renn/Zwick 1998: Chap. 6). They illustrate that the profound lack of credibility and trustworthiness might evoke political protest.

9 In this context Niklas Luhmann would speak of the tendency of social systems towards self-referential processes of conclusion, with a proneness to focus on systemic programs and codes; according to his opinion, problems of the system environment can only be perceived and dealt with when they meet with sufficient resonance, i.e. when the problem can be translated into the code of the system in question (1990).

Fig. 11: Subjective State of Knowledge of Various Risks

Pejorative risk

Stigma theory has pointed out that the assessment of risks does not always involve rational processes of judgement. Stigmatized risks largely trigger negative chains of associations (cf. Gregory et al. 1995, Flynn 1999). ›Pejorative‹ risks of this type can also be identified in the data set at hand. Fig. 12 below is based on a Likert Indicator, which defines ›pejorative‹ risk as being highly individually threatening, enforced, involving a high potential for social harm and catastrophe, where benefit and potentials of harm are perceived as being unfairly distributed, that it cannot be influenced personally, that not much is known about it, and where no personal or social benefit is discernible. The indicator was finally standardized, with the intention of setting its range symmetrically at $-27 < x < 27$. This symmetry makes sense, as risks can of course be seen to encompass also chance and benefit potentials. Accordingly, the positive range means that, on the whole, positive aspects prevail in the public and vice versa.

Fig. 12: "Good" and "Pejorative" Risks

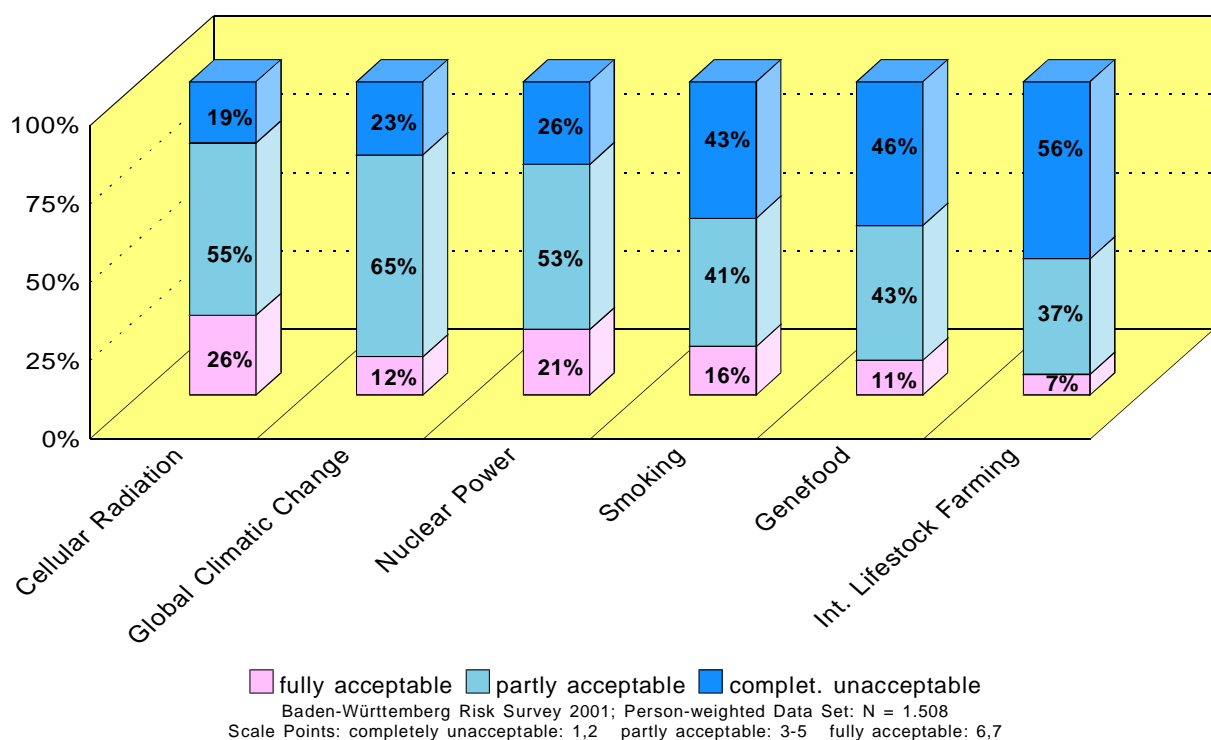
Baden-Württemberg Risk Survey 2001; Person-weighted Data Set: N = 1.508
 Value Range of Balance Judgement [0 : 6] and [-6 : +6] respectively

Fig. 12 differentiates three types of risk: Cellular phones are clearly in the positive range. Utilization of nuclear power and the risk of global climate change show an almost balanced result, genetically altered food and BSE are clearly in the negative range. If stigma is to be understood such that the negative end of the scale (6 or 7) was marked in all 9 characteristics, then the following were stigmatized: The cellular phone risk by 0.1%, nuclear power by 0.8%, global climate change by 1.1%, BSE by 4.2% and genetically altered food by 8.5% of those interviewed. This example also shows that it are those risks which are closest to everyday life - whose health- and life-threatening potentials are literally built-in, where the public shows the most sensitive reaction! As high correlations can be found between pejorative risks and the acceptability of risks ($.43 < r < .69$), it can be assumed that risk acceptance will follow the pattern of Fig. 12.

Risk: Acceptability or avoidance behavior?

The acceptability of risks was intentionally excluded from the above indicator, as it is not a perceived or ascribed risk characteristic in the proper sense but acts as an independent judgment. To what extent does risk, all things considered, appear to be acceptable or unacceptable? Fig. 13 provides the answer:

Fig. 13: Acceptability of various Risks



The risks investigated by us can have, depending on the point of view, more or less negative and positive aspects. It is therefore of little surprise that the skeptically ambivalent judgments of Fig. 13 are accorded a lot of credibility.

Fig. 13 shows one particularity: The proton of interviewees assessing the cellular radiation risk as acceptable exceeds the quantity of people valuating this risk being unacceptable! But even climate change and nuclear power are assessed as unacceptable by only one in four of the persons interviewed. Analogous to cellular phone technology, skeptical-ambivalent judgments prevail here. With the remaining risks - smoking, genetically altered food and large-scale livestock production resp. the BSE risk -

rejecting and skeptical-ambivalent judgments prevail. As expected it are the two food risks, genetically altered food and large-scale livestock production which evoke the highest rejection. Large-scale livestock production is even rejected by a clear majority of the population.

Rejection and - even more so - the stigmatization of risks can become influential on behavior and can lead to an avoidance of products or places. However, not everyone is prone to stigmatize sources of risk. Seen in this way, stigma is not a risk characteristic but a process: The source of risk in question is consistently associated with negative characteristics.

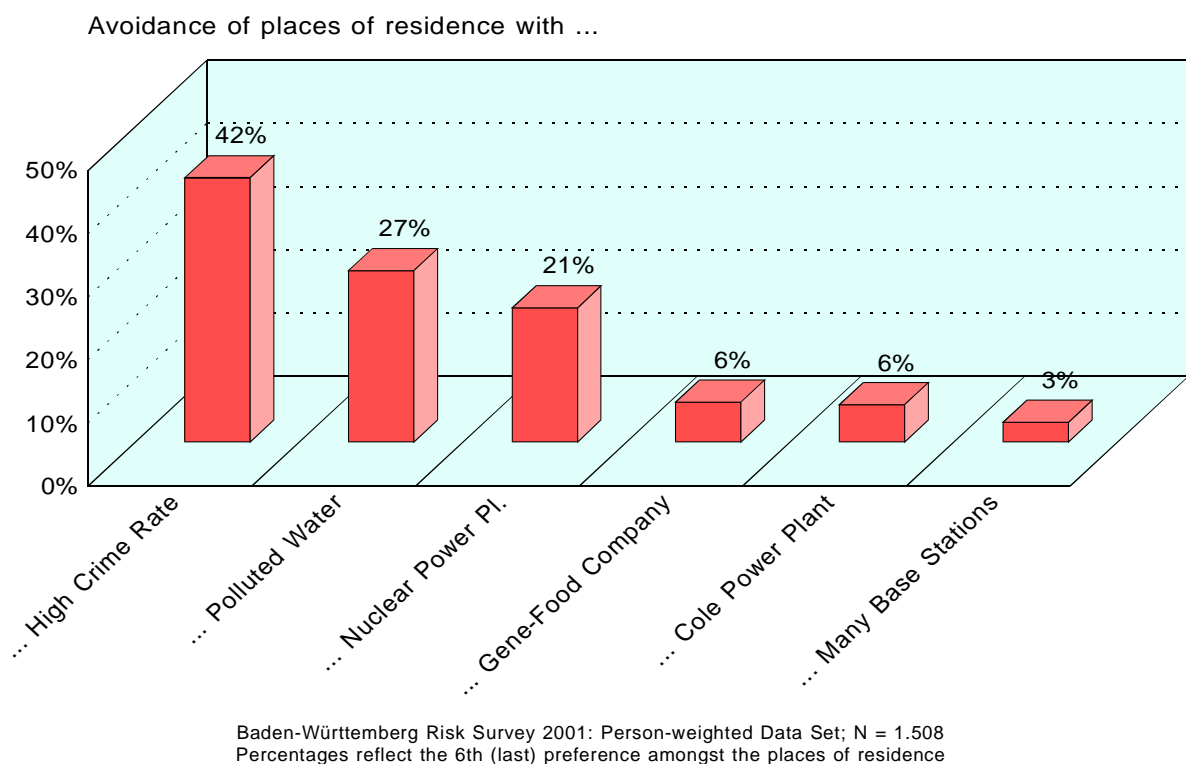
Current findings give occasion to the assumption that products which are or were suspected of being afflicted with BSE were stigmatized by a part of the population, and are being or were avoided, at least for a certain period of time. The temporary drastic decrease of beef consumption in Germany is in keeping with this assumption. According to the findings it can be assumed that genetically altered products, too, would be rejected by a considerable part of the population and stigmatized by a smaller part.

Places of residence can also be subject to the process of stigmatization. We asked: »Suppose you would have to move to another place. Be it that you are offered a dream job, be it for private reasons. Your residential area would be ideal, but unfortunately each of these places is afflicted with a certain danger«. On file cards we offered a town with a nuclear power plant, one with a coal power station, one with a company producing genetically engineered food, one with contaminated drinking water, one with many cellular network transmitting stations or with a high crime rate. The persons interviewed were to express the living place preference in a ranking order of the 6 risks. Fig. 14 shows those places evoking the highest rejection (sixth preference).

Interestingly it is the crime rate which would deter people most from moving to another place. Over 40% of those interviewed would rather avoid a place afflicted with a high crime rate. Combined with the comparatively low subjectively perceived threat from Fig. 1 this means that the majority of the people living in Baden-Württemberg do feel relatively safe, but are little inclined to move to an unsafe place. After a marked distance come places with in turn entirely different risks. If crime is in the class of social risks, contaminated drinking water would be in the risk class of the ›slow poisoning‹ type. The nuclear power plant follows in third place, probably because of its catastrophe and accident potential. Genetic engineering companies and coal power stations evoke markedly lesser aversions. Which is all the more surprising as due to both risk semantics and the type of hazard - slow, unavoidable poisoning - there are

strong parallels to contaminated drinking water. Far behind in last place finally comes the town with an particularly high number of cellular phone transmitting stations. Our findings clearly show that it is not the potential for harm which is important but rather the uncertainty surrounding the potential harm. High subjective belief in control and a fair share of personal and social benefit are more reasons to let this risk seem worth avoiding for a minority of only 3.5%.

Fig. 14: Preference of Places of Residence Afflicted with Specific Risks



2.3 Risk perception and assessment - attempting a synopsis

The findings represented here are complex - too manifold to reveal characteristic profiles for the various risks. Table 3 below thus ventures on an attempt of synthetically summarizing the particular, characterizing properties of each risk shown in the preceding tables and figures. In order to gain firm clues, the original scales with seven characteristics were used and the scale mean values were compared across each dimension. Depending on the direction of the deviation, deviations exceeding ± 0.5 were marked with a + or -, deviations of more than ± 1.0 scale points with -- and ++.

However, the main issue is to make substantial deviations from the average easily recognizable and to clearly highlight risk-specific profiles.

Cellular phones show a distinct profile: very little knowledge combined with a low risk and medium benefit perception, all in all resulting in a positive benefit-risk balance. The risk is perceived as being distributed fairly and subjectively controllable. Its acceptability is high which is also expressed in living place preferences.

Nuclear power is experienced as an external technology whose risks people perceive as being forced upon them. However, this negative impression is largely compensated by the perception of high social and individual potential benefit, all in all leading to an average risk acceptability.

In the matter of the *global climate risk* high individual and social threat and catastrophe potentials culminate with the high individual and social benefit of motorized personal mobility. The balance of solely extreme assessments results in an average rating of acceptability and, what is also revealed later by the qualitative evaluations, an experience of high cognitive dissonance.

Genetically engineered food is revealed as a seemingly ›useless‹ undertaking: very small personal benefit and below-average social benefit with moderate hazard potentials yield a negative benefit-risk balance. Knowledge about genetically engineered food is represented as being rather poor. All in all, risk acceptability is still average; firms producing genetically engineered food are not stigmatized by the population.

BSE has the lowest rating of all: low personal benefit, unfairly distributed as well, enforced hazards and high catastrophic potential. Therefore, the persons interviewed reach an overall negative balance judgment with regard to risk acceptability.

For the two remaining risks, smoking and crime, not enough information is available to outline a clear profile. *Smoking* is represented as a risk which is taken mostly voluntarily, about which most seem to consider themselves well informed. Overall, the picture is that of a risk which is generally acceptable, especially to the smokers themselves.

Regarding the *risk of crime*, the high social hazards are emphasized. Preferences in place of residence point to low acceptability and an inclination by considerable parts of the population to stigmatize this risk.

Table 3: Synoptic representation of the determined risk profiles

<i>Characteristic</i>	<i>Risk</i>						
	Cellular networks	Nuclear power	Traffic Climate change	Gene-food	Intens. animal breeding/ BSE	Smoking	Crime
Perceived threat	--	0	+	0	0	0	0
Benefit (personal)	0	+	++	--	-		
Benefit-risk balance (individual)	++	+	+	--	-		
Social hazards	--	0	+	0	0	0	+
Social benefits	0	+	+	-	0		
Benefit-risk balance (social)	++	+	0	-	-		
Catastrophe potential	--	0	+	0	+	0	
Benefit & risk justly balanced	+	0	0	0	-		
Risk is forced upon the individual	-	++	0	0	+	--	
Subjective ability to influence	++	-	0	0	0		
Subjective state of knowledge	--	0	0	-	0	++	
Acceptability of risk	+	0	0	0	-	0	
Intention to avoid when selecting place of residence	--	+		- *)			++

Baden-Württemberg Risk Survey 2001. Empty squares signify that the dimensions were not surveyed. Symbols are explained in the accompanying text.
 *) Company producing genetically altered food.

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