

Edited by Astrid Epp, Britta Michalski, Ursula Banasiak, Gaby-Fleur Böhl

## **Pesticide Residues in Food**

Public Perceptions in Germany – A Summary Report

Project implementation:

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Public Perceptions in Germany –  
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## Preface

The subject of pesticide residues in food has been in the public eye for many years, as the regular media coverage of the subject shows. At the same time a European survey has shown that the residues of pesticides in fruit and vegetables is seen by consumers in Germany as the major risk factor in the field of foodstuffs. This makes knowledge-based communication concerning the actual risks posed by foods substantially more difficult. To survey the actual situation, the Federal Institute for Risk Assessment (BfR) carried out a representative poll of the population in 2009 so as to obtain further, more detailed information on the perception, coping strategies and information behaviour of consumers in Germany with regard to pesticides.



The findings published in the present report show that consumers know little about the residues of pesticides in foodstuffs. Although they express great interest in the subject, they feel they are insufficiently informed. Apparently information on pesticides does not reach the consumers. As a consequence they draw false conclusions about their use and legal regulation of their use. According to the study, about 70 per cent of those polled assume that pesticide residues in food are not allowed. They are perceived as violations of the law, even when the quantities are below the maximum legal limits. The maximum legal limits ensure that pesticide residues in foodstuffs do not pose a health risk for consumers on the one hand and on the other hand, through their Europe-wide standardisation, they serve as national and international trade standards. The false assumption of the consumers contributes to pesticide residues being perceived as a health risk. The misconception about the legal regulation of pesticides is regularly taken up in media coverage and, as this study shows, is thus reinforced.

The Federal Institute for Risk Assessment sees in the results of the population survey key starting-points for risk communication: on the one hand, consumers should in the future be given still more targeted information about the benefits and risks of pesticides and their regulation by law. On the other hand, in the communication regarding this subject the connection between agriculture and food production should be emphasised still more strongly. To that end, the BfR makes use of its cooperation with multipliers, for example from consumers' and environmental associations, industry and agriculture.



## 1 Background and objective of the study

In the present report the results of the study “Representative Population Survey on Pesticides” conducted in the years 2009 and 2010 on behalf of the Federal Institute for Risk Assessment by the Arbeitsgemeinschaft Hopp & Partner and the Süddeutsches Institut für empirische Sozialforschung are documented.

The knowledge, perception and behaviour of the population and public expectations with regard to information on the subject of pesticides were determined within the context of the country-wide representative telephone opinion poll (1003 persons). The present report presents the methodological implementation and the findings of the study.

In this chapter the background and objective of the study will be discussed. Following the introduction (1.1) the background and context will be outlined (1.2). After that the statutory regulations in Germany regarding pesticide residues in food will be reported on (1.3). A sub-chapter devoted to the events described in the media in connection with pesticides in foodstuffs (1.4) will follow before the role of organic farming for consumers will be briefly presented.

### 1.1 Introduction

Since the publication of Rachel Carson’s book “Silent Spring” (1962), which not only became an international classic but at the same time triggered the establishment of the world-wide environmental movement, the social discourse on the subject of pesticides and their effects on human health and the environment has never stopped.<sup>1</sup> It is no coincidence that political discussions concerning sustainable agriculture are kindled over and over by the question of the use and handling of pesticides and their legal regulation.

In the case of pesticides, unlike many other health risks occasioned, for example, by chemicals and chemical products, consumers are faced with a fundamental dilemma, since they can scarcely consciously avoid the risks connected with pesticide residues in foodstuffs. “Non-nutrition” is not an option. This is accompanied by social uncertainty about the safety of foods and the question of which foods confront us or do not confront us with such substances. One result of this is that attention is focused on the credibility of different stakeholders (producers, retailers, the food processing industry, regulatory and supervisory authorities). The consumption of food is always linked to a great extent with confidence in producers and retailers. This confidence on the part of the population is constantly being challenged in view of recurring media coverage about the detection of pesticides in foods (from non-governmental organisations or retail chains, for example). In some cases it has been officially established that the maximum legal limits have been exceeded (see, for example, the “National Report on Pesticide Residues”).

The discourse on pesticides and their residues in foodstuffs is marked by great factual complexity on the one hand and uncertainty on the part of the consumers on the other hand. The official debate is correspondingly controversial. Against this background the perception of pesticide residues in foodstuffs fulfils some criteria of a “systemic risk”.<sup>2</sup> Characteristic of systemic risks is that they provoke hazards that are difficult to calculate. They must also be seen as unintended side effects of conscious decisions and actions.<sup>3</sup> For that reason such situations of risk can easily undermine the confidence of the citizens in the problem-solving ca-

<sup>1</sup> Cf. for example Bösch, S. (2000): Risikogenese. Prozesse gesellschaftlicher Gefahrenwahrnehmung.

<sup>2</sup> Renn, O. & Klinke, A. (2001): Systemic Risk. A new challenge for risk management. First report to the OECD Systemic Risk Group. July 2001.

<sup>3</sup> Cf. Beck, U. (1986): Risk Society. Towards a New Modernity; see also: Beck, U. (2007): World at Risk.

capacity of the administration and/or the honesty of the industry. In the food industry in particular, this is not unproblematic.

Given the controversial media coverage of pesticides, consumers have to develop strategies for dealing with pesticide residues in foods. Owing to the complexity of the subject (large number of substances and potentially contaminated foodstuffs) the consumers are forced to apply simplified, practical behaviour patterns. In concrete terms, what are those strategies? What subjective theories on dealing with this risk can be observed among the German population? How is confidence attributed in the case of pesticides? What kind of information and which informants are felt to be trustworthy? What heuristics and everyday rituals in dealing with pesticides do we find in the population? What does the population know about pesticides, and where does it get this information? And what importance does the population attach to conventional and organic farming respectively? The present representative population survey on pesticides provides answers to those questions.

## 1.2 Context and background

The Federal Institute for Risk Assessment (BfR) is responsible for the health-related assessment of substances (chemicals, biocides, pesticides) and preparations (pesticides). It is one of three assessment authorities for pesticides in Germany together with the Federal Environment Agency (UBA) and the Julius Kühn Institute (JKI). The approval itself is done by the competent risk management authority, the Federal Office for Consumer Protection and Food Safety (BVL). One of the statutory mandates of the BfR is to communicate risks, which means, for example, to identify risk perception among the population regarding pesticides and on that basis to adequately inform the public about the possible health risks of pesticides and pesticide residues in foodstuffs. The improvement of health-related consumer protection and scientific support for risk management in implementing the relevant regulations is one of the core tasks of the BfR.

The BfR carried out the following study on the subject of the perception, knowledge and information behaviour of the German population regarding pesticide residues in foodstuffs in order to develop risk communication strategies tailored to the needs. The goal of the representative population survey was to determine the state of knowledge, the risk perception and risk behaviour and the information and communication expectations in the population. This model is based on the assumption that knowledge about pesticides and perception of their risks are essential framework conditions for adequate risk communication strategies.

The starting points for the preliminary considerations were the following questions posed by the Federal Institute for Risk Assessment.

- What does the German public presently know about pesticides?
- What does the German public presently know about the safety, the regulation and the supervision of pesticides and their residues in foodstuffs?
- What does the German public know about the differences between conventional and organic farming?
- Are pesticides perceived by the German public more from the point of view of risks or of benefits?
- How do the consumers themselves come in contact with pesticides (for example through their use to fight plant pests in home and garden or on the job → farmers; through their nutrition and possible residues on foods or the like)?
- What do consumers demand in terms of the quality, appearance, seasonal availability

and price of foodstuffs?

- How does their knowledge about pesticides and their regulation influence the perception and behaviour of consumers?
- To what extent have reports on pesticide residues in foods (fruit, vegetables, wine etc.) influenced the perception of consumers regarding the safety of pesticides?
- To what extent does the conflict played out in the media influence the perception and behaviour of consumers? Is the conflict perceived at all?
- Who is perceived as an “information provider”? Do the consumers feel that they are adequately protected by the competent authorities or do they see themselves exposed to risks? If so, what risks?
- Whose assertions about risks from pesticides are more likely to be believed in case of conflict: those of government agencies and institutions or those in press reports and/or from NGOs?
- What expectations do consumers have regarding information on pesticides and pesticide residues in foods? How and where do consumers find out about the properties and occurrence of pesticides and pesticide residues in foods? How and by whom would consumers like to be informed about pesticide residues in foods?
- Can one deduce propositions from the survey as to what factors influence the risk perception of consumers and in what direction public opinion will develop with regard to pesticides and pesticide residues in foods?

### 1.3 Statutory regulations pertaining to pesticides in Germany

Pesticides are deployed world-wide to protect cultivated plants and plant products from harmful organisms. They serve to ensure yields in agriculture as well as to guarantee high food quality. This includes protection of the consumer from mycotoxins. Different groups of pesticides are differentiated, such as herbicides (against weeds), insecticides (against harmful insects), fungicides (against fungal infection), molluscicides (against snails), acaricides (against mites).<sup>4</sup> The employment of pesticides in agriculture is regulated in the "Gesetz zum Schutz der Kulturpflanzen" (Plant Protection Act – Pflanzenschutzgesetz, PflSchG) and the accompanying ordinances. The EC regulation on organic production (Regulation [EC] N° 834/2007) and the accompanying implementing regulation (Regulation [EC] N° 889/2008) stipulate what pesticides may be employed in organic farming.<sup>5</sup> With regard to the problems of pesticide residues in foods, insecticides and fungicides are especially significant in terms of consumer health protection.

In Germany, almost 35,000 tonnes of pesticides were spread on fields, in gardens and in vineyards in 2008.<sup>6</sup> At the present time, about 600 different pesticides are approved in Germany under about 1,100 different trade names, based on about 250 approved active substances.<sup>7</sup> Residues of pesticides on and in foodstuffs cannot be avoided even when the pesticides are applied appropriately. This is fundamentally the case for organic agriculture as well, which likewise cannot fully dispense with pesticides either.

How much pesticide residue is permitted on or in foodstuffs is legally stipulated by the so-called Maximum Residue Levels. Foods with residues up to the Maximum Residue Level for an active pesticide substance pose no threat to the consumer, neither when the food concerned is consumed in large quantities for a short period nor when it is consumed in moderate amounts for a lifetime. In determining the maximum levels, care is taken to ensure that the amounts taken in by the consumer exceed neither the ADI nor the ARfD.<sup>8</sup> Only foods that remain within the stipulated Maximum Residue Levels for pesticide residue content may be sold. The food processing industry and retailers are obliged to guarantee observance of the maximum levels. The basic principle is that a food that exceeds the Maximum Residue Levels may not be sold. This is monitored by the foodstuff control agencies in the different states.

In April 2008 the "National Plan of Action for Sustainable Utilisation of Pesticides" was adopted by the Conference of Ministers of Agriculture. The goal of the Plan of Action was to further reduce the risks that pesticides might entail. Expressed in quantitative terms, the potential risk is to be reduced by 25 per cent by the year 2020. The National Plan of Action replaced the "Reduction Programme for Chemical Pest Control" adopted in 2004 and was a further development of that Programme.<sup>9</sup> The "National Reports on Pesticide Residues" issued annually by the Federal Office of Consumer Protection and Food Safety (BfL) are considered to be an important data source for determining the actual contamination of foodstuffs.

Uniform Maximum Residue Limits have been in force EU-wide since 1 September 2008. If the maximum limits are found to have been exceeded within the European Union and this exceedance could present a threat to consumers, all other member states are informed via

<sup>4</sup> Cf. <http://www.bfr.bund.de/cd/240>, 1 February 2010. There are many more groups of pesticides besides those cited here. A list can be found on the web pages of the Federal Office for Consumer Protection and Food Safety (BVL) [www.bvl.bund.de](http://www.bvl.bund.de).

<sup>5</sup> Cf. BfR: Pflanzenschutzmittel, Dokument: psm\_1\_090266.

<sup>6</sup> Apotheken Umschau (2008): Pflanzenschutz – wie viel Gift ist erlaubt?, 8 November 2008, pp. 68–73.

<sup>7</sup> Apotheken Umschau (2008): Pflanzenschutz – wie viel Gift ist erlaubt?, 8 November 2008, pp. 68–73; see also: BfR: Fragen und Antworten zu Pflanzenschutzmittel-Rückständen in Lebensmitteln, updated FAQ of the BfR dated 22 February 2007, p. 1.

<sup>8</sup> The "Acute Reference Dose" refers to the amount of a substance that a person can ingest once or in one day without endangering his or her health. Chronic hazards are expressed by the ADI value, the acceptable daily intake of a substance that a person can ingest every day during their lifetime without endangering their health. Cf. BfR: Fragen und Antworten zu Pflanzenschutzmittel-Rückständen in Lebensmitteln, updated FAQ of the BfR dated 22 February 2007, p. 3.

<sup>9</sup> Cf. Website of the Julius Kühn Institute: <http://nap.jki.bund.de/>

the RASFF (Rapid Alert System for Food and Feed) so that they can take any necessary steps to protect the consumers from such foods.<sup>10</sup>

The EU has also taken other steps to protect consumers from health risks caused by pesticides. Since 1993, active pesticide substances have been tested in a common procedure according to uniform principles.<sup>11</sup> Only those for which a safe application has been demonstrated are entered in an EU-wide positive list and may be used in pesticides, with the result that 74 per cent of the active substances originally used in the EU have been taken off the market.<sup>12</sup> While the active substances are tested at the EU level, approval of the pesticides produced from and based on those active substances takes place in the member states.

By means of new statutory regulations (Regulation [EC] N° 1107/2009, Directive 2009/128/EC), the European Union intends to further reduce the effects of pesticides on human health and the environment and the use of pesticides. Among other things, “carcinogens, mutagens, endocrine disruptors, substances toxic for reproduction or which are very persistent will not be approved” for use in pesticides.<sup>13</sup>

#### 1.4 Media portrayal of pesticides in food, 2008 and 2009

Public trust in the food consumed is challenged by recurring media coverage of the detection and in some cases officially announced exceeding of the maximum limits on pesticides in food. Two fundamental problems relating to pesticide residues taken up by the media manifest themselves in particular: one is the problem of multiple exposure (“multiple residues”), which has so far not been satisfactorily solved by science, the other is the public debate about how many pesticides one actually needs and how many residues a person can endure.<sup>14</sup> In the present study the effects on risk perception of media events pertaining to pesticides during 2008/2009 is examined.

In March 2008 the European Pesticide Action Network (PAN) published a study in which wines sold in Europe were examined for pesticide residues.<sup>15</sup> PAN had had a total of 40 bottles of wine tested for pesticide residues. Residues were found in 24 of the 40 bottles tested, prompting PAN to demand that the use of pesticides be totally discontinued. The BfR undertook its own evaluation of PAN’s findings and noted that none of the two toxicological thresholds – neither the ARfD, indicating the acute dangerousness of a substance (for humans), nor the ADI, expressing the chronic dangerousness of a substance when taken daily – was exceeded. Accordingly, the BfR ruled that none of the 24 wines objected to by PAN posed a risk for consumers.<sup>16</sup>

In May 2008 it was learned that residues of the active pesticide substance formetanate had been detected in strawberries, resulting in the ARfD being exceeded. The BfR was asked for

<sup>10</sup> European Commission/Directorate General for Health and Consumers (2008): New rules on pesticide residues in food, September 2008.

<sup>11</sup> 1993 European Council Directive 91/414/EEC.

<sup>12</sup> European Commission/Directorate General for Health and Consumers (2009): Factsheet. EU Action on Pesticides “Our food has become greener”. March 2009.

<sup>13</sup> Cf. European Commission/Directorate General for Health and Consumers (2009): Factsheet. EU Action on Pesticides “Our food has become greener”. March 2009.

<sup>14</sup> Cf. Böschen, S., Dressel, K., Schneider, M., Viehöver, W., Wastian, M. (2005): European Food Safety Regulation under Review. An Institutional Analysis – Germany. Chapter IV. 1: Pesticides – well known, well proven? Final report on the EU Project: SAFE FOODS.

<sup>15</sup> Pesticide Action Network (2008): European wines systematically contaminated with pesticide residues. Press release 26 March 2008. See also: <http://www.pan-europa.info/>.

<sup>16</sup> Federal Institute for Risk Assessment (2008): Analyseergebnisse von PAN Europe: BfR sieht keine gesundheitlichen Risiken durch die nachgewiesenen Pestizid-Rückstände in Wein. Statement No. 012/2008 of the BfR dated 27 March 2008.

a risk assessment in that regard. The BfR arrived at the assessment that, in that specific case, there was no acute risk either for adults or for children.<sup>17</sup>

Several times during the years 2007 and 2008 and again at the beginning of October 2009 a case was headlined that clearly called for official action: The insecticide and acaricide amitraz, no longer in use in Germany and now no longer used anywhere in the EU, was not only found in pears from Turkey but was found in amounts unequivocally harmful to human health: 14,000 times the ARfD value.<sup>18</sup> The pears posed an acute threat to human health and especially that of infants consuming large quantities of pears. The authorities seized and destroyed the produce before it reached the retail outlets. The head of the Baden-Württemberg Residue Laboratory at the Chemisches und Veterinär-Untersuchungsamt (CVUA) Stuttgart, Eberhard Schüle, commented in this regard: "Fortunately these are exceptions. In no other case in recent years have we had such extreme exceedances."<sup>19</sup>

The EU-wide harmonised maximum levels for pesticide residues mentioned above, promulgated with annexes to Regulation (EC) N° 396/2005, were taken up by Greenpeace Germany which subjected them to an evaluation of its own. Shortly before the new Regulation came into force in August 2008, Greenpeace published its findings under the heading "The unsafe maximum pesticide levels in the EU".<sup>20</sup> In that study, Greenpeace comes to the conclusion that the maximum residue levels set by the EU supposedly exceeded the ARfD in 567 cases. The BfR responded to the Greenpeace study and published a position statement of its own at the end of September.<sup>21</sup> In that document the BfR noted that the assertions in the Greenpeace report about possible health risks were scientifically unsound. The BfR conceded, however, need for action might possibly arise owing to new scientific findings with regard to the maximum level of the active substance flufenoxuron in dessert grapes: "The assessment carried out by the BfR shows that the maximum residue levels classified by Greenpeace as critical with regard to a possible acute risk prove as a result of the scientific evaluation to be uncritical. Only in the case of flufenoxuron can the need for a change arise on the basis of the current evaluation in the EC peer review process."<sup>22</sup>

In November 2008, Greenpeace again submitted and made public data from an international comparative study on pesticides in dessert grapes.<sup>23</sup> A total of 124 grape samples from retail stores were tested by Greenpeace. The conclusion reached by Greenpeace was that in one of the samples tested the acute reference dose (ARfD) for the active substance procymidone, a fungicide, was supposedly exceeded. The BfR published a position statement of its own on this as well and arrived at a different toxicological assessment than Greenpeace: "In the opinion of the BfR the Greenpeace calculation is toxicologically [...] unfounded." And further: "The BfR assessment result shows clearly that a threat to human health from ingesting grapes with the procymidone residues described by Greenpeace [...] exists neither for children nor for other population groups."<sup>24</sup>

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<sup>17</sup> Federal Institute for Risk Assessment (2008): Keine akute Gesundheitsgefährdung durch Formetanat in Erdbeeren. Statement No. 021/2008 of the BfR dated 7 May 2008.

<sup>18</sup> Cf. [http://www.cvuas.de/pub/beitrag.asp?subid=1&Thema\\_ID=5&ID=881&Pdf=No](http://www.cvuas.de/pub/beitrag.asp?subid=1&Thema_ID=5&ID=881&Pdf=No)

<sup>19</sup> Deutschlandfunk, Wissenschaft im Brennpunkt: Ungeschützter Verzehr? Zum Risiko von Pestizid-Rückständen auf Obst und Gemüse, 9 August 2009, 4:30 pm, p. 1.

<sup>20</sup> Op. cit., p. 3.

<sup>21</sup> Cf. [http://www.greenpeace.de/fileadmin/gpd/user\\_upload/themen/umweltgifte/EU\\_Pestizidhoechstmengen270808\\_AT.pdf](http://www.greenpeace.de/fileadmin/gpd/user_upload/themen/umweltgifte/EU_Pestizidhoechstmengen270808_AT.pdf), viewed on 10 January 2010.

<sup>22</sup> Federal Institute for Risk Assessment (2008): Greenpeace-Bericht „Die unsicheren Pestizidhöchstmengen in der EU“ enthält keine belastbaren Aussagen über mögliche Gesundheitsrisiken von Verbrauchern. Statement No. 040/2008 of the BfR dated 26 September 2008.

<sup>23</sup> Federal Institute for Risk Assessment (2008): Greenpeace-Bericht „Die unsicheren Pestizidhöchstmengen in der EU“ enthält keine belastbaren Aussagen über mögliche Gesundheitsrisiken von Verbrauchern. Statement No. 040/2008 of the BfR dated 26 September 2008, pp. 8 f.

<sup>24</sup> Greenpeace (2008) Pestizide in Tafeltrauben 2008: Fünf EU-Länder im Vergleich. Greenpeace e.V. 11/2008.

<sup>25</sup> Federal Institute for Risk Assessment (2008): Keine akute Gesundheitsgefährdung durch Rückstände von Pestiziden in Trauben. Statement No. 044/2008 of the BfR dated 26 November 2008, p. 1.

As can be seen from these media events, Greenpeace is intensively occupied with monitoring pesticide residues in fruit and vegetables. According to Greenpeace, one could even speak of a "chronic food scandal" at the beginning of the new millennium.<sup>25</sup> Greenpeace concedes, however, that "Exceedances in the case of fruits and vegetables [...] are clearly receding. [...] In the case of real problem produce, early strawberries, peppers, dessert grapes, where we had in some cases 40, 50 per cent of the produce on the market that was not saleable, that was too polluted. [...] In principle we have a sharp reduction there."<sup>26</sup> In the opinion of the BfR, on the other hand, "the figures for exceedances of maximum residue limits [...] have been constant for years".<sup>27</sup>

## 1.5 Pesticides in organic farming

The consumption of food is always linked with a high degree of confidence in producers and retailers. The emergence and success of organic farming can be seen as a direct consequence of diminishing consumer confidence in conventionally produced food. The so-called bio-produce thus represents for the consumer a purchasing alternative with supposedly less contamination by pesticides. Were the consumers to obtain more precise information about organic farming produce, however, they would have to realise that they are not produced entirely without using pesticides either – even though here only a few active substances are permitted. Copper preparations, for example, play a major role in combating fungi in organic farming. According to the Naturland Association for Organic Farming, there is as yet no alternative to the use of copper in farming, although attempts are being made to further reduce the amounts.<sup>28</sup>

Fruit and vegetables from organic farms normally contain residues of pesticide less often and in lesser amounts than conventionally farmed produce. That is the conclusion reached by the Federal Office for Consumer Protection and Food Safety in its "2008 National Report on Pesticide Residues" (March 2009)<sup>29</sup>. In the data submitted, 1,451 fruit and vegetable samples were designated as organic samples. These samples were substantially less contaminated than the totality of the samples. Of the samples tested, 1,277 (88.0%) contained no quantifiable residues and traces of residues were found in 174 (12.0%). Only 14 samples (1.0%) contained residues exceeding the maximum levels in force. The findings have been confirmed by "Ökomonitoring Baden-Württemberg", a monitoring programme of the Baden-Württemberg food monitoring agency that has been running since 2002 and concerns itself specifically with organically grown food.<sup>30</sup>

Since from the point of view of the consumer the supply of organic produce in retail stores is the most obvious distinguishing feature in terms of the contamination of foods, the population survey also focused on the importance of conventional and organic farming respectively.

<sup>25</sup> Deutschlandfunk, Wissenschaft im Brennpunkt: Ungeschützter Verzehr? Zum Risiko von Pestizid-Rückständen auf Obst und Gemüse, 9 August 2009, 4:30 pm, p. 1.

<sup>26</sup> Op. cit., p. 2.

<sup>27</sup> Welt online: „Bei uns erkrankte noch niemand durch Pflanzenschutzmittel“, Andreas Hensel über Risiken in Lebensmitteln und die Vorsorge der Behörden. 22 March 2009, 1:22 am: [http://www.welt.de/wams\\_print/article2320211/Bei-uns-erkrankte-noch-niemand-durch-Pflanzenschutzmittel.html](http://www.welt.de/wams_print/article2320211/Bei-uns-erkrankte-noch-niemand-durch-Pflanzenschutzmittel.html).

<sup>28</sup> Cf. <http://www.naturland.de/wissen/html>, viewed on 18 October 2009.

<sup>29</sup> Cf. <http://www.bvl.bund.de>, viewed on 10 January 2009.

<sup>30</sup> <http://oekomonitoring.cvuas.de/berichte.html>



## **2 Presentation of findings**

### **2.1 Survey method**

The methodological implementation of the data collection process is documented in this chapter. The detailed results of the population survey with an analysis of different sub-groups are presented in a separate table volume.

#### **Method**

The interviews were conducted by means of Computer Assisted Telephone Interviewing (CATI). More than 20 CATI stations were provided. Only trained interviewers who had received extensive person-to-person project instruction were used. A supervisor was always present to monitor quality during the collection of data.

#### **Survey instrument**

The questionnaire is included in this report as an annex.

#### **Target group**

The target group was persons 14 years of age and over living in private households with telephones in the Federal Republic of Germany. To ensure a high response rate, up to eight contact attempts were made at different times of day and on different days of the week.

#### **Sampling and selection procedure**

A total of 1,003 interviews were conducted.

The selection of target households for the survey was made by random sampling to ensure the representativeness of the sample. The phone numbers were selected using the Gabler-Häder process. Phone numbers unlisted in the telephone directory were generated by Random Digit Dialling (RDD). In that procedure the last two figures in a block of numbers are randomly generated. This ensures that all elements of the target group, in this case all land line telephone numbers in German households, have the same chance of being included in the sample – regardless of whether they are listed in the telephone directory or not.

The selection of the actual person in the household to be interviewed was also made randomly (Last Birthday Method). With this method all persons belonging to the household have the same chance of entering the sample. The interviewing was done Mondays to Fridays between 4:30 pm and 8:30 pm and Saturdays between 11 am and 4 pm so that all population groups were equally covered. The survey was conducted from 23 November to 19 December 2009.

A soft quota arrangement was used based on age and gender of the respondents.

#### **Interviewers**

A total of 28 interviewers with experience in conducting telephone surveys were employed. The project-specific training took the form of person-to-person instruction in which all the peculiarities of the project were explained. Project instructions in writing were utilised in addition.

### Response rate protocol

A response rate of 17% of the net sample was achieved. The average interview duration was 20 minutes, the average screening duration 29 minutes and the gross duration 49 minutes.

	Cases	% of the contacted gross sample	% of the net sample
<b>Gross sample</b>	<b>15,951</b>		
contacted	8,151	100	
<b>Sample-neutral failures</b>	<b>2,179</b>	<b>27</b>	
no connection	1,233	15	
no business	3	0	
no private line	108	1	
fax or modem	47	1	
no answer	302	4	
busy	2	0	
quota failures	437	5	
other	47	1	
<b>Net sample</b>	<b>5,972</b>	<b>73</b>	<b>100</b>
<b>Systematic failures</b>	<b>4,969</b>	<b>61</b>	<b>83</b>
refusal	3,875	48	65
interview aborted	61	1	1
open appointments	65	1	1
open paused interviews	3	0	0
contact maximum reached	956	12	16
no appointment possible in field time	9	0	0
<b>Interviews conducted</b>	<b>1,003</b>	<b>12</b>	<b>17</b>

### Data processing

The data preparation and analysis was done using SPSS statistical software and included all the consistency and plausibility controls that are customary in social science research.

The data were weighted by age and gender (bound weighting). Owing to the weighting, the absolute sample sizes given in the tables may deviate from the actual sample sizes.

The net equivalent income was determined so that different-sized households could be better compared in terms of income. The net equivalent income weights disposable income according to household size and composition. The disposable household income is distributed taking a weighting scale (equivalence scale) into consideration. The weighting scale comprises the following values:

Weight 1: first adult person

Weight 0.5: second adult person

Weight 0.3: children under 18 years of age

### **Statistical margin of error**

The results of the study are representative for the population of German-speaking persons 14 years of age or older living in private households with telephones in the Federal Republic of Germany (1,003 cases).

The maximum statistical margin of error of the results is  $\pm$  three percentage points in the overall result. The sample size is partially reduced through filtering and the margin of error increases accordingly. The margin of error also increases for the values of the sub-groups identified in the table volume. The data on the statistical margin of error relate to a significance level of 95 per cent.

### **Indexation**

The survey instrument was designed in such a way that extensive possibilities were available for sub-group and multivariate analysis. One important basis for the evaluation was indices, formed from the survey data on individual questions. The variables so condensed offered a valid and at the same time flexible possibility of examining connections between the central attributes. This examination took place primarily through sub-group and correlation analyses. In the graphs below, therefore, in addition to percentages there are often index values; in the simplest case, mean values were used. This enabled examination of the connections between the following attributes, among others:

- readiness to perceive risks from pesticide residues
- health concerns (ingredients)
- health concerns (food groups)
- image of pesticides
- subjective knowledge
- number of known eco-labels
- number of known stakeholders
- number of sources of information used
- information interest
- decision to purchase eco-labels
- socio-demographic attributes

## **2.2 Risk perception**

The question of the perception of the risks of pesticides in the German population is a central one: How are such products perceived by the citizenry? What aspects are more in the foreground, the benefits or the risks? What are the attitudes towards pesticides and certain production methods in agriculture? How is the presence of pesticides in food perceived? How does it fit into risk perception with regard to other foods or food groups?

In summary, the following core findings can be formulated with regard to the variable “perception of pesticides and food risks”:

1. Pesticides are generally rated as risky and damaging to humans and the environment.
2. The benefit of pesticides is seen nevertheless.
3. The evaluation of the risk to human health depends on the agricultural production method.
4. The preference for products from organic agriculture correlates with sex and age: women and older people are more critical of pesticides than men and younger people.
5. Consumers see pesticide residues as a high food risk, almost as dangerous as the bacterial contamination of foods.
6. Risk perception is greatly influenced by the media and less by personal experience.

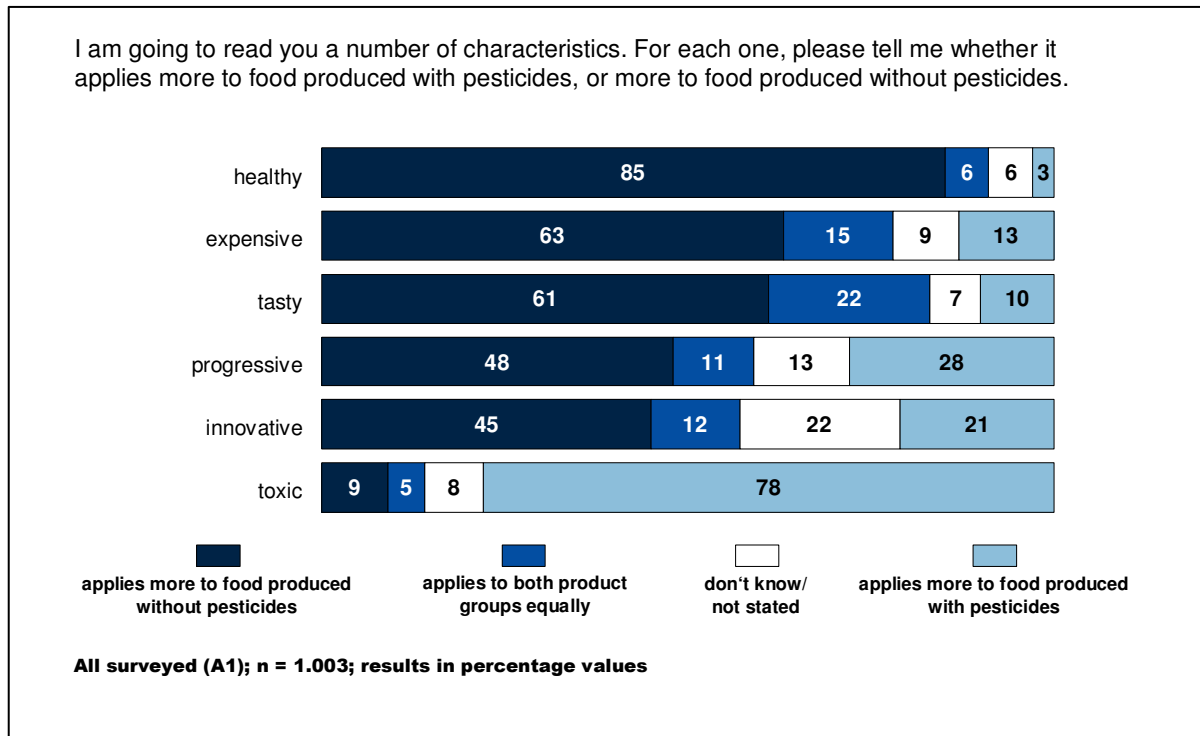
In the following, four points will be discussed. First the attitudes towards foods produced on the one hand with and on the other without pesticides will be recorded. An image profile of the different foods will thus be determined (2.2.1). Second, a central role is assigned to the assessment of different food risks (2.2.2). Third, perception of risk as expected subjective concern will be recorded with the sources of that assessment (2.2.3). Fourth and finally, the perception of risk will be placed in the horizon of personal experience. This will make clear why this topic can so easily be managed through the media (2.2.4).

### 2.2.1 Risk perception: Attitudes towards pesticides

As the first central theme regarding risk perception, the image profiles of foods produced with and without pesticides were compared. Not the actual production of foods is decisive in this context but the assessment of the consumer as to whether certain foods were produced with or without pesticides.

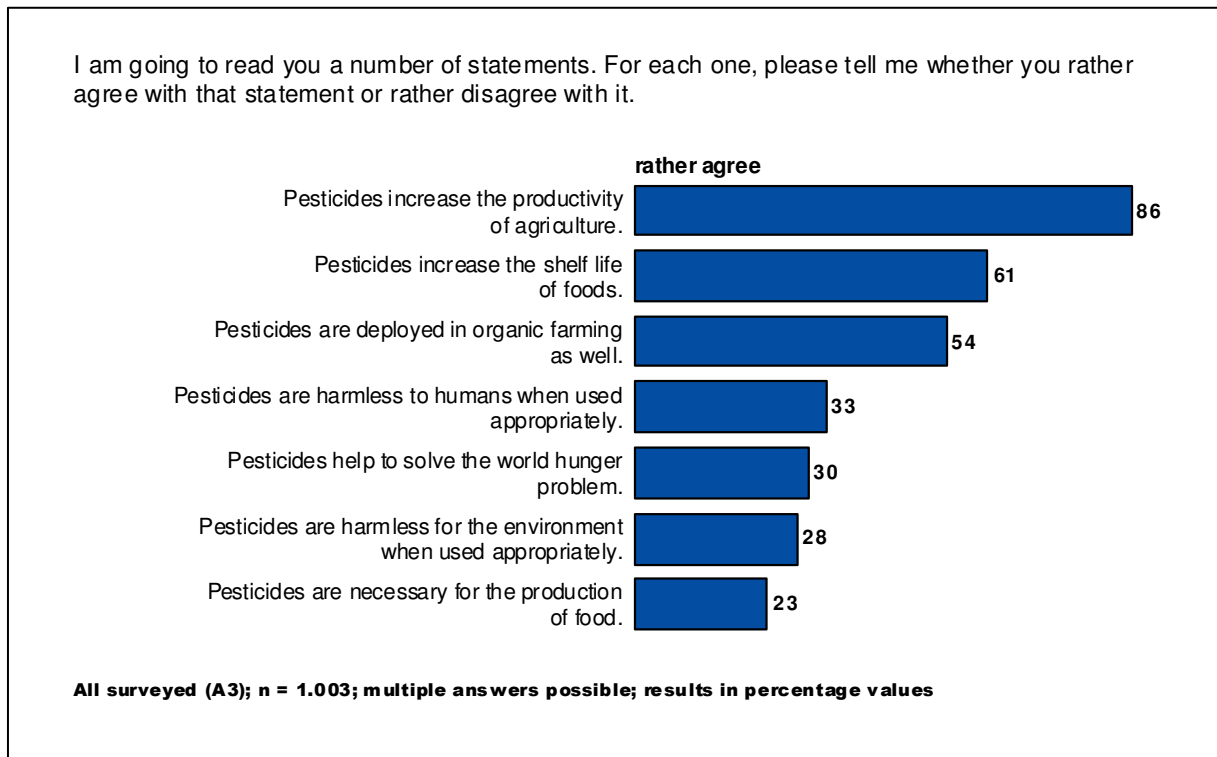
The image of foods produced with pesticides is considerably worse than the image of foods produced without pesticides. Seventy-eight per cent of the population associate foods produced with pesticides with the attribute of toxicity. The attribute "healthy" is in 85 per cent of the cases linked with those foods that were produced without pesticides. Foods without pesticides are clearly considered to be more healthy and tasty, but also more expensive than foods without pesticides. Nevertheless, pesticides are definitely regarded as useful. For if one considers the approval of certain production methods in agriculture and the demands that are placed on them, then 86 per cent of the consumers agree with the proposition that pesticides "increase the productivity of agriculture". Positive effects are seen with regard to the properties of produce as well, for 61 per cent of the consumers agree with the assertion that pesticides "increase the shelf life of foods". The majority of consumers (77%) are convinced, however, that pesticides are not absolutely necessary for food production.

**Figure 1: Image profile of foods produced with and without pesticides (Question A1)**



Pesticides are generally classified as risky and damaging to humans or the environment – even when used appropriately. For only 28 per cent of the consumers agree with the assertion that pesticides when used appropriately are harmless for the environment. Conversely, that means that 72 per cent of the consumers believe that pesticides are harmful to the environment despite being used appropriately. The result is similar with regard to harmfulness to humans (67%).

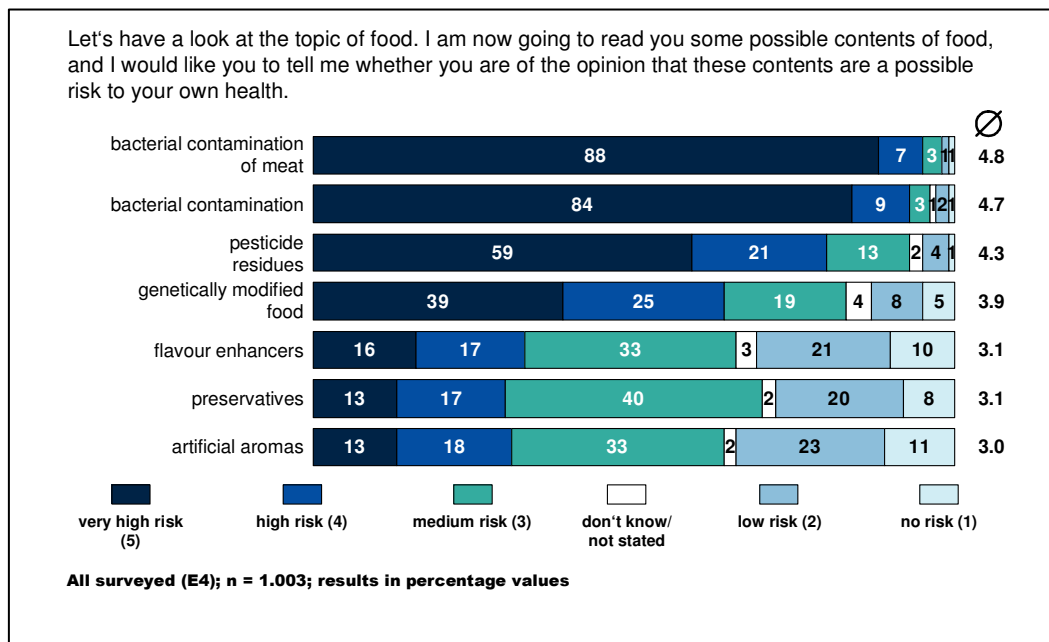
Women are even more convinced than men of their harmfulness (75% vs. 68% on the environment, 69% vs. 64% on human health) – a result that applies not just to pesticides but also for other perceived food risks such as GMOs, preservatives, artificial aromas and flavour enhancers.

**Figure 2: Attitudes towards the benefits of pesticides (Question A3)**

### 2.2.2 Comparison of food risks

The subject of pesticides is placed high on the list of food risks. After all, 59 per cent see pesticide residues as a high risk. If the “very high” and “high” risk assessments are combined, then 80 per cent, or by far the majority of the population, agree with that statement.

Pesticides rank in risk perception second only to topics that are either associated with strong feelings of nausea (“rotten meat”; category of bacterial contamination of meat: 88% “very high risk”) or those associated by many with their own experiences or experiences in their immediate environment (“bacterial poisoning”; 84% “very high risk”). Risks from pesticides are rated higher than the other risks surveyed, i.e. risks from genetically modified foods, flavour enhancers, preservatives or artificial aromas.

**Figure 3: Comparison of different food risks in overview (Question E4)**

This result is in conformity with the Special EUROBAROMETER 238 “Risk Issues” (2006). According to it, consumers in Germany were concerned about pesticides: In the open poll regarding “remembered food risks” pesticides were spontaneously placed directly in second place by 14 per cent of EU-wide respondents – second only to food poisoning. Germany heads the list on this question with 34 per cent. Pesticides even came in first in the assisted poll and were described as (very) alarming by 71 per cent of the EU-wide respondents. Germany was just under the European average on this question with 69 per cent.

Some interesting relationships can be discerned as well for the qualification of the risk perception of food risks. Risk perception increases with age (cf. Figure 4).

Persons with high risk assessment are more likely to pay attention to information on pesticides and thus know more stakeholders involved in the subject of pesticides. Persons who have very great concerns about pesticides rely less often on internal sources (experience, friends, feelings). Thus the concerns were aroused by media coverage.

When shopping, consumers with pronounced health concerns regarding food ingredients opt for products with eco-labels much more often (cf. Figure 5).

Figure 4: Connection between age and assessment of health concerns (Question E4)

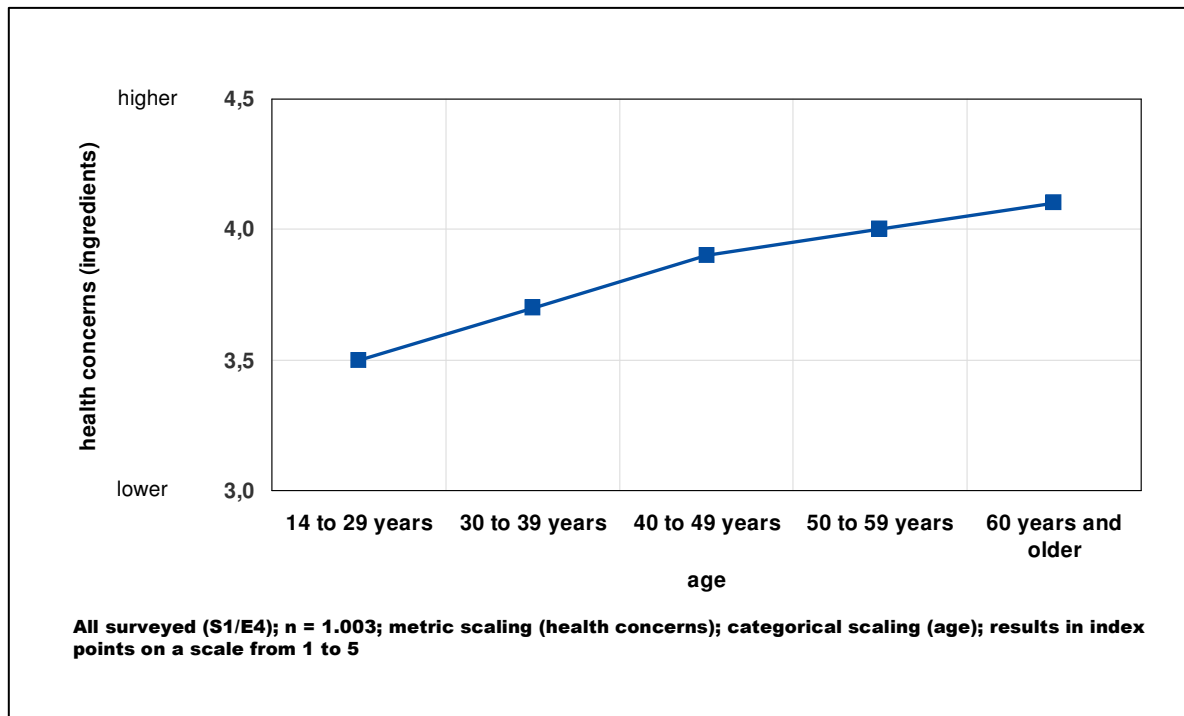
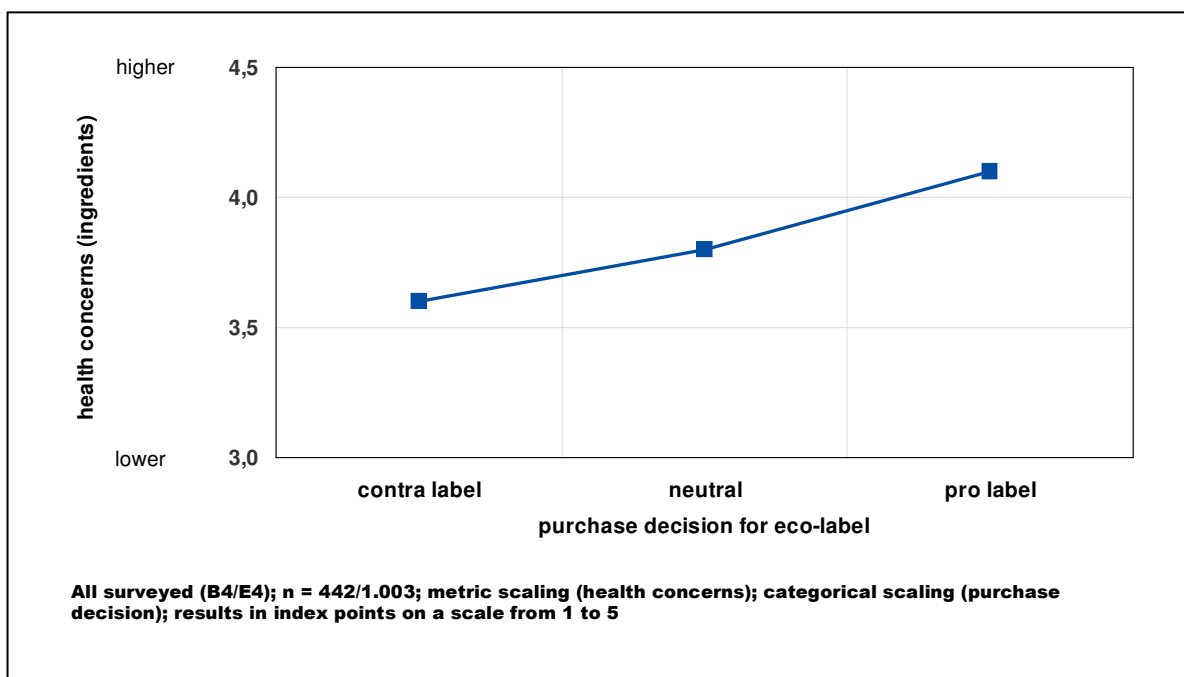


Figure 5: Connection between purchase decision and health concerns (Question B4/E4)



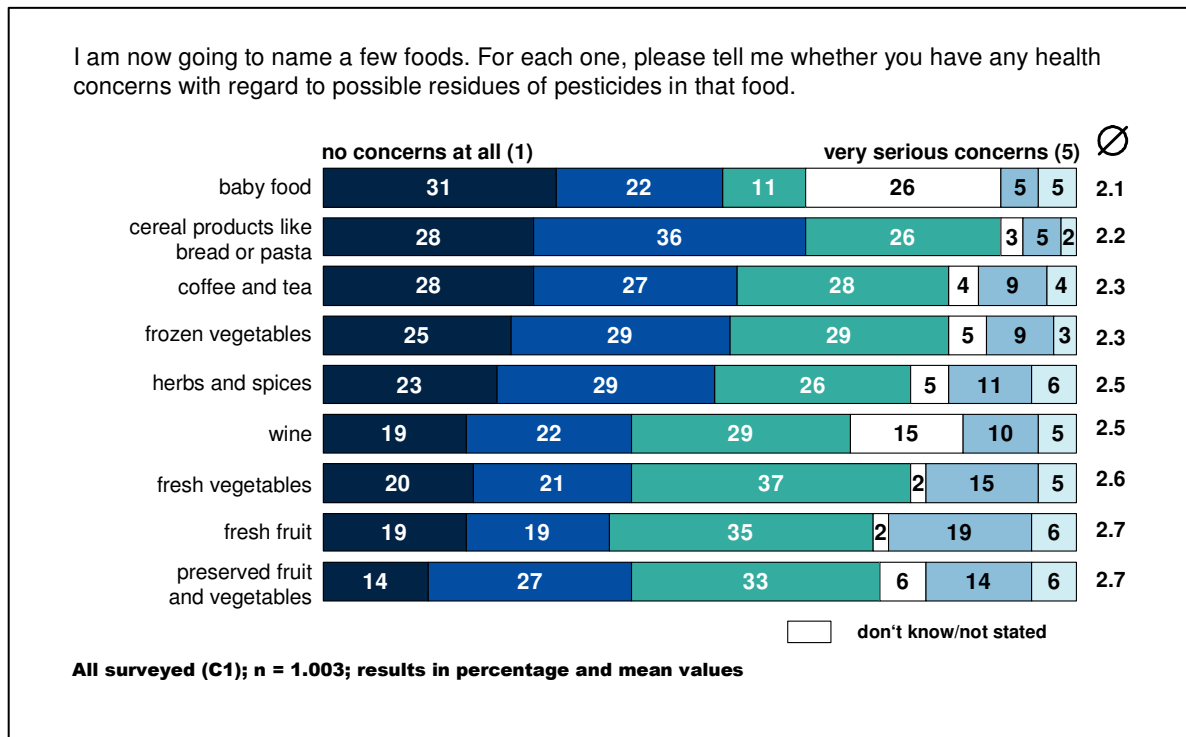
2.2.3 Risk perception: Subjective concerns

The greatest concerns consumers have with regard to residues of pesticides in food have to do with fresh and preserved fruit and vegetables. For all foods other than fresh fruit (25%, mean value [MV] 2.7 on a scale of 1 to 5) only a maximum of 20 per cent have “very serious concerns” or “serious concerns”. Cereal products (seven per cent; MV 2.2) and baby food (ten per cent; MV 2.1) are most likely to be considered safe.

As the results of the correlation analysis show, consumers with major health concerns tend to prefer organic products.

Special attention was given to the question of which information sources conveyed the health concerns of consumers with regard to foods. The answer is unequivocal: Risk perception with regard to pesticides or pesticide residues is controlled primarily by the media. At the same time, mass media scandal-mongering seems not to have a lasting effect on risk perception but only to cause a short-term heightening of the relevance of the subject.

Figure 6: Assessment of health concerns about foods (Question C1)



Regardless of the food group, the media focus on risks has a much stronger influence on possible concerns than individual experience (cf. Figure 7). Other sources of experience such as friends and acquaintances, feelings, tips from consumer protection organisations and information from government and public information sources come even later (cf. Figure 8).

Figure 7: Qualification of concerns expressed about certain foods (Part I; Questions C2 to C7/C9)

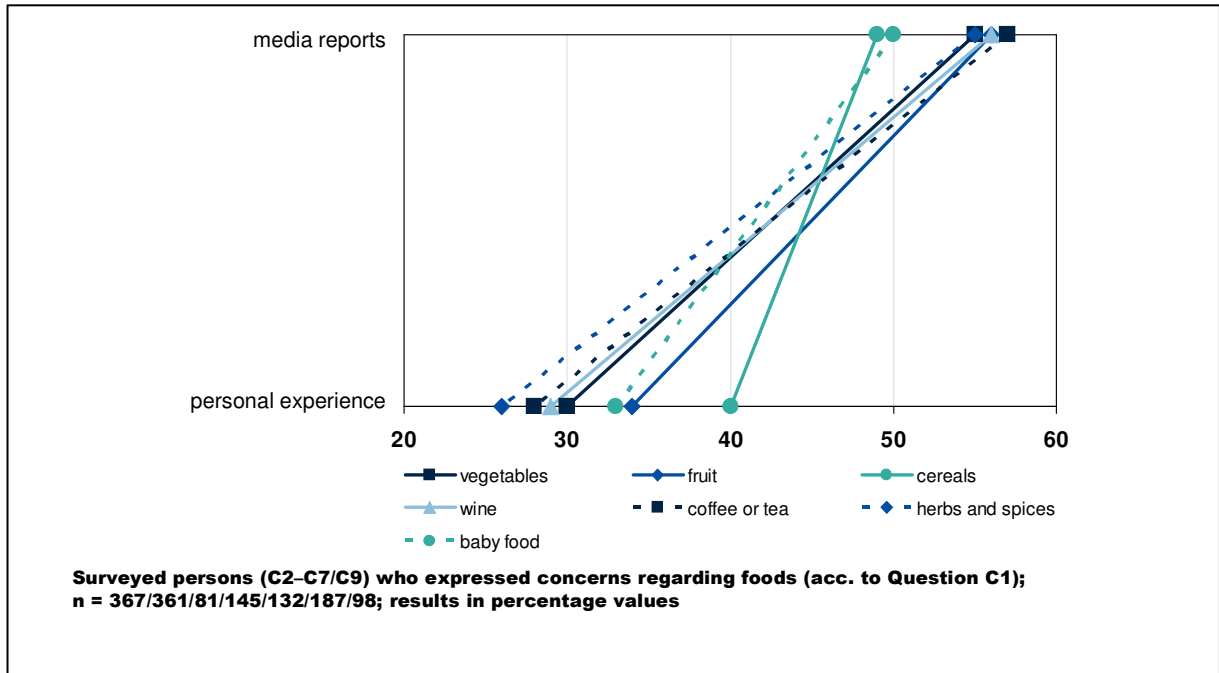
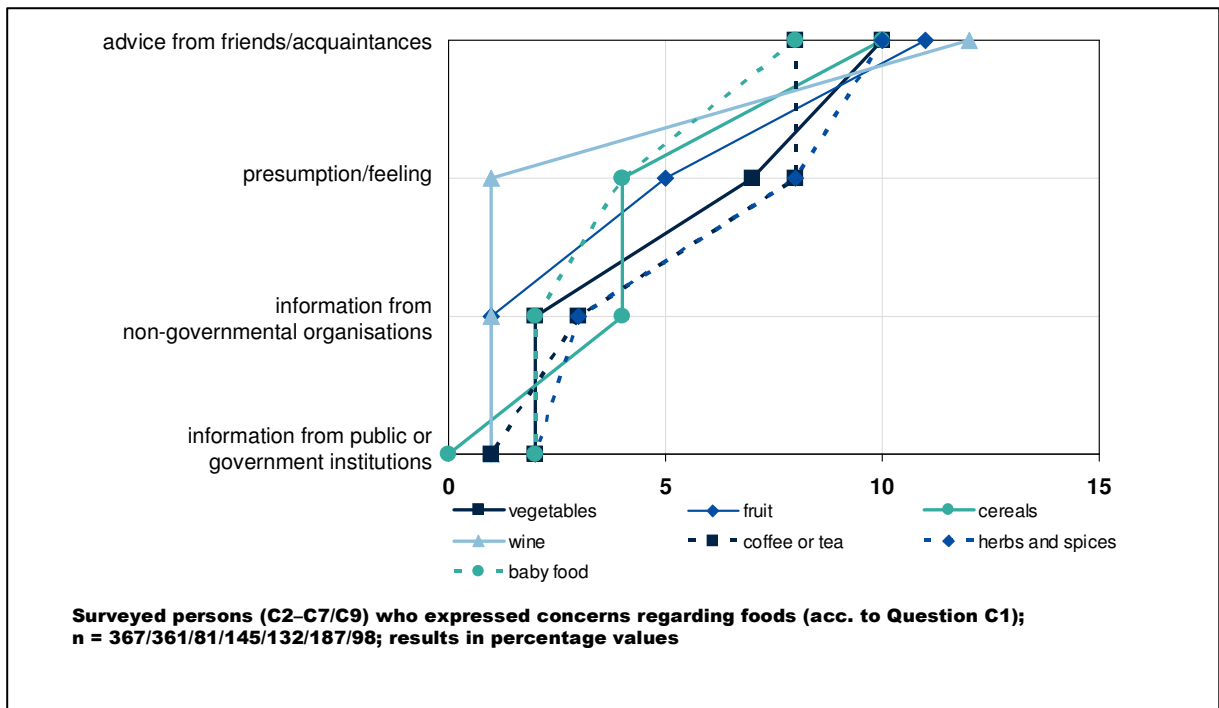


Figure 8: Qualification of concerns expressed about certain foods (Part II; Questions C2 to C7/C9)



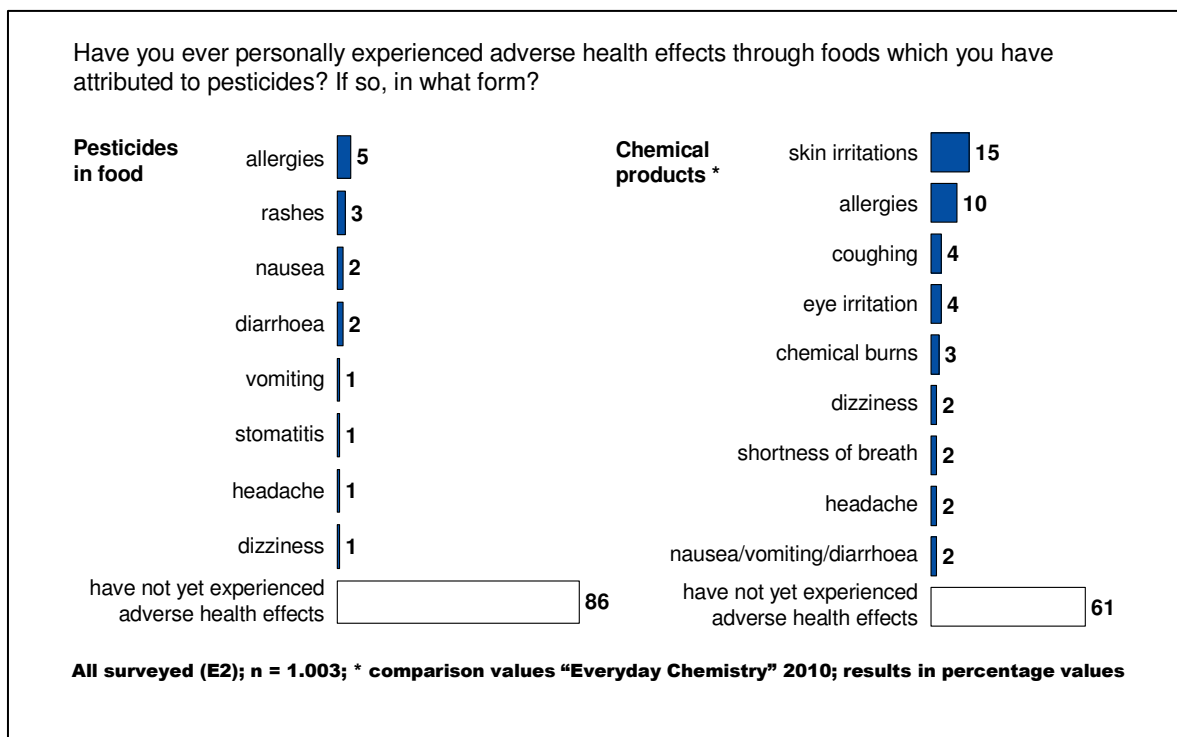
### 2.2.4 Risk perception and personal experience

The high degree of media control over this subject is linked to the fact that for most consumers the subject of possible risks from pesticides is highly abstract. Consumers generally have no sensual experiences with pesticides. They therefore rarely report about having suffered adverse health effects that they associate with pesticides. There is thus a clear distinction between this and the subject of “chemicals in consumer-focused products” (cf. the BfR study “Everyday Chemistry”, BfR 2010). For in the field of chemical products there are substantially more (negative) personal experiences. In the study mentioned, a total of 39 per cent of consumers indicated that they had already suffered adverse health effects from using chemicals.

In the open inquiry on whether pesticides could be linked to certain personal experiences of adverse health effects, 86 per cent of consumers indicate that they have not yet suffered any adverse health effects. Pesticides are a risk factor that is seldom placed in the context of personal experience by individuals. At the same time, however, there is a hazy uneasiness about the presence of pesticide residues in the food chain. Taken together, this increases the chances of media control of attention.

In the responses, “allergies” are in first place with five per cent, followed by rashes, nausea and diarrhoea. Only one per cent of the population attribute vomiting, stomatitis, headache or dizziness to pesticide residues in foods.

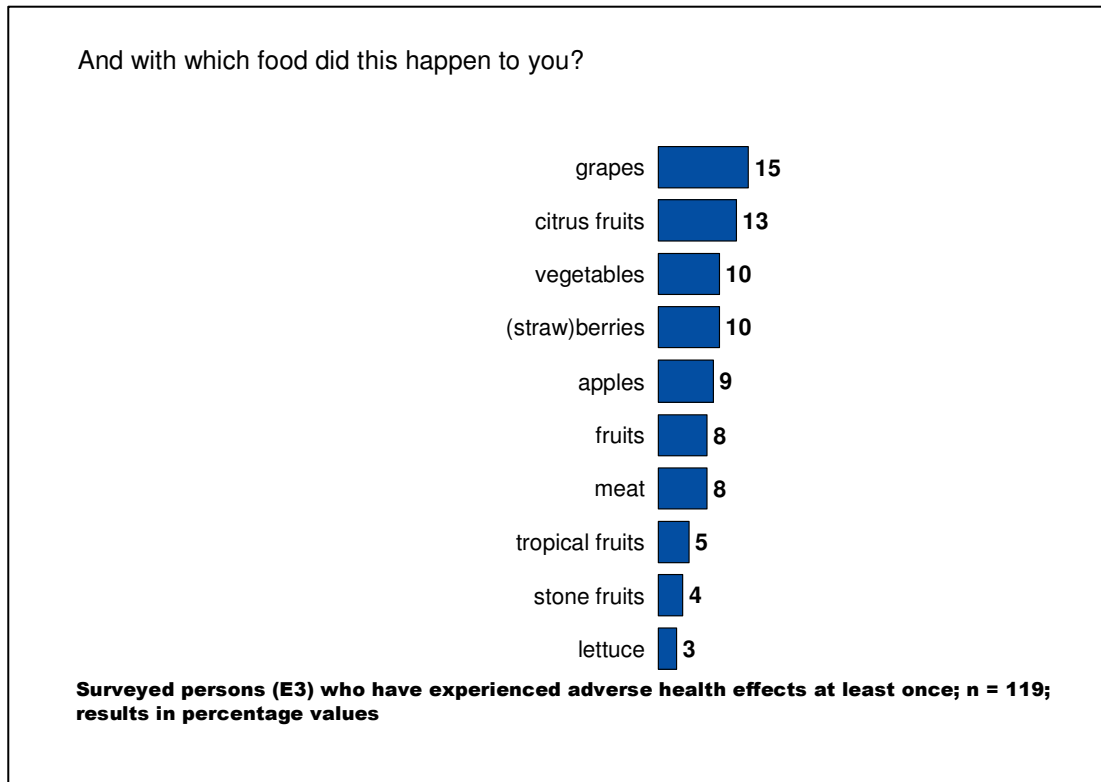
**Figure 9: Adverse health effects from pesticides as compared to chemicals (Question E2)**



To determine which foods the consumers themselves felt had caused them to suffer adverse health effects, the respondents were asked to indicate this in the context of an open poll.

All in all, fruit are more often made responsible for the adverse effects than vegetables. In the open poll, consumers most often mentioned grapes (15%), citrus fruits (13%) and only in third place the general category of vegetables (ten per cent). Other foods mentioned were (straw)berries (10%)<sup>31</sup>, apples (9%) and the general category of fruit (8%). Lettuce was in last place at three per cent.

**Figure 10: Food made responsible for adverse health effects (Question E3)**



<sup>31</sup> The wording (straw)berries was used because while strawberries were most often associated with adverse health effects, other kinds of berries were also cited to a lesser extent.

## 2.3 Behaviour and pesticides

For most consumers, dealing with pesticides appears as an indirect field of action, since few of them apply these agents themselves. Consumers see themselves primarily as persons affected by pesticides. The substances are seen as undesirable residues in the food they need daily. The crucial point here is the link between the subject of pesticides and the “food shopping” set of activities. In this context, ways of dealing with pesticides are articulated indirectly, namely through preferences for certain products when shopping. In summary, the following points can be noted with regard to the „Behaviour and pesticides“ block of issues.

1. Fifty per cent of consumers have a preference for organically produced foods.
2. Media reports and other events with pesticides have led to concrete behavioural changes only in a minority of the population.
3. Children in the household influence buying behaviour in favour of organically produced foods.
4. Respondents say they rarely use pesticides in their own gardens.

The greatest importance is attached to purchasing behaviour in this chapter. Here preferences for certain kinds of farm products and the justification of purchasing behaviour can be linked with supposed risks from pesticide residues (2.3.1). The second question was to what extent there have been changes in behaviour in the context of risk events with pesticides (2.3.2). Third, attention was to be paid to the extent to which the presence of children in the household affects behaviour (2.3.3). The final question was to what extent the consumers themselves practice gardening, thus coming into contact with pesticides as users, and to what extent that possibly affects perception of the subject of pesticides (2.3.4).

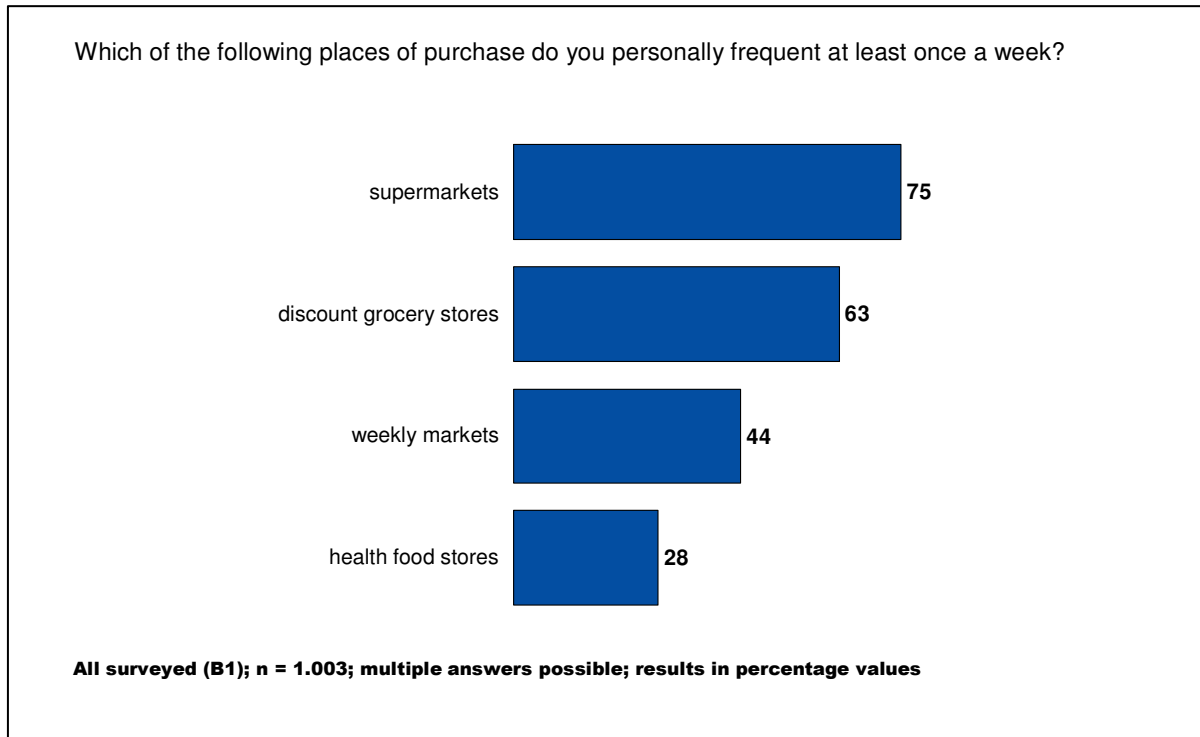
### 2.3.1 Purchasing behaviour

Purchasing behaviour is the decisive factor in dealing with the subject of pesticides in food. For that reason the first question was to determine the retail outlets consumers frequent for fresh fruit and vegetables. Note that in the case of this question a simplified query form was used, the results of which were needed for the sub-group representation and for correlation analyses. One effect that has already appeared in the past in comparable surveys, is the overestimation of the proportion of health food store shoppers owing to social desirability.<sup>32</sup> For many consumers, moreover, the distinction between the terms “supermarket” and “discount store” is unclear.

The places of purchase used say nothing definitive about organic preferences. Health food stores, which can be classified as places to purchase organically farmed food, are visited by only 28 per cent of consumers. In the meantime, however, supermarkets and even discount stores offer “organic product lines” that are certified as such.

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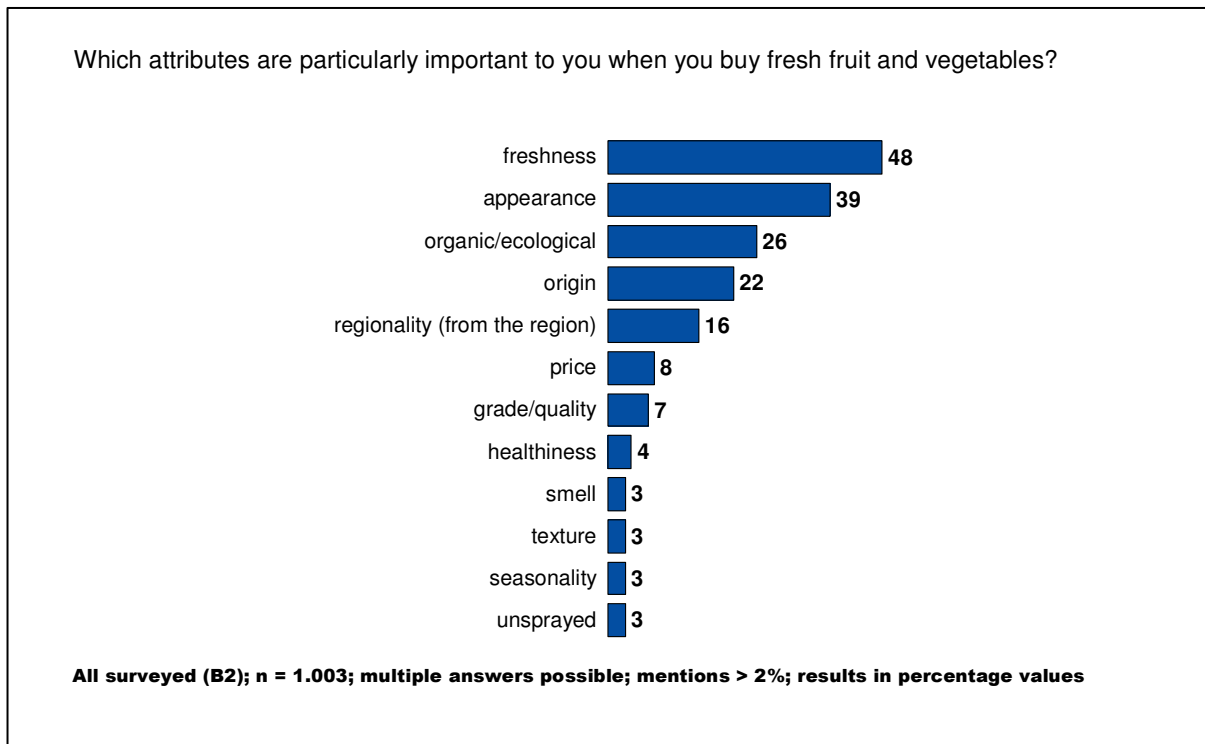
<sup>32</sup> The term “social desirability” describes the phenomenon that certain answers are considered by the respondents to be particularly legitimate or viewed as particularly eligible in the interaction. This results in a systematic bias favouring those answers which have positive connotations in the public sphere and designate (allegedly) desirable social conditions.

**Figure 11: Overview of supply sources (Question B1)**

The most important selection criteria in purchasing fruit and vegetables were asked about in an open question. The frequency of the answers is shown in the next chart.

The most important factors in the purchasing decision are freshness (48%) and appearance (39%). It is striking that only 26 per cent mentioned the factor “organic/ecological” here. A preference for organically produced food therefore exists at least in part of the population, but this factor is subordinate to freshness and appearance.

The place where the food is grown is also important to consumers: The origin is important for 22 per cent and the regional character for 16 per cent. This factor reflects the geographical classification of produce by the consumers. Regionality is a factor that signals trust. The geographical classification according to country of origin also plays a crucial role for the subject of pesticides: Following media reports on contaminated foods the consumers often avoid fruit and vegetables from the countries or origin concerned (cf. Figures 22/23).

**Figure 12: Appraisal factors in purchasing fruit and vegetables (Question B2)**

There is a clear preference for avoiding pesticides in food (76%). That does not mean, however, that organically farmed produce is purchased by preference for that reason. Here the assessments balance out: half the population say they prefer to purchase conventionally farmed produce, the other half organically farmed produce. These data run counter to current surveys regarding the actual consumption of organic produce (BÖLW 2010). These surveys give a pronouncedly asymmetrical picture of purchasing behaviour (according to a 2008 GfK study): Intensive buyers account for only three per cent of households but are responsible for 39% of the consumption of organic produce. Fifty per cent of households are in the group of non-purchasers or occasional purchasers and are responsible for only four per cent of organic turnover. However, the group of non-purchasers and occasional purchasers shrank from 63% to 50% of households between 2005 and 2008 (BÖLW 2010, p. 28).

When asked about information behaviour with regard to pesticides in food, however, the majority turned out not to be fully informed (68%). This parallels the finding that the ecological/organic labels are not particularly well known (see below). There is a clear correlation between age and increased perceptiveness with regard to pesticides in food (cf. Figure 14): younger consumers are far less attentive as far as pesticide residues in food are concerned.

Figure 13: Perceptiveness with regard to pesticides (Question B9)

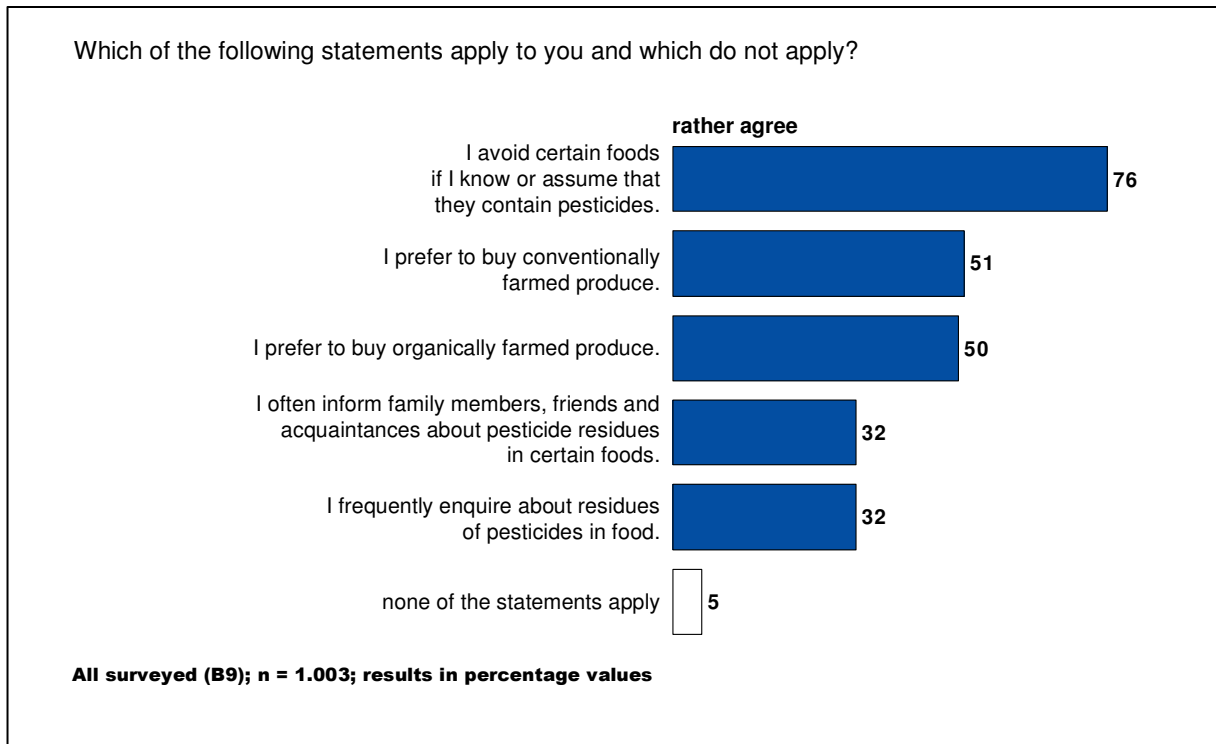
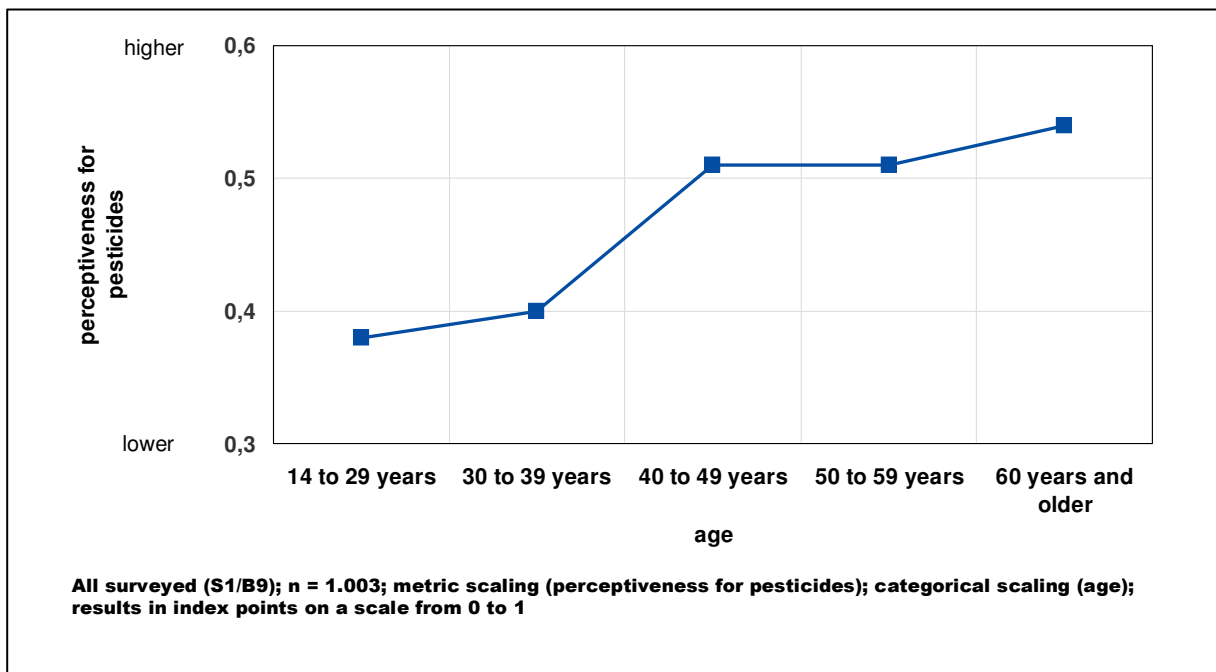


Figure 14: Relationship between age and perceptiveness for risks in the field of pesticides (Question S1/B9)



There are also other correlations to be seen between organic preference and socio-demographic features. There is a very clear correlation between sex and preference for a certain method of growing produce: among women, the proportion who prefer to buy organically grown produce dominates, among the men the proportion who prefer conventionally grown produce (Figure 15).

Citizens with low incomes more often tend to buy conventionally grown produce: 59 per cent of the persons in the lowest income group (up to 1 000 € net equivalent income) prefer conventionally grown food, but only 45 per cent of persons in the highest income group (more than 1 750 €).

Persons with low to average formal education levels and with migration backgrounds tend to prefer organically grown produce less often than the population as a whole (Figure 16).

**Figure 15: Organic preference by net equivalent income and gender (Question B9/S15/S16)**

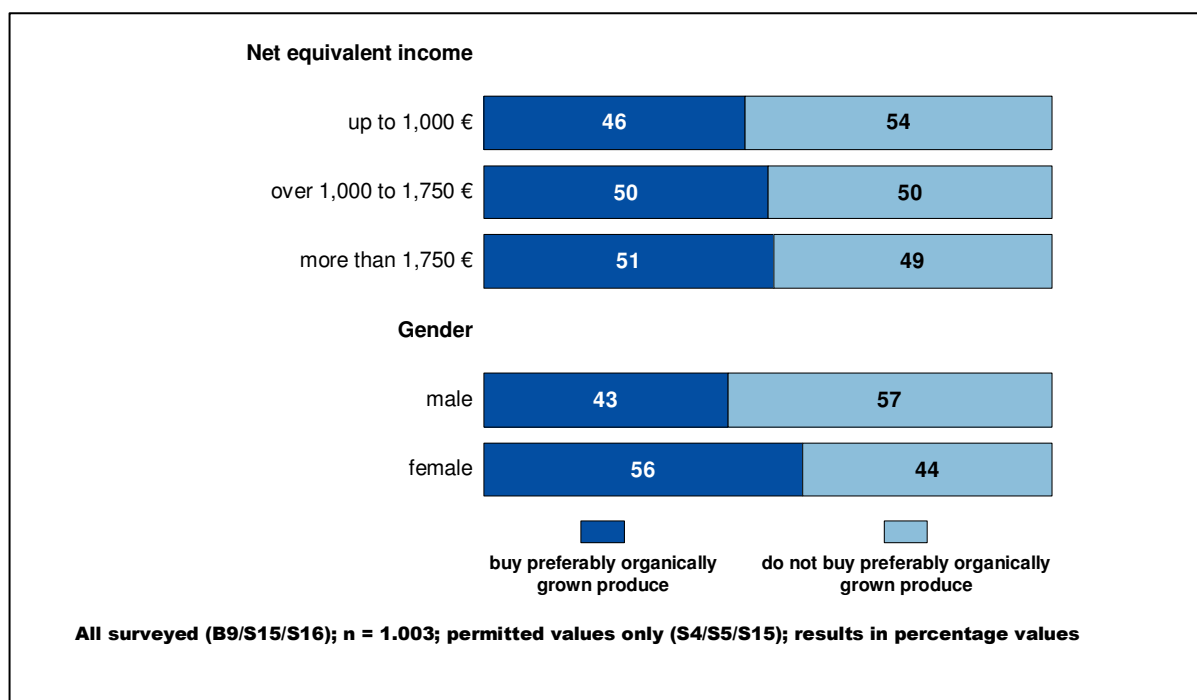
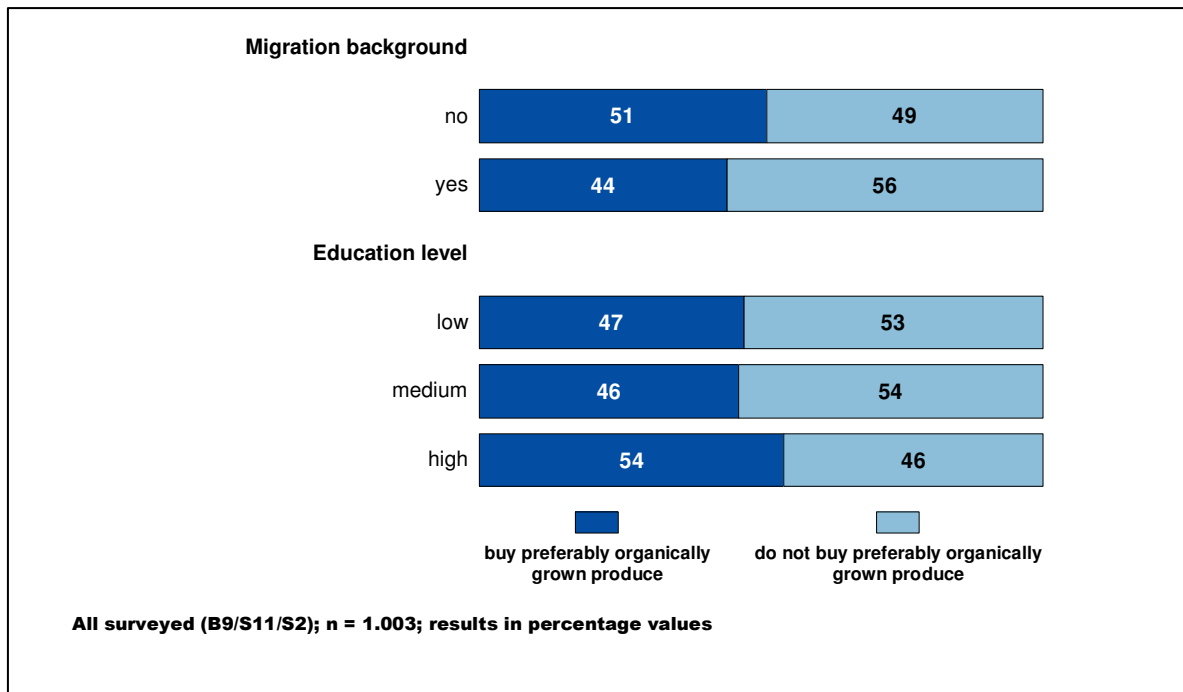
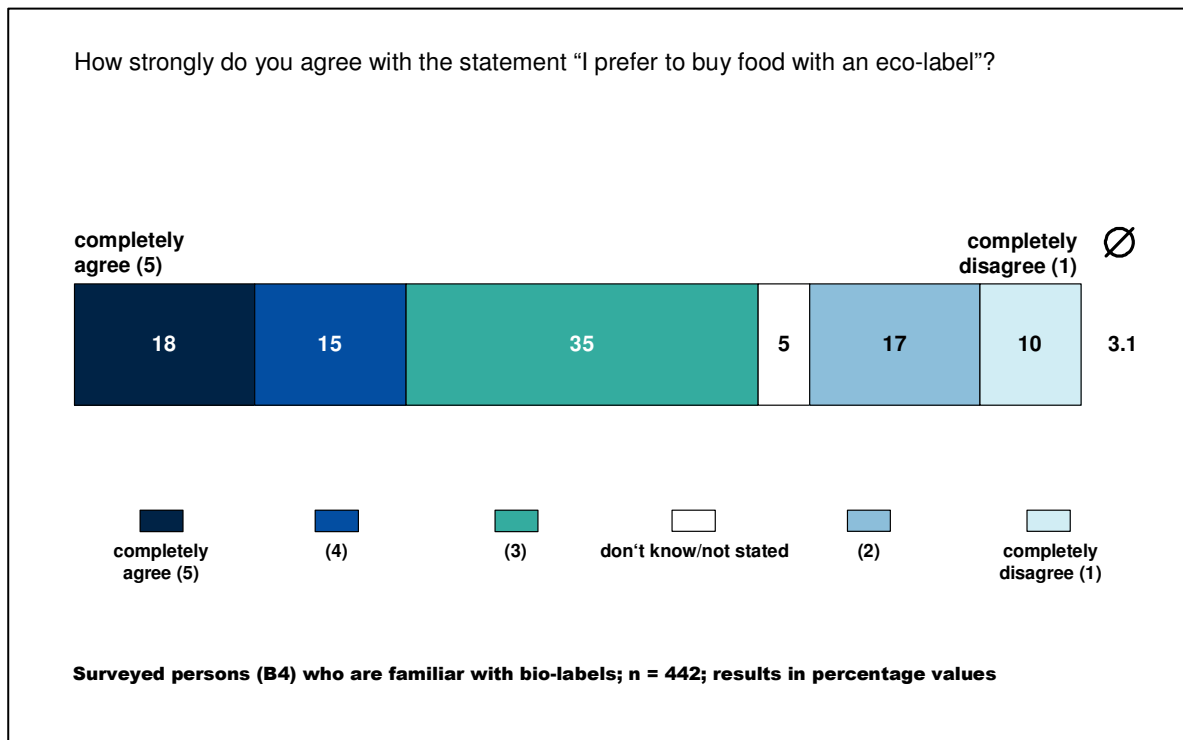


Figure 16: Organic preference by migration background and education (Question B9/S11/S2)



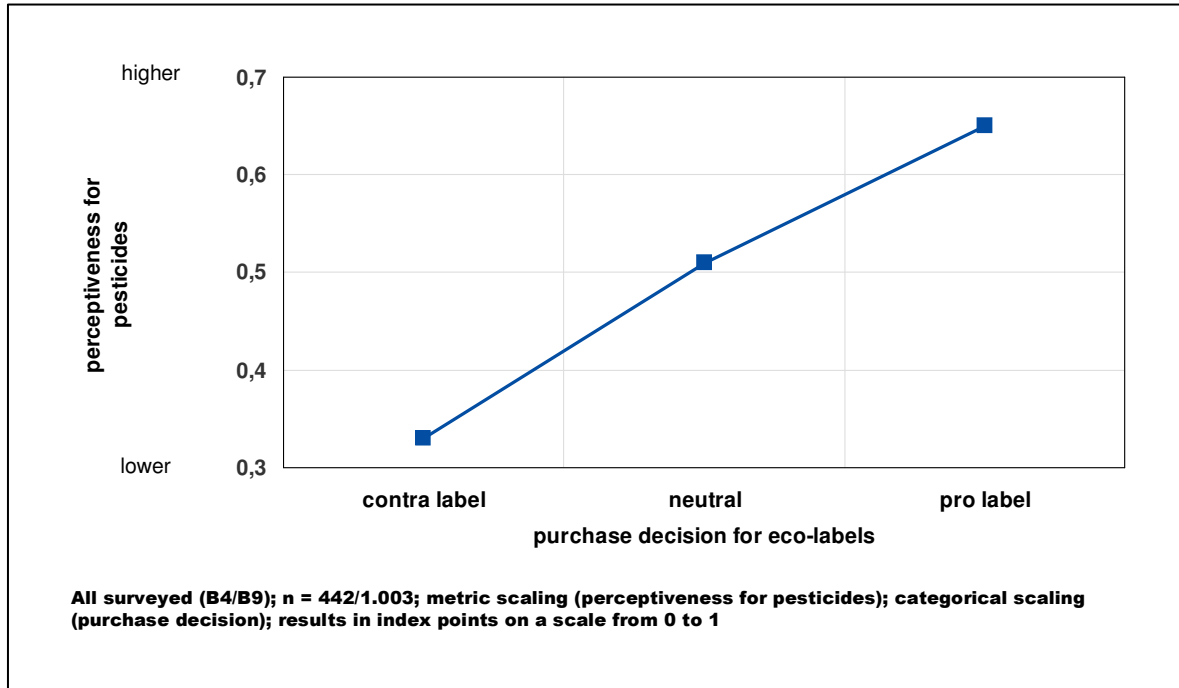
About one third of the population expresses a preference for organically grown produce when shopping. Thirty-three per cent agree (completely) with the statement “I prefer to buy food with an eco-label“. Thirty-five per cent adopt the neutral “neither nor” position (3). Twenty-seven per cent disagree (completely) with the statement.

Figure 17: Preference for products with eco-labels (Question B4)



The purchasing decision and its orientation on an eco-label correlates significantly with perceptiveness regarding pesticides in food: the sooner consumers pay attention to pesticide residues in food, the sooner they choose products with an eco-label when shopping.

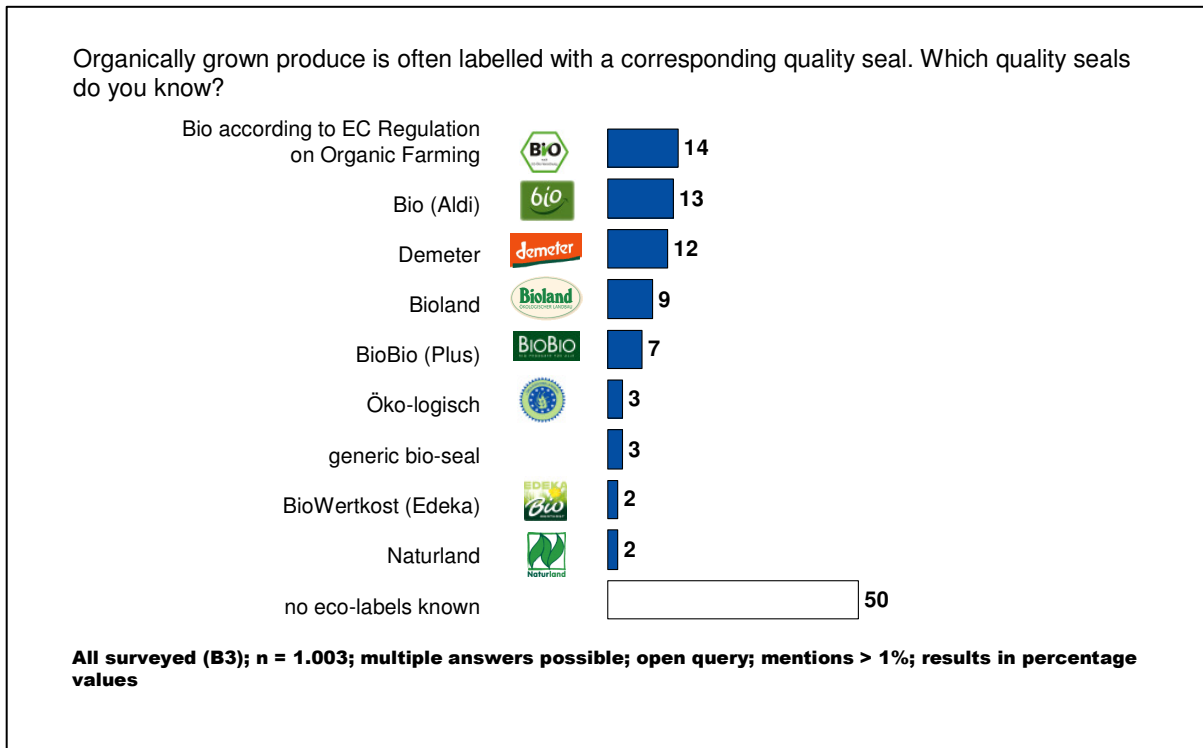
**Figure 18: Correlation between purchase decision and perceptiveness for risks from pesticide residues (Question B4/B9)**



About half the consumers are able to name concrete quality seals in response to the open query. Although half the population expressed a preference for organically grown produce, eco-labels are thus known only to a limited extent. Fifty per cent indicate they know of no eco-labels whatsoever.

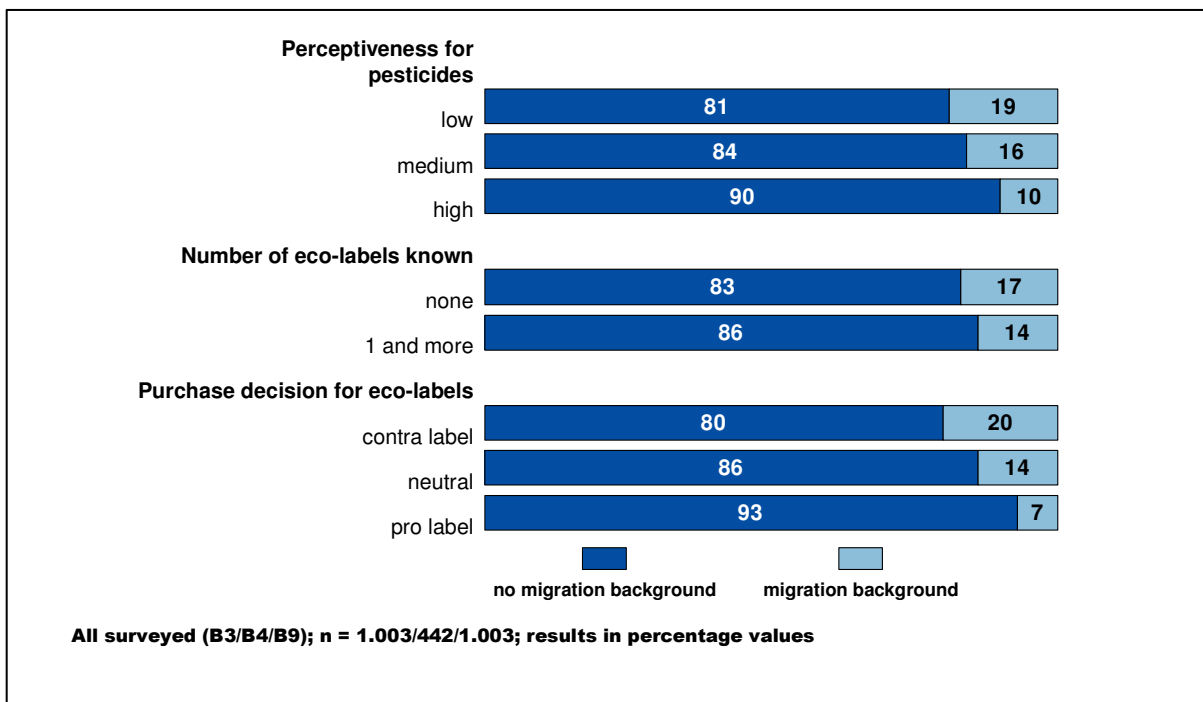
In interpreting the results, however, it should be noted that the data was collected by means of a telephone survey and the individual labels are presumably known only visually and – apart from the mention “organic” – are often difficult to verbalise. A survey with graphic depictions of the individual quality seals would certainly reveal a significantly greater familiarity with all labels.

**Figure 19: Familiarity of eco-labels (Question B3)**



As the following chart shows, persons with migration backgrounds are less perceptive of risks from pesticides, tend to know less eco-labels and when shopping choose products with eco-labels much less often than persons without migration backgrounds.

**Figure 20: Perceptiveness for risk from pesticides, number of eco-labels and purchasing decision by migration (Question B3/B4/B9)**

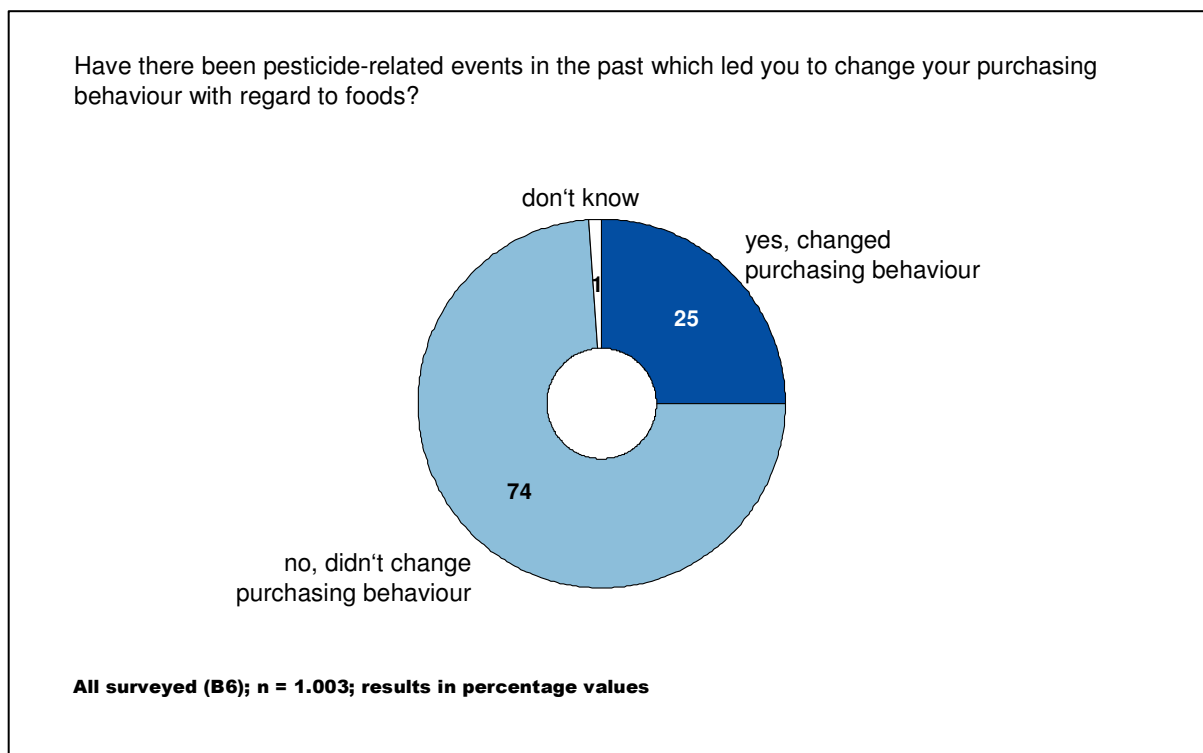


### 2.3.2 Behavioural change after events with pesticides

One quarter of the population has ceased to buy certain foods, at least temporarily, owing to information about pesticides. Looking at it another way, the threshold for a change in behaviour is relatively high: The vast majority, 74 per cent, have not yet changed their behaviour in connection with reports on pesticides.

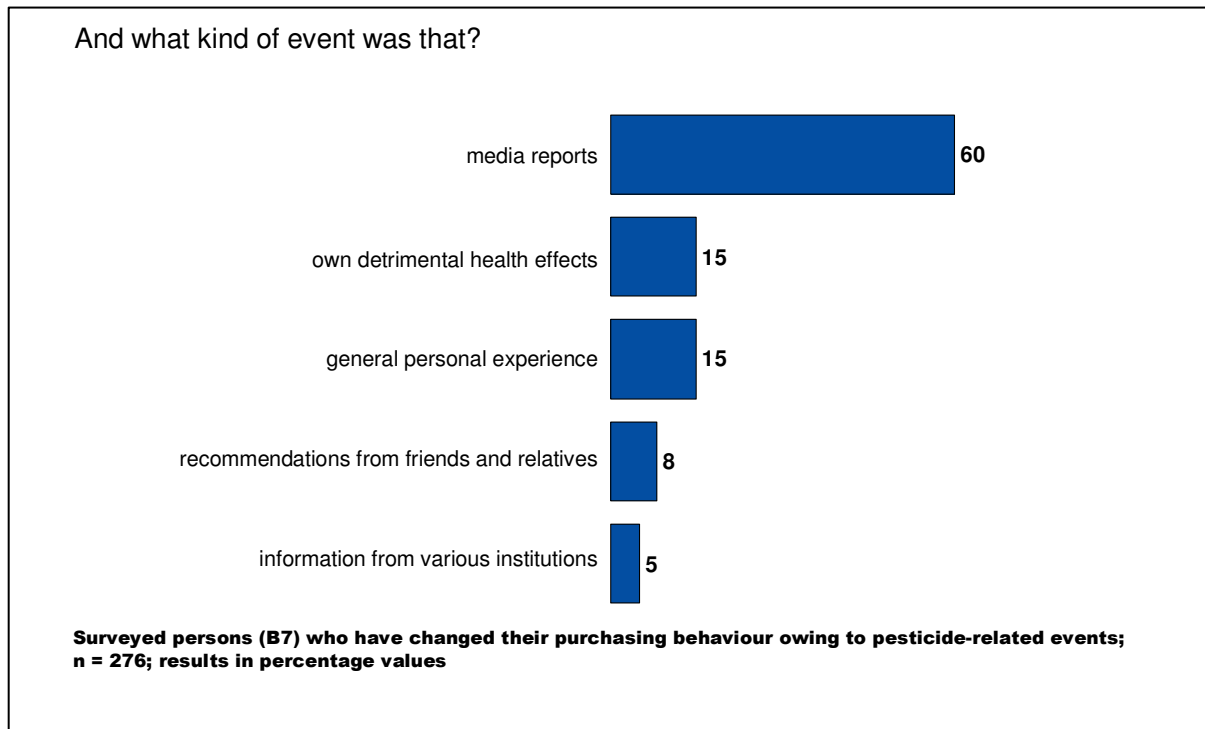
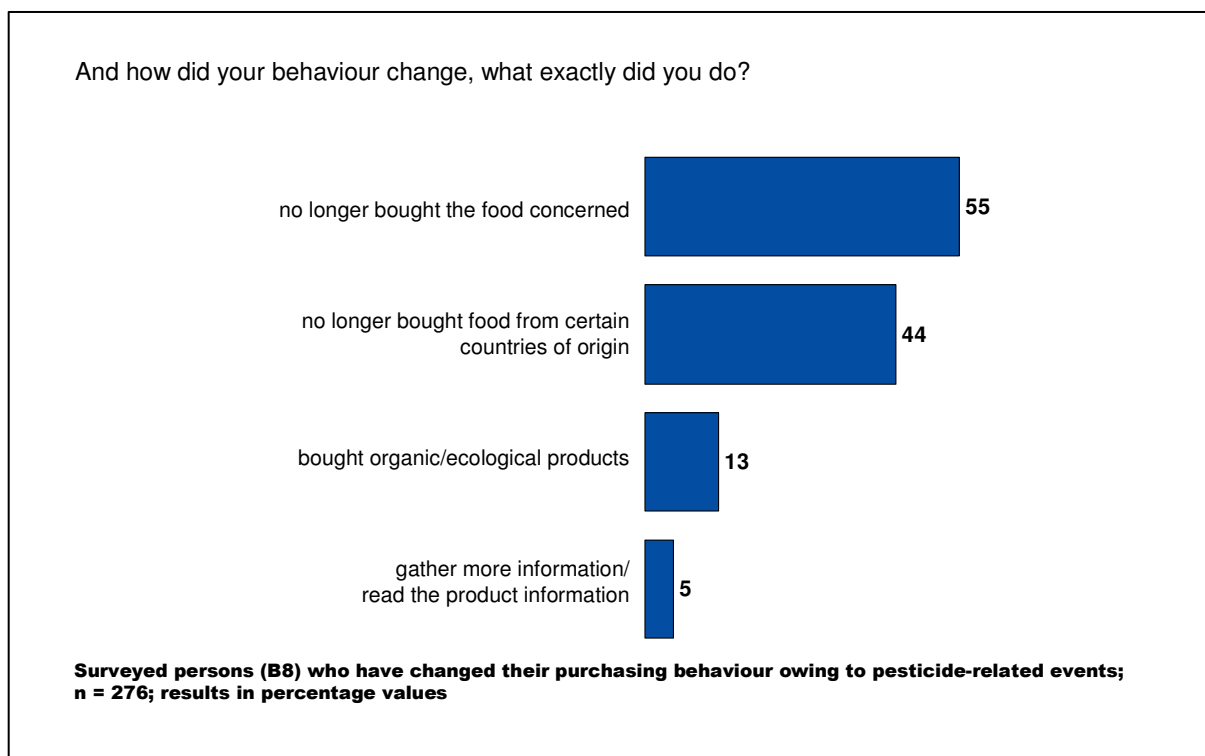
Older consumers state much more frequently than younger ones that they have changed their purchasing behaviour in the past: in the 14 to 19 age group the proportion is only eleven per cent. It increases with the age of the consumer and stands at 35 per cent in the over 59 age group.

**Figure 21: Behavioural change owing to pesticide events (Question B6)**



Sixty per cent of the consumers who have already changed their behaviour (temporarily) in the past did so because of media reports. Detrimental health effects or personal experience generally lag far behind at 15 per cent each. This finding underscores once again the conclusion that the media are a key actuator of behavioural changes in connection with pesticides.

The behavioural adaptation selected, following a media report on pesticides in food, follows the pattern of a minimum adaptation. Simple heuristics are applicable here: one no longer buys the food product concerned (55%) or one avoids foods from certain countries of origin (44%). The latter is an item of information that is often included in the media reports and enables easy attribution to the possible danger and its avoidance.

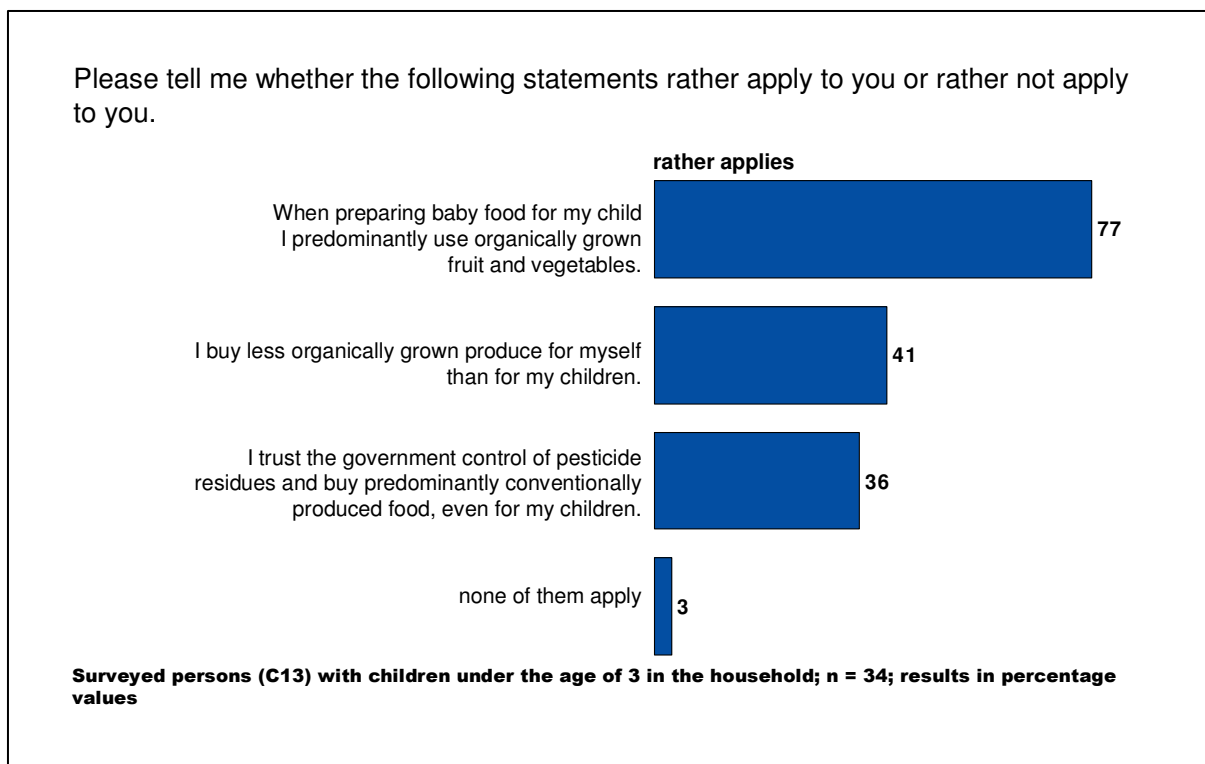
**Figure 22: Event triggering change in behaviour (Question B7)****Figure 23: Type of change in behaviour after event with pesticides (Question B8)**

### 2.3.3 Peculiarities of households with children

The presence of children in the household reinforces the preference for organically grown fruit and vegetables. The exposition that follows is based on the responses of persons in households with children under the age of three. For children, more attention is paid to whether the food is organically grown (77%). At least some of the adults draw a distinction here between purchasing for themselves and purchasing for the children: Forty-one per cent agree with the statement that they buy less organically grown produce for themselves than for their children. The majority do not trust government controls and therefore display no preference for conventionally grown produce (64%). These figures contrast with the actual purchasing decisions (cf. 2.3.1).

It is striking in this connection that persons with children in their households express greater misgivings with regard to pesticides when purchasing foods of all product groups. Thus they are generally more prudent in their assessment and are more likely to entertain the suspicion of a risk.

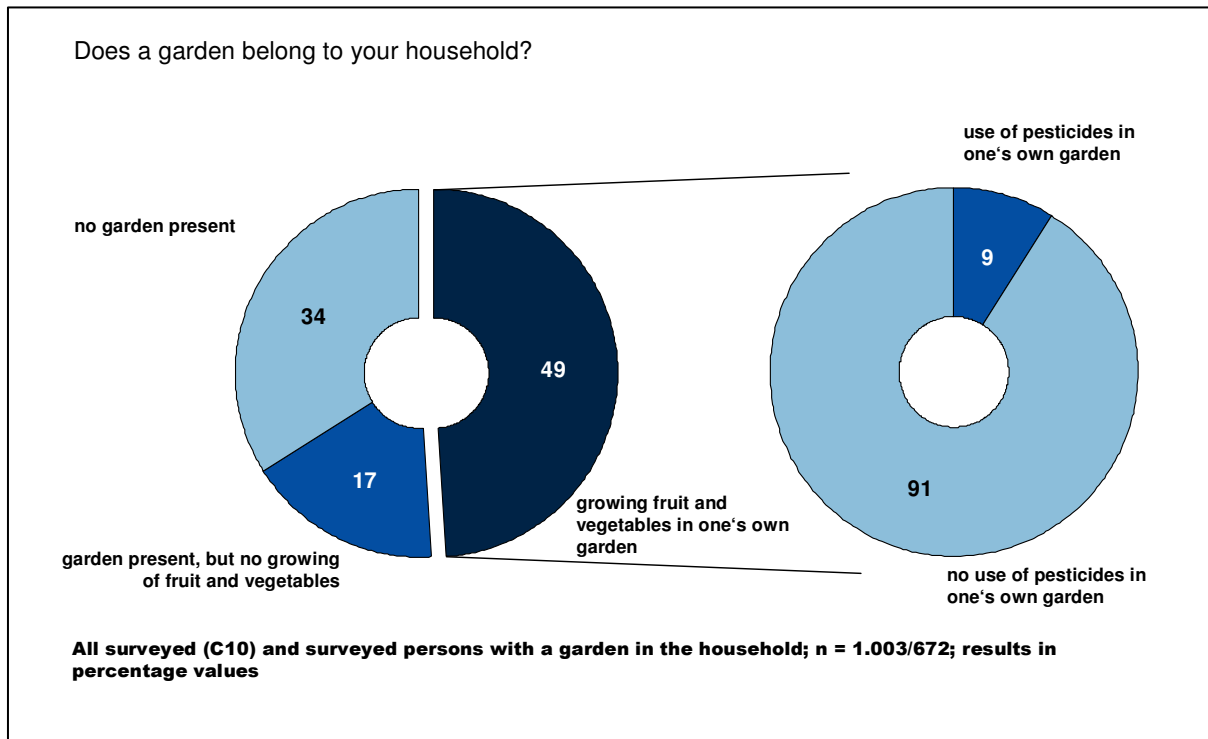
**Figure 24: Purchasing behaviour/preparation of food for children (Question C13)**



### 2.3.4 The private garden and the use of pesticides

Just under half the citizens indicate that they grow fruit and vegetables in their own gardens. But only nine per cent of these indicated that they use pesticides in their own gardens. It can be assumed that that figure is too low. The question is therefore, how is this finding to be interpreted? It can be assumed that the predominant idea among consumers is that pesticides are used in agriculture and horticulture but that they are not associated with their own households. Pesticide products for one's own garden, such as snail grain or insect poisons, are not perceived as "pesticides".

Figure 25: Growing fruit and vegetables in one's own garden (Question C10)



## 2.4 Knowledge about pesticides

In this study the "knowledge about pesticides" group of questions was structured with some specific question elements. A particularly important question here was to what extent the occurrence of pesticides in food was legal. Knowledge about possible health risks was also to be asked about, however.

The main results at a glance:

1. Two thirds of the population assume that no residues of pesticides at all may be contained in foods.
2. Still, 40 per cent of consumers assume that conventionally grown produce harbours a health risk.
3. In open querying, of all varieties of fruit and vegetables, apples and grapes are most often associated with pesticides.
4. When consumers know that pesticides are used in organic agriculture as well the preference for organic products sinks.

The following shows in what specific situations the consumers suspect adverse health effects from foods. Forty-three per cent assume that adverse health effects can result despite observance of the maximum residue levels for pesticides. Exceeding the maximum pesticide levels was unambiguously identified as a trigger for possible adverse health effects (86% agreement). The subjects of multiple application (74%) and multiple residues (80%) were also associated to a substantial extent with adverse health effects.

Finally, there is a clearly discernible difference when different agricultural production methods are compared: 40 per cent of the consumers assume that adverse health effects are

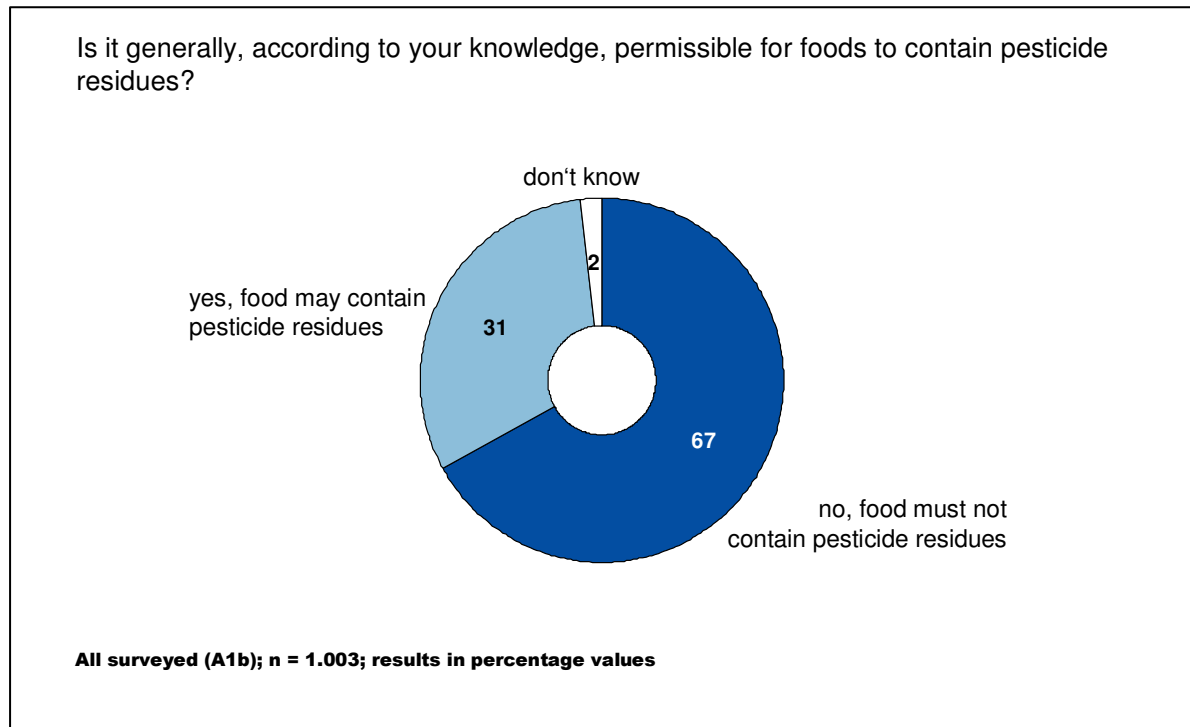
possible simply because the foods were conventionally grown. In the case of organically grown foods, only 17 per cent made the same assumption. Seen from a different angle, this also means that absolute safety is not to be expected from organically organised agriculture either. The non-use of pesticides appears to signal a situation of relatively slight impacts on health.

**Figure 26: Possible adverse health effects from pesticide residues (Question E1)**



The following question was posed as a specific knowledge question. As the results show, 67 per cent of consumers assume that no pesticide residues whatsoever are permissible in foods. This assessment has far-reaching consequences with a view to the media context of the topic of pesticides as well as with regard to what is expected of regulating authorities. For it amounts to the formulation of a sort of “zero tolerance” statement (cf. Heberer et al. 2007). Consumers generally proceed from complete freedom of foods from pesticides as a legal concept. But if pesticide residues are then found in foods and the media make a story out of it, the impression readily emerges among consumers of a (supposed) offence as well as lack of control and enforcement of regulations, even if there is nothing to object to from a legal point of view. This controversy was already discussed on the basis of concrete examples in Chapter 1 in connection with the media presentation of pesticides in foods.

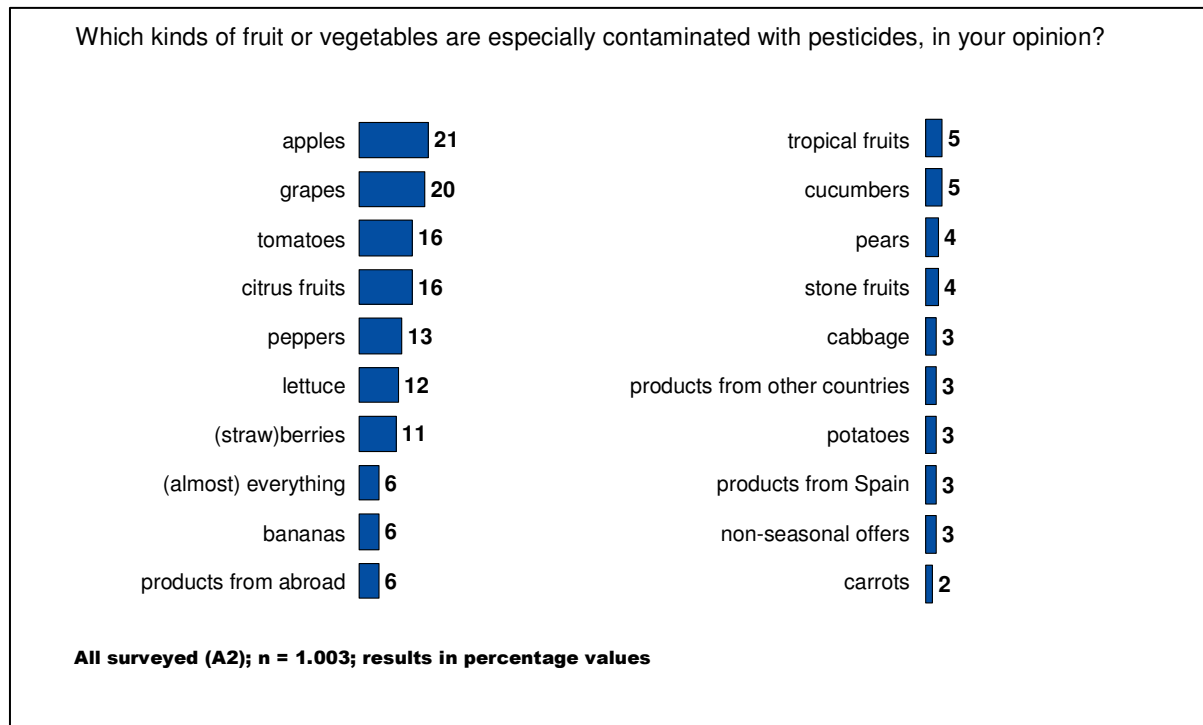
This “zero tolerance” expectation of the consumers is also closely related, however, to the pronounced though hazy uneasiness about pesticides and conventional agriculture, as shown in the preceding chart.

**Figure 27: Legality of pesticide residues in food (Question A1b)**

The open query on the evaluation of foods especially contaminated with pesticides yielded the following picture: at the top of the ranking were apples and grapes (21% and 20% respectively), followed by citrus fruits and tomatoes (16% each), peppers (13%) and lettuce (twelve per cent). It seems that the most contaminated foods are those that also have a prominent place on the daily menu.

Interestingly enough, these results correlate only to a limited extent with the media scandal-mongering of pears, strawberries and wine in the two years under review discussed as examples in the first part.

The correlation analysis shows that the more kinds of fruits and vegetables consumers cite as contaminated the greater their health concerns and suspected health risks with regard to pesticides.

**Figure 28: Which foods seem especially contaminated with pesticides (Question A2)**

In sum, a few other relationships can be demonstrated by means of correlation analyses.

The more eco-labels a person knows, the greater is their perceptiveness with regard to pesticides (cf. Figure 29) and the higher is their rating of health concerns (cf. Figure 30). The rating of one's own knowledge and the number of known stakeholders as well as the tendency to prefer organics also correlate positively with familiarity with eco-labels.

Furthermore, knowledge of several stakeholders also goes hand in hand with heightened perceptibility of risks relating to pesticides (cf. Figure 31); in addition, more information on pesticides is perceived and pesticide-specific and unspecific risks are rated more highly.

Persons who know that pesticides are used in organic agriculture as well (cf. Figure 2), have less of a preference for organics, rate pesticide-independent risks higher and are more likely to assume that pesticides are harmless when appropriately used.

Figure 29: Relationship between known eco-labels and perceptiveness for risks from pesticides (Question B9/B3)

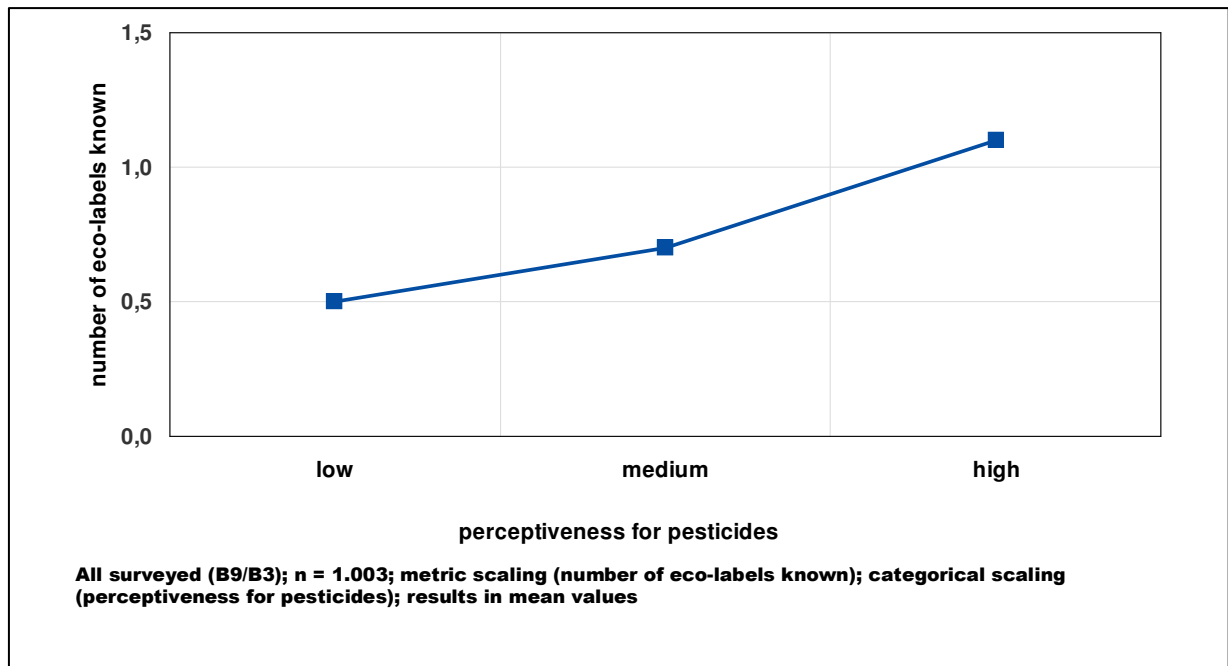
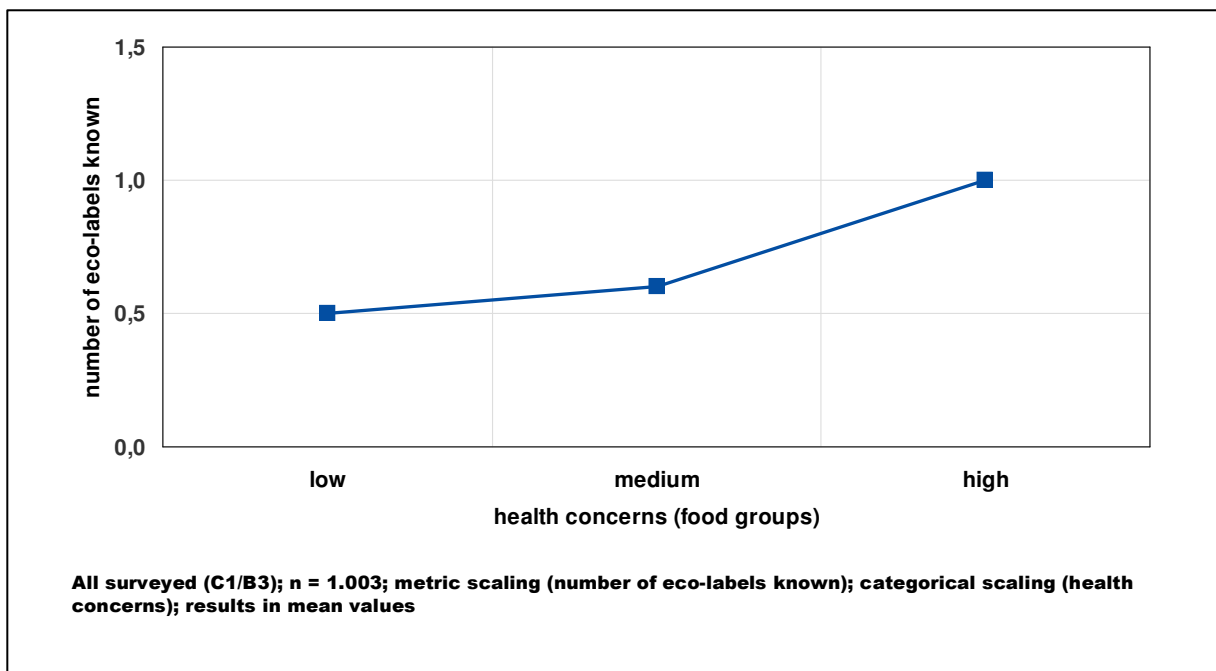
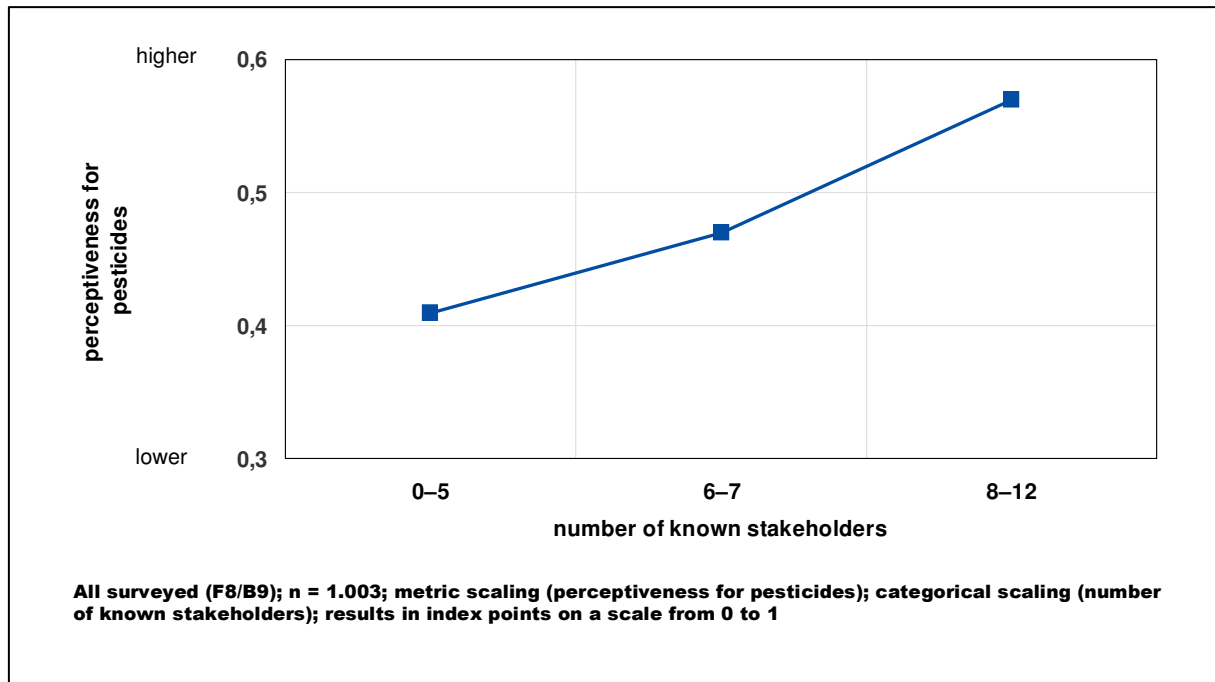


Figure 30: Relationship between knowledge of eco-labels and health concerns (Question C1/B3)



**Figure 31: Relationship between number of known stakeholders and perceptiveness for pesticide risks (Question F8/B9)**



## 2.5 Information behaviour

The information expectations and information behaviour of the German population with regard to pesticides as well as their subjective knowledge were another focus of the population survey. The following questions fall into this range of issues: How and where do consumers find out about pesticides in food (information sources)? How well informed do consumers feel about possible risks of pesticides and pesticide residues in food? And what expectations and what interest do consumers have with regard to information about pesticides and their regulation? What role in consumer information do advisory services provided by consumer advice centres play? The answers to these questions are crucial to the development of concepts for risk communication suited to the recipients.

To summarise, the following key results can be formulated for the field of "information behaviour and information expectations of the population with regard to pesticides":

1. Three quarters of the population are aware of the topic of pesticides, primarily from television and newspapers.
2. More than 40 per cent indicate that they feel poorly informed, and only five per cent feel very well informed.
3. Half the population are interested in information on pesticides.
4. The better informed one feels subjectively, the more negative one's attitude towards pesticides.
5. The places where one wishes to be informed about pesticide residues in food are primarily food retail outlets and newspapers. Up to now, however, retailers play no part in conveying information.
6. Consumer advice centres are regarded as the most trustworthy informants, but up to now they play no part in conveying information.
7. The producers are not expected to provide information on pesticides, unlike chemical products (cf. the study "Everyday Chemistry"; BfR 2010).

The first point to be discussed is the extent to which consumers have perceived the topic of pesticide residues at all in the media and what they remember concretely (2.5.1). Subjective knowledge of this topic is slight, so the question arises to what extent this correlates with other aspects and how this result can be interpreted in comparison to the topic of "chemicals in consumer products" (2.5.2). The existing interest in information on pesticides (2.5.3) and the places where consumers wish to be informed about the risks of pesticide residues (2.5.4) will also be discussed.

### 2.5.1 Perception of the topic of pesticides through the media

For a substantial part of the population, pesticide residues are a topic that they have already become aware of in the media. Only 22 per cent of the population indicate that they have noticed nothing about this topic in the media in the last two years. The media are thus an essential regulator of the perception and processing of this topic by the consumer.

Persons with higher formal education and persons with higher net household incomes tend to have noted this theme more frequently than consumers with lower levels of education or lower incomes.

The perception of information through the media governs the assessment of the topic of pesticide residues by the consumers. Media coverage leads to a critical approach to pesticides on the part of consumers. For persons who become aware of information on pesticides:

- are more apt to perceive risks from pesticides (cf. Figure 33),
- rate pesticide-specific risks higher,
- know more stakeholders in this field and
- tend to know more eco-labels.

Figure 32: Perception of the topic of pesticides through the media (Question D1)

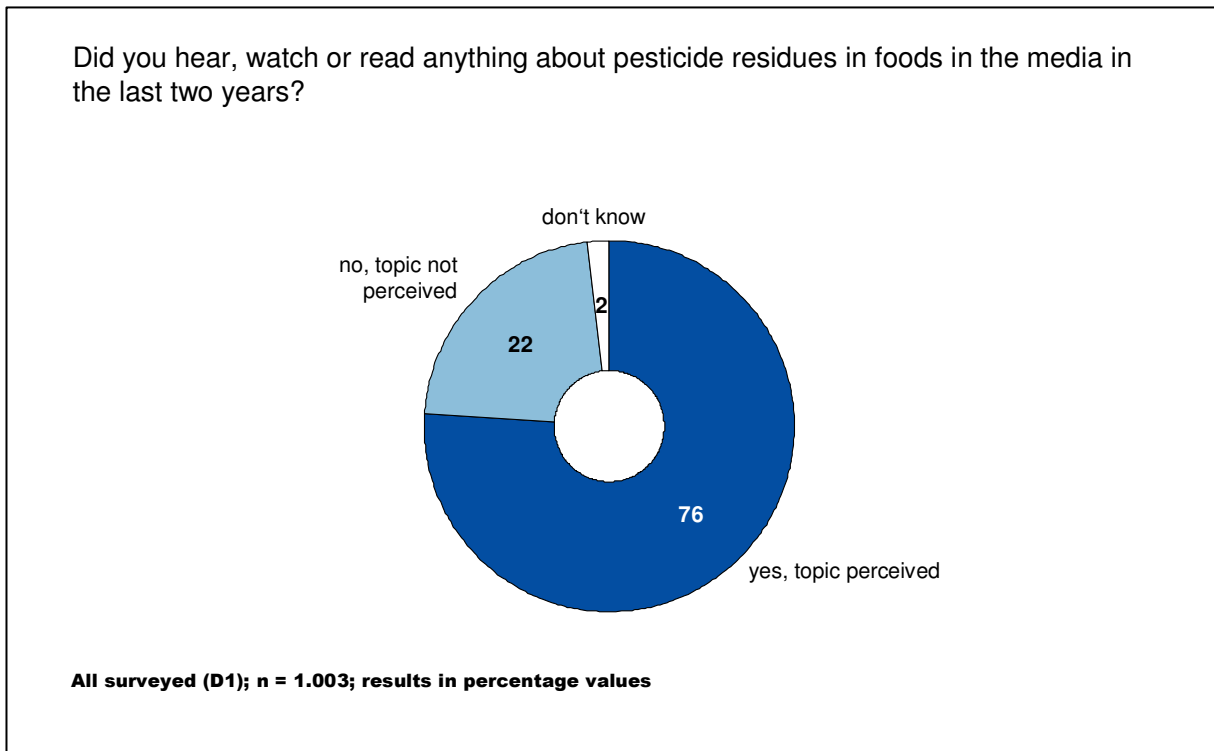
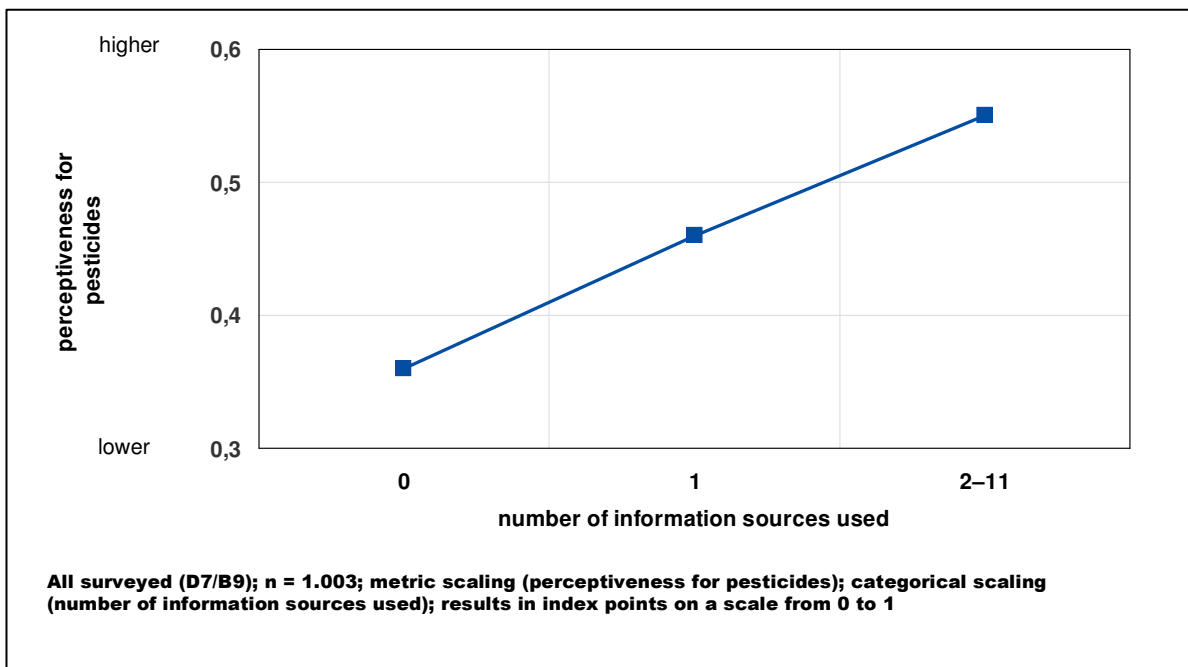


Figure 33: Relationship between number of information sources used and perceptiveness for pesticide risks (Question D7/B9)



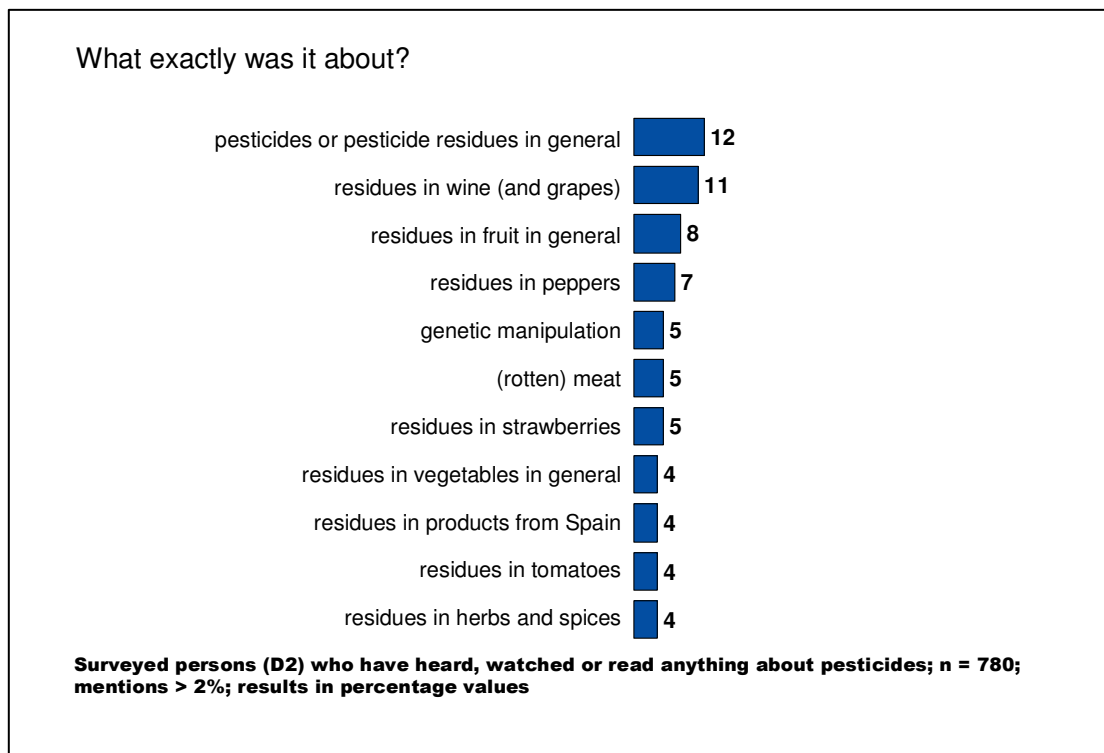
Persons who have noticed the topic in the media in the past two years were asked about what they remembered of the content. Most of the mentions in this open query were of pesticides or pesticide residues in general (12%), followed by residues in wine (and grapes) (11%) and residues in fruit in general (8%). There are certain kinds of fruit and vegetables (grapes, peppers) that are given special attention in connection with pesticide residues (cf. also Figure 28).

When the fruit and vegetable varieties remembered are contrasted with the media events that actually occurred in the past two years (including strawberries, wine, dessert grapes, pears and pesticide residues and multiple contamination in general), one sees that the consumers can no longer remember the discovery of actually noxious amitraz residues in pears. The media treatment of pesticide residues in wine and dessert grapes ("grapes") on the other hand were spontaneously recalled by eleven per cent and the pesticide residues in strawberries by five per cent.

This allows the following conclusions:

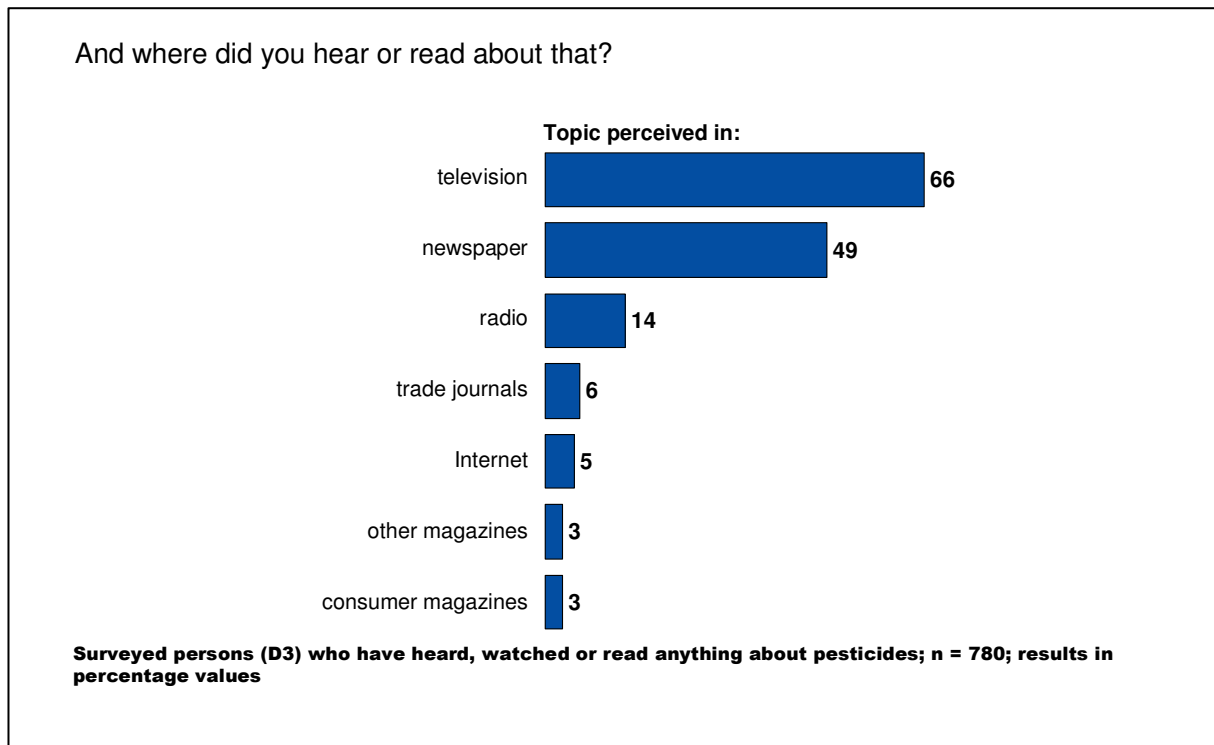
- The influence of the media in connection with pesticide residues does not generally last long. The theme career of food scandals is brief and usually endures only a few months.
- The consumer is more likely to remember, however, in the case of regularly recurring reports (e.g. grapes and peppers).
- The extent of reporting on a food scandal relating to pesticides is not directly related to the danger that the discovered risks entail.

**Figure 34: Topics perceived in the media (Question D2)**



Most consumers became aware of the reporting on pesticide residues through television (66%) or the newspaper (49%). A lesser role is played by radio (14%), trade journals (six per cent) and the Internet (five per cent). Up to now, therefore, it is the “classical” media through which risk perception takes place and not the “new” media, i.e. the Internet.

**Figure 35: Information sources for topic perception (Question D3)**



### 2.5.2 Subjective knowledge

A second group of topics was devoted to subjective knowledge. It is a striking fact that in sum 41 per cent of the consumers feel "poorly" or "very poorly" informed of possible risks from pesticide residues in food. In the study on "Chemicals in Daily Life" (BfR 2010), by contrast, it was only 28 per cent with reference to the chemical content in consumer products. Thus subjective knowledge in this field is very slight. This assessment probably has to do with the fact that the topic of pesticide residues is not very present in everyday life for most people. In the case of chemicals, on the other hand, consumers come into contact with the relevant products daily: cleaners, hair dyes, paint and lacquer. In contrast, pesticides are a relatively abstract topic conveyed primarily through the media. It is therefore plausible that one subjectively feels poorly informed.

If one considers the connection between subjective knowledge and further features, one will notice first of all that subjective knowledge increases with age (cf. Figure 37).

The correlation analyses show that the greater the subjective knowledge, the more negative is the attitude towards pesticide residues. It also turns out, as an apparent paradox, that although persons who feel better informed know more eco-labels, they tend to know less often that pesticides are also used in organic farming. Thus subjective knowledge is not directly connected with factual knowledge in all fields. Instead it represents a belief in a general danger in the case of conventionally grown produce and a shift towards organically grown produce, generally regarded as "better".

Figure 36: Subjective knowledge about pesticides – chemical ingredients (Question D4)

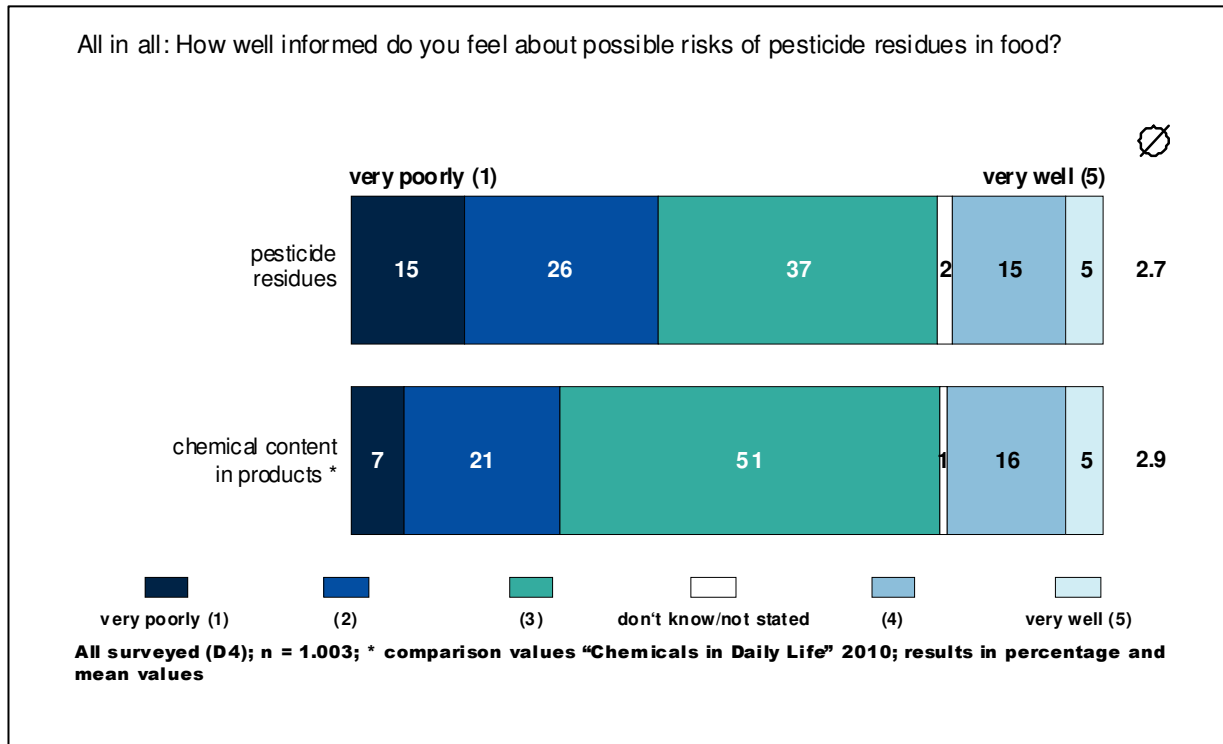
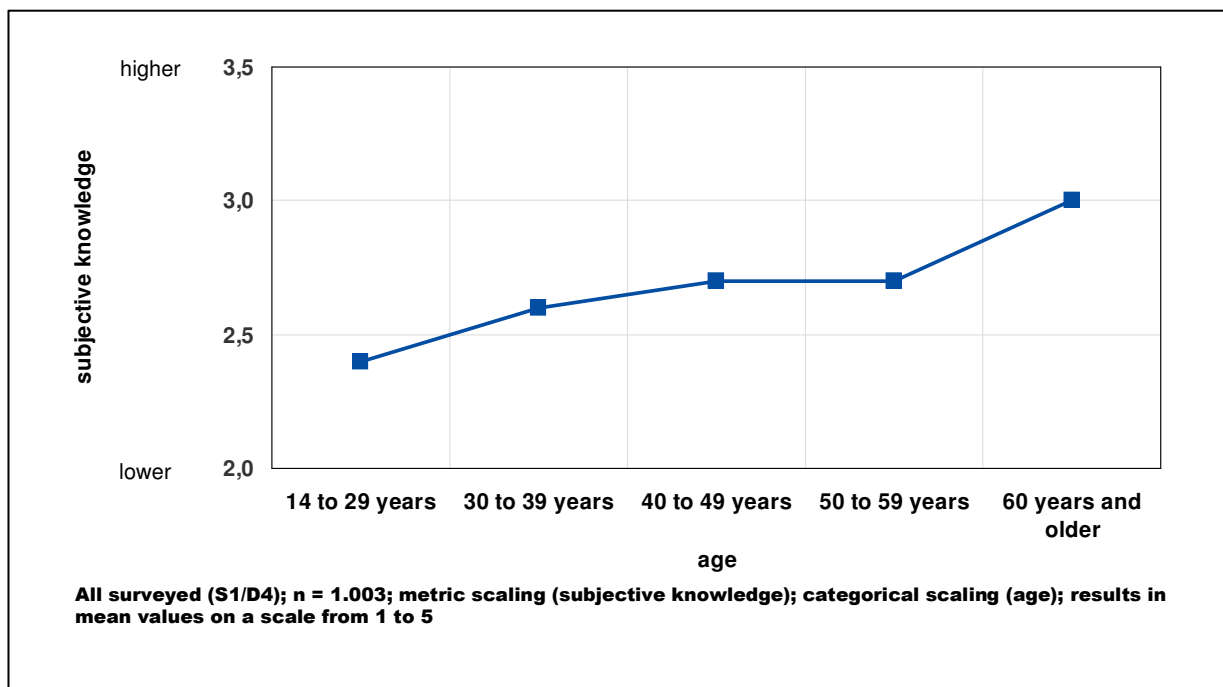


Figure 37: Subjective knowledge and age (Question S1/D4)

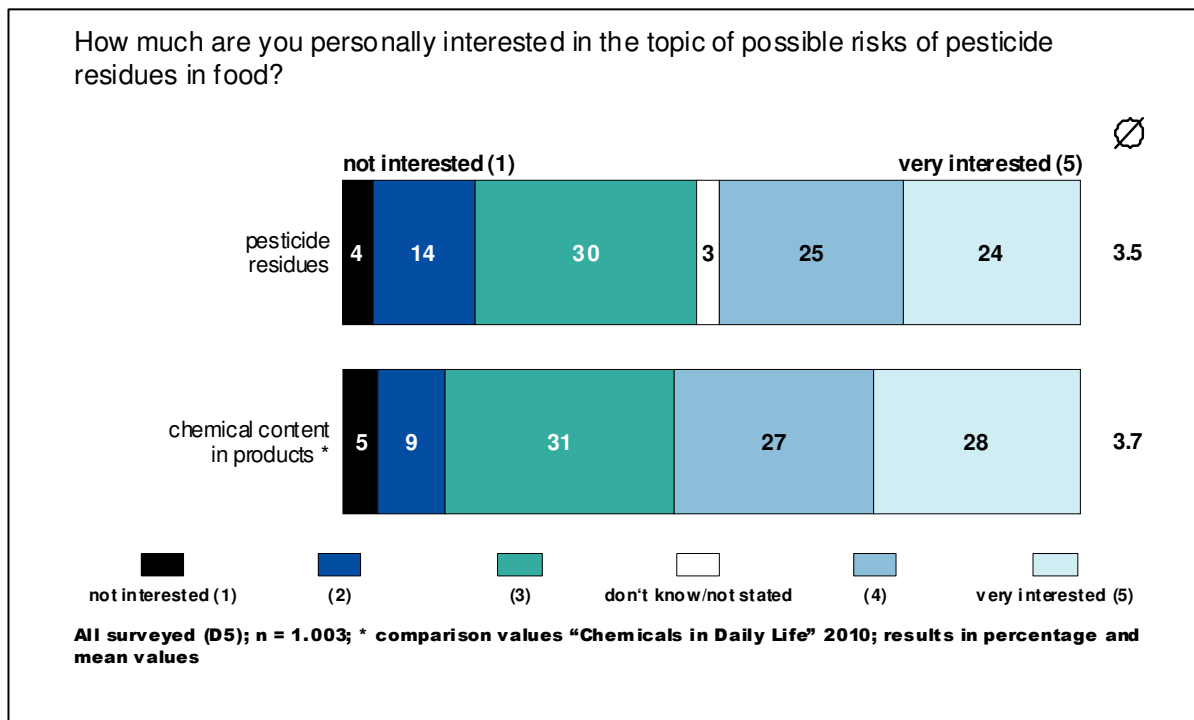


### 2.5.3 Interest in information

Interest in information about pesticides exists in about half the population (49% "interested" and "very interested"). Thirty per cent are undecided, and 18 per cent are explicitly not interested.

It is revealing that, in comparison to the field of chemicals, there is a somewhat slighter interest in information on the topic of pesticides. Since there is less of both subjective knowledge and interest in information than on the subject of chemical products, one can assume that the topic of pesticides overall is of less relevance to consumers.

**Figure 38: Comparison of information interest (Question D5)**



In the multivariate analysis, a connection was observed between increasing age of the consumer and an increasing interest in information (Figure 39), as well as between the likelihood of perceiving risks from pesticides and interest in information (Figure 40). Interest in information thus clearly increases with age and persons critical of the topic of pesticides are in greater need of information.

Figure 39: Relationship between age and interest in information (Question S1/D5)

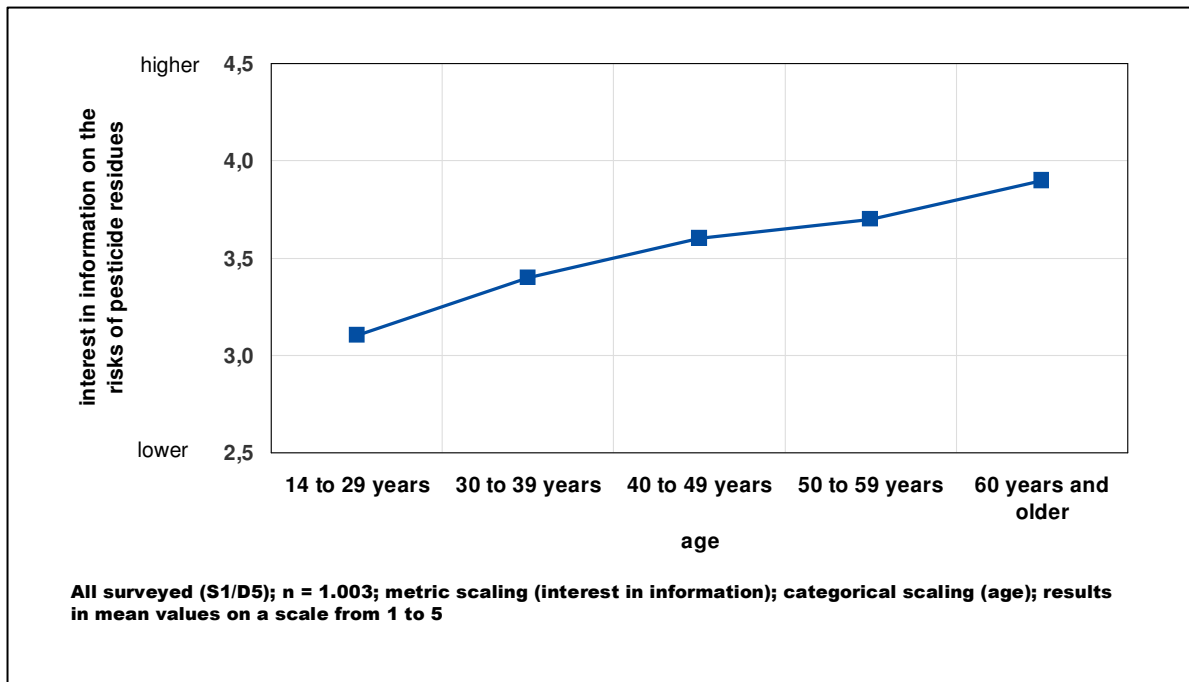
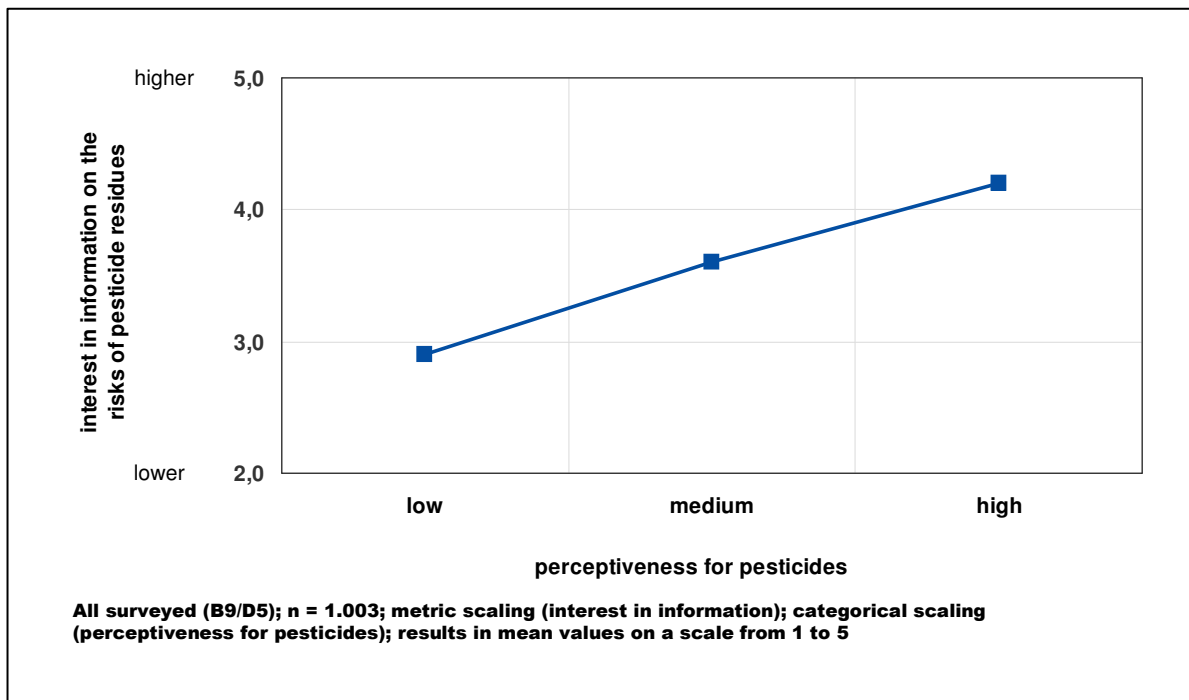


Figure 40: Interest in information and perceptiveness for risks from pesticides (Question B9/D5)

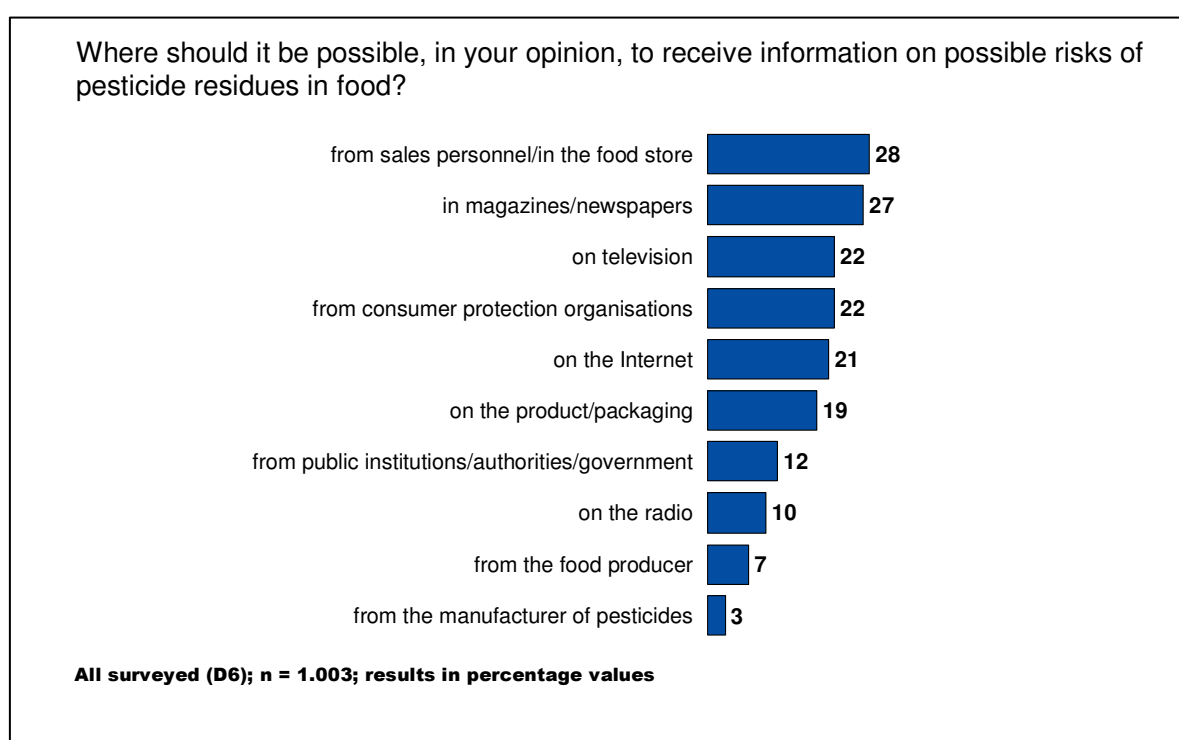


#### 2.5.4 Desired sources of information

The sources of information about possible risks of pesticide residues desired by the consumers are presented below. In first place is the sales personnel and the grocery stores (28%): the most natural thing seems to be for consumers to obtain their information at the place of purchase. In second place is newspapers and magazines (27%), followed by television (22%), the consumer protection organisations (22%), the Internet (21%) and the product or packaging (19%).

Very few consumers expect information on possible risks from public institutions or authorities (twelve per cent). The food producers were mentioned by only seven per cent of the consumers as desirable sources of information.

**Figure 41: Information sources on pesticide residues**

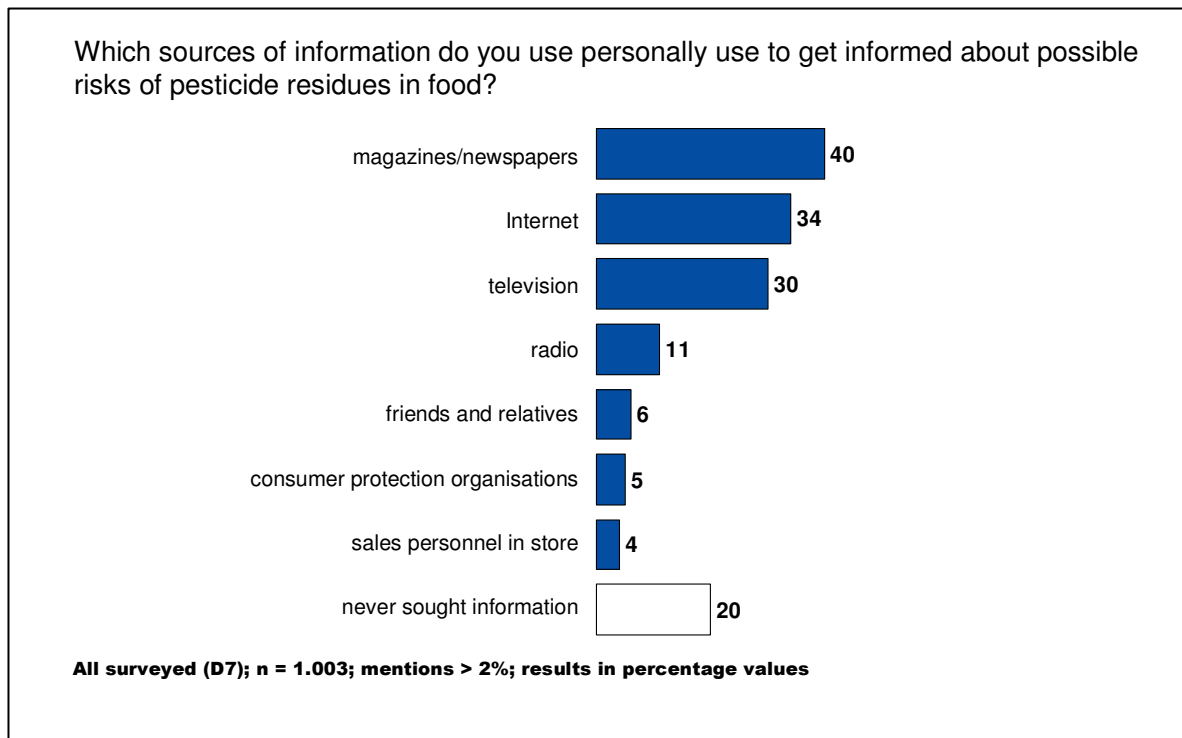


The desired and actual use diverge in the case of information sources. The consumers prefer to obtain purchase-related information in the food stores: the most convenient and direct possibility of obtaining information, at the point of sale, while desired by the consumer, is in fact not used in practice. Possible reasons are the inadequate declarations on the packages, absent or uninformed sales personnel and/or virtually absent interest of the consumers who would like to have many things when asked but make no use of them on site.

It also transpired that contrary to the information source wishes expressed, it is mainly the classical media (newspapers and magazines, television) and the Internet that have been used up to now. On the other hand, consumer organisations, public agencies and producers tend to be on the wish list but are actually seldom used.

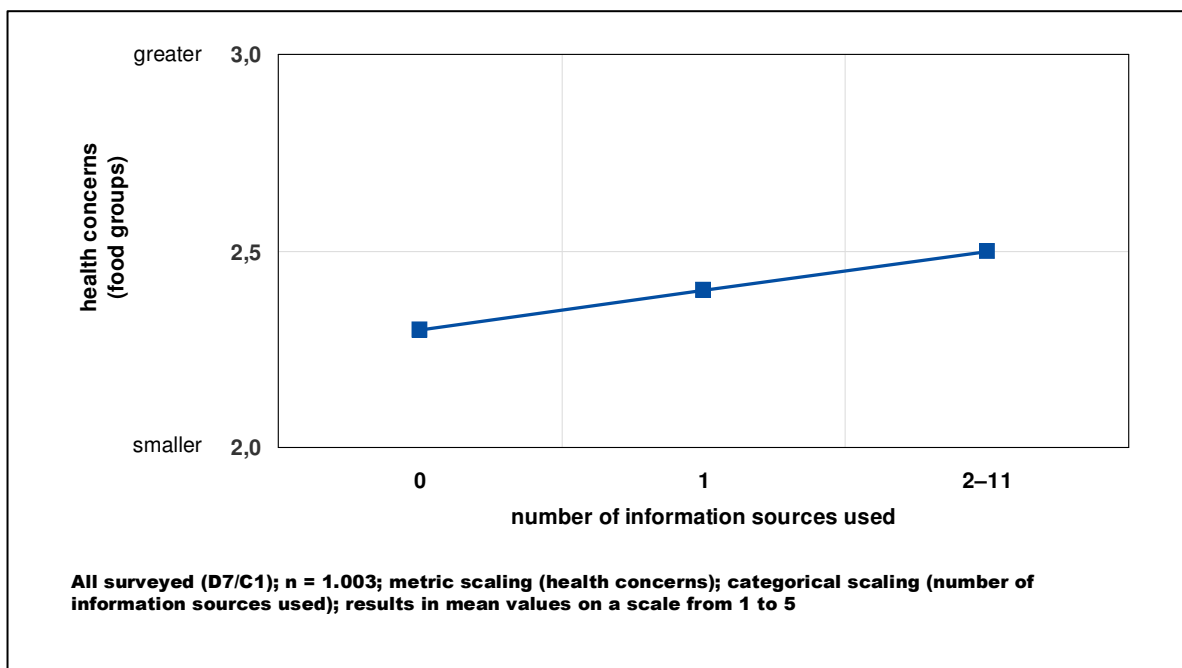
One fifth of the population (largely younger people) indicate that they have never sought information on the topic of pesticides.

**Figure 42: Sources of information on pesticide residues used (Question D7)**



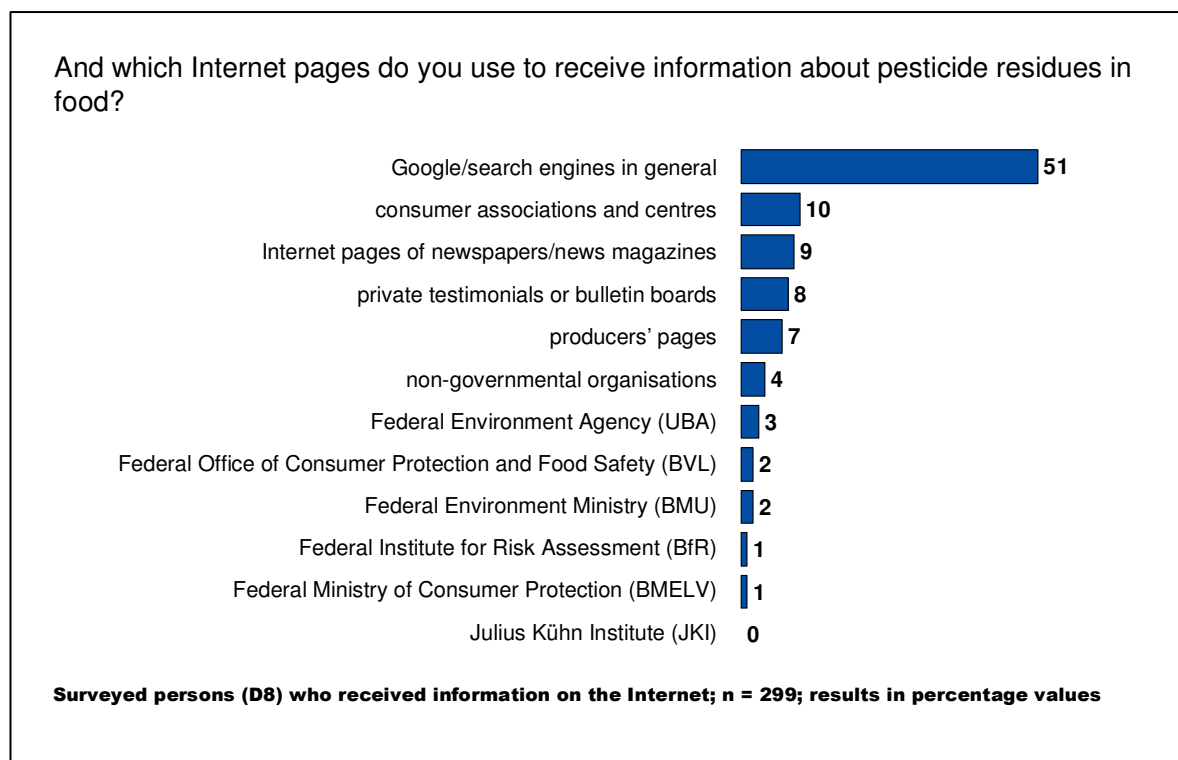
The more information sources on the topic are used, the greater the health concerns regarding pesticide residues in food and the more stakeholders are known. The use of information sources also correlates with knowledge of eco-labels and with resorting to personal sources of information (friends, personal experience, feelings) that might provide reasons for concern regarding pesticides. Information behaviour is not connected with subjective knowledge, however.

**Figure 43: Relationship between information sources used and health concerns (Question D7/C1)**

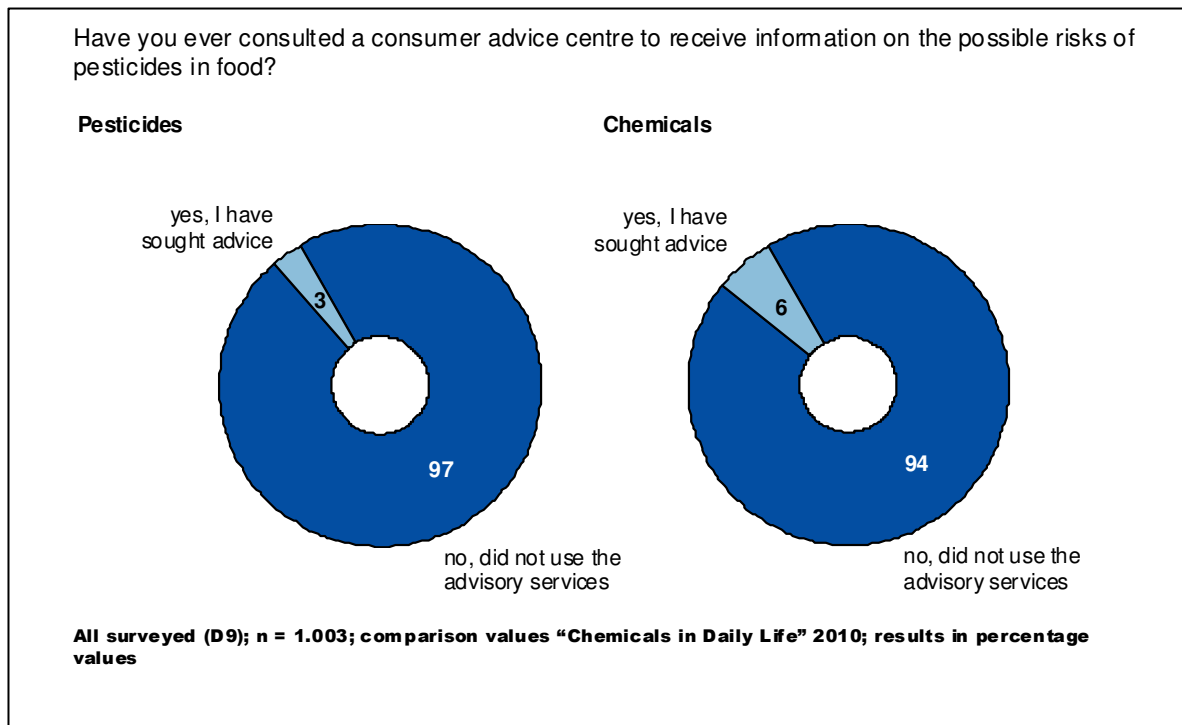


Corresponding to the abstractness of the topic in everyday life for consumers, it is mostly search engines that are mentioned with regard to the Internet sites used. Government institutions play no significant part with regard to this topic on the Internet. The search is general rather than concretely directed towards certain organisations or associations or producers. By contrast, in the study on “Everyday Chemistry” (BfR 2010) the producers’ pages were mentioned as the most important information platform on the Internet (31%), followed by consumer associations at 21 per cent.

**Figure 44: Internet pages used as information sources (Question D8)**

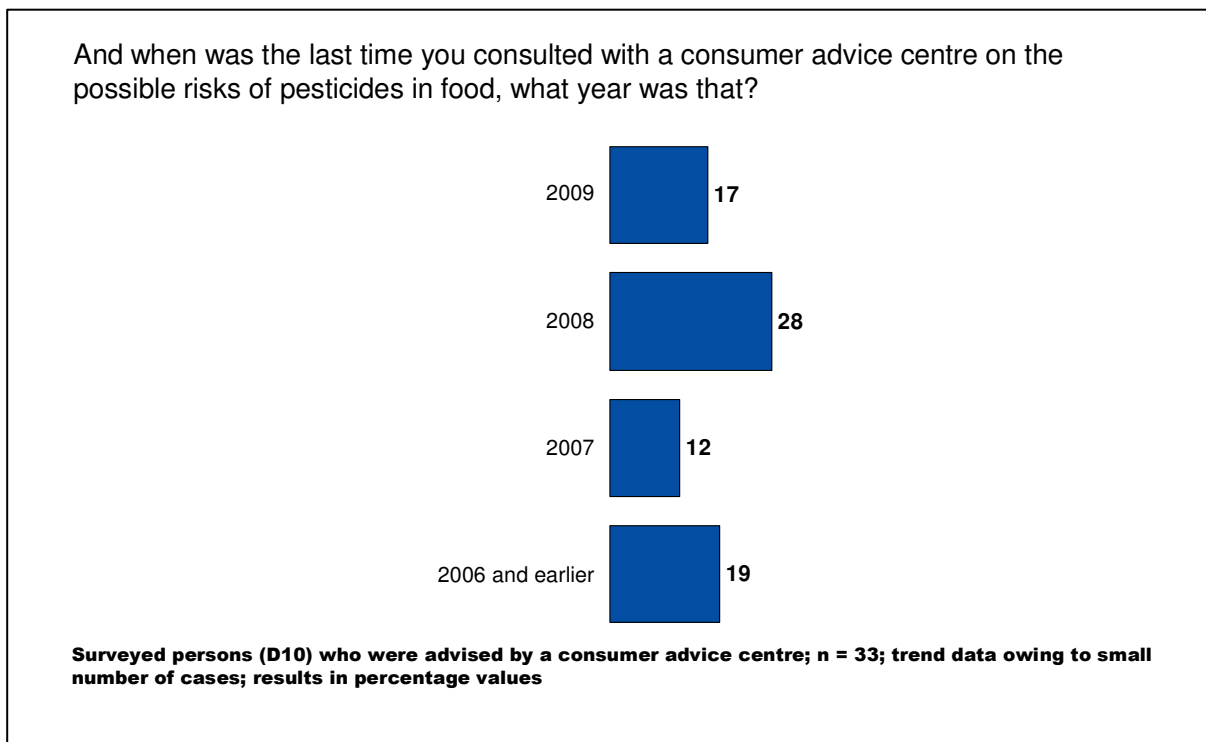


**Figure 45: Advisory services of consumer advice centres compared (Question D9)**



Direct consultation by the consumer advice centres is virtually unused. Even on the very concrete topic of "chemicals in consumer products" consumers rarely addressed themselves directly to the consumer advice centres.

**Figure 46: Time of consultation of consumer advice centres (Question D10)**



The majority of the few who addressed themselves to consumer advice centres in connection with pesticide residues in food did so in 2008: 28 per cent. By comparison, it was only 12 per cent in 2007 and only 17 per cent in the following year, 2009. The fact that the majority of consumers state that they addressed their queries to consumer advice centres in 2008 largely corresponds with the media scandal-mongering about pesticide residues in food in that year, when there were several controversial publications at brief intervals (see the chapter on the role of the media in risk perception).

## 2.6 Responsibility and regulation

The topic of pesticide residues is in large measure framed by the media and at the same time generates a hazy uneasiness among consumers about possible hazards. The scientific appraisal of pesticides, the legal stipulation of maximum residue levels and the monitoring of compliance with statutory regulations is therefore of special importance. Since personal experience of negative effects of residues is absent, the consumers rely largely on the combination of politics, consumer protection and science.

The present survey results pertaining to the topic of "Responsibility and regulation" show that the topic of pesticides is of little relevance to consumers in practical everyday terms. Great expectations are formulated as to what the competent institutions have to do, but a scope for action of their own is only seen to a very limited extent.

The key findings in this field:

1. Personal control possibilities are not great – but that does not relieve the individual of personal responsibility.
2. Personal control possibilities are seen by the majority in the washing of fruit and vegetables.
3. High expectations of control are placed in policy makers.
4. Control issues are best resolved by the combined efforts of policy makers, consumer protection agencies and research institutions.
5. From the point of view of consumers the manufacturers of pesticides bear little responsibility.
6. The most trustworthy information comes from the consumer associations.
7. Information is not actively demanded of the stakeholders.

In the following sub-chapters, the ideas of consumers about the future development of agriculture will be presented first (2.6.1). The topic of the responsibility of institutions and the related expectations of the consumers will also be discussed (2.6.2). Third, focus will be directed at the recognition of different stakeholders in the field (2.6.3).

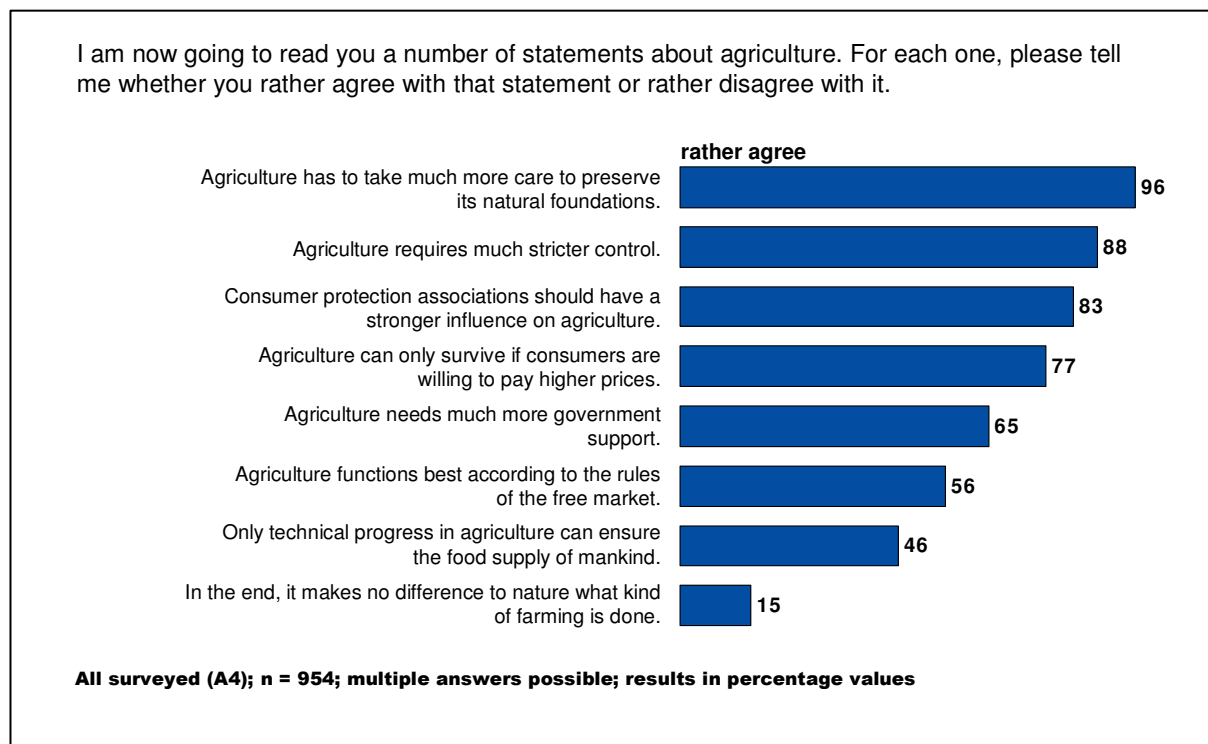
### 2.6.1 Future of agriculture

To get an impression of the stakeholders in the field of agriculture and the attitudes of consumers towards certain marginal development conditions, the consumers were confronted with statements about possible requirements and development prospects in agriculture.

The preservation of the natural foundations of agriculture has a key role to play: 96 per cent of the consumers agree with that statement and only 15 per cent are of the opinion that agricultural practice has no repercussions on nature. The need for sustainable agriculture is thus seen by practically the entire population.

Another finding is the emphasis on government intervention patterns as opposed to those of a pure market: 88 per cent wish to see much stricter controls and 65 per cent want more government support for agriculture. On the other hand, only 56 per cent of consumers are convinced that agriculture functions best according to the rules of the free market. Finally, the vast majority would like the consumer associations to have greater influence (83%).

**Figure 47: Statements concerning what is required of the agriculture in the future (Question A4)**



## 2.6.2 Responsibility of institutions

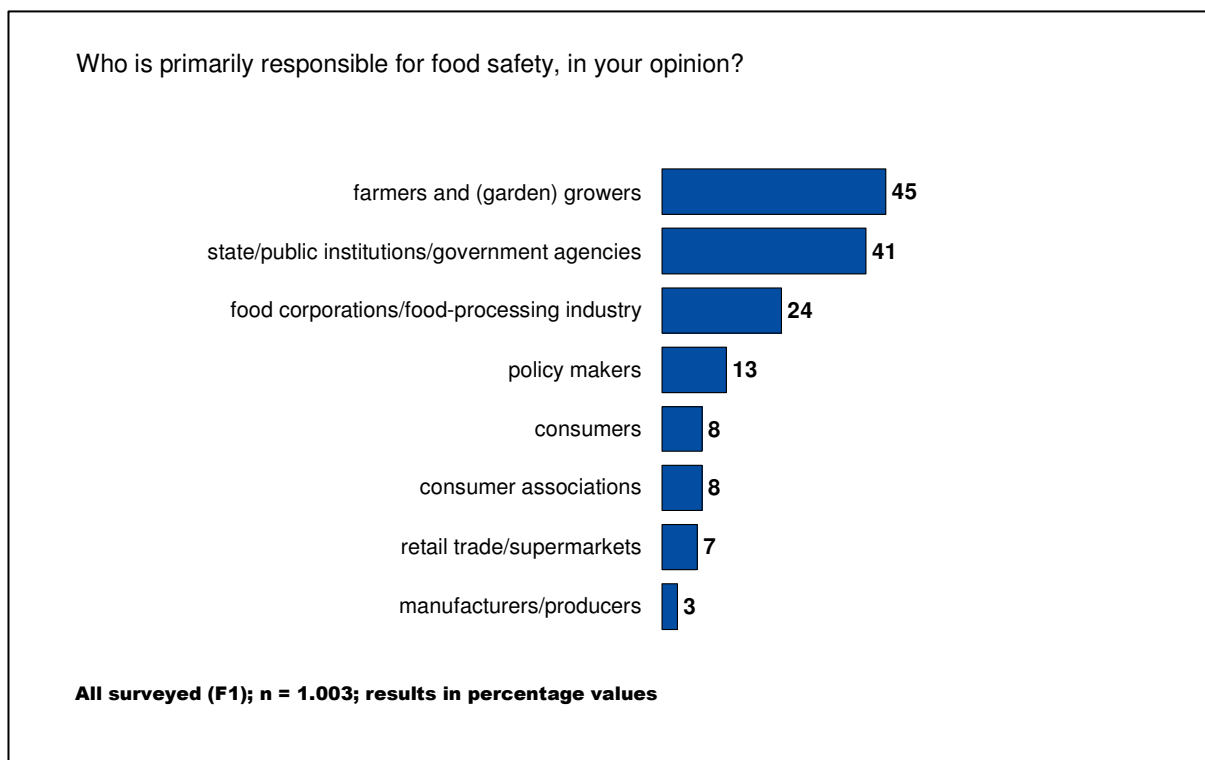
The attribution of responsibility plays an essential role in such an important field as food production. Who is classified as responsible for food safety? The following picture emerges: farmers (45%) and controlling authorities (41%) are ranked first on the scale of responsibility. The food corporations (24%) and policy makers (13%) are far behind. It is thus seen as the duty primarily of the primary producers of food and of the competent supervisory authorities. Retail trade and the manufacturers of pesticides are spontaneously assigned no particular responsibility for food safety.

The farmers are thus seen as mainly responsible for food safety. In surprising contrast to this is the consumers' assessment that the farmers often do not comply with the corresponding legal provisions: only 36 per cent of the consumers assume that the farmers obey those provisions. That means in other words that 64 per cent assume that the farmers do not always comply with the legal requirements.

In the eyes of the population, the government and its agencies are not doing their job either. Here 69 per cent of the respondents assume that the pesticide residues in food are too rarely monitored, and only 30 per cent consider the legal provisions in this field to be adequate.

There emerges therefore on the whole a critical attitude of the population towards the stakeholders considered responsible. However, personal responsibility through everyday personal action is also considered relevant for dealing with the problem of pesticide residues: the vast majority of 77 per cent of consumers are of the opinion that they can reduce pesticide intake through their own behaviour, for example by washing fruit and vegetables.

**Figure 48: Those presumed responsible for food safety (Question F1)**

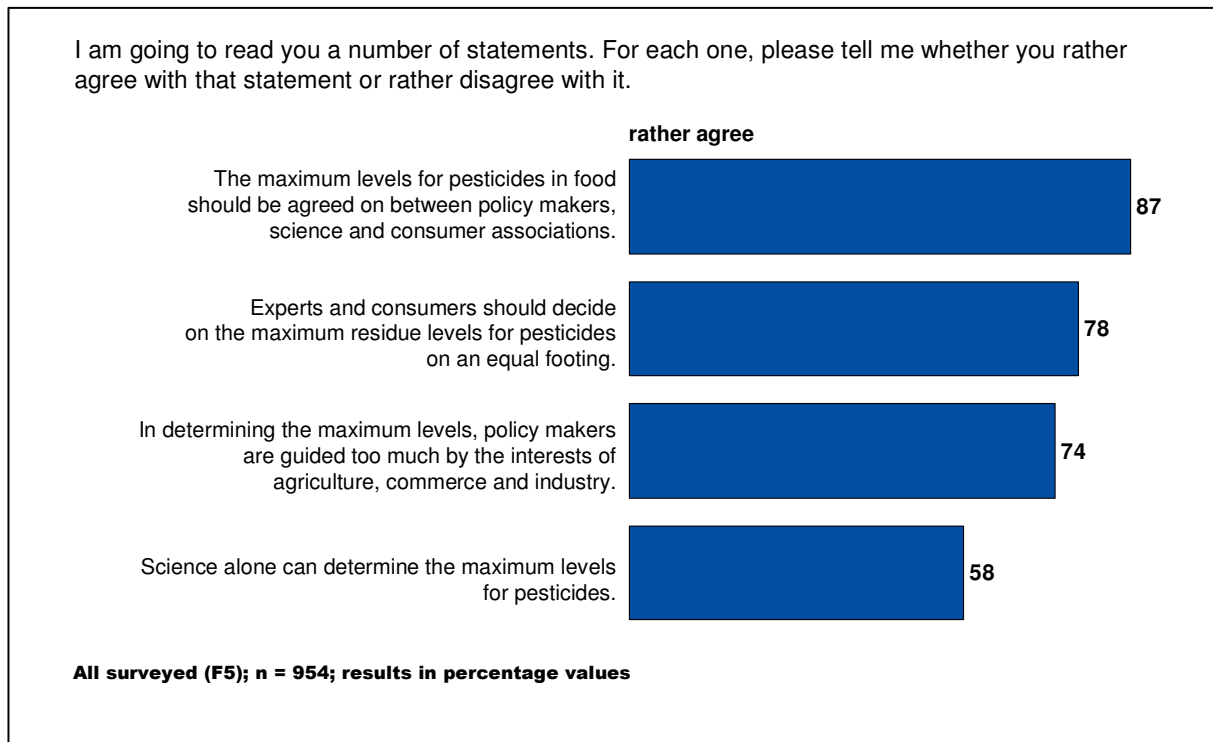
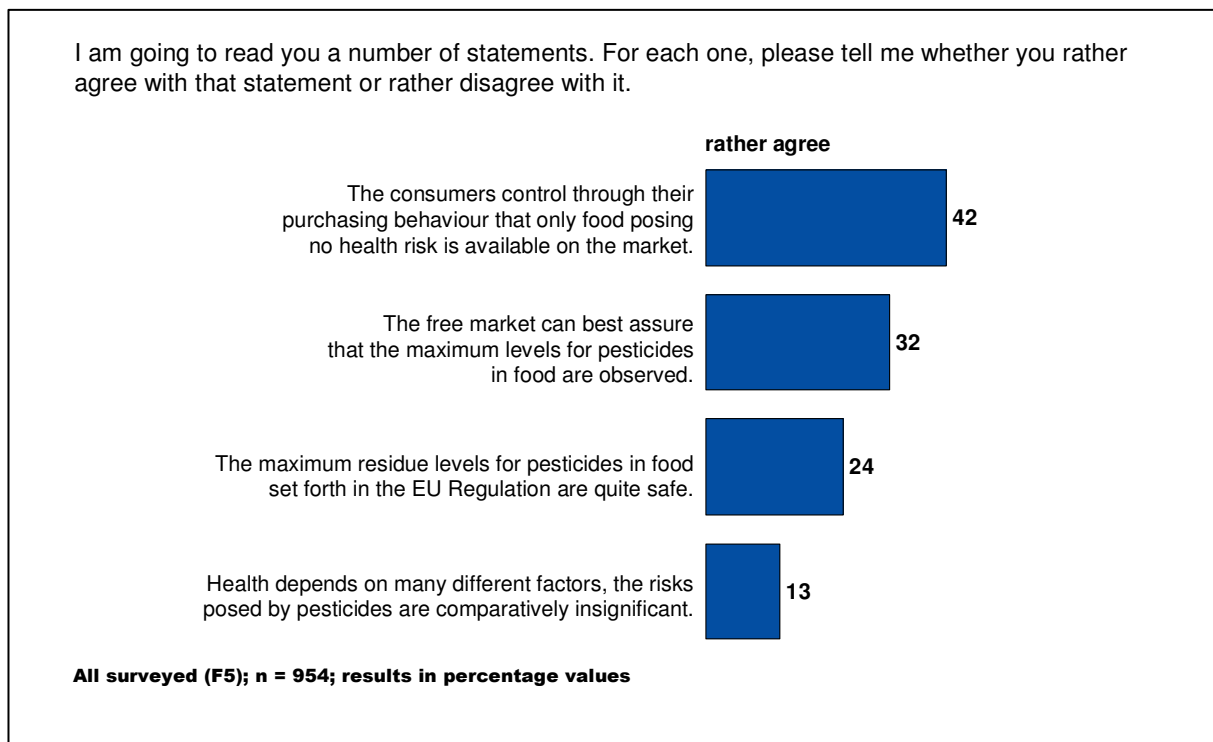


**Figure 49: Personal responsibility and the responsibility of others (Question F3)**

To expand on these assessments, the consumers had to pass judgement on various statements about the responsibility for maximum residue levels in food. The scenario that met with the greatest approval in the population was one in which policy makers, science and consumer associations agreed among themselves on the maximum amounts (87% approval). A similarly high rating was given to one in which experts and consumers determined the maximum amounts on an equal footing (78% approval). This supports the statement that in the view of the population more influence should be accorded to the consumer associations in coordinating regulatory tasks. Science alone can determine such maximum levels, on the other hand, in the view of only 58 per cent of consumers.

At this point it can be seen once again that in the eyes of the population the state does not adequately perform its control function: Seventy-four per cent are convinced that in determining the maximum levels the policy makers are guided too much by agricultural, commercial and industrial interests. At the same time, only 24 per cent of the respondents assume that the maximum levels for pesticide residues set forth in the EU Regulation are quite safe (Figure 51).

As was seen from the answers to the previous question, only a minority of consumers approve of a purely market-driven solution when it comes to responsibility for complying with maximum residue limits (32%). On the other hand, 68 per cent do not believe that the free market can best ensure observance of the maximum levels for residue in food. All the same, 42 per cent of consumers see the influence of their own purchasing behaviour on food production.

**Figure 50: Responsibility for maximum residue levels (Part I; Question F5)****Figure 51: Responsibility for maximum residue levels (Part II; Question F5)**

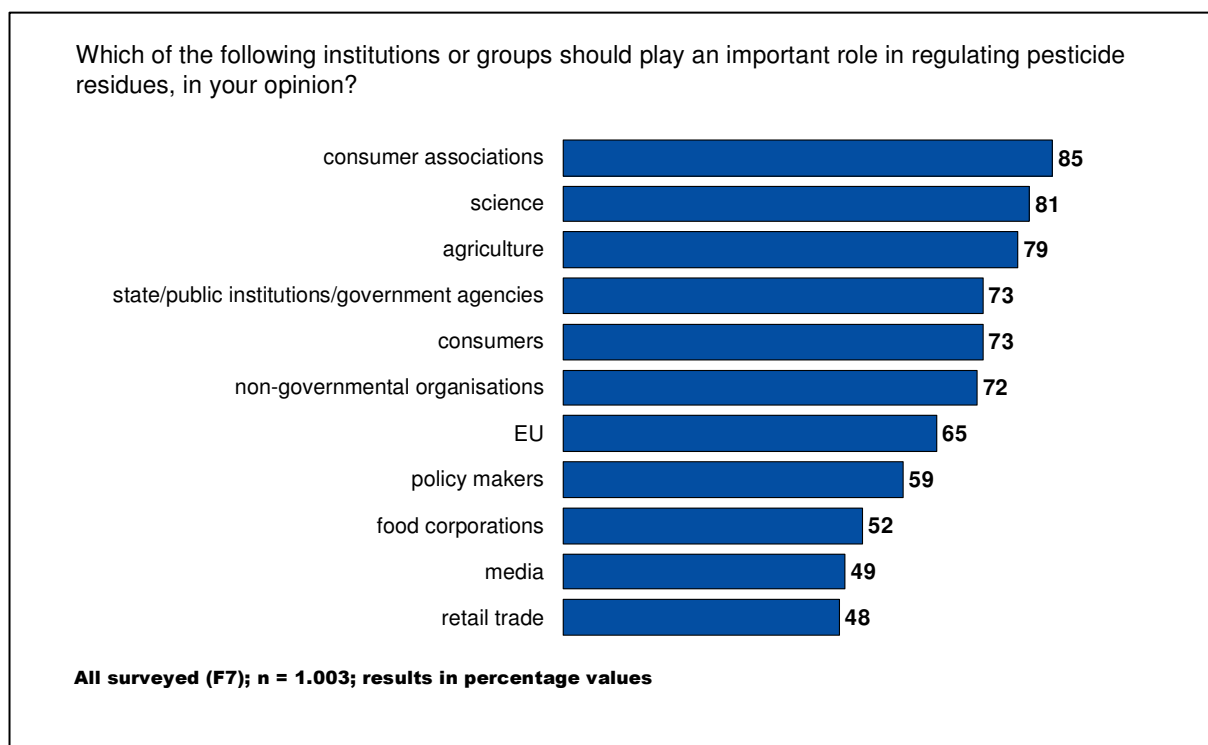
### 2.6.3 Stakeholders in the field: Trust and recognition

To further differentiate the above assessments and obtain statements concerning the individual groups of stakeholders as well as concrete organisations, the thematic area "Stakeholders in the field" was further diversified. First the consumers had to judge the importance of predetermined stakeholders.

The consumer associations are accorded a key position in regulation (85%), even ahead of government institutions. But also science (81%), agriculture (79%) and public authorities (73%) are expected to play an important part. Most of the consumers, however, also see themselves in an important position (73%). Food corporations (52%), the media (49%) and retailers (48%) are of lesser relevance for consumers.

Of the eleven predetermined stakeholders, the consumers selected an average of 6 (6.2) stakeholders who in their view ought to have an important role to play in the regulation of pesticide residues. It seemed to be important to the consumers that a whole series of key players have a say in regulation.

**Figure 52: Trustworthiness of different stakeholders (Question F7)**



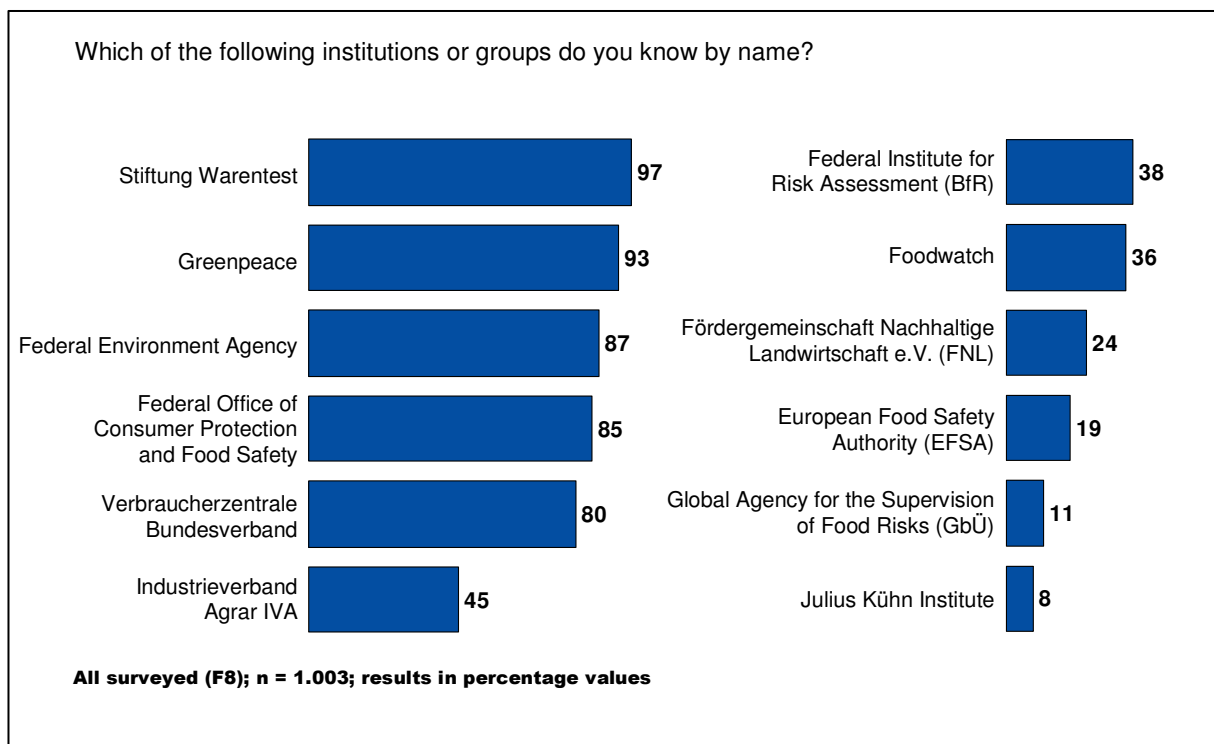
Aided querying was used to find out how well known selected stakeholders were. The degrees of recognition were found to be comparatively high overall. The values shown below must be considered exaggerated, however, due to two effects that often occur in social science surveys: firstly the social desirability of the replies, which is an important factor especially when the topics are relevant in terms of social policy. In the present case this led to institution names that were read out in aided querying often being indicated as supposedly known so as not to admit to what was felt to be embarrassing ignorance. Another phenomenon is the confusion of institutions owing to similarity of name. Thus a "European Agency for..." or an "Industrial Association..." will always find a degree of recognition in the population. In order to be able to quantify these two effects in the evaluation, a "dummy" was integrated into the question. The non-existent GbÜ (Globale Behörde zur Überwachung von Lebensmittelrisiken – Global Agency for the Supervision of Food Risks) attained a supposed

recognition rate of eleven per cent. The recognition rate of the other institutions – especially the less well known – is probably exaggerated by about the same percentage.

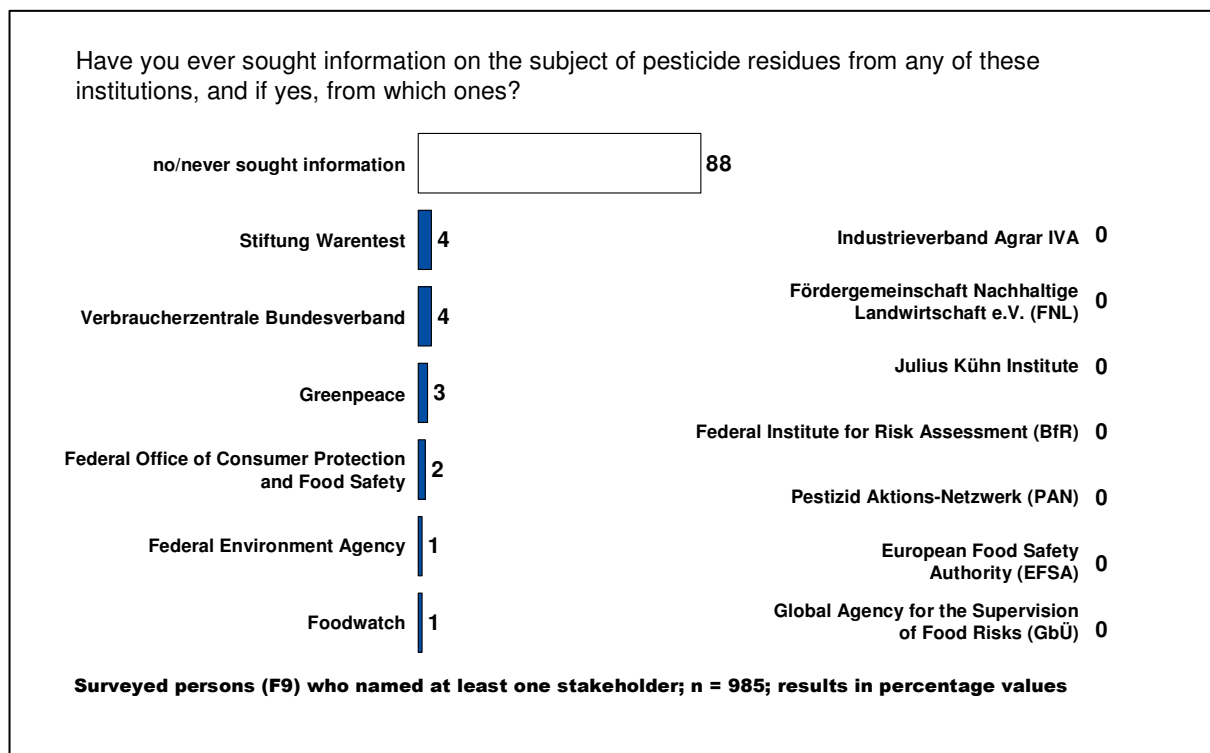
The rate of recognition of the Stiftung Warentest was 97 per cent, that of Greenpeace 93 per cent and that of the Federal Environment Agency 87 per cent.

The recognition of the Verbraucherzentrale Bundesverband (Federation of German Consumer Organisations), which amounted to 80%, probably often implies the recognition of consumer advice centres generally.

**Figure 53: Recognition of stakeholders (Question F8)**



**Figure 54: Utilisation of the information made available by the stakeholders cited (Question F9)**



Eighty-eight per cent of consumers have never sought information from any of the institutions cited on the subject of pesticide residues. Even in the case of the Stiftung Warentest and the consumer advice centres, only four per cent mention such activities – and those are the highest figures. There has therefore been no active quest for information from the stakeholders up to now.

### 3 Summary and discussion

In this chapter the key findings will be presented once again in thesis form.

#### 3.1 Risk perception

The answers to the key question regarding the perception of pesticide risks in the German population could be summarised as follows:

- Pesticides are generally classified as risky and harmful to humans and the environment.
- Nevertheless the benefits of pesticides are seen as well.
- The assessment of the threat to health depends on the agricultural production method.
- The preference for organic farming produce correlates with gender and age: women and older people take a more critical view of pesticides than men and younger people.
- Consumers see pesticide residues as a major health risk, almost as dangerous as bacterial contamination of food.
- Risk perception is strongly influenced by the media – not so much by personal experience.

#### 3.2 Behaviour

Since not many consumers use pesticides themselves, dealing with pesticides is more of an indirect field of action. The substances are seen as undesirable residues in the food daily required, so that consumers perceive themselves as affected by pesticides. The crucial point here is the link between the subject of pesticides and the “food shopping” set of activities, since ways of dealing with pesticides are articulated through the purchase of specific products. Thus the following points can be noted:

- Fifty per cent of consumers have a preference for organically grown food.
- Media reports and other events with pesticides have led to concrete changes in behaviour only in a minority of the population.
- Children in the household influence purchasing behaviour in favour of organically grown food.
- Respondents say they rarely use pesticides in their own gardens.

### 3.3 Knowledge

The topic of "Knowledge" was structured with some specific question elements, and one particularly important question was to what extent the occurrence of pesticides in food is legal. Knowledge about possible health risks was also asked about. The main results at a glance:

- Two-thirds of the population assume that no residues of pesticides at all may be contained in foods.
- All the same, 40 per cent of consumers assume that conventionally grown produce harbours a health risk.
- In open querying, of all varieties of fruit and vegetables, apples and grapes are most often associated with pesticides.
- When consumers know that pesticides are used in organic agriculture as well, the preference for organic products decreases.

### 3.4 Information behaviour and information expectations

Both the information expectations and the information behaviour of the German population constituted another focus of the study. Besides these, subjective knowledge was another focus of the survey. In summary, the following key results can be formulated for the field of "Information behaviour and information expectations":

- Three quarters of the population are aware of the topic of pesticides, primarily from television and newspapers.
- More than 40 per cent indicate that they feel poorly informed – only five per cent feel very well informed.
- Half the population are interested in information on pesticides.
- The better informed one feels subjectively, the more negative is one's attitude towards pesticides.
- The places one wishes to be informed about pesticide residues in food are primarily food retail outlets and newspapers. Up to now, however, retailers play no part in conveying information.
- Consumer advice centres are regarded as the most trustworthy informants, but up to now they play no part in conveying information.
- The producers are not expected to provide information on pesticides, unlike chemical products (cf. the study "Everyday Chemistry"; BfR 2010).

### 3.5 Responsibility and regulation

Since the topic of pesticide residues is in large measure framed by the media and at the same time generates a hazy uneasiness among consumers about possible hazards, the scientific appraisal of pesticides, the legal stipulation of maximum residue levels and the monitoring of compliance with statutory regulations is of special importance. The present survey results pertaining to the topic of “Responsibility and regulation” show that the topic of pesticides is of little relevance to consumers in practical everyday terms. Great expectations are formulated as to what the competent institutions have to do, but a scope for action of their own is only seen to a very limited extent.

The key findings in this field:

- Personal control possibilities are not great – but that does not relieve the individual of personal responsibility.
- Personal control possibilities are seen by the majority in the washing of fruit and vegetables.
- High expectations of control are placed in policy makers.
- Control issues are best resolved by the combined efforts of policy makers, consumer protection agencies and science.
- From the point of view of consumers the manufacturers of pesticides bear little responsibility.
- The most trustworthy information comes from the consumer associations.
- Information is not actively demanded of the stakeholders.



## **4 Answers to key questions and conclusions**

### **(1) What does the German population know about pesticides at the present time?**

The population do not have adequate knowledge. Their subjective and actual knowledge is slight. But at the same time they are interested in information on this topic.

### **(2) What does the German population know at the present time about the safety, regulation and monitoring of pesticides and their residues in food?**

The German population assumes that there are regulation deficits: with regard to the frequency of food inspections, monitoring of the use of pesticides and the effectiveness of the legal provisions.

### **(3) What does the German population know about the difference between conventional and organic agriculture?**

The vast majority of the population know that the kind of agriculture has an influence on the environment: only 15 per cent indicate that "in the end it makes no difference to nature what kind of farming is done". Only 54 per cent of the population realise that pesticides are used in organic agriculture as well. Most consumers see no need for the use of pesticides: three quarters indicate that they consider pesticides dispensable for food production. Half the consumers prefer organically grown produce, the other half conventionally grown produce.

### **(4) Are pesticides perceived by the German population more from the point of view of risks or of benefits?**

Both. Eighty-six per cent know that pesticides increase agricultural productivity. At the same time, 67 per cent believe that pesticides are harmful to humans even when used appropriately.

### **(5) How do consumers themselves come into contact with pesticides?**

From what they themselves say, hardly at all. Many consumers seem not to be aware of using pesticides in their own gardens.

### **(6) What do the consumers demand of their food in terms of quality, appearance, seasonal availability and price?**

When purchasing fresh fruit and vegetables, consumers pay most attention to freshness (48%) and appearance (39%). The third factor mentioned is whether it is "eco" or organically grown (26%). The origin of the food is significant for 22 per cent.

### **(7) How does knowledge about pesticides and their regulation influence the perception and behaviour of consumers?**

The more consumers find out about pesticides or about stakeholders in the field, the higher they rate pesticide-specific as well as unspecific risks. Consumers who are more aware of information about pesticides more often cite external sources (NGOs, government) as sources of concern and are less likely to classify health risks from pesticides as insignificant. Also, the less the persons concerned can draw on personal experience for their knowledge, the more pronounced is their assessment of pesticide-specific risks. Finally, people who tend to assess the risks as high also pay more attention to information on pesticides.

### **(8) To what extent have reports on pesticide residues in food influenced the consumers' perception with regard to the safety of pesticides?**

Media coverage of pesticide residues has led to a more critical consumer attitude towards pesticides. Behaviour has been influenced only slightly or temporarily, however. Behavioural

changes were in reference to specific foods or countries of origin that were classified as unsafe.

**(9) To what extent does the conflict played out in the media influence the perception and behaviour of the consumer? Is any conflict perceived at all?**

The conflict played out in the media generates fleeting interest that quickly dissipates but is to some extent recalled some time later. A conflict is perceived to the extent that pesticide residues appear not to be sufficiently regulated and the expectations of control by the regulatory authorities are correspondingly very high.

**(10) Who is perceived as an “information provider”? Do consumers feel adequately protected by the competent authorities or do they feel exposed to risks? If so, what risks?**

The media (television and newspapers) are perceived as information providers. It can be assumed that the consumers are not clear about the concrete source of the information (public authorities, science, producers). Apparently quite different institutions are considered as potential information providers. However, little use is made of such information. Because the topic of pesticides is slumbering under the surface, as it were, high expectations of control by the authorities are formulated.

**(11) Whose assertions about risks from pesticide residues are more readily believed in case of conflict: those of government authorities and institutions or press reports/NGOs?**

The media context is more decisive for the topic as the origin of the information. Nevertheless, consumer associations are the most trustworthy. They are also allocated greater information expectations than government authorities (22% versus 12%). This effect is probably heightened by the fact that the authorities are made responsible for the smooth functioning of the system to a high degree – quickly leading to withdrawal of trust in the event of disappointment (“scandal”).

**(12) What expectations do consumers have with regard to information on pesticides and pesticide residues in food? How and where do consumers obtain information? How and by whom would consumers like to be informed?**

Consumers subjectively feel poorly informed and express great interest in more information on pesticides. Television, newspapers and the Internet are used as information sources. All other potential information sources play almost no part at all so far. Deficiencies in the supply of information are seen in food retailers and the consumer associations: in the view of the citizens, more information should be available there.

**(13) Can conclusions be drawn from the survey about what factors influence the risk perception of consumers and in what direction public opinion will develop with regard to pesticides and pesticide residues?**

The consumers are easily reached through the media when risks are publicised, Risk perception depends on one’s age: concerns regarding pesticides increase as one grows older. The negative image of pesticides has in the past led to preference for organics. If this image is not fundamentally changed and if reporting in the form of “scandals” is continued, the preference for organics will presumably be reinforced in the coming years. Organically grown produce enjoys a positive image – that pesticides are used in organic gardening is largely unknown.

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## 6 Annex

### 6.1 Annex 1: Questionnaire of representative survey

#### Questionnaire

Project: BfR – Representative Population Survey Pesticides  
Project No.: 231  
Method: CATI  
Target group: persons 14 years of age and over, representative federally  
Number of cases: 1,000  
Interview duration: about 25 minutes  
Field time: 23 November – 18 December 2009  
Version: 25 November 2009

Overview:

- Module I – Screening
- Module A – Attitudes toward pesticides
- Module B – Behaviour toward PESTICIDES
- Module C – Perceived affectedness
- Module D – Information behaviour
- Module E – Assumed danger potential
- Module F – Responsibility and regulation
- Module S – Socio-demography

## Background and structure of the survey instrument

Essential patterns to be asked about

### 1. **Perception**

Assessments with affective content that draw attention to certain properties of products and thus justify risk-relevant action strategies. Thus the specific attitudes towards products are also discussed in this dimension.

### 2. **Knowledge**

Cognitive schemata that define the attention horizon during action. Ultimately this dimension comprises practical knowledge and the formal knowledge reflected, for example, in knowledge of legal regulations and chemical terms.

### 3. **Behaviour**

Routines that are employed in dealing with food and thus include experience in dealing with produce potentially contaminated with residues from pesticides.

### 4. **Information behaviour**

Elements that can be integrated into cognitive schemata and hence are capable of expanding one's attention horizon or restructuring action.

The questionnaire is structured on the basis of modules subdivided according to specific aspects of the general question. It consists of seven modules, briefly described below.

#### *Module A – Attitudes towards pesticides*

Pesticides occur as residues in food. At the same time PESTICIDES stand for a certain kind of agriculture, essentially conventional (in contrast to organic) agriculture. Different forms of agriculture are culturally encoded in different ways. Here the intention is to ask about quite specific attitudinal patterns pertaining to pesticides on the one hand and about the cultural patterns for identifying pesticides as either the solution or the problem (as attitudes towards specific kinds of agriculture). This also covers the question concerning the image of foods that have been grown conventionally or organically.

#### *Module B – Behavioural aspects*

Question domain: Can the respondents name events in connection with pesticides that have led to concrete and lasting behavioural changes? What everyday strategies are applied in dealing with pesticides? What influence do the media have on behaviour and on dealing with pesticides?

*Module C – Perceived affectedness*

The consumers' subjective feeling of insecurity is ascertained. In what cases do people feel affected by the topic? The significance of the topic for parents of children (up to 3 years of age, "bottle age") is to be discussed in the question domain "Knowledge". Can population groups perhaps be identified for which pesticides play no role whatsoever? Can population groups be identified for which pesticides play a special role? The difference between lay and expert assessments can also be discussed on the basis of these findings.

*Module D – Information behaviour*

Question domains: The study shall determine where and how consumers obtain information about pesticides so that conclusions can be drawn as to what desirable information looks like. The "subjective knowledge" of users of organically grown produce shall be compared with that of users of conventional produce. What role do the media play in spreading knowledge?

*Module E – Assumed danger potential*

To make the rather abstract topic of "product risks" tangible, assumed deleterious effects (e.g. headache, allergies, cancer) will be asked about in Module E. Personal experience with adverse health effects of foods that may have contained residues of pesticides presumably has an especially powerful influence on risk awareness and will therefore be determined as well. The risks of pesticide residues in food shall be compared with other food risks (Salmonella, Campylobacter, mycotoxins, rotten meat, genetically modified food, food additives). What risks emanate from foodstuffs?

*Module F – Responsibilities/Regulation*

Pesticides are subject to extensive legislation. What do consumers know about the regulation of pesticides? The allocation of responsibilities among authorities, companies (industrial and commercial), farmers and consumer associations shall also be asked about. Data shall be collected as to what consumers know and what they think about the regulation of pesticides (e.g. extent of regulation; monitoring of regulation-compliant use and observance of maximum pesticide levels etc.).

*Module S – Socio-demography*

In addition to standard socio-demography, migration background (simplified with two questions) and the querying of household food purchasing deciders were integrated into Module S so as to be able to show possibly existing differences in state of knowledge and information behaviour.

## Module I – Screening

### Question I1

Hello, I am ... of Hopp & Partner in Berlin. We are conducting a survey for a government contractor on the subject of consumer protection. Your phone number was selected at random. Could I please speak with the person in your household who is at least 14 years old and was the last to have a birthday?

*Interviewer: IF CONTACT PERSON HESITATES:*

Your household was selected by a random statistical process. To ensure that the findings are representative of the opinions of the target group it is very important that as many people as possible take part in the survey.

Of course all your information will be completely anonymised and evaluated in compliance with the data protection regulations.

We are conducting the survey on behalf of a government contractor.

*Note to Interviewer: In the following we use the terms pesticide and plant protection agent as synonyms, without any value judgement.*

- |   |                      |   |   |
|---|----------------------|---|---|
| 1 | TP on the phone      | → | continue with question I2                   |
| 2 | TP not on the phone  | → | have TP called to the phone,<br>Question I3 |
| 3 | TP cannot be reached | → | make an appointment, END CALL               |
| 4 | Contact denied       | → | END CALL                                    |

### Question I2

The survey will take about 20–25 minutes. May I start the interview with you now?

- |   |                        |   |                               |
|---|------------------------|---|-------------------------------|
| 1 | yes                    | → | START INTERVIEW               |
| 2 | no, later              | → | make an appointment, END CALL |
| 3 | no, interview declined | → | END CALL                      |

### Question I3

*– Repeat screening as in Question I1 –*

The survey will take about 20–25 minutes. May I start the interview with you now?

- |   |                        |   |                               |
|---|------------------------|---|-------------------------------|
| 1 | yes                    | → | START INTERVIEW               |
| 2 | no, later              | → | make an appointment, END CALL |
| 3 | no, interview declined | → | END CALL                      |

## Module A – Attitudes towards pesticides

### Question A1 – Image profile of foods with or without pesticides

In the following we will talk about pesticides, also called plant protection products. They are used in agriculture to protect plants from insects, weeds or fungal infection.

I am going to read you a number of characteristics. For each one, please tell me whether it applies more to food produced with pesticides, or more to food produced without pesticides:

*Interviewer: Read out.*

*Programmer: Randomise*

- a) ... tasty
- b) ... progressive
- c) ... healthy
- d) ... toxic
- e) ... expensive
- f) ... innovative

- 1 applies more to food produced with pesticides
- 2 applies more to food produced without pesticides
- 3 applies to both product groups equally
- 99 don't know/not stated

### Question A1b – Pesticides in food (was: F6)

Is it generally, according to your knowledge, permissible for foods to contain pesticide residues?

- 1 yes
- 2 no
- 99 don't know/not stated

### Question A2 – Especially contaminated food

Which kinds of fruit or vegetables are especially contaminated with pesticides, in your opinion?

*Interviewer: Ask further: And which others?*

---

**Question A3 – Attitudes: Benefits of pesticides**

I am going to read you a number of statements. For each one, please tell me whether you rather agree with that statement or rather disagree with it.

*Interviewer: Read out. Select applicable statements.*

*Programmer: Randomise.*

- 1 ... Pesticides increase the productivity of agriculture.
- 2 ... Pesticides help to solve the world hunger problem.
- 3 ... Pesticides are harmless for the environment when used appropriately.
- 4 ... Pesticides are harmless to humans when used appropriately.
- 5 ... Pesticides increase the shelf life of foods.
- 6 ... Pesticides are employed in organic farming as well.
- 7 ... Pesticides are necessary for the production of food.
- 96 nothing applies
- 99 don't know/not stated

**Question A4 – Comparison: Statements on the future of agriculture**

I am now going to read you a number of statements about agriculture. For each one, please tell me whether you rather agree with that statement or rather disagree with it.

*Interviewer: Read out.*

*Programmer: Randomise.*

- a) ... Agriculture has to take much more care to preserve its natural foundations.
  - b) ... Agriculture functions best according to the rules of the free market.
  - c) ... Agriculture requires much stricter control.
  - d) ... Only technical progress in agriculture can ensure the food supply of mankind.
  - e) ... Agriculture can only survive if consumers are willing to pay higher prices.
  - f) ... Agriculture needs much more government support.
  - g) ... Consumer protection associations should have a stronger influence on agriculture.
  - h) ... In the end, it makes no difference to nature what kind of farming is done.
- 1 rather agree
  - 2 rather disagree
  - 99 don't know/not stated

## Module B – Behaviour toward pesticides

### Question B1 – Places of purchase for fresh fruit and vegetables

Which of the following places of purchase do you personally frequent at least once a week?

*Programmer: Randomise.*

- 1 ... in supermarkets and branch shops, like Edeka or REWE
- 2 ... in food discount stores, like Lidl or Aldi
- 3 ... on weekly markets
- 4 ... in health food stores
- 5 none of them
- 99 don't know/not stated

*Programmer: Move question to start of questionnaire.*

### Question B2 – Factors in the purchasing decision

Which attributes are particularly important to you when you buy fresh fruit and vegetables?

*Interviewer: Don't read out. Multiple answers possible.*

- 1 freshness
- 2 healthiness
- 3 organic/ecological
- 4 grade/quality
- 5 appearance
- 6 price
- 7 origin
- 8 regionality (from the region)
- 9 quality seals
- 10 place of purchase
- 11 packaging
- 12 advice by sales personnel
- 98 others, namely \_\_\_\_\_
- 99 don't know/not stated

### Question B3 – Familiarity of eco-labels

Organically grown produce is often labelled with a corresponding quality seal. Which quality seals do you know?

*Interviewer: Don't read out. Multiple answers possible.*

- 1 Bioland
- 2 Naturland
- 3 Bio according to EC Regulation
- 4 Demeter
- 5 EcoVin
- 6 BioBio (Plus)
- 7 Öko-logisch
- 8 Bio (Aldi)
- 9 Spar Natur pur (Spar)
- 10 Naturkind (Tengelmann)
- 11 BioWertkost (Edeka)
- 96 none
- 98 others, namely \_\_\_\_\_
- 99 don't know/not stated

Filter: Only if eco-labels or eco-trademarks were named (acc. to B3 not answer 96 or 99).

**Question B4 – Purchase decision and eco-labels**

How strongly do you agree with the statement “I prefer to buy food with an eco-label”?

*Interviewer: Read out.*

- 1 1 – completely disagree
- 2 2
- 3 3
- 4 4
- 5 5 – completely agree
- 99 don't know/not stated

**Question B6 – Behavioural change owing to pesticide residues**

Have there been pesticide-related events in the past which led you to change your purchasing behaviour with regard to foods?

- 1 yes
- 2 no
- 99 don't know/not stated

Filter: Only if events occurred (acc. to Question B6 answer 1).

**Question B7 – Events triggering change in behaviour**

And what kind of event was that?

*Interviewer: Don't read out, multiple answers possible*

- 1 media reports
- 2 information from various institutions
- 3 recommendations from friends and relatives
- 4 own detrimental health effects
- 98 others, namely \_\_\_\_\_
- 99 don't know/not stated

Filter: Only if events occurred (acc. to Question B6 answer 1).

**Question B8 – Concrete change in behaviour**

And how did your behaviour change, what exactly did you do?

- 1 no longer bought the food concerned
- 2 no longer bought food from certain countries of origin
- 98 others, namely \_\_\_\_\_
- 99 don't know/not stated

**Question B9 – Sensitivity with regard to pesticides**

Which of the following statements apply to you and which do not apply?

*Interviewer: Read out. Select applicable statements.*

- 1 I frequently enquire about residues of pesticides in food.
- 2 I prefer to buy conventionally farmed produce.
- 3 I prefer to buy organically farmed produce.
- 4 I avoid certain foods if I know or assume that they contain pesticides.
- 5 I often inform family members, friends and acquaintances about pesticide residues in certain foods.
- 96 nothing applies
- 99 don't know/not stated

## Module C – Perceived affectedness

### Question C1 – Health concerns (food groups)

I am now going to name a few foods. For each one, please tell me whether you have any health concerns with regard to possible residues of pesticides in that food. Please tell me on a scale from 1 "no concerns at all" to 5 "very serious concerns":

*Interviewer: Read out.*

*Programmer: Randomise.*

- a) ... fresh vegetables
- b) ... fresh fruit
- c) ... cereal products like bread or pasta
- d) ... wine
- e) ... coffee and tea
- f) ... herbs and spices
- g) ... frozen vegetables
- h) ... preserved fruit and vegetables
- i) ... baby food

- 1 1 – no concerns at all
- 2 2
- 3 3
- 4 4
- 5 5 – very serious concerns
- 99 don't know/not stated

Filter: Only if fresh vegetables, frozen vegetables or preserved fruit and vegetables (acc. to Question C1a, g, h) have been associated with concerns 4 or 5.

### Question C2 – Qualification of concerns expressed about vegetables

And where did your concerns regarding vegetables originate?

*Interviewer: Multiple answers possible.*

- 1 media reports
- 2 personal experience
- 3 information from public or government institutions (public authorities)
- 4 information from non-governmental organisations (e.g. from the field of environmental protection)
- 5 advice from friends/acquaintances
- 98 others, namely \_\_\_\_\_
- 99 don't know/not stated

Filter: Only if fresh fruit or preserved fruit and vegetables (acc. to Question C1b, h) have been associated with concerns 4 or 5.

**Question C3 – Qualification of concerns expressed about fruit**

And where did your concerns regarding fruit originate?

*Interviewer: Multiple answers possible.*

- 1 media reports
- 2 personal experience
- 3 information from public or government institutions (public authorities)
- 4 information from non-governmental organisations (e.g. from the field of environmental protection)
- 5 advice from friends/acquaintances
- 98 others, namely \_\_\_\_\_
- 99 don't know/not stated

Filter: Only if cereal products (acc. to Question C1c) have been associated with concerns 4 or 5.

**Question C4 – Qualification of concerns expressed about cereals**

And where did your concerns regarding cereal products originate?

*Interviewer: Multiple answers possible.*

- 1 media reports
- 2 personal experience
- 3 information from public or government institutions (public authorities)
- 4 information from non-governmental organisations (e.g. from the field of environmental protection)
- 5 advice from friends/acquaintances
- 98 others, namely \_\_\_\_\_
- 99 don't know/not stated

Filter: Only if wine (acc. to Question C1d) has been associated with concerns 4 or 5.

**Question C5 – Qualification of concerns expressed about wine**

And where did your concerns regarding wine originate?

*Interviewer: Multiple answers possible.*

- 1 media reports
- 2 personal experience
- 3 information from public or government institutions (public authorities)
- 4 information from non-governmental organisations (e.g. from the field of environmental protection)
- 5 advice from friends/acquaintances
- 98 others, namely \_\_\_\_\_
- 99 don't know/not stated

Filter: Only if coffee/tea (acc. to Question C1e) have been associated with concerns 4 or 5.

**Question C6 – Qualification of concerns expressed about coffee or tea**

And where did your concerns regarding coffee or tea originate?

*Interviewer: Multiple answers possible.*

- 1 media reports
- 2 personal experience
- 3 information from public or government institutions (public authorities)
- 4 information from non-governmental organisations (e.g. from the field of environmental protection)
- 5 advice from friends/acquaintances
- 98 others, namely \_\_\_\_\_
- 99 don't know/not stated

Filter: Only if herbs and spices (acc. to Question C1f) have been associated with concerns 4 or 5.

**Question C7 – Qualification of concerns expressed about herbs and spices**

And where did your concerns regarding herbs and spices originate?

*Interviewer: Multiple answers possible.*

- 1 media reports
- 2 personal experience
- 3 information from public or government institutions (public authorities)
- 4 information from non-governmental organisations (e.g. from the field of environmental protection)
- 5 advice from friends/acquaintances
- 98 others, namely \_\_\_\_\_
- 99 don't know/not stated

Filter: Only if baby food (acc. to Question C1i) has been associated with concerns 4 or 5.

**Question C9 – Qualification of concerns expressed about baby food**

And where did your concerns regarding baby food originate?

*Interviewer: Multiple answers possible.*

- 1 media reports
- 2 personal experience
- 3 information from public or government institutions (public authorities)
- 4 information from non-governmental organisations (e.g. from the field of environmental protection)
- 5 advice from friends/acquaintances
- 98 others, namely \_\_\_\_\_
- 99 don't know/not stated

**Question C10 – Garden in the household**

Does a garden belong to your household?

*Interviewer: This includes external garden properties, as long as they belong to the household.*

- 1 yes
- 2 no
- 99 don't know/not stated

Filter: Only if garden in the household (acc. to Question C10 answer 1).

**Question C11a – Growing fruit and vegetables in one's own garden**

Have you personally grown fruit and vegetables for your own consumption in your own garden in the last three years?

- 1 yes
- 2 no
- 99 don't know/not stated

Filter: Only if fruit and vegetables grown in one's own garden (acc. to Question C11a answer 1).

**Question C11b – Use of pesticides in one's own garden**

Have you personally used pesticides, for example treatments against vermin, for fruit and vegetables you have grown yourself in the last three years?

- 1 yes
- 2 no
- 99 don't know/not stated

*Programmer: Move questions about children in the household from Module S (Questions S5 and S6) to here.*

Filter: Only if children up to 3 years of age in the household (acc. to Question S6 not answer 1).

**Question C12 – Subjective concerns about baby food**

I am now going to name a few foods for babies and small children. For each one, please tell me whether you take care on purchase of that product that it contains no pesticide residues.

*Interviewer: Read out.*

*Programmer: Randomise.*

- a) ... children's tea and children's juice
- b) ... prepared dishes for children
- c) ... vegetables in glass jars
- d) ... fruit in glass jars
- e) ... frozen food
- f) ... formula

- 1 I take care
- 2 I don't take care
- 99 don't know/not stated

Filter: Only if children up to 3 years of age in the household (acc. to Question S6 not answer 1).

**Question C13 – Purchase and preparation of baby food**

Please tell me whether the following statements rather apply to you or rather not apply to you:

*Interviewer: Read out. Select applicable statements.*

*Programmer: Randomise.*

- 1 ... When preparing baby food for my child I predominantly use organically grown fruit and vegetables.
- 2 ... I buy less organically grown produce for myself than for my children.
- 3 ... I trust the government control of pesticide residues and therefore buy predominantly conventionally produced food, even for my children.
- 96 nothing applies
- 99 don't know/not stated

## Module D – Information behaviour

### Question D1 – Perception of information about pesticides

Did you hear, watch or read anything about pesticide residues in foods in the media in the last 2 years?

- 1 yes
- 2 no
- 99 don't know/not stated

Filter: Only if information about pesticides was perceived (acc. to Question D1 answer 1).

### Question D2 – Topics perceived in the media

What exactly was it about?

*Interviewer: Ask further: And what else did you hear or read?*

*Interviewer: If mentioned by TP: BSE, rotten meat or other meat-related scandals: Do you also remember media reports specifically about pesticide residues in food, if yes, which ones?*

---

Filter: Only if information about pesticides was perceived (acc. to Question D1 answer 1).

### Question D3 – Topic perception in the media

And where did you hear or read about that?

*Interviewer: Don't read out. Multiple answers possible.*

- 1 television
- 2 radio
- 3 newspaper (daily or weekly)
- 4 consumer magazines (e.g. Stiftung Warentest, Öko-Test)
- 5 trade journals
- 6 other magazines
- 7 free weekly newspapers
- 8 Internet
- 96 no/heard, saw or read nothing
- 98 others, namely \_\_\_\_\_
- 99 don't know/not stated

### Question D4 – Subjective knowledge

All in all: How well informed do you feel about possible risks of pesticide residues in food? Please tell me on a scale from 1 "very poorly" to 5 "very well".

- 1 1 – very poorly
- 2 2
- 3 3
- 4 4
- 5 5 – very well
- 99 don't know/not stated

**Question D5 – Interest in information**

How much are you personally interested in the topic of possible risks of pesticide residues in food? Please tell me on a scale from 1 "not interested" to 5 "very interested".

- 1 1 – not interested
- 2 2
- 3 3
- 4 4
- 5 5 – very interested
- 99 don't know/not stated

**Question D6 – Information source**

Where should it be possible, in your opinion, to receive information on possible risks of pesticide residues in food?

*Interviewer: Don't read out. Multiple answers possible.*

- 1 from sales personnel/in the food store
- 2 from the manufacturer of pesticides
- 3 from the food producer
- 4 from public institutions/authorities/government
- 5 from consumer protection organisations
- 6 on the Internet
- 7 in magazines/newspapers
- 8 on television
- 9 on the radio
- 10 on the product/packaging
- 98 others, namely \_\_\_\_\_
- 99 don't know/not stated

**Question D7 – Information sources on pesticide residues**

Which sources of information do you use personally use to get informed about possible risks of pesticide residues in food?

*Interviewer: Don't read out. Multiple answers possible.*

- 1 sales personnel in store
- 2 friends and relatives
- 3 doctors
- 4 Internet
- 5 magazines/newspapers
- 6 television
- 7 radio
- 8 consumer protection organisations
- 9 public institutions/authorities/government
- 10 manufacturers of pesticides
- 11 food producers
- 96 none, never sought information
- 98 others, namely \_\_\_\_\_
- 99 don't know/not stated

Filter: Only if Internet is information source (acc. to Question D7 answer 4).

**Question D8 – Internet pages used**

And which Internet pages do you use to receive information about pesticide residues in food?

*Interviewer: Don't read out. If Google/search engine mentioned, ask further: And on which Internet page do you then find the information you are looking for?*

- 1 producers' pages
- 2 private testimonials or bulletin boards
- 3 Internet pages of newspapers/news magazines
- 4 consumer associations and centres
- 5 non-governmental organisations (e.g. Greenpeace, Foodwatch)
- 6 Federal Environment Ministry (BMU)
- 7 Federal Institute for Risk Assessment (BfR)
- 8 Federal Environment Agency (UBA)
- 9 Federal Ministry of Consumer Protection (BMELV)
- 10 Federal Office of Consumer Protection and Food Safety (BVL)
- 11 Julius Kühn Institute (JKI)
- 98 others, namely \_\_\_\_\_
- 99 don't know/not stated

**Question D9 – Consulting a consumer advice centre**

Have you ever consulted a consumer advice centre to receive information on the possible risks of pesticide residues in food?

- 1 yes
- 2 no
- 99 don't know/not stated

Filter: If acc. to Question D9 answer 1.

**Question D10 – Time of consultation of consumer advice centre**

And when was the last time you consulted with a consumer advice centre on the possible risks of pesticides in food, what year was that?

- 1 2009
- 2 2008
- 3 2007
- 4 2006
- 5 2005
- 6 2004
- 7 2003
- 8 2002
- 9 2001
- 10 2000
- 11 1999 and earlier
- 99 don't know/not stated

## Module E – Assumed danger potential

### Question E1 – Possible adverse health effects from pesticide residues

Which of the following situations can, in your opinion, result in adverse health effects on people:

*Interviewer: Read out. Multiple answers possible.*

*Programmer: Randomise.*

- 1 ... The approved maximum pesticide levels have been observed
- 2 ... Several different pesticides have been used
- 3 ... A pesticide has been applied more than once
- 4 ... The foods have been conventionally grown
- 5 ...The foods have been organically grown
- 6 ... The maximum pesticide levels in food have been exceeded
- 7 ...No pesticides were used at all
- 96 none of them
- 99 don't know/not stated

### Question E2 – Adverse health effects from pesticides experienced

Have you ever personally experienced adverse health effects through foods which you have attributed to pesticides? If so, in what form?

*Interviewer: Don't read out. Multiple answers possible.*

- 1 nausea
- 2 vomiting
- 3 diarrhoea
- 4 dizziness
- 5 headache
- 6 allergies
- 7 cancer
- 8 rashes
- 96 no, nothing of the kind
- 98 others, namely \_\_\_\_\_
- 99 don't know/not stated

Filter: Only if suffered from at least 1 adverse health effect (acc. to Question E2 not answer 96 or 99).

### Question E3 – Food responsible for adverse health effect

And with which food did this happen to you?

---

*Programmer: Move question E4 to start of questionnaire.*

**Question E4 – Comparison of different food risks**

Let's have a look at the topic of food. I am now going to read you some possible contents of food, and I would like you to tell me whether you are of the opinion that these contents are a possible risk to your own health. Please tell me on a scale from 1 "no health risk" to 5 "very high health risk".

*Interviewer: Read out.*

*Programmer: Randomise*

- a) ... bacterial contamination like Salmonella
- b) ... preservatives
- c) ... flavour enhancers
- d) ... pesticide residues
- e) ... bacterial contamination of meat, so-called rotten meat
- f) ... genetically modified food
- g) ... artificial aromas

- 1 1 – no risk
- 2 2 – low risk
- 3 3 – medium risk
- 4 4 – high risk
- 5 5 – very high risk
- 99 don't know/not stated

## Module F – Responsibilities and regulation

### Question F1 – Responsibilities for food safety

Who is primarily responsible for food safety, in your opinion?

*Interviewer: Don't read out. Multiple answers possible.*

- 1 farmers and (garden) growers
- 2 food corporations/food-processing industry
- 3 state/public institutions/government agencies
- 4 policy makers
- 5 consumers
- 6 retail trade/supermarkets
- 7 science
- 8 consumer associations
- 9 non-governmental organisations (like e.g. environmental associations)
- 10 media
- 98 others, namely \_\_\_\_\_
- 99 don't know/not stated

### Question F3 – Attitudes: Responsibility of institutions

I am going to read you a number of statements. For each one, please tell me whether you rather agree with that statement or rather disagree with it.

*Interviewer: Read out. Select applicable statements.*

*Programmer: Randomise.*

- b) ... The legal provisions in the field of pesticides are adequate.
  - g) ... I can reduce my pesticide intake through my own behaviour, for example by washing fruit and vegetables.
  - c) ... The farmers comply with the legal provisions regarding the use of pesticides.
  - d) ... Pesticide residues in food are too rarely monitored.
- 
- 1 agree
  - 2 disagree
  - 99 don't know/not stated

**Question F5 – Responsibility for maximum residue levels**

I am going to read you a number of statements. For each one, please tell me whether you rather agree with that statement or rather disagree with it.

*Interviewer: Read out.*

*Programmer: Randomise.*

- a) ... Science alone can determine the maximum levels for pesticides.
- b) ... The maximum residue levels for pesticides in food set forth in the EU Regulation are quite safe.
- c) ... The maximum levels for pesticides in food should be agreed on between policy makers, science and consumer associations.
- d) ... The free market can best assure that the maximum levels for pesticides in food are observed.
- e) ... The consumers control through their purchasing behaviour that only food posing no health risk is available on the market.
- f) ... In determining the maximum levels, policy makers are guided too much by the interests of agriculture, commerce and industry.
- g) ... Experts and consumers should decide on the maximum residue levels for pesticides on an equal footing.
- h) ... Health depends on many different factors, the risks posed by pesticides are comparatively insignificant.

1 rather agree

2 rather disagree

99 don't know/not stated

**Question F7 – Trustworthiness of different stakeholders**

Which of the following institutions or groups should play an important role in regulating pesticide residues, in your opinion?

*Interviewer: Read out. Multiple answers possible.*

*Programmer: Randomise.*

1 ... agriculture

2 ... state/public institutions/government agencies

3 ... retail trade

4 ... policy makers

5 ... science

6 ... consumers

7 ... consumer associations

8 ... non-governmental organisations (e.g. environmental associations)

9 ... food corporations

10 ... media

11 ... EU

99 don't know/not stated

**Question F8 – Recognition of stakeholders**

Which of the following institutions or groups do you know by name?

*Interviewer: Read out. Multiple answers possible.*

*Programmer: Randomise.*

- 1 ... Federal Office of Consumer Protection and Food Safety
- 2 ... Julius Kühn Institute, the Federal research institute for cultivated plants
- 3 ... Federal Environment Agency
- 4 ... Federal Institute for Risk Assessment
- 5 ... EFSA, the European Food Safety Authority
- 6 ... Verbraucherzentrale Bundesverband
- 7 ... Stiftung Warentest
- 8 ... Fördergemeinschaft Nachhaltige Landwirtschaft FNL
- 9 ... Industrieverband Agrar (IVA)
- 10 ... Greenpeace
- 11 ... Foodwatch
- 12 ... GbÜ, the Global Agency for the Supervision of Food Risks
- 96 none of them
- 99 don't know/not stated

Filter: Only if stakeholders were mentioned (acc. to Question F8 not answer 96 or 99).

**Question F9 – Stakeholders as sources of information**

Have you ever sought information on the subject of pesticide residues from any of these institutions, and if yes, from which ones?

*Interviewer: Don't read out. Multiple answers possible.*

- 1 Federal Office of Consumer Protection and Food Safety
- 2 Julius Kühn Institute, the Federal research institute for cultivated plants
- 3 Federal Environment Agency
- 4 Federal Institute for Risk Assessment
- 5 EFSA, the European Food Safety Authority
- 6 Verbraucherzentrale Bundesverband
- 7 Stiftung Warentest
- 8 Fördergemeinschaft Nachhaltige Landwirtschaft FNL
- 9 Industrieverband Agrar (IVA)
- 10 Greenpeace
- 11 Foodwatch
- 12 GbÜ, the Global Agency for the Supervision of Food Risks
- 13 PAN, the Pestizid Aktions-Netzwerk
- 96 no/never sought information
- 99 don't know/not stated

## Module S – Socio-demography

### Question S1 – Age

Finally, a few statistical questions which we need for the analysis. What year were you born?

- 1 19 | \_ | \_ | \_ | \_ |
- 99 don't know/not stated

### Question S2 – Formal education

What is your highest level of school or university education?

*Interviewer: Don't read out.*

- 1 (no) lower secondary school leaving certificate (8th form)
- 2 intermediate school leaving certificate, POS qualification (10th form)
- 3 University or technical college entrance qualification, EOS qualification
- 4 university or technical college studies
- 5 other school leaving certificate
- 6 still student at school, so no certificate
- 99 don't know/not stated

### Question S4 – Number of persons in household

How many persons live in your household, including children?

*Interviewer: Don't read out.*

- 1 1 person/living alone
- 2 2 persons
- 3 3 persons
- 4 4 persons
- 5 5 persons
- 6 6 persons
- 7 7 persons
- 8 8 persons and more
- 99 don't know/not stated

Filter: Only if more than one person in household (acc. to Question S4 not answer 1 and not answer 99).

### Question S5 – Number of children in household

And how many children below the age of 18 years live in your household?

- 1 none
- 2 1 child
- 3 2 children
- 4 3 children
- 5 4 children
- 6 5 children
- 7 6 children
- 8 7 and more children
- 99 don't know/not stated

Filter: Only if children in household (acc. to Question S5 not answer 1 and not answer 99).

**Question S6 – Number of children below 3 years in household**

And how many children below the age of 3 years live in your household?

- 1 none
- 2 1 child
- 3 2 children
- 4 3 children
- 5 4 children
- 6 5 children
- 7 6 children
- 8 7 and more children
- 99 don't know/not stated

Filter: Only if more than one person in household (acc. to Question S4 not answer 1 and not answer 99).

**Question S7 – Purchase decider**

Who is primarily buying food for your household, is it you or another person?

- 1 target person him/herself
- 2 other person
- 99 don't know/not stated

**Question S8 – Employment**

Are you currently gainfully employed?

- 1 yes
- 2 no
- 99 don't know/not stated

Filter: Only if not employed (acc. to Question S8 answer 2).

**Question S9 – Group membership**

Are you ...

*Interviewer: Read out.*

- 1 ... pupil
- 2 ... university or college student
- 3 ... in retirement
- 4 ... unemployed, zero short-time worker
- 5 ... homemaker
- 6 ... doing military or community service
- 97 others
- 99 don't know/not stated

Filter: Only if employed (acc. to Question S8 answer 1).

**Question S10 – Occupational position**

Are you ...

*Interviewer: Read out.*

- 1 ... white collar worker
- 2 ... blue collar worker
- 3 ... self-employed, freelancer, farmer
- 4 ... civil servant, judge, professional soldier
- 5 ... trainee
- 6 ... family worker
- 97 others
- 99 don't know/not stated

**Question S11 – Migration background – Country of birth**

What country were you born in?

- 1 Germany
- 2 in another country
- 99 don't know/not stated

**Question S12 – Migration background – Parents' country of birth**

Was either of your parents born outside Germany?

- 1 both born in Germany
- 2 one or both parents born abroad
- 99 don't know/not stated

**Question S13 – Population of place of residence**

Approximately how many people live in your place of residence?

*Interviewer: Read out if required.*

- 1 up to 500 inhabitants
- 2 501–1,000 inhabitants
- 3 1,001–5,000 inhabitants
- 4 5,001–10,000 inhabitants
- 5 10,001–50,000 inhabitants
- 6 50,001–100,000 inhabitants
- 7 more than 100,000 inhabitants
- 99 don't know/not stated

**Question S14 – Internet use**

Do you regularly use the Internet?

- 1 yes
- 2 no
- 3 don't know/not stated

**Question S15 – Net household income**

What is the total monthly net income in your household?

*Interviewer: Read out if required.*

What I mean is the sum of all incomes from gainful employment, pensions, public benefits, housing benefits, child allowance and other income after deducting taxes and social security contributions.

Your answer – like all other answers in this interview – will of course be entered completely anonymously. It would help us if you could at least tell us the approximate income group your household belongs to.

*Interviewer: Read out answers if required.*

- 1 ... less than 500 euros
- 2 ... 500 to less than 1,000 euros
- 3 ... 1,000 to less than 2,000 euros
- 4 ... 2,000 to less than 3,000 euros
- 5 ... 3,000 euros and more
- 99 don't know/not stated

**Question S16 – Gender**

Recorded by interviewer:

- 1 male
- 2 female

**Question S17 – Postal code**

*Programmer: Transfer postal code from telephone sample*

**We have reached the end of the interview.  
Many thanks for your participation!**

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