



Federal Ministry of
Food, Agriculture
and Consumer Protection

Food Safety Strategies





Foreword

Dear Reader,

Food safety is important and indispensable. We all eat every day and we all must be able to rest assured that the food we eat does not pose a threat to our health. The increasing globalisation of the world's food markets poses ever-new challenges for those persons responsible for food safety. New pathogens or residues of contaminants necessitate the use of new analytical methods at the end of the chain and, often as a result, amended rules and regulations for cultivation and processing at the start of the chain.

Today we owe our high level of food safety in Europe and Germany to a continually evolving network dedicated to risk minimisation. Agriculture, the processing industry, trade, inspection bodies, the research community and the political sector each bear their own particular responsibility in this connection. At the same time – as in many other areas of life – a 100% guarantee is never possible because food safety involves biological systems that are perpetually changing in dynamic ways.

Whenever a new hazardous situation arises, we take appropriate action. For example, following the EHEC epidemic in 2011 we significantly improved cooperation between Germany's federal government and



Land (state) governments in crisis situations. In addition, consumer information was made more transparent and cooperation within the EU was intensified.

This brochure outlines the strategies and structures which link the partners in the food production chain with one another. The “seven fundamental principles of food safety” provide a map that shows how the various aspects fit together like pieces in a puzzle to create a whole. Whoever says that food in Germany has never been safer is right. Ensuring that this remains so requires a daily commitment from all involved to continually work to ensure food safety.

A handwritten signature in green ink that reads "Ilse Aigner".

Ilse Aigner
Federal Minister of Food, Agriculture and
Consumer Protection



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1 Introduction: Food Safety in Germany

An average supermarket in Germany stocks around 10,000 food products. Larger chains have as many as 60,000 items on their shelves. They sell hundreds of different types of bread, fruit and vegetables from countries all over the world, meat, cheese and cold cuts in all shapes and sizes, fish from oceans far and wide, regional delicacies, and international specialties such as ham, pasta and pesto. Their availability is all thanks to modern food processing, interna-

tional trade and sophisticated logistics. We can eat at any time, day or night. We can obtain food wherever and whenever we want to. Things have never been so easy. But with such an abundant supply, the difficulty comes in keeping it all in check. Global markets, the international flow of goods and ever-changing production and consumption patterns harbour new risks and demand new strategies to ensure food safety. This is what this brochure is all about.



Fig. 1: Factors influencing our food supply

2 Food Safety Means Teamwork: The Food Safety Network

Food safety involves many heads and hands. Farmers, butchers, bakers, restaurant owners and the food processing industry who must train their employees in matters of hygiene, food safety inspectors who take samples in supermarkets, chemists who work in the *Länder* (state) food and veterinary offices, and staff at Germany's Federal Ministry of Food, Agriculture and Consumer Protection who liaise with others at EU

level to consult on new threshold values. They all play their part and they are all linked with one another. If the European Commission adopts a new monitoring programme, it impacts on the work of food safety inspectors in cities and villages across the country. This also works in reverse: If a German food and veterinary office finds a food product is contaminated, the other EU Member States must also be informed.

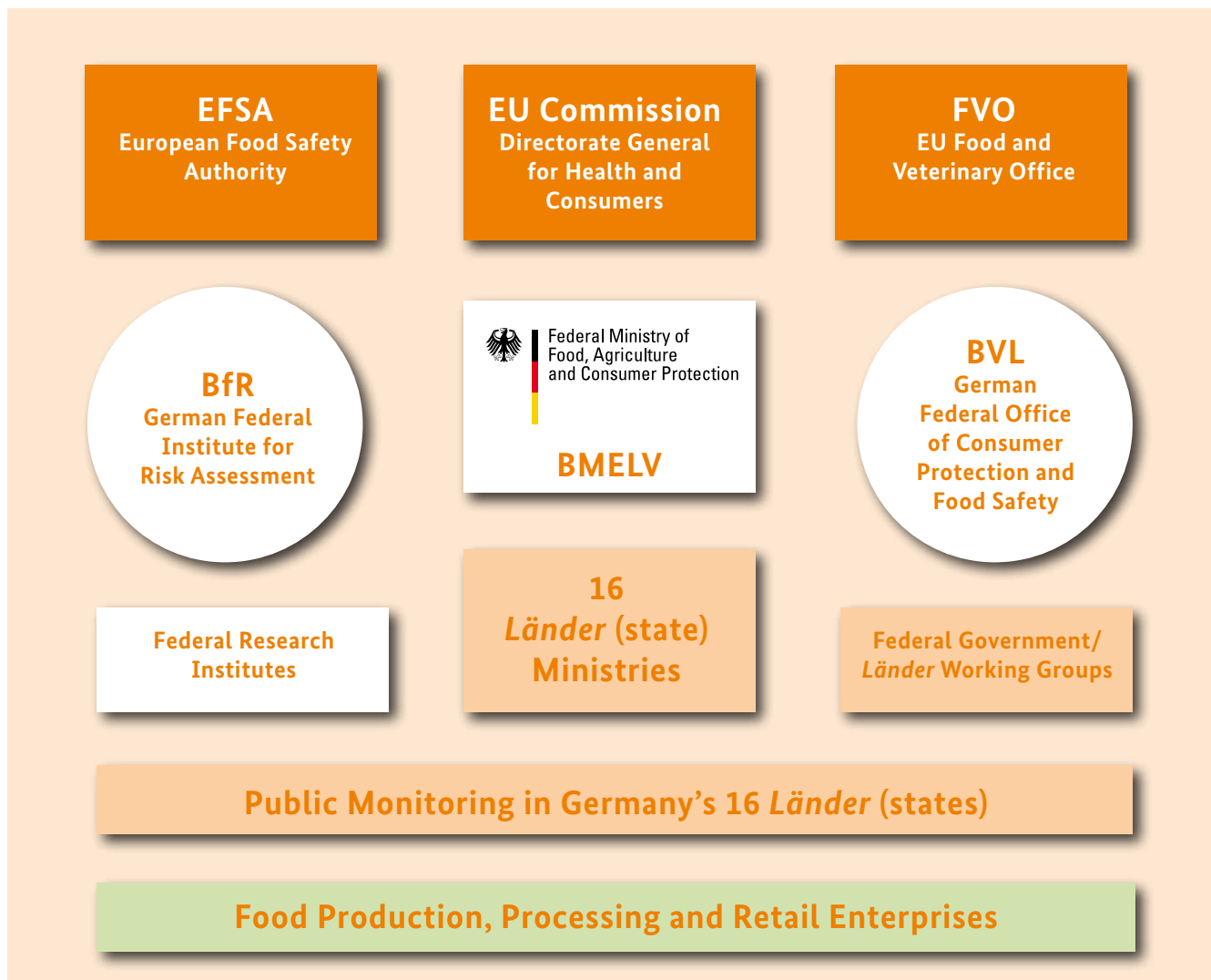


Fig. 2: The food safety network



Division of Responsibility within the Network

It is really quite simple: Everyone must observe food safety requirements in their place of work and know who their partners are in the food chain.

Food safety during production: It all starts with the food producers. They hold primary responsibility for food safety, be they industrial enterprises, farmers, bakers or restaurant owners. Public food and veterinary inspectors in cities and in rural areas take random samples of products and monitor quality management on site. *Länder*-level ministries coordinate monitoring activities at *Länder* (state) level. Their representatives work closely with the federal government on issues such as devising nation-wide monitoring and inspection programmes and also in the event of a food crisis.

Food safety at national level: Division of responsibility is key. The Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) is responsible not only for food safety legislation but also for developing risk management measures and selecting other suitable measures.

Research work is conducted by the Federal Institute for Risk Assessment (BfR) along with four other Federal Research Centres, all of which advise BMELV. BfR issues independent expert opinions. In its practical work, BMELV is supported by the Federal Office of Consumer Protection and Food Safety (BVL), which in turn has the job of coordinating activities between the *Länder* (states), the federal government and the EU.

Food safety around Europe: The same division of responsibility is seen at EU level. In matters of policy,

Germany's BMELV cooperates with the European Commission, the European Parliament and the European Council. The Commission is advised by the European Food Safety Authority (EFSA). The European Food and Veterinary Office (FVO) performs duties at EU level that are similar to those undertaken by BVL at national level in Germany. It also monitors the monitoring and surveillance systems in the EU Member States and in third countries. Beyond EU borders, a number of other bodies and committees develop food safety standards. One such standard is the Codex Alimentarius. German food safety experts are also involved in this work.

Codex Alimentarius: The global reference point in matters of food safety

International food markets need regulation too. If, for example, a producer of baby formula wants to export to Indonesia or if an American company aims to market its gluten-free foods in Europe, then certain checks are necessary. What kind of labelling is needed and which production standards apply? The World Health Organization (WHO) and the Food and Agriculture Organization of the United Nations (FAO) set up a body for this back in 1962, the Codex Alimentarius. More than 180 countries and the European Commission on behalf of the EU work together in more than 20 different committees to develop standards, guidelines and codes of practice on food quality and safety. These include standards on food additives and contaminants, and on certain food groups such as fruit and vegetables. Many other such codes have since been brought into being. The German government is heavily involved in these activities and is committed to achieving a high degree of consumer protection worldwide. Germany is, for example, the host country to and also holds the presidency of the Codex Committee on Nutrition and Foods for Special Dietary Uses (CCNFSDU). While CCNFSDU standards do not take the form of binding national legislation, they apply as recommendations for Codex members. In trade disputes, the WTO uses them as reference standards for achieving compliance with WTO requirements.

For more information, see:
www.codexalimentarius.net

3 Food Safety Aims and Principles

Food legislation comprises more than 200 regulations, laws and landmark decisions, ranging from regulations on maximum limits for pesticide residues to consumers' rights to information. They all serve the three main aims of food safety law:

- To protect human health: Only safe food may be placed on the market.
- To safeguard consumers from deception.
- To ensure the public receives accurate information.

These three aims are enshrined in both German and EU law.

The Seven Fundamental Principles of Food Safety

Clear aims call not just for good team players but for good strategies to achieve them. In the food sector, the fundamental principles of food safety apply. They delineate the responsibilities and roles played within the network and form pillars upon which the food safety structure rests.

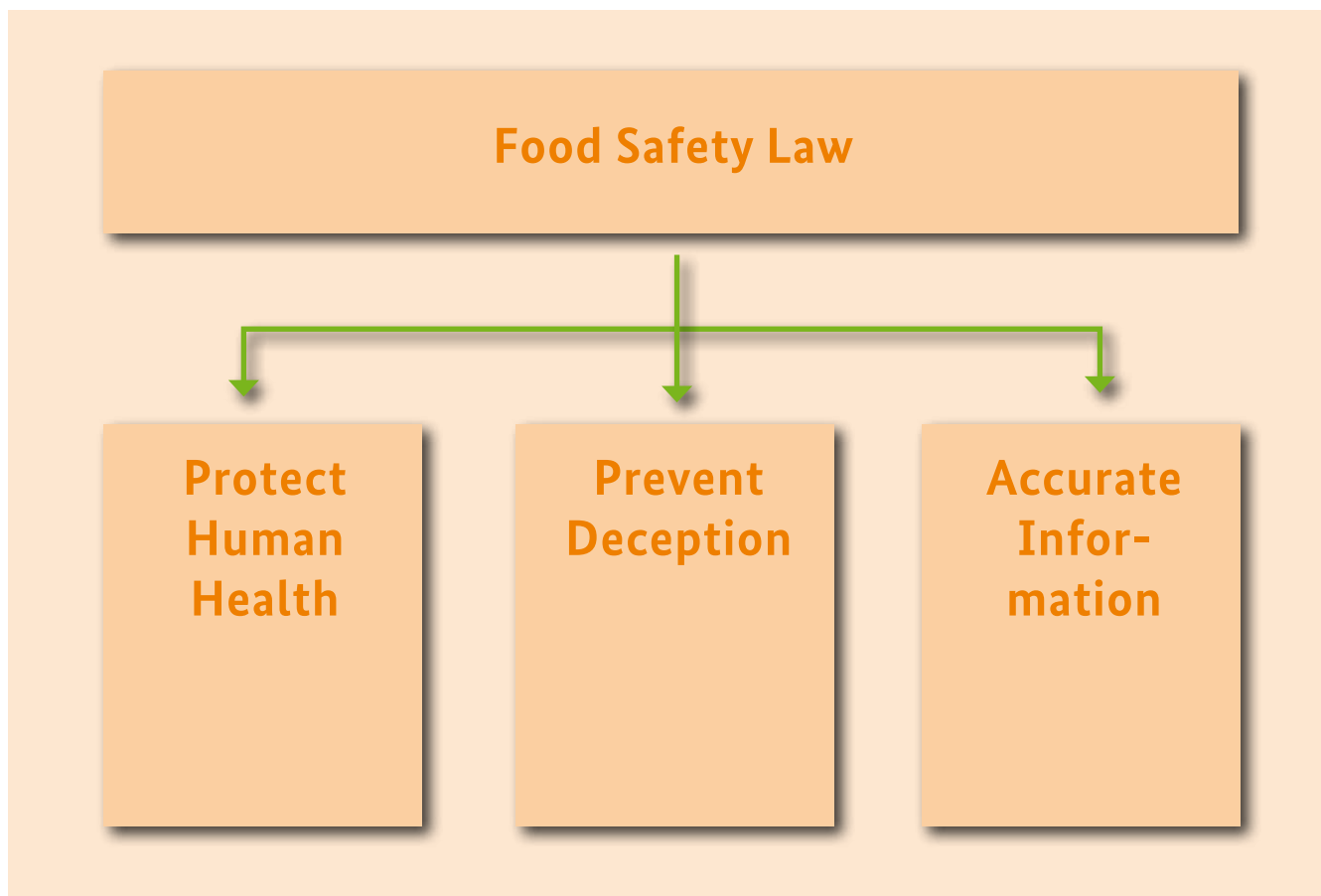


Fig. 3: The three aims of food safety law



These **fundamental principles** apply throughout Europe:

1. **The food chain principle**
2. **The principle of producer responsibility**
3. **The traceability principle**
4. **Independent scientific risk assessment**
5. **Separation of risk assessment and risk management**
6. **The precautionary principle**
7. **Transparent risk communication**

Principle 1: Look at the Entire Food Chain

Be it a frozen ice lolly, a pork steak or a glass of beer, all measures to ensure food safety must be strictly implemented along the entire food chain. Mistakes made at just one stage of production can impact on the chain as a whole. In 2005, great inroads were made in this regard with the merging of food and feed law into a combined German Food and Feed Code (LFGB). Following the 'from farm to fork' principle, this provided a closed system of regulations and inspections which encompasses every phase of production. In the case of ice cream, for example, these regulations and inspections begin with the animal feed used for the cows and end at the shop counter.

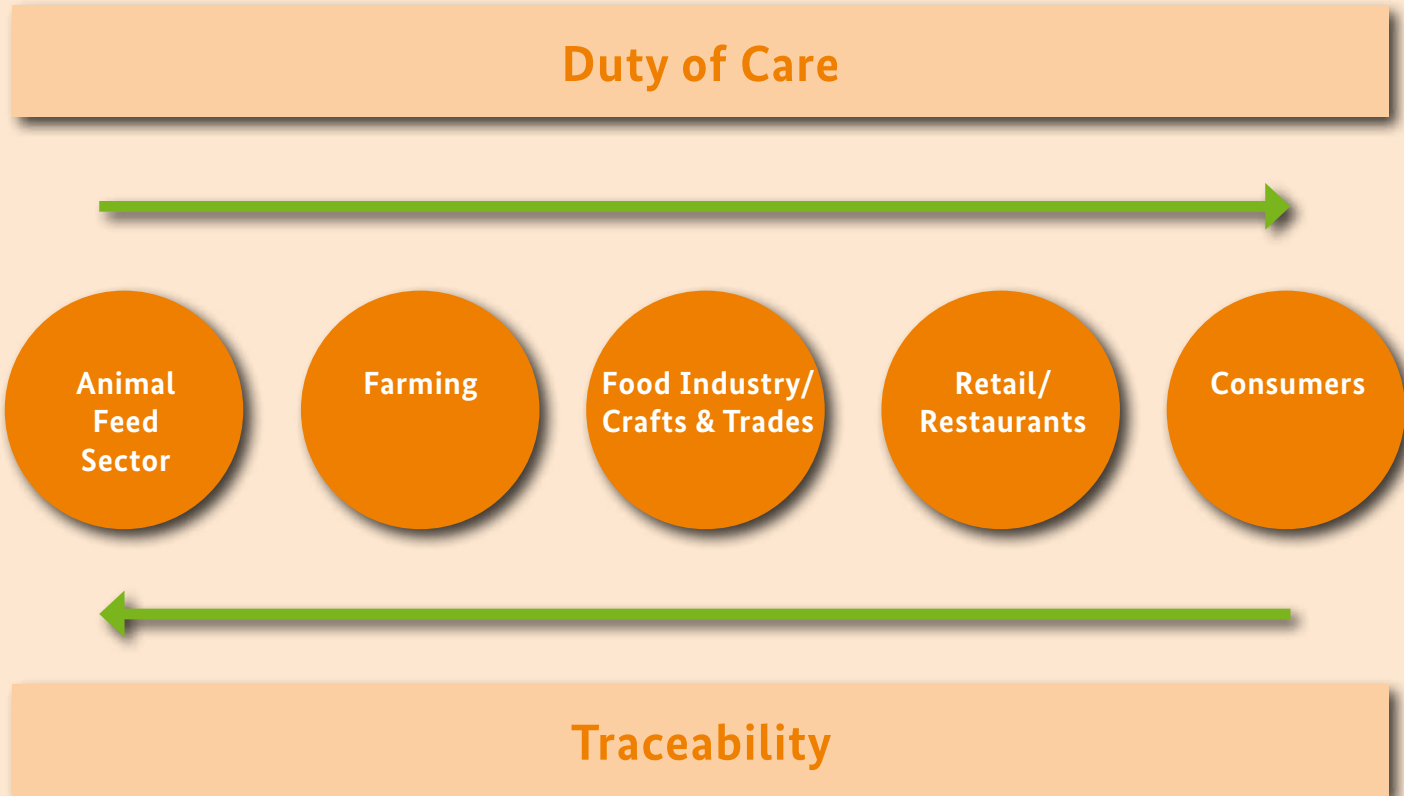


Fig. 4: The food chain



Principle 2: Producer Responsibility

Producers of food and feed, be they farmers, bakers or the owner of a sugar factory, are themselves responsible for ensuring that their products are safe for consumption. Applicable food law uses the term 'duty of care'. Without exception, producer responsibility begins with the selection of raw materials and ingredients. When a consignment of raw materials is received for use in baby food, for example, tests for up to 800 substances are performed before the analyst can give the go ahead for them to be processed. If producers fail to observe their duty of care, it can have serious consequences in that they are liable under civil law for any loss or damage which occurs as a result of their producing a substandard product. Furthermore, in such cases, administrative authorities and, if necessary, law enforcement agencies and the courts can call producers to account.



Principle 3: Traceability (Codes on Packaging)

This has long been standard practice: All food packaging bears either a code or a date by which producers and inspectors can see which 'batch' the product came from. A batch comprises a quantity of a specific food product produced and packaged under virtually the same conditions. But this is only the last step in the traceability chain. Since 1 January 2005, producers have been required not only to document which food products they have delivered and where they delivered them to but must also provide proof of where they obtained the raw materials used in those products. This is the only way to quickly detect the cause of any contamination which may occur. All food producers are required to observe the traceability principle.



Duty of Care and Traceability: The example of chocolate

Chocolate is not only delicious, it is an excellent product with which to illustrate food safety. The raw materials used to produce chocolate come from all over the world. Only when quality assurance controls continue through to the shop counter is the product really enjoyable. Dr Bernd Schartmann, Director of Research and Development at chocolate makers Lindt & Sprüngli explains what this means in practice:

“The duty of care begins long before production starts”, says Schartmann. “Before we buy in raw materials, we usually visit the suppliers. Sugar, for example, is generally bought locally. We get the milk powder for milk chocolate from the Allgäu region, nuts from Piemont and Turkey, Cognac naturally comes from France. Selected cooperatives from Central and South America, Madagascar and Ghana supply the cocoa beans. Visits to our suppliers focus on the production methods they use, factory hygiene practices and quality assurance measures. If everything is satisfactory, then product specifications are agreed. These describe both the production and composition of the raw materials, complete with analysis data, allergen content and freshness traits. “We avoid suppliers who also process peanuts”, says Schartmann, and adds that “Although this restricts us to a certain extent, peanuts are potential allergens and we want to keep them out of our products”.

Each batch of raw materials received requires a certificate. The certificate serves as the suppliers’ confirmation of their own research results and states that the agreed specifications have been complied with. The goods are then stored as blocked stock. This is where in-house quality assurance kicks in. Only when sensory and microbiological tests have proven positive may milk

powder, nuts and fruit pastes be moved and added to the production stock. Companies in this sector carry out some 10,000 microbiological tests on goods received each year. And this is just the start of a long series of tests. “We take samples every half hour from each of our production lines”, says Dr Marlene Kolvenbach, head of microbiology. “This gives us an average sample from each shift which we then subject to microbiological tests.” Samples are also taken from every shift for sensory tests. All finished products and all semi-finished products are tasted by experts each and every day. During production itself, a finely-meshed network of control points ensures quality and safety. For example, once they have been roasted, nuts may only be stored for a maximum of two days at a temperature of between 10°C and 14°C. There are prescribed temperature requirements for each production area. Liquid chocolate flows through a series of strainers which are regularly inspected for foreign bodies. “If something is wrong, the whole production line is stopped until we find out what happened”, says Schartmann. Quality assurance has top priority. Once the product has reached the shop, the producer’s sphere of influence becomes ever smaller. But strictly speaking, producers’ duty of care only ends when the customer has eaten the product and enjoyed it.

Traceability also begins at the goods received stage. Each delivery receives a code for the product, the supplier, the date and quantity. The code allows a raw material to be traced along the entire production chain. At the end of the chain, each box receives a batch number. The number allows the producer to determine when the package was produced, which chocolates it contains, when they were wrapped and produced, and the raw materials used to make them.

Testing Whether a Box Has Any Flavour

The duty of care also applies to packaging. Boxes used for chocolates are not only subjected to chemical testing for the purpose of detecting residues, they are also subject to sensory tests. In the Robinson test, foldable boxes and grated choco-

late are placed together under glass for 48 hours. Blind tests are then conducted to see what the grated chocolate tastes like when compared with a neutral sample.



Principle 4: Independent Scientific Risk Assessment

How do we judge whether a risk to health is large or small? How can we evaluate the importance of BSE, the occurrence of antibiotic-resistant MSRA bacteria in livestock farming or dioxins in animal feed for food safety? Hundreds of new research findings are published every day. So in policy terms, it is vital that risks be correctly assessed. In her 2001 report “Organisation of Consumer Health Protection”, Hedda von Wedel, President of the Federal Audit Office, called for the establishment of a government agency which conducts research and publishes its findings on its own account, independent from political, social and economic influences. The federal government took this seriously and set up the Federal Institute for Risk Assessment (BfR) in 2002.



Principle 5: Separation of Risk Assessment and Risk Management

There is a clear separation between scientific risk assessment on the one hand and risk management by policymakers on the other. This means that researchers first produce their opinions independent of any influence from policymakers or industry. It is only then that the risk managers take over. They must take account of all important aspects, be they environmental, social or economic needs, and decide which measures are best suited to minimise risk. This is not an easy task. Risk management takes in things like judging which measures are appropriate and which would be overblown or exaggerated. Which groups of the population require special protection? Which risks are acceptable and at what cost? The separation of risk assessment and risk management has been enshrined in both German and EU law since 2002.



Principle 6: Prevention Is Better Than Cure – The Precautionary Principle

From a scientific standpoint, risks cannot always be fully assessed, for instance when previously unknown contaminants are discovered. In such cases, the people responsible can apply the precautionary principle when making their decisions. This allows risk management to take precautionary measures in the interests of risk minimisation. However, it can only do so on the condition that the measures are appropriate and are subjected to review as soon as new research findings become available. The precaution-

ary principle was applied, for example, when assessing acrylamide, a contaminant. In 2002, when Swedish officials first proved that this substance found its way into many starch-containing foods such as chips (french fries), crisps (potato chips) and crisp bread, it was not immediately apparent how dangerous it was. Nonetheless, a minimisation strategy was first implemented in Germany and later throughout Europe to reduce acrylamide content in food. Animal tests have proven acrylamide to be both carcinogenic and mutagenic. While no full risk assessment of the harm it can cause to human health is yet available, the precautionary principle has significantly reduced the risk to consumers.



Principle 7: Transparent Risk Communication

Risk communication takes place on many levels: Researchers need to exchange information on the impact of a newly detected risk. Policymakers, industry and science and research discuss the scientific risk assessment and agree on suitable risk minimisation measures; this is all part of risk communication. Finally, the general public must be informed about risks in an appropriate manner. This can take the form of pro-active public relations work by the various ministries and other government agencies, the Federal Institute for Risk Assessment (BfR) and the Federal Office of Consumer Protection and Food Safety (BVL). In addition, the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) provides funding for a number of organisations that assume communication duties and represent consumer interests:

→ **Stiftung Warentest**: Tests products and services in independent institutes using scientific methods. It publishes the results online and in its own regular magazines. Since its inception, Stiftung Warentest has tested some 100,000 products and services. Foods are tested for microbial risk and contaminants, among other things.
See also: www.test.de (in German)

→ **Verbraucherzentrale Bundesverband e. V.** (Federation of German Consumer Organisations): An umbrella organisation comprising 16 consumer advice offices and 25 further consumer associations. It represents consumers' interests and helps them exercise their rights. Further education and training for its members and uniform advisory standards ensure that the advice given to consumers throughout Germany is at the same high standard everywhere.
See also: www.vzbv.de.

→ **aid infodienst Verbraucherschutz, Ernährung, Landwirtschaft e. V.**: This organisation has the mandate to inform consumers, experts and the press independently and in accordance with available knowledge. In performing its duties, aid infodienst not only produces a wide range of materials and information on farming, food and nutrition, it also plays a key role in risk communication. Consumers can use a website (www.was-wir-essen.de – in German) to pose questions free of charge to aid infodienst experts.

→ **Die Deutsche Gesellschaft für Ernährung e. V.** The German Nutrition Society focuses on all issues related to nutrition and identifies topics for nutrition-related research. It supports nutrition research in non-material ways and provides information on new findings and trends, both in publications and at specially organised events. DGE develops dietary recommendations on a scientific basis.
See also: www.dge.de (in German)

These four organisations are actively integrated into communication processes within the ministry and its subordinate agencies.

Germany's *Länder* (federal states) and BVL provide information on the website www.lebensmittelwarnung.de regarding warnings about foods that are hazardous to health, repulsive or suited to misleading consumers. In addition to references to, for example, return programmes or product recalls undertaken by food producers, visitors to this website will also find warnings about unsafe products, such as when a product is sold from abroad (for example, via the Internet) and there is no manufacturer or marketer in Germany.
See also: www.lebensmittelwarnung.de (in German)

Interview with Gerd Billen, Executive Director of the Federation of German Consumer Organisations

The BSE scandal sparked radical restructuring in Germany and across Europe. For example, consumer protection responsibilities were consolidated within a single ministry and risk management was separated from risk assessment. How do you view these measures?

Separating risk assessment from risk management which brought the establishment of BfR and BVL made sense at the time. Today however, cooperation between all specialist agencies and the bodies responsible for food and feed monitoring is under discussion, particularly the cooperation between Germany's federal, *Land* and local governments. This is because the report issued by the Federal Audit Office on "The Organisation of Consumer Health Protection" in October 2011 states that the government had not succeeded in the last ten years in passing implementing legislation that is binding for all. This runs counter to the consumer's legitimate expectation that the work conducted in connection with food control and inspection be effective and coordinated.

In what areas do you see a need for action?

Global trade has pushed our present food control and inspection structures to their limits. Additional resources, adapted structures and new instruments are needed. Germany's federal and *Land* governments together have to ensure uniformly high nationwide standards and provide the funding this requires. We need to inject greater trans-

parency into the tasks involved in food control and inspection and have to give the federal government more authority where needed.

What would you still like to see happen in the area of food safety?

The growing number of zoonotic diseases, in other words diseases that are transmitted from animals to humans, poses an enormous problem. We must optimise the entire chain, starting with the producer and extending all the way to the consumer's refrigerator. The discussions on decontaminating poultry meat with the help of chlorine and other substances shows that Europe and the USA have different approaches to this issue. We see it as the government's responsibility to approve only those methods that make a safe contribution to hygiene. In addition, a labelling system for indicating the use of such a process must be designed and introduced in such a way that consumers can understand the effect that the decontamination method has, for example, when the method leads to qualitative changes – such as in the product's flavour, aroma or texture. Or when the method has a negative impact on the environment. Another cause for concern are antibiotic-resistant germs that are being found in food. In the face of this development, we need measures that drastically reduce the use of antibiotics in the livestock industry. In addition, we urgently need ideas and measures that are suited to protecting consumers from antibiotic-resistant germs.



4 Who Does What in the Food Safety Network?

BMELV: The Food Safety Communications Centre

The Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) is Germany's food safety communications centre at national level. This is where things come together: reports on public food and feed monitoring, scientific opinions, the minutes of parliamentary debates, European-level hearings and talks, information from industry and industry associations, and, of course, media reports and press releases. Given that somewhere between 80 and 90 per cent of current food legislation is harmonised EU-wide, one of the ministry's main tasks is to maintain close contact with Brussels and represent German interests there (see Section 2).

The information gathered allows BMELV to become actively involved in the drafting of EU legislation and other measures to improve food safety. This all serves to continually improve food safety and is an element in risk management: everything to do with minimising or eliminating risk. Risk management can involve very different activities, from setting maximum thresholds for mycotoxins (moulds) in food, stricter border controls and new labelling requirements for food allergens (see Fig. 5), to measures that have nothing at all to do with legislation. BMELV also delegates certain risk management activities (such as coordinating the monitoring and inspection activities conducted by the *Länder*) to the Federal Office of Consumer Protection and Food Safety (BVL).

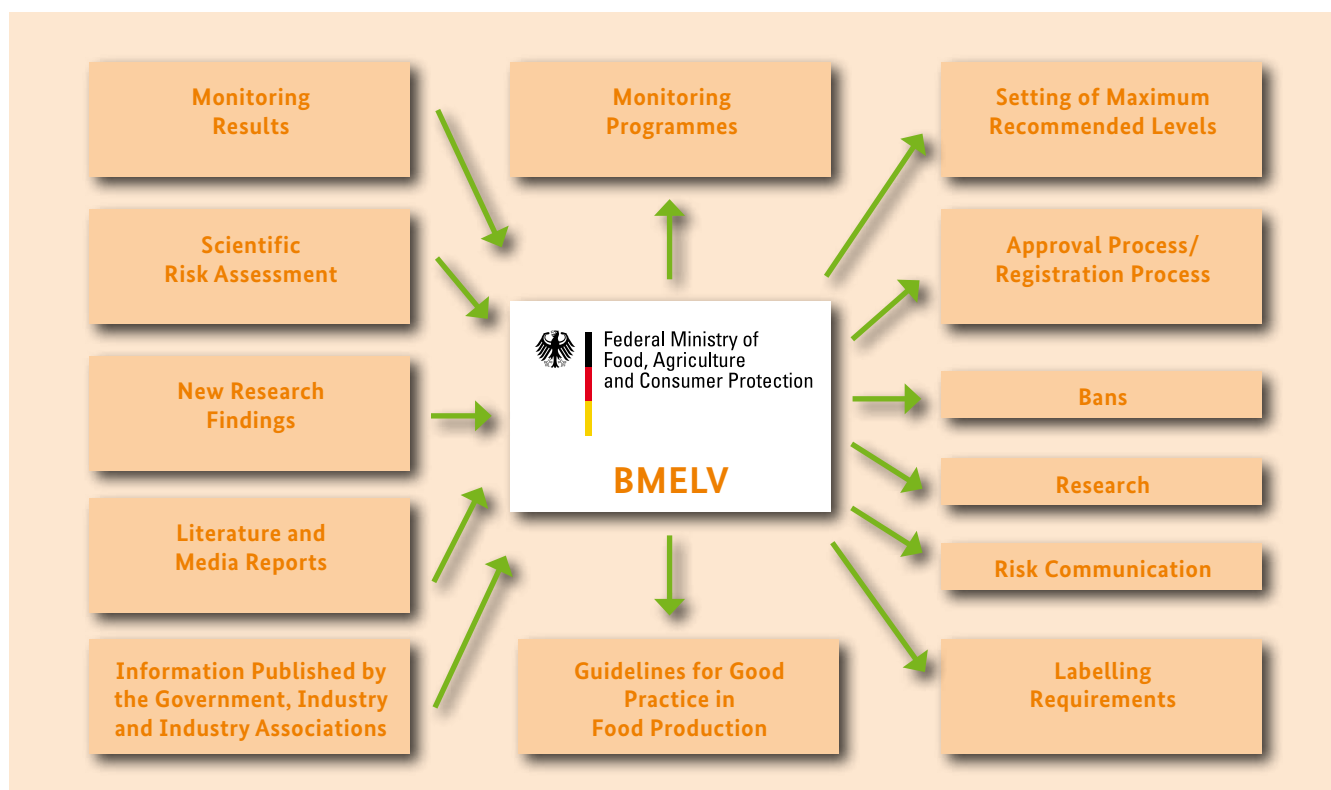


Fig. 5: BMELV – The food safety communications centre

Federal Office of Consumer Protection and Food Safety: Coordination and Crisis Management Centre

The Federal Office of Consumer Protection and Food Safety (BVL) was founded in 2002. Its remit includes acting as the coordination centre between the *Länder* (state) governments, federal government and the EU. In this capacity, it assumes the role of national contact point for the EU Rapid Alert System for Food and Feed (RASFF). In this capacity, it receives and passes on all information and warnings issued by the monitoring authorities. As part of this work, BVL also conducts early detection of situations and events that could result in a crisis. If a food-related crisis arises, a situation centre for the federal-*Länder* crisis unit is set up at BVL.

BVL also plays a key role in testing and approving things like plant protection products, veterinary medicines, animal feed additives, genetically modified organisms and new types of food. BVL's staff comprise experts who, for example, must decide whether a producer's approval and license application contains sufficient information to prove that a pesticide or a genetically modified crop plant is safe to use. A string of BVL-run laboratories enjoy National Reference Laboratory status. These develop standards for analysis and advise the states' food and veterinary offices, including in matters of communication and information.

See also: www.bvl.bund.de

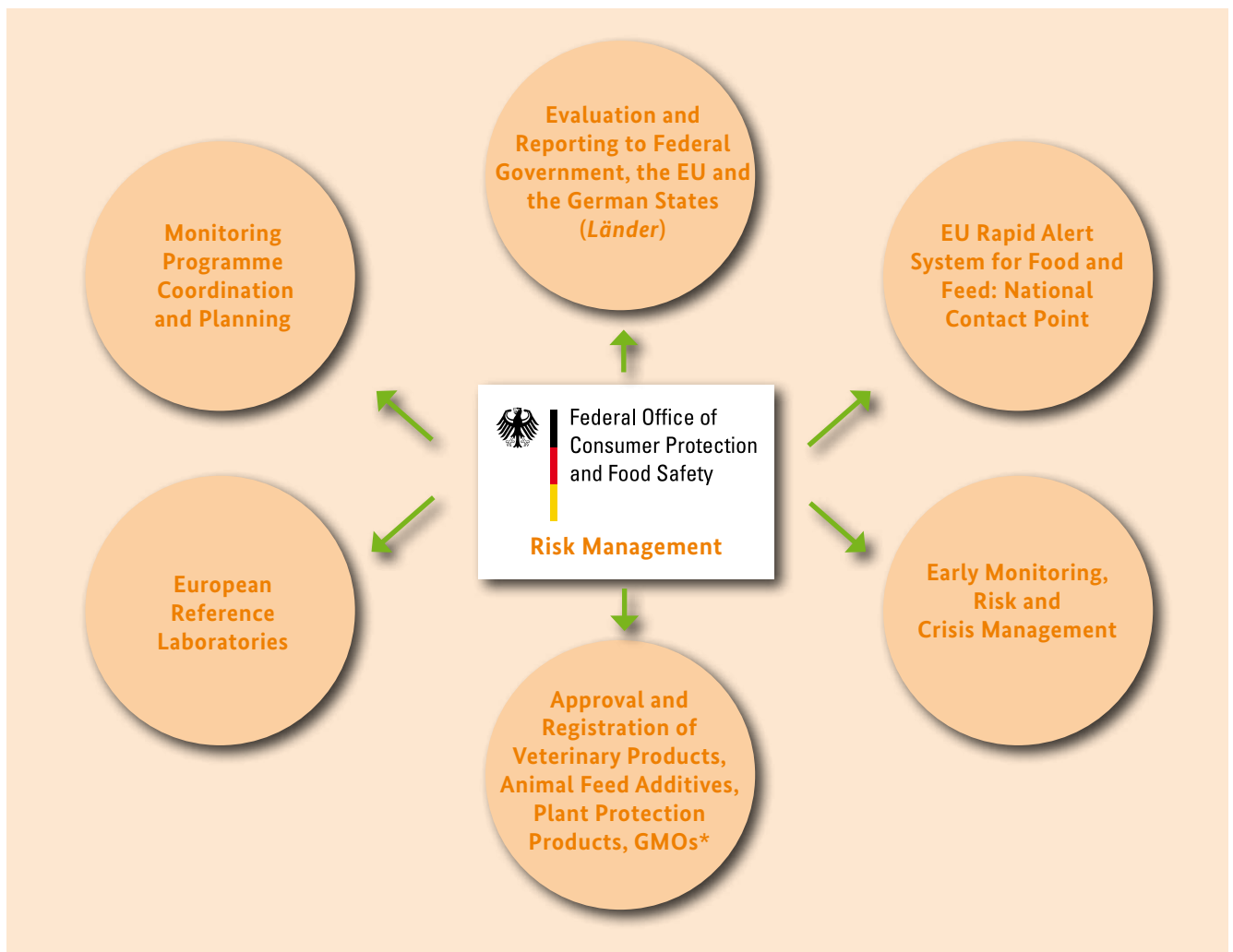


Fig. 6: BVL mandate

*Genetically modified organisms



Federal Institute for Risk Assessment: Independent Risk Assessment

EU Rapid Alert System for Food and Feed

Information on unsafe food and feed must be exchanged as quickly as possible between the EU Member States. This is done by means of the European Union's Rapid Alert System for Food and Feed (RASFF). If a monitoring authority in Germany finds that a certain food or feed product poses a health hazard, they notify the Federal Office of Consumer Protection and Food Safety (BVL). BVL verifies the reports and forwards them to the European Commission. In the other direction, BVL notifies the *Länder* (state) authorities about reports received from other EU Member States via the RASFF system. If consumer health is at risk, the respective *Länder* authorities inform the public about the products and producers in question. See also: www.bvl.bund.de/rasffmeldung (in German)

Whether it be EHEC, dioxin or toys: The Federal Institute for Risk Assessment (BfR) is responsible for analysing and evaluating the health risks posed by foodstuffs, substances and products of all shapes and sizes. Its expertise is in great demand. Since its establishment at the end of 2002, BfR researchers have produced over 25,000 expert opinions. They cover a broad range of issues, from chemicals to plant protection products and the risks arising from microbial contamination of foodstuffs. BfR opinions serve ministries, government authorities and the courts, providing a scientific basis for their decisions. They are also used to discuss relevant issues with researchers at EU and international level and to provide information to journalists, consumer associations and the general public.

At national level, BfR researchers work with Federal Research Centres and state-run universities. The BfR's sister organisation at EU level is the European Food Safety Authority (EFSA). The two work closely together. BfR delegates its experts to bodies such as the World Health Organization (WHO), the Organisation for Economic Co-operation (OECD) and the International Organisation of Vine and Wine (OIV). The institute maintains a large number of National Reference Laboratories, which develop testing standards and provide advisory services. See also: www.bfr.bund.de

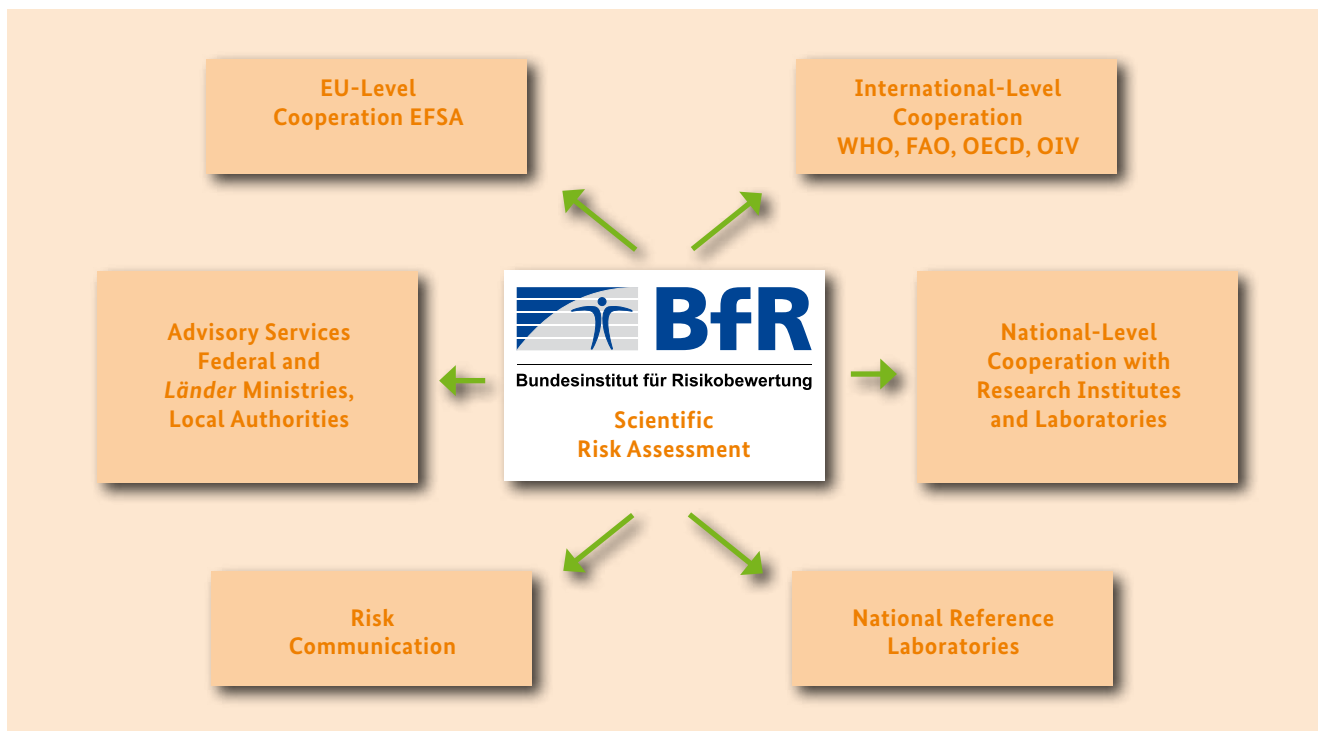


Fig. 7: BfR mandate

BMELV-Funded Research: The Federal Research Centres

Agricultural and nutrition research are the basis for a safe, healthy and balanced diet. The Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) makes some €364 million (2012) available each year to fund its four Federal Research Centres and the Federal Institute for Risk Assessment (BfR) (including construction measures and rent). These five research centres are currently conducting some 150 research projects that revolve around the priority research field Promoting Consumer Health Protection by Improving Food and Product Safety; Improving Control of Zoonoses. The focus of this work ranges from antibiotic resistance to zoonotic pathogens. The responsibilities of Germany's four Federal Research Centres are as wide-ranging as the subjects covered by BMELV's mandate.

Max Rubner Institute, the Federal Research Institute of Nutrition and Food

A healthy diet and safe food form the core of the research activities conducted at the Max Rubner Institute (MRI). One of the research questions it works on involves eating habits in Germany, a subject examined in the Nationale Verzehrsstudie (NVS II) national nutrition survey. Its research work also includes the NEMONIT national monitoring programme to assess nutritional behaviour.

See also: www.mri.bund.de

Julius Kühn Institute, Federal Research Centre for Cultivated Plants

Food safety starts with the crops grown in the fields. The Julius Kühn Institute (JKI), which is the Federal Research Centre for Cultivated Plants, conducts research relating to cropgrowing and covers issues such as cereal types that are particularly resistant to mould.

See also: www.jki.bund.de

Friedrich Loeffler Institute, Federal Research Institute for Animal Health

Be it swine fever, bird flu or BSE, the Friedrich Loeffler Institute (FLI), the Federal Research Institute for Animal Health, conducts research into preventing and combating animal disease. It also looks at the new pathogens that are likely to spread as a result of climate change.

See also: www.fli.bund.de

Johann Heinrich von Thünen Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries

Forestry, fisheries and farming have several things in common: They create jobs, provide resources that are vital to life and must be managed sustainably. Researchers at the Johann Heinrich von Thünen Institute (TI), the Federal Research Institute for Rural Areas, Forestry and Fisheries, explore ways to balance the needs of these very different sectors. Their work examines, for example, the question of what the future has in store for the likes of the cod, herring and similar fish.

See also: www.ti.bund.de

The German *Länder*: Farm to Fork Monitoring and Surveillance

The food and veterinary offices play an important role in ensuring food safety. Public inspectors conduct on-site inspections and take samples from any premises at which food is produced or sold. In Germany, responsibility for food safety inspections lies with the *Länder* (states).

Nationwide monitoring and surveillance: On-site sampling and inspections are the duty of the cities and rural authorities. Each year, nearly a million inspections are conducted at food factories and shops, and more than 400,000 samples are taken. The inspectors work to detect risk: Particularly sensitive foodstuffs, factories and shops are monitored especially frequently. The samples are analysed in laboratories at city, district and *Länder* level. While some samples are only tested for a single substance, many are tested for several hundred substances. The *Länder*

are responsible for enforcing compliance with food safety requirements and they prosecute and punish any breaches of the law.

Coordination centre: The Federal Office of Consumer Protection and Food Safety (BVL) supports monitoring activities wherever possible. It collates the results of food and feed monitoring activities in the individual *Länder* (states) and puts them together in a report. This report is then used by the federal and *Länder* governments to devise new monitoring plans. See also: www.bvl.bund.de (Click on Lebensmittel/ Amtliche Lebensmittelüberwachung/Bundesweiter Überwachungsplan – or for a brief English-language explanation, click on English, then on Food/Federal control plan.)

Controlling the Controller: The European Food and Veterinary Office (FVO) monitors the monitoring and surveillance programmes operated in all EU Member States.

See also: http://ec.europa.eu/food/fvo/index_en.cfm

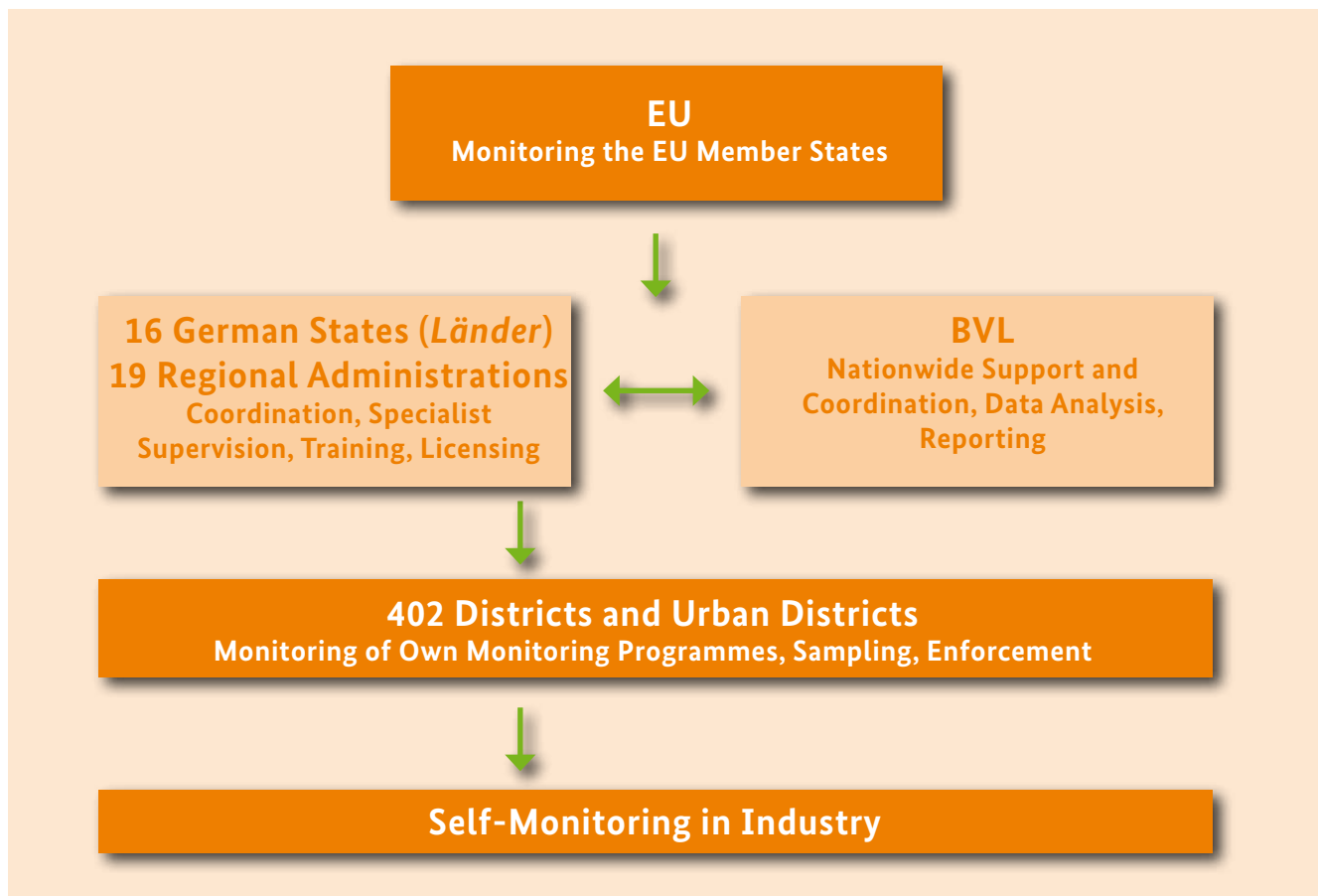


Fig. 8: The food safety monitoring network

Monitoring and Surveillance: From Farm to Fork

The monitoring system covers the entire food chain. For example, there are border checks on imports entering the country. And before animal feed reaches the trough, public inspectors have checked the products and taken samples in accordance with a nationwide monitoring plan. The *Länder*-based plant protection services monitor the sale and use of pesticides and herbicides. Veterinary authorities monitor farms and abattoirs, while public food inspectors inspect the food products and the premises of producers, crafts and trades, retailers, restaurants and kitchens. But first and foremost, effective monitoring is reliant on producers' own quality management systems (see Fig. 9).

Food Safety Monitoring is one of many systematic testing and surveillance programmes. In place since 1995, it is operated jointly by the federal and *Länder* governments. And it is a monitoring programme with a difference: Rather than focusing on risk, sample-taking serves to provide a representative sample for the whole of Germany. Each year, more than 10,000 samples taken from throughout the country are tested for undesirable substances that are harmful to human health. These include plant protection products, heavy metals and other contaminants. The Federal Office of Consumer Protection and Food Safety (BVL) publishes the results in a food monitoring report. The results then flow into the health risk assessment and are used, for example, to test whether a product exceeds maximum recommended levels for an undesirable substance or substances.

See also: www.bvl.bund.de (Click on Aufgaben im Bereich Lebensmittel/Amtliche Lebensmittelüberwachung/Monitoring – or for a brief English-language explanation, click on English, then on Food/National Monitoring.)

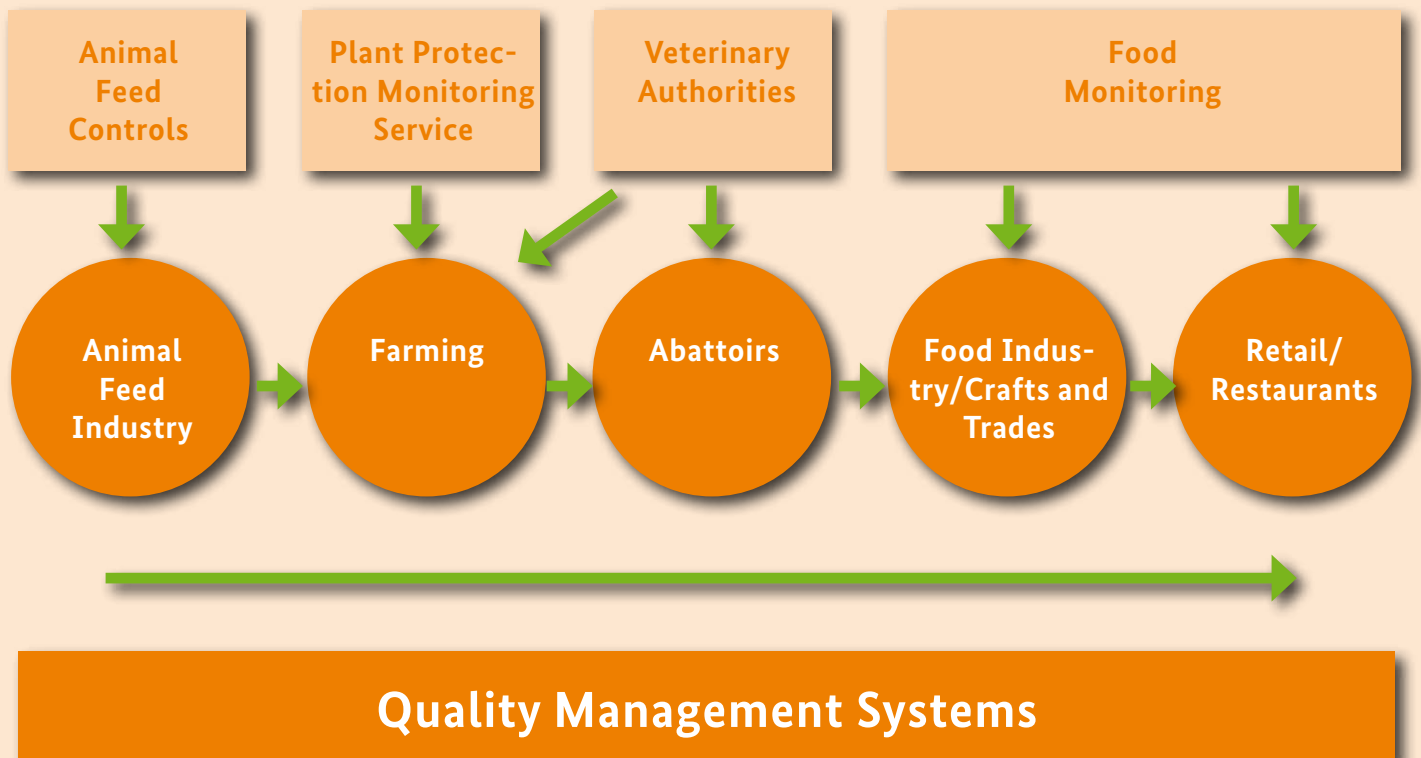


Fig. 9: Monitoring in the food chain



The services provided and the results attained under Germany's Food Safety Monitoring programme are impressive. The programme has provided BVL with no less than 30 million data records since 2000. Several times more data is kept in the laboratory information management systems operated by the German states.

5 Risk Analysis and Appropriate Action

Interplay Between Risk Assessment, Risk Management and Risk Communication

The term risk gives no indication of how great or small a threat might be. Risk only indicates the possibility of a threat. For risk managers, it is important to know how realistic or unrealistic a threat is, but they must be careful neither to under-estimate nor over-estimate a risk. A distinction can be made between subjectively perceived risk and objective risk:

→ Subjectively perceived risk takes in things like additives in food. Additives may only be used in quantities which according to available knowledge can objectively be seen as posing no threat to human health. They have passed through a stringent

approval and licensing procedure which takes in comprehensive health risk assessments – assessments which are subject to review as soon as new research findings become available. Nonetheless, many consumers still see additives as a health hazard.

→ When an objective risk arises, the scientific risk assessment must determine the extent of the risk. Policymakers can then use the information to develop appropriate risk management measures.

Whatever the risk involved, scientific risk assessment provides the basis for any and all action taken. Be it great or small, subjective or objective, suitable risk communication methods must be used to inform the general public (see Fig. 10).

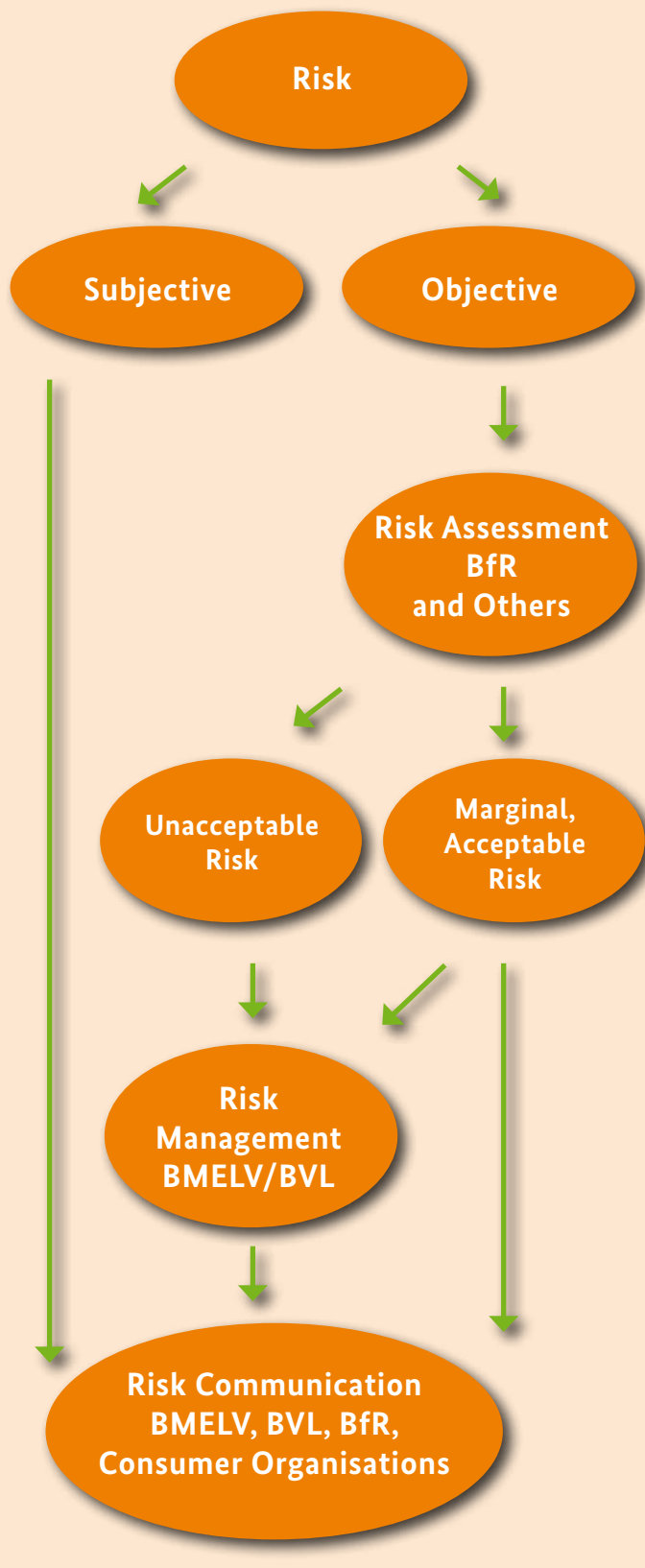


Fig. 10: Risk assessment and risk communication

EHEC

A rare and particularly aggressive pathogen by the name of enterohaemorrhagic *Escherichia coli* (EHEC) O104:H4 set off a serious epidemic in Germany in the early summer of 2011.

The EHEC outbreak in 2011 was the largest outbreak involving *Escherichia coli* bacteria ever to occur in Germany and one of the largest such outbreaks ever worldwide.

Fifty-three people died in Germany during the outbreak. A total of 3,842 people fell ill with EHEC, some of them very seriously.

The EHEC bacterium belongs to that group of pathogens that can cause serious disease in animals and humans and can be transmitted to humans via food. To manage the EHEC crisis, the competent employees at *Land* (state) and federal level worked at full steam, directing all their energies to getting to the bottom of what caused the epidemic. They succeeded in identifying beansprouts as the cause of the epidemic. In this case, the beansprouts were in all probability grown from fenugreek seeds from Egypt that were contaminated with EHEC bacteria. Following the issue of a recommendation on the consumption of fenugreek sprouts, the closure of a bean sprout production facility and a temporary embargo on fenugreek and other sprout seeds from Egypt, the epidemic was officially declared over in early July 2011.

The protection of consumers' health had absolute priority over economic considerations: Recommendations regarding consumption of any suspected foods were issued as soon as there was a well-founded suspicion that a particular food might be the cause of the epidemic. Although this led to an enormous drop in sales for truck farms, this step was absolutely necessary to protect human lives. Fortunately, thanks to the collaboration between all government agencies involved it was possible to quickly identify the causes for the outbreak on a targeted basis and the recommendations issued for other foods could be cancelled.

This experience taught us one thing: Food safety is possible only when all players work hand-in-hand. Transnational events that pose a significant health risk, such as the EHEC outbreak, can be successfully addressed only through efficient teamwork on the part of Brussels, Berlin and Germany's *Länder* (federal states).

As a consequence of the EHEC outbreak, Germany's federal government subsequently adopted an extensive set of measures to protect citizens even better against food-borne diseases.

These measures were based on the findings of a report by the Federal Audit Office on the organisation of consumer health protection. This report was prepared in 2011 by the Federal Commissioner for Efficiency in Public Administration who made a wide variety of suggestions for improvement.

Germany's federal and *Land* governments have in the meantime agreed upon specific measures for further improving the food control and inspection system in Germany. The objective here is to be able to act even faster in the event of a food crisis and to significantly shorten the time it takes to identify the cause of the problem.

In future, a crisis council at state secretary level and a crisis unit at the level of the competent directors-general will be set up in the event of a food safety crisis that extends to several *Länder*. These two bodies will then coordinate the crisis management and crisis communication at political and technical level in future.

In addition, the crisis council can set up a Food and Feed Safety Task Force whose primary task is to determine the causes of the crisis at hand. Specialists from federal and *Land* agencies and the European Food Safety Authority (EFSA) work together in this task force to trace complex supply streams and identify the cause of the particular chain of infection.

In a crisis situation the task force operates out of the Situation Centre at the Federal Office of Consumer Protection and Food Safety (BVL) in Berlin.

The German government has also initiated important amendments to existing law in order to ensure that the communication between all authorities involved is fast and efficient. The planned amendments to the Protection against Infection Act and the Food and Feed Code include, for example, new notification requirements and short communication channels plus improved awareness training for personnel that handles sprouts, germ buds and sprout seeds.

The EHEC crisis also had consequences at European level. The European Commission developed a number of new rules with assistance from Germany, for guaranteeing the best possible quality of sprouts in fu-

ture. The details of these rules were discussed extensively with the Union's 27 Member States. This led to tougher hygiene requirements and requiring operations that cultivate or process sprouts to obtain official approval, an EU-wide control system to improve the traceability of product flows and supply channels plus more stringent import regulations for products from third countries. Producers are also now required to have their sprouts tested regularly for EHEC prior to marketing them.

See also:

www.bmelv.bund.de/ehec (in German)

www.bmg.bund.de/ehec (in German)

German-language leaflet issued by the Federal Institute for Risk Assessment (BfR) with tips on protecting oneself against EHEC: <http://www.bfr.bund.de/cm/350/verbrauchertipps-schutz-vor-infektionen-mit-enterohaemorrhagischen-e-coli-ehec.pdf>

Acrylamide

Acrylamide has probably been around since man started using fire. But it was only in 2002 that Swedish scientists proved the presence of acrylamide in foods cooked at high temperatures, foods like chips (french fries), crisps (potato chips), cornflakes, coffee and toast. It was clear right from the beginning, however, that although the substance could be reduced during the food production process it could not be entirely avoided. Then there was the added problem of it also occurring during cooking in the home. The findings of a scientific risk assessment were not good. Results from animal tests showed that a high intake of acrylamide promotes certain types of cancer. Something had to be done. In response, BMELV adopted a risk management approach which relied on four separate measures:

1. Research: Consolidated Action

Acrylamide was a completely new research area. The Federal Institute for Risk Assessment (BfR) assumed the task of risk assessment, produced expert opinions and conducted research studies and events. The individual Federal Research Centres looked at when and where acrylamide occurs and ways to reduce it. Additional research work was commissioned to investigate the degree of harm caused by the substance. Industry also took part with a broad-based research programme.

2. Minimisation Strategy: Keep levels as low as possible

It is impossible to impose a ban on acrylamide. There are some production and processing activities in which it cannot be avoided. It is thus necessary to keep acrylamide levels in food as low as possible. This is where the ALARA Principle comes in. ALARA stands for As Low As Reasonably Achievable. The Federal Ministry of Food, Agriculture and Consumer Protection (BMELV), industry and Germany's federal states agreed a minimisation strategy. When a particular food exceeds the specified signal value, the causes have to be identified and remedial action such as changing the recipe must be taken. This strategy targeted a phased reduction in acrylamide content in food. Coordination of the strategy was assigned to the Federal Office of Consumer Protection and Food Safety (BVL). The strategy encompassed sectoral talks involving a whole range of individuals, from cooks to caterers to representatives of the bakery and snacks industry (see Fig. 11). Acrylamide levels in a number

of foods such as potato crisps (potato chips) and cornflakes have since been significantly reduced.

3. Informing the Consumer

Consumer associations were notified about the problem and invited to attend regular meetings early on. Because acrylamide also occurs during frying and baking in household kitchens, a set of standardised recommendations were developed in cooperation with the research sector and were then communicated to consumers. For example, BMELV worked closely with the aid infodienst Verbraucherschutz, Ernährung, Landwirtschaft e. V. organisation to produce a consumer information flyer on acrylamide. Over two million copies of the flyer were distributed nationwide.

4. Cooperation at International Level

At European level, an acrylamide monitoring programme was launched across all Member States in

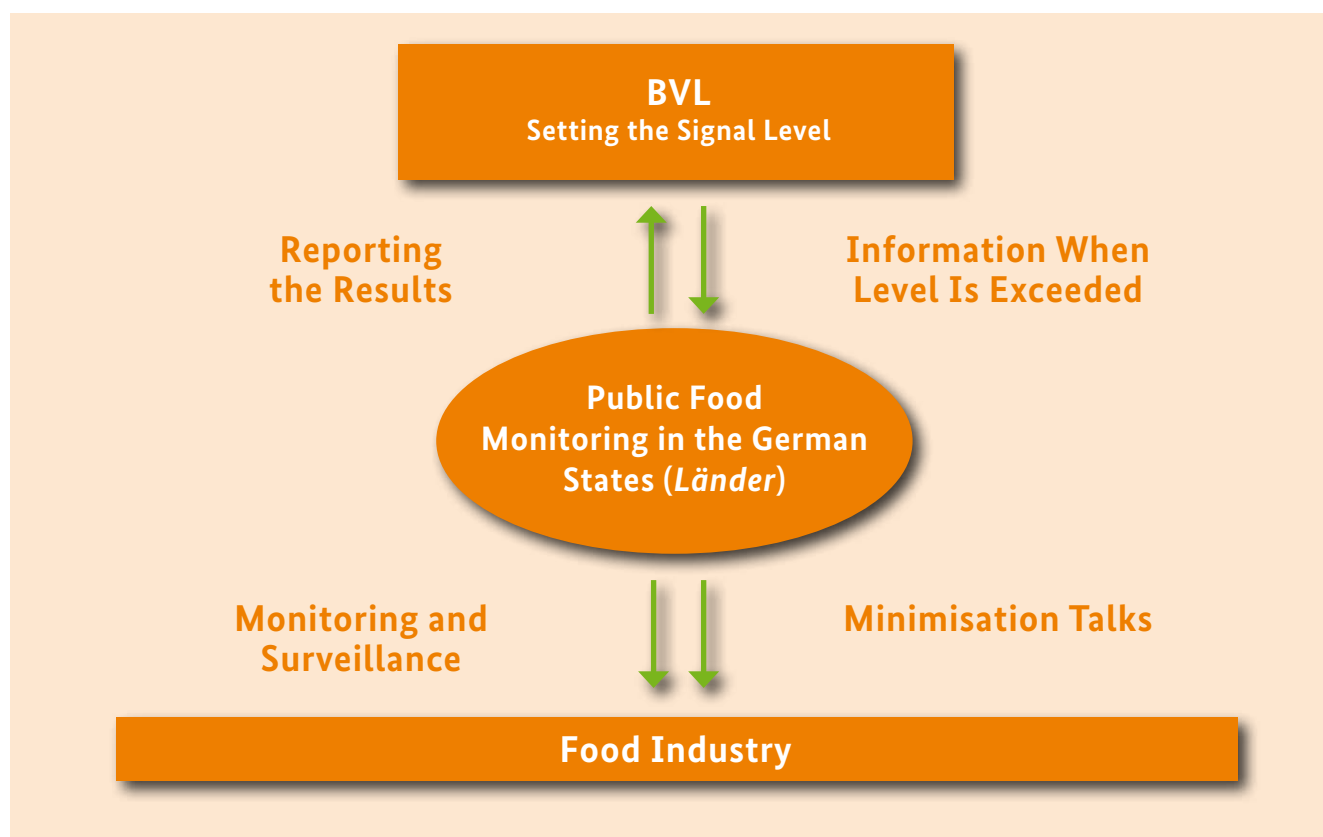


Fig. 11: Acrylamide minimisation strategy

BVL collates analysis data from the various *Länder* and uses it to set the signal level. If acrylamide contamination exceeds the signal level, BVL notifies the monitoring authorities who in turn enter into minimisation talks with producers.

2006. The international Heat-Generated Toxic Foods (HEATOX) research project was conducted with German involvement. As part of the project, the Confederation of the Food and Drink Industries (CIAA) devised an acrylamide toolbox to assist acrylamide reduction in food production. The European Commission followed Germany's example and issued a recommendation on 10 January 2011 on investigations into levels of acrylamide in food and set indicative values at European level for many foods. These indicative values replace the German signal values.

3-MCPD Ester: A New Toxin

The acrylamide minimisation measures are still in full swing and with 3-MCPD ester, a new toxin can be added to the list. One of its components has long been known: 3-monochloropropane-1,2-diol, or 3-MCPD for short. This substance is present, for example, in soy sauce and toast. In high concentrations, it promotes the formation of tumours. Less is known about the compound 3-MCPD ester. In January 2007, the State Institute for Chemical and Veterinary Analysis of Food in Stuttgart developed a (first-ever) rough method for identifying this compound. It enabled detection of this substance in fats, oils, nut nougat creams and baby food. The latest research findings indicate that 3-MCPD esters are split in the body into 3-MCPD which is hazardous to human health. In response of this, BMELV has introduced similar measures to those implemented in the case of acrylamide. These include research programmes, with special attention given to research on technical strategies for minimising 3-MCPD esters and on improved analytical methods, sectoral talks and consultations in EU committees and international bodies.

Trans Fatty Acids

Trans fatty acids (TFA) form when fats with high levels of poly-unsaturated fatty acids are partially hydrogenated using industrial processes. Consumption of large amounts of TFA increases the risk for cardiovascular disease. In light of this, the German Nutrition Society (DGE) recommends limiting TFA consumption to less than one per cent of daily nutritional energy. Average TFA intake in Germany is currently estimated to be less than this. However a considerable share of the German population consumes more trans fatty acids than recommended. This is particularly the case for young men between the ages of 14 and 34. One third of this group consumes more TFA than recommended through chips (french fries),

pizza and baked goods. In response to this situation, BMELV has launched a joint campaign together with the food industry with the aim of reducing TFA levels in foods. Industry associations have developed, with scientific advice from the Max Rubner Institute (MRI), a framework guideline and seven specific guidelines for different product categories. The guidelines aim to make manufacturers aware of the problem and provide assistance with the changeover to low-TFA products. The associations are required to regularly report to BMELV on minimisation measures that have been taken.

See also:

www.bmelv.bund.de (Click on Food & safety/Safe food.)

www.bvl.bund.de (Click on Food/Acrylamide.)

www.bfr.bund.de (Enter "acrylamide" and "3-MCPD ester" in the search field.)

Plant Protection Products

According to agricultural researchers at the University of Bonn, use of plant protection products secures around one third of the global harvest. These crops would otherwise fall victim to pests, disease and competition from weeds, making pesticides and herbicides not entirely indispensable. Policymakers and scientists must thus tackle two questions: how to make plant protection products as safe as possible and how to identify what quantity of which substance is necessary and meaningful. The answers lie in a comprehensive safety strategy which extends from approval and licensing to monitoring of users and food. A key role is played by the independent agricultural advisory services operated by chambers of industry and commerce and by the competent authorities. These help ensure that many potential problems are nipped in the bud.

Double and Triple Checks: Approval and licensing

The approval and licensing process is the eye of the needle through which plant protection products must pass before they can be placed on the market. It is a key risk management instrument whereby substances are tested according to the very latest available knowledge and using state-of-the art technology. The focus



of the tests is on the safety of humans, animals and the environment. The Federal Office of Consumer Protection and Food Safety (BVL) is responsible for approval and licensing in Germany. BVL liaises with three different assessment authorities to ensure that all relevant aspects are thoroughly addressed and the right management decisions are made:

- The Julius Kühn Institute (JKI), which is the Federal Research Centre for Cultivated Plants, assesses the effectiveness, plant compatibility, potential impact on bees, and practical uses and benefits of pesticides and herbicides.
- The Federal Institute for Risk Assessment (BfR) assesses potential effects on human and animal health. Even if a plant protection product is used correctly and in accordance with prevailing law, residues can still remain in harvested crops. These residues must be kept as low as possible to ensure they are not a health hazard, whether consumed daily (chronic intake) or in a single meal comprising large quantities of food (acute intake). BfR uses its findings to draw up recommendations for maximum residue levels.
- The Federal Environment Agency (UBA) assesses the potential impacts on the environment.

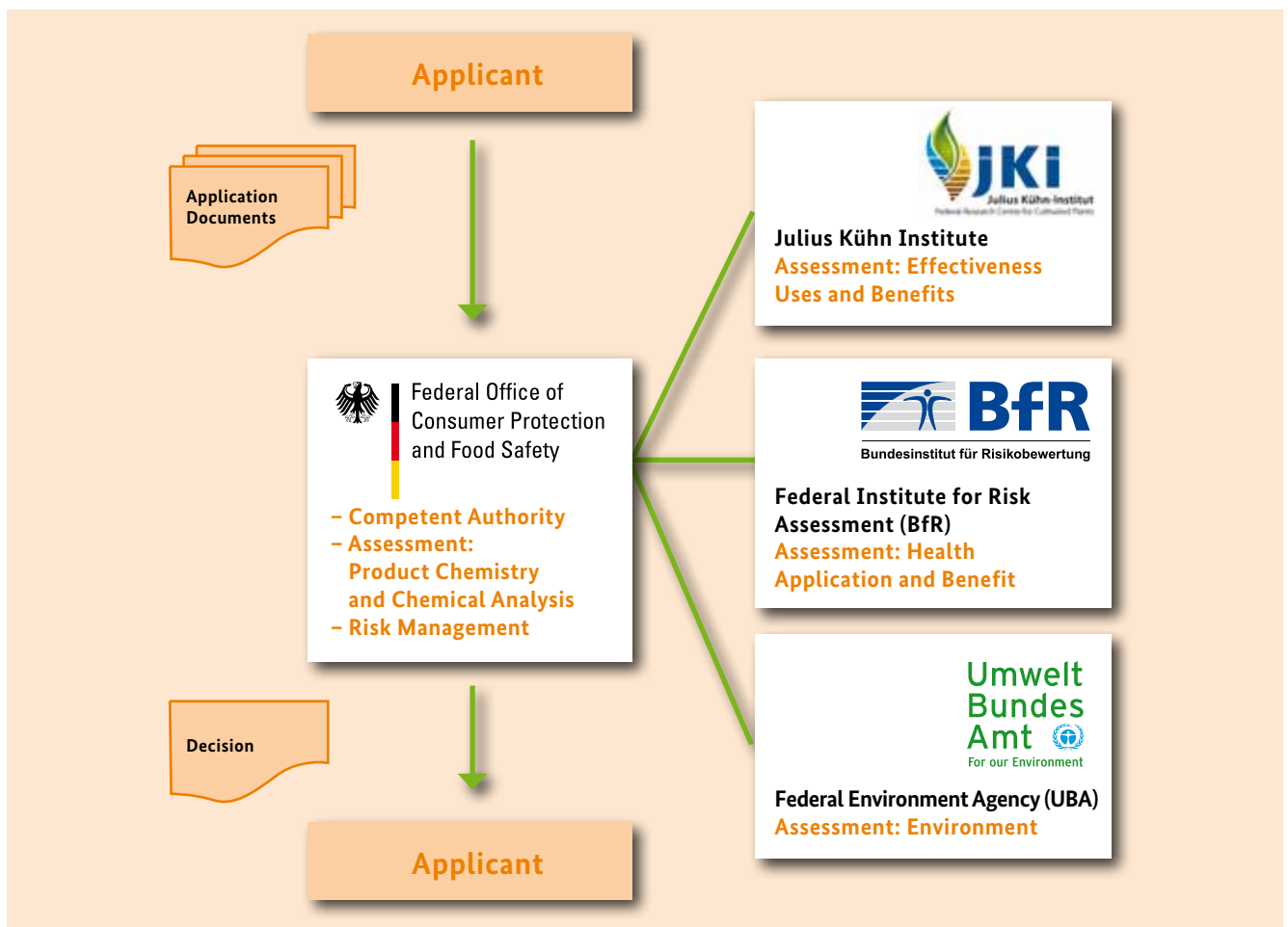


Fig. 12: Cooperation between government authorities in approving plant protection products



Plant protection products that are to be placed on the market must have received national-level approval. The approval process is harmonised throughout Europe. This means there are standardised requirements for data and all approval and licensing authorities in the EU use the same assessment process and approval criteria. In Europe, the substances contained in plant protection products are assessed using a Community procedure.

Using Plant Protection Products: Knowledge and technology

The professional application of plant protection products calls for expert knowledge and use of the latest technology. Anyone who uses a pesticide or herbicide must have the required knowledge and be able to prove that they can handle plant protection products and equipment correctly.

The bigger tractors now used in farming are fitted with onboard computers because the quantities of substances allowed for use per hectare of land are sometimes quite minute. Some substances are applied at a rate of less than 20 grams per 10,000 m². Computer control ensures the right mix of tractor speed, engine speed and sprayer pressure. And sprayer technology has become sophisticated: Modern spray nozzles produce drops that contain air. These particles are larger than normal drops of water and are not

so easily carried on the wind. When using such equipment, the principles of good plant protection practice must be observed. This starts with selecting suitable measures to prevent infestation and only ends with monitoring activities, both to ensure correct use and because each application of a plant protection product must be documented. Taking a 'the more the better' attitude is no longer acceptable. The costs involved in treating a crop of potatoes can amount to between €300 and €400 per hectare and that does not include the cost of seed, fertiliser and labour. If a crop stands to generate sales of around €5,000, then the use of expensive substances must be well planned.

Monitoring Chain: From approval to market

The biggest hurdle faced by plant protection products is the approval and licensing procedure. But the road does not end there. A finely-meshed monitoring and surveillance system ensures that controls and risk minimisation efforts continue. The plant protection services in the German states monitor both points of sale and farms. Plant protection equipment must be approved by the Julius Kühn Institute and be inspected once every two years by accredited independent inspectors. Ground and surface water are tested at regular intervals. To monitor impacts on bees, the Julius Kühn Institute operates a central testing centre where bees and plant specimens are tested when it is suspected they have been harmed by a pesticide or

herbicide. Finally, the food safety offices in the various German states check whether maximum residue levels have been complied with in the food concerned.

These maximum residue levels are harmonised Europe-wide. To ensure compliance with these levels and to determine consumer exposure to pesticide residues, the European Commission has issued a coordinated multiyear monitoring programme for the European Union that is updated every year. This programme contains details regarding the food/substance combinations to be examined and the minimum number of samples to be taken. The EU Member States develop their own national multiyear programmes for monitoring plant protection product residues based on this framework. These programmes are also updated on an annual basis and submitted to the European Commission and the European Food Safety Authority (EFSA).

Monitoring Results and Data Evaluation

Germany tests for more plant protection substances than any other EU Member State. And of all the countries in the European Union, people in Germany worry most about the effects of pesticides and herbicides: Almost 70 per cent are worried about residues. But one thing is for sure: The number of test results has grown steadily in recent years. A total of 17,157 food samples were tested for pesticide residues in 2011. This involved conducting 5,423,227 individual tests for 856 different substances. Only 44 of these food samples – 0.3 per cent – were classified as “possibly dangerous to human health”, leading to a rapid alert notification being sent to the Rapid Alert System for Food and Feed (RASFF). “In most of the cases in the past, the samples that had exceeded a maximum residue level did not pose a risk for consumers”, writes the Federal Institute for Risk Assessment.

Maximum Residue Levels, Thresholds and Reference Doses: Advanced toxicological jargon

Residues are the remains of substances or decomposition products which following correct use and a reasonable period of time can still be detected in food. Plant protection products are only approved for licensing if these residues are proven not to be a health hazard.

The **maximum residue level** indicates the maximum acceptable concentration for residues of a plant protection substance in or on an item of food. Maximum residue levels are set according to the minimisation principle, which means they must be:

- As low as possible,
- No more than necessary or only as much as is needed to ensure the substance is effective,
- No more than is acceptable in the interests of human health.

Regulation (EC) 396/2005 additionally requires that when setting maximum residue levels, the potential health risks for especially vulnerable groups like chil-

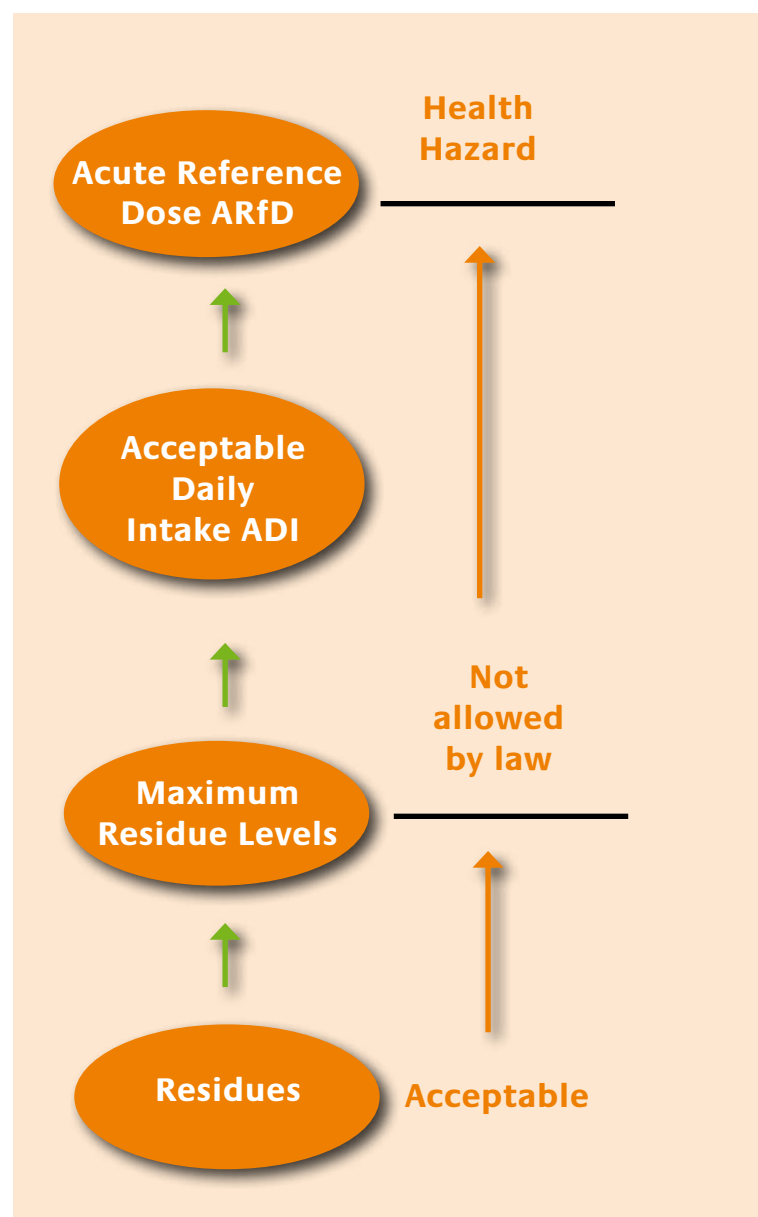


Fig. 13: Residues, maximum residue levels, ADI and ARfD



dren and foetuses be taken into account when conducting the risk assessment.

If a maximum residue level is exceeded, it does not automatically mean that a health hazard exists. If a foodstuff contains a higher level of residues than is legally allowed, it constitutes a breach of law on the part of the retailer and must be investigated by the food and veterinary office. The product may not be placed on sale. Possible causes could involve incorrect application such as excess use of a plant protection product or the use of non-approved preparations. Maximum residue levels are not the same as toxicological thresholds. Whether an excess has an impact on human health is determined during the risk assessment by comparing it with the acute reference dose (ARfD) and the acceptable daily intake (ADI) level.

ADI: Acceptable Daily Intake. The ADI indicates the number of milligrams of a substance per kilo of body weight that individuals can consume each day of their lives without there being any recognisable risk to their health. This also means that exceeding the

ADI for a short time is of little concern because the value was set on the assumption that the substance would be taken in daily for an entire lifetime.

ARfD: Acute Reference Dose. The ARfD is the amount of a substance measured in milligrams per kilo of body weight that can be taken in on a given day with one or several meals without it posing a health risk. If the daily amount is exceeded, it can no longer be ruled out that consumers' health will be negatively affected. The ARfD serves in assessing whether exceeding the maximum recommended level can be harmful to health. If the ARfD is exceeded, a report is produced via the European Rapid Alert System.

See also:

www.bvl.bund.de (Click on Plant Protection Products/Residues and MRLs)

www.bfr.bund.de (Click on Chemicals/Pesticides)



Interview with Dr Hans-Gerd Nolting, Department Head, Plant Protection at BVL

Dr Nolting, what area does your department cover?

One of our most important tasks involves approval and licensing of plant protection products for use in Germany. As the national management authority for pesticide and herbicide approval, we guide the process and decide which products are suitable for placing on the market. We also participate in the European processes as an officially recognised authority.

Under what circumstances is approval denied or withdrawn?

Germany implemented the strict EU provisions contained in Directive 91/414/EEC 15 years ago already. This resulted in the fact that applications for approval of many products with critical traits stopped altogether although they were still being approved in the rest of Europe. There are still some instances, however, where testing shows that the impacts of a substance on the environment are so serious that in the interest of protecting waterborne organisms, no acceptable distance to surface waters can be set. When it comes to health issues, it can occur that during spraying activities, a substance can have such serious effects on the user that even risk minimisation measures are not enough to ensure safe use of the plant protection product it is contained in. Approval is denied in such cases. And if new knowledge on harmful effects comes to light after a substance or product has been approved, there is still the option of withdrawing the license or suspending it until further investigations have been made.

What has your department achieved so far?

We have established high safety standards in Germany in the past 15 years. For example, the 0.1 microgram per litre threshold for drinking water was also applied in groundwater assessments. Our work takes in the interests of many different stakeholder groups. These are the applicants on the one hand, who invest around €200 million in developing a new plant protection product and naturally have a vested interest in placing it on the market. Then there are users of pesticides and herbicides: Farmers, for example, would like to be able to choose from an adequate range of products. And of course, there are the consumer and environment protection organisations that critically monitor and comment on our work – something which is extremely important and which we welcome. Bearing all of this in mind, I believe we have succeeded when in deciding whether to approve a product or substance, we have been able to balance the differing interests involved.

Where do you see the challenges for the future?

One of the biggest challenges we face is the implementation of the EU Plant Protection Product Directive. It provides for a greater 'division of labour' in the EU Member States during the approval process for plant protection products. This means that we must intensify our contacts with European partner authorities in order to bring harmonisation forward. The main aim here is, of course, to ensure adequate plant protection while safeguarding the interests of users, consumers and the environment.

Zoonoses

In matters of food safety, micro-organisms pose a very different challenge to that of contaminants and residues in that they are usually also able to multiply in foodstuffs. Regardless of where they occur in the food chain, there are complex tasks that need to be tackled. These include the development of suitable detection methods and monitoring strategies. Many infectious diseases can also be transmitted from animals to people. These are called zoonoses. The best-known zoonotic pathogens, particularly among those that are transmitted via food, include salmonella. *Campylobacter*, *Yersinia* and *listeria*, prions and SARS viruses are also pathogens that are transmitted directly or indirectly from animals to humans and vice versa. Many of these pathogens have probably been around since man and animal began sharing the land. However, especially in times of global trade flows, changed eating habits and changing climatic conditions, the various pathogens have new opportunities to spread, thus heightening the potential risk to humans and animals.

Making the Food Chain Safer

Zoonose pathogens can enter the food chain at any number of places: in animal feed, in livestock farming, at the abattoir, during food processing as well as at home in the kitchen. The measures taken by the federal government to combat zoonoses thus target a number of areas:

- **Animal feed:** The hygienic condition of the raw materials used in animal feed production is monitored during feed inspections and import controls. In 2006, for example, inspectors found salmonella in five per cent of fishmeal imports from non-EU countries.
- **Farming:** A whole range of rules and regulations provides for food safety in farming. Livestock holders must adopt hygiene practices to prevent pathogens spreading on their premises. The German government's salmonella prevention programme, in the form of national salmonella prevention programmes for breeding poultry, chickens kept

for meat production, laying hens and turkeys and the Swine Salmonella Ordinance, also covers this stage of the production chain.

- **At the abattoir:** Public inspections of animals for slaughter and meat from slaughtered animals are conducted at the abattoir. These inspections direct special attention to any signs of diseases that can be transmitted to people or other animals, in order to eliminate risks to people and animals right from the start. Details of identified shortcomings in commercial slaughtering facilities are collected from all of Germany and analysed to determine any need for action and to adjust the inspection processes used for animals for slaughter and meat from slaughtered animals to bring them even more closely into line with the requirements. Imported foods of animal origin also undergo a public inspection to ensure they are safe.
- **Food processing, trade and retail:** Extensive hygiene requirements also apply to food production, trade and retail, and transport. They range from general hygiene requirements for food, to training obligations, to rules on cheesemaking and preparation instructions that must be printed on packaging for minced meat containing poultry meat and meat products made with mechanically recovered meat. The food and veterinary office checks compliance with these requirements.
- **Monitoring:** Programmes to monitor zoonoses and antibiotic resistance have long been in place. Both the veterinary authorities and the public health authorities are involved. The data from these activities is collected by the Robert Koch Institute (humans) and the Federal Institute for Risk Assessment (food). The latter uses this information to identify two things: how far the zoonoses have spread and the frequency of pathogens that cause food poisoning. In addition, based on the Zoonoses Food Chain general administrative regulation, the relevant authorities throughout the country collect and transmit information regarding important pathogens at all levels of the food chain.
- **Research:** Zoonoses always involve two specialised disciplines: veterinary medicine and human medicine.

To improve cooperation between these two fields, the German government has agreed an integrated research programme to combat zoonoses. Particularly important areas of focus in zoonosis research include the development of adequate detection methods for

relevant zoonotic pathogens such as campylobacter and in-depth investigations of the transmission pathways they take along the food chain, with the aim of developing effective control strategies on the basis of this information.

Interview with Dr Annemarie Käsbohrer, Epidemiology and Zoonoses Unit at the Federal Institute for Risk Assessment (BfR)

What role does your work have in food safety?

Our section collects and analyses data on the occurrence and spread of zoonoses. We look at how they develop and identify trends in their development.

What do you do with the data you collect?

We want to find out where these germs originate. This kind of research is known as source attribution. Once we know which salmonella outbreak stems from which food, policymakers can make informed decisions when considering what action to take.

What kind of action is taken?

To reduce the number of outbreaks and people becoming infected, we need to do two things.

Firstly, the germ count must be lowered during production. Secondly, we must prevent germs being transmitted to humans. This calls for close cooperation between public health and safety authorities and the food and veterinary offices. Consumers must also be informed.

Are the measures effective?

Research into and prevention of zoonoses is a challenge faced throughout Europe. Cooperation has been intensified in this field in recent years. And we are able to report some initial success with regard to salmonella. The number of salmonella cases reported in Germany has dropped from more than 200,000 in the 1990s to just 24,500 in 2011. The goal is, of course, to reduce the number of people being infected even further.



As of 24 March 2007, all pork breeders with capacity for 100 or more animals must document the salmonella conditions on their premises. This requirement was extended on 1 January 2009 to include pork breeders with capacity for 50 or more animals. Those who fail to do so risk both fines and bans on the sale of their produce. Since this was implemented, more than 95 per cent of porkers reared in Germany have been registered under the voluntary salmonella monitoring programme operated by QS Qualität und Sicherheit GmbH.

Zoonosis Prevention Europe-Wide

Microorganisms cannot be stopped at national borders, making it all the more important that the EU has stepped into the ring to fight salmonella and campylobacter. For a number of years now, the European Commission and the EU Member States have been working on a prevention programme to stamp out the transmission of salmonella, one animal species at a time and one pathogen at a time. And always following the same principle. First pilot studies are conducted Europe-wide to investigate the prevalence of a pathogen in a given species. The information this reveals is used to set an EU target which must be achieved after a couple of years. In 2006, for example, some 17 per cent of Germany's broiler hen colonies were infected with salmonella. The European Commission prescribed that by 31 December 2011, no more than one per cent of broiler colonies may test positive for certain salmonella. The targets are extremely ambitious. With a detection rate of 0.2 per cent, Germany has posted a significantly better performance than targeted, due not least of all to its strict regulation of animal feed. This approach has been used to set targets to prevent salmonella in poultry, laying hens, broiler hens and turkeys.

The Europe-wide collaboration in research on zoonoses and steps to control them is having a positive effect. For example, there has been a steady and significant decline in the number of salmonella cases among humans throughout the European Union. The food safety criterion that applies Europe-wide undoubtedly makes an important contribution to further reducing risk for consumers. Under this criterion, since 1 December 2011 an enterprise may place fresh poultry meat on the market only when its own inspections confirm that the meat is not contaminated with salmonella.

Parallel to this, data on campylobacter show that this pathogen is increasingly responsible for food-borne disease, particularly the kind caused by the consumption of campylobacter-contaminated poultry meat that has not been sufficiently cooked. Given the many unanswered questions regarding this pathogen and the factors that possibly play a role in infection, it is vital that new strategies be developed in a common effort to reduce the introduction of pathogens and minimise their spread at all stages of the food chain.

Antibiotic Resistance

Antibiotics are the most important tool for treating infectious diseases. However the incidence of antibiotic resistance is also on the rise in Germany. As a result medicines can become ineffective for treating sick people and animals. In the long run, the use of antibiotics can foster antibiotic resistance. To avoid this, steps have to be taken to ensure that antibiotics are used only when they are absolutely necessary. This particularly applies when it comes to treating animals that are used to produce food. Legal regulations, comprehensive information, intensive research and risk-oriented monitoring are the mainstays of the strategy being used to curtail unnecessary and incorrect use of antibiotics in the agricultural sector and to avert antibiotic resistance. All the measures taken are aimed at preventive health protection which is, at the same time, preventive consumer protection.

The plan developed by the Federal Ministry of Food, Agriculture and Consumer Protection to reduce the use of antibiotics foresees:

- Improving husbandry conditions,
- Tightening up regulations governing veterinary drugs and
- Promoting – for example, in connection with research – alternatives to the use of antibiotics.

In 2008, the Federal Ministry of Health, the Federal Ministry of Food, Agriculture and Consumer Protection and the Federal Ministry of Education and Research jointly launched the German Antibiotics Resistance Strategy (DART). The primary aim of this strategy is to reduce the spread of antibiotic resistance in Germany. In the animal husbandry, food chain and veterinary medicine fields, DART focuses on ensuring consumer health protection without undermining animal health.

See also:

www.bfr.bund.de (Click on Food safety/Microbial risks.)

Nanotechnology

If a rod measuring one metre in length were to be divided into a billion equal pieces, then each piece would be one nanometre in length, meaning 0.000000001 of a metre. A nanometre is 200 times thinner than a human hair and cannot be seen with the human eye. The same order of magnitude applies to nanoparticles, nanorods, nanolayers and nanopores. In sun cream, they provide protection against UV rays, in toothpaste they repair tooth enamel and in packaging they prevent the release of moisture and gases. In the food sector, the word nanotechnology summons up images of technically produced nanomaterials contained in food – particles measuring less than 100 nanometres.

Rare Use in Food

According to the German Federation of Food Law and Food Science (BLL), technically produced nanomaterials are not being deliberately used as ingredients, at least not in Germany. Although very little attention has been directed to date to using technically produced nanomaterials in food, a number of uses are conceivable in this area as well. In the case

of food additives for example the use of nanoparticulates might make it possible to reduce the necessary amount or increase the bioavailability of certain nutrients.

Nanotechnology is more widely used in what are known as food contact materials (materials and articles intended for contact with food). There are even products that are manufactured using nanoscale materials. These include packaging with coatings that act as a barrier against moisture, oxygen, UV light and gases, and surfaces with antibacterial properties. Some manufacturers are working on 'smart' packaging, which will be able to recognise and raise the alarm on unsafe food.

Preventive Health and Safety

The legal situation is clear: Food producers who intend to use nanoparticles must (as with other foods) ensure that they are safe and have no detrimental effect on human health. This is required by the duty of care enshrined in food law.

According to a statement issued by the Federal Institute for Risk Assessment (BfR) in August 2012, "There has been no known case where it has been proven that nanoparticles or nanomaterials have caused harm to human health". Scientists believe that possible risks arise when large amounts of nanoparticles are inhaled, such as during production or processing. Whether or not risks arise from the intake of nanoparticles via the intestinal tract has not been established to date. The German government has devised a comprehensive catalogue of measures for research and information on the distribution paths and responsible use of nanotechnology. Such measures include German participation in international working groups under the auspices of the OECD, the development of the Nanotechnology Action Plan 2015 and a joint research strategy between BfR, the Federal Environment Agency (UBA) and the Federal Institute for Occupational Health and Safety (BAuA). BfR has already carried out a number of activities such as research projects, a consumer conference (to deter-



mine how the subject of nanotechnology is perceived by the public and in the media) and conferences on nanosilver.

Preventive consumer health protection also involves reviewing existing laws and regulations to determine whether they meet the challenges posed by nanotechnology. A number of regulations have already been adjusted at EU level in response to the possibility of nanotechnology use in the food sector in future. This was done at EU level because food law has been harmonised to a large extent throughout the European Union and unilateral action at national level is not always expedient. Food additives – in other words, substances with a technical purpose – such as food colouring and preservatives, which are to be used in the form of technically produced nanoparticles rather than in their conventional form must, for example, first be re-evaluated and, if necessary, re-approved before they can be added to food. As a rule, the approval procedure stipulated by the EU Regulation concerning novel food applies to nutritional substances. But here too, more comprehensive rules are planned.

The same rules apply to ,nanopackaging‘ as to food: Health risks for consumers must be precluded. Based on the principle that a substance is prohibited until it is approved, approval procedures have been set up for certain components used in food contact materials made from plastic or cellulose film. These procedures also cover nanoparticles. The manufacturer is responsible for compliance with the legal requirements.

Transparency in Nanotechnology

While safety is naturally paramount, the concept of transparency is also of fundamental importance. To ensure that consumers have information regarding the use of technically produced nanomaterials in foods, the European Union has issued special rules for such ingredients. In future, any ingredient that is found in food in the form of technically produced nanomaterials must be listed in the list of ingredients with the word ‘nano’ in brackets.



In the case of food contact materials that are produced with the help of nanomaterials, they must comply with the legal regulations to protect consumers against misrepresentation and deception.

See also:

http://www.bmbf.de/pub/aktionsplan_nanotechnologie_2015_en.pdf

<http://www.nanopartikel.info/cms/lang/en/Projekte>

Out-of-Date (Putrid) Meat

In 2007, meat that was no longer fit for human consumption was imported from neighbouring EU countries to Berlin and also traded between the German states of Schleswig-Holstein and Bavaria. It was a situation that pushed the public health and safety authorities to their limits. While the meat, described by the media as Gammelfleisch (putrid meat), originated from animal products that were fit for use in the food industry, it was not meant for human consumption and, as Category 3 material, should not have found its way into the food chain. Although no real health risk existed, the use of the materials as food was not allowed and the sellers acted illegally in doing so. Illegal trade in this meat can only be tackled if the national and *Länder* governments work together. At the end of 2006, Germany's Standing Conference of Consumer Ministers met in Berlin to agree a 13-point strategy. The agenda focused mainly on improving food safety inspections. BMELV also left the conference with a long 'to do' list. The German government has tackled and carried out all the tasks from the package of measures against putrid meat that fall under its purview.



Important points are:

- Establishment of **uniform quality standards in the food control and inspection system**: This included a cross-*Länder* quality management system, including audits at the monitoring authorities, rotation of inspectors and use of the dual control principle during inspections.
- **Naming and shaming**: With the Consumer Information Act and the parallel improvement of the active provision of information to the public in accordance with Section 40 of the Food and Feed Code, provisions were adopted which require monitoring authorities to name both the product and the producer involved in any breach of the law. This covers anyone trading in out-of-date or putrid meat.
- **Fines**: The level of the fines and penalties for certain violations of food law was raised in the Food and Feed Code in 2011.
- Improved information management: BVL maintains an Internet-based platform to allow a rapid **exchange of information** between *Länder* (state) and federal authorities. Staff at all enforcement authorities have direct access to this source of information.
- **Cooperation between food safety authorities and public prosecution offices**: As soon as the public prosecution office begins work on a case involving food and feed, it must inform the food inspection authorities.
- Proof of expertise for food producers: The regulations on **hygiene training** for food producers which were adopted in 2007 in connection with the National Food Hygiene Ordinance have proven to be effective based on experience gained in the meantime.
- **Improved self-monitoring by the industry**: As part of the risk assessments they conduct, government food inspectors must also evaluate existing self-monitoring systems that are in place at food processing companies.



Dioxin

It became known in late 2010 that a feed business in northern Germany had used industrial grease containing dioxins to produce animal feed. In response, the German government developed the Consumer Protection in the Feed Chain action plan which initiated the measures that were needed to eliminate weaknesses in the feed monitoring and inspection system.

The Consumer Protection in the Feed Chain action plan contains the following measures that are at work along the entire production chain:

- **Price dumping:** The fierce competition on the meat market often leads to price wars. The **Act on the Prevention of Price Abuse** came into effect in December 2007. It prohibits the sale of food at prices below cost price.
- **Notification requirement:** Food producers who are offered unsafe food or food not fit for human consumption are required to report the fact to the authorities.
- **Improved traceability:** The German government committed itself to convincing the European Commission to adopt further special regulations to improve the traceability of foods of animal origin. These regulations were subsequently adopted with the Commission Implementing Regulation (EU) No 931/2011 (special traceability requirements for food of animal origin) and the Commission Regulation No 16/2012 (special information requirements concerning the production and freezing dates of frozen food of animal origin). These require, for example, that the date of freezing for frozen meat, meat preparations and unprocessed meat products also be indicated.

1. Approval Requirement for Animal Feed Producers

The European Commission and the EU Member States agreed to anchor an approval requirement for animal feed producers in the law. This led to a corresponding regulation which was promulgated in the Official Journal of the European Union on 16 March 2012 and went into force on 16 September 2012.

2. Separation of Production Flows

The European Commission and the EU Member States agreed to anchor the separation of production flows in the law. A corresponding regulation was promulgated in the Official Journal of the European Union on 16 March 2012 and went into force on 16 September 2012.

3. Extension of the Legal Requirements for Feed Inspections

The European Commission and the EU Member States agreed on more stringent legal requirements for feed monitoring and inspections. The corresponding regulation was promulgated in the Official Journal of the European Union on 16 March 2012 and went into force on 16 September 2012.

4. Notification Requirement for Private Laboratories

The notification requirement for private labs went into effect in Germany on 4 August 2011 with an amendment of the Food and Feed Code.

5. Binding Positive List of Feedstuffs

In talks with Germany, the European Commission has signalled its agreement to making appropriate additions to the EU catalogue of feed materials.

6. Obligation to Cover Liability Risks

On 14 November 2012, the federal cabinet approved a draft bill to amend the Food and Feed Code to ensure that the liability risk of feed businesses is covered.

7. Review of the Maximum and Minimum Penalties

The penalties that can be imposed have been significantly increased. Anyone who places food on the market that is unsuitable for sale and in doing so gains enormous pecuniary advantages for themselves or others out of gross self-interest among other reasons may be punished with imprisonment of up to two years. The Food and Feed Code and other regulations were amended accordingly. These changes went into effect on 4 August 2011.

8. Expansion of Dioxin Monitoring – Establishment of an Early Warning System

The Food and Feed Code was amended with effect from 4 August 2011 to establish mandatory requirements for reporting the levels of dioxins and similar substances in foods and feeds. A corresponding ordinance that lays down the procedure for this has been in effect since 1 May 2012.

9. Improved Quality of Food and Feed Monitoring and Inspection

Germany's *Länder* governments are currently examining a joint administrative agreement which is being deliberated on the basis of a key issues paper from the Federal Ministry of Food, Agriculture and Consumer Protection.

10. Transparency for Consumers

Amendments to the Consumer Information Act and the binding obligation requiring government agencies to inform the public of breaches of maximum limits and significant breaches of hygiene and deception regulations and was anchored in the Food and Feed Code went into force on 1 September 2012.



Important points contained in the Consumer Protection in the Feed Chain action plan have also been implemented at European level. Since the autumn of 2012, feed producers who mix, for example, raw vegetable oils or feed fats must go through a uniform pan-European approval procedure with stringent requirements. This was stipulated by an EU regulation that has enshrined the approval requirement for feed operators in law Community-wide. Production streams must be clearly segregated from one another in future. Fats for feeds and fats/greases for industrial use must be produced separately and stored separately. The legal provisions governing feed inspection were also made more stringent: Feed producers who sell feed fats and feed oils and products made with them are required to have their products inspected at regular pre-established intervals.

Germany's *Länder* have jurisdiction in these matters and they investigate anytime it is suspected that food or feed is contaminated with dioxin, identify the cause and source, and immediately remove any possibly contaminated products from the market. The number of cases reported to authorities could rise in the future due to the new notification requirement for enterprises and laboratories stemming from the action plan and because the inspection density has been increased.

6 Food Safety: A Status Report

With the seven fundamental principles of food safety (see Section 3), early and rapid warning systems, on-site inspections and international cooperation provide effective tools with which policymakers can achieve a high level of safety and perform effective risk management. But, just as drivers can never be entirely prevented from ignoring a red light, a breach somewhere in the food safety network can never be completely ruled out. As the food market develops and new research findings come to light, food safety legislation must be amended and enhanced as part of an on-going process.

With the wide range of foods on offer today, food safety calls not only for producers and authorities, but for consumers to take their responsibilities seriously. People wanting to make use of the many convenience foods available, be it a frozen meal or a portion of Norwegian smoked salmon, must ensure that nothing is left to chance as regards the conditions in their fridges, in their pots and pans, and on their plates. Food producers must play their role and consumers must play theirs.

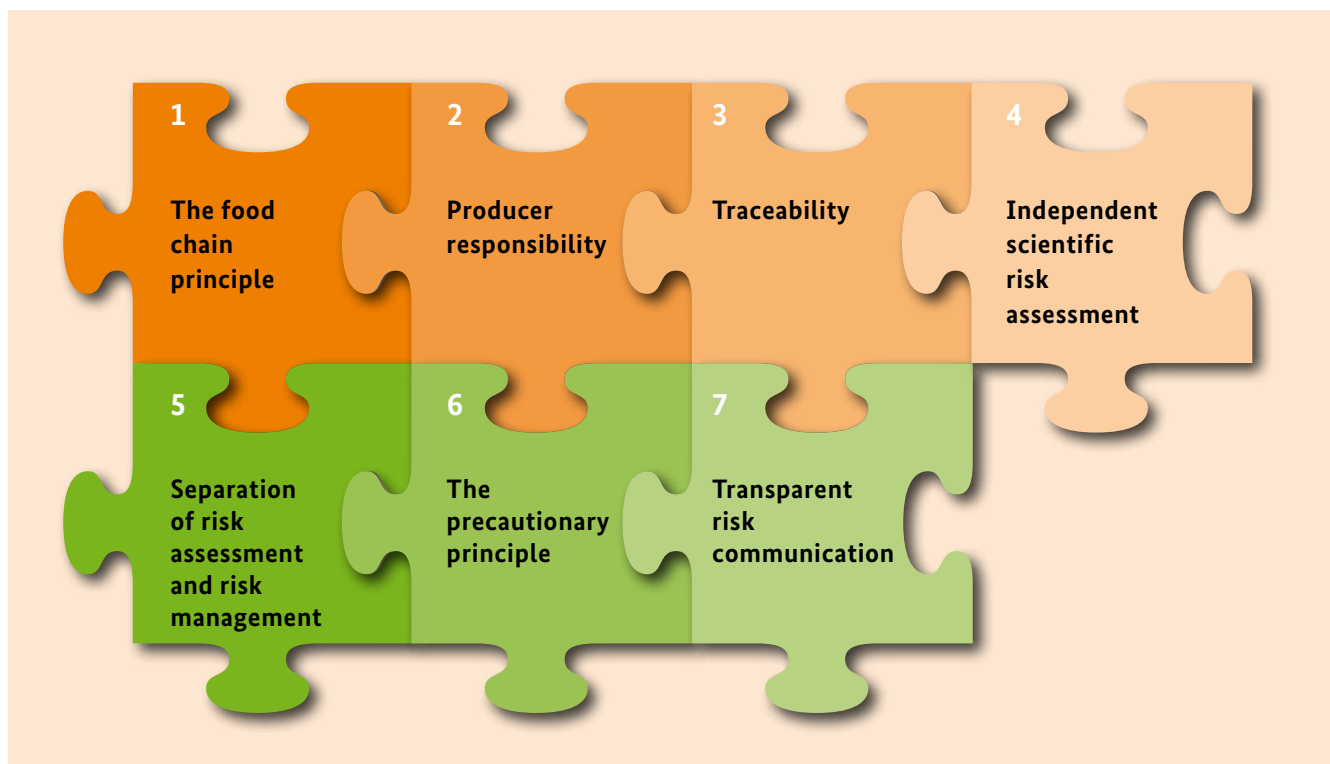


Fig. 14: The Seven Fundamental Principles of Food Safety

7 Further Information

- Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz
(Federal Ministry of Food, Agriculture and Consumer Protection)
www.bmelv.bund.de
 - Bundesamt für Verbraucherschutz und Lebensmittelsicherheit, BVL
(Federal Office of Consumer Protection and Food Safety)
www.bvl.bund.de
www.lebensmittelwarnung.de
 - Bundesinstitut für Risikobewertung, BfR
(Federal Institute for Risk Assessment)
www.bfr.bund.de
 - Bundesforschungsinstitut für Ernährung und Lebensmittel (Max Rubner-Institut)
(Federal Research Institute for Nutrition and Food)
www.mri.bund.de
- Some of the organisations which receive funding from BMELV:**
- Stiftung Warentest
www.test.de
 - Verbraucherzentrale Bundesverband e. V.
www.vzbv.de
 - Deutsche Gesellschaft für Ernährung e. V.
www.dge.de
 - aid infodienst Verbraucherschutz, Ernährung, Landwirtschaft e. V.
www.aid.de
 - The consumer protection website operated by aid infodienst e. V.
(provides a free forum for consumers' questions)
www.was-wir-essen.de

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www.bmelv.de

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(www.verbraucherlotse.de).



