CODEX ALIMENTARIUS COMMISSION







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FOOD SAFETY AND QUALITY SITUATION IN COUNTRIES OF THE REGION

(Prepared by FAO and WHO)

Introduction and background

- 1. The global environment in which Codex is operating has changed and demands efficient responsiveness to critical and emerging Food Safety and Quality issues. The 70th session of CCEXEC noted the importance to identify emerging issues, and to define priorities among them (see REP15/EXEC). It was also noted that the FAO/WHO Regional Coordinating Committees (RCCs) could play a role in this process and their revitalization is important, also for this aspect.
- 2. The 70th session of CCEXEC requested FAO and WHO, in collaboration with the Codex Secretariat and the Regional Coordinators, to: develop a set of questions on needs and priorities in the regions; prepare an analysis of the information collected for presentation at the next round of the Regional Coordinating Committees.
- 3. The objective is to help countries/regions in proactively identifying prospective food safety/quality issues that could be of regulatory significance.

Survey on critical and emerging food safety/quality issues

- 4. In order to identify critical and emerging issues in food safety and quality, a survey was conducted in member countries of each Codex region. A questionnaire was sent to the Codex Contact Points of all members of the respective region with the request to indicate what issues in food safety and quality they consider as most critical and/or emerging.
- 5. Definitions of the key terms used in the questionnaire were provided such as: issues, critical issues, emerging issues and drivers of change (see Table 1). Furthermore, since many external factors can directly and/or indirectly affect food safety and quality, examples of some important drivers of change were indicated.

Table 1. Key terms in the questionnaire on critical and emerging food safety and quality issues.

Key terms	Definition
Issues	With the word <i>issues</i> is meant hazards/challenges, but also opportunities or trends that might have an impact on food safety and quality.
Critical issues	Those that are the most pressing ones, and as such need to be addressed and considered as priorities. They can be known issues that are actually present/already occurring or even recurring. They can also be completely new.
Emerging issues	Those that are new or unexpected. Although their effect is currently not necessarily being experienced, these issues may cause a change in the status quo. Identification of these issues will help to provide proactive guidance and support to counties in addressing prospective issues that could be of regulatory significance.
Drivers of Change	A driver refers to the underlying cause of change that might lead to the presence or potential occurrence of a food safety issue. A driver of change could lead to hazards as well as opportunities in food safety and quality.

6. Member countries were asked to indicate the 3-5 most critical and emerging issues in food safety/quality, together with an explanation: 1) why that issue was selected (i.e. on what basis - information/data, knowledge or assumption - the choice was made) and 2) the expected and/or actual impacts of the issue (whether the impact would be sector-specific, affect only some sub-populations or countries/regions, whether it would be related to public health or trade etc.).

Summary and Analysis

- 7. Responses were received from 22 members, including 21 countries and one coordinated response from the European Union (EU). Members that provided responses by the deadline for inclusion in this document were the following: Albania, Armenia, Austria, Croatia, Cyprus, Estonia, EU, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Macedonia, Malta, Montenegro, the Netherlands, Norway, Poland, Russian Federation, Tajikistan and Uzbekistan. All responses to the questionnaire can be found at https://www.codexalimentarius.nl/content/news. Based on the obtained responses, the issues were grouped into different categories.
- 8. An overview of all issues that were identified either as critical or emerging is provided in Table 2 and Table 3 in the Annex.

Critical issues

9. The issues that were most frequently identified as critical included: Food fraud and Food adulteration (55% 1); Antimicrobial resistance (AMR) (36%); Contaminants (36%); Issues related to the globalization of trade (36%); Challenges in food safety management along the chain (32%), foodborne pathogens (32%) and new distribution channels (32%). Issues that were indicated only as critical included Challenges food safety management along the chain (32%) and the traceability of food products (9%).

Food Fraud and Food adulteration

Different cases of fraud may arise and they can be distinguished as adulteration, falsification, counterfeiting (e.g. infringement of intellectual property rights, counterfeiting of pharmaceutical and phytosanitary products), misrepresentation (e.g. through labelling and commercial communication) or endangerment of public health (e.g. recycling of animal by-products back into the food chain, slaughtering in illegal premises /not officially approved establishments).

Antimicrobial resistance

Massive and improper use of antimicrobials in the livestock sector as well as in aquaculture was indicated as an issue of great concern. The need to better understand the contribution of the food chain to the overall problem of AMR and the extent to which systems that recycle animal waste and by-products may contribute to the dissemination of AMR was highlighted.

Contaminants

Chemical contaminants were noted to be a great concern. In particular, endocrine disruptors that interfere with natural hormone systems and whose health effects can be felt long after the exposure has stopped, were indicated as a critical issue.

Issues related to the globalisation of food trade

The globalisation of food chains was highlighted by many countries as one of the major drivers for the rapid spread of food safety hazards. It was also noted that mega-regional partnership agreements, are covering standards for both trade of goods and regulations on SPS matters; concerns about these standards were expressed as they may compromise the role of the Codex Alimentarius Commission, OIE and IPPC. The need for enhancing of food safety early warning systems and traceability has also been highlighted as well as the need for better harmonization of food safety standards.

Challenges in food safety management along the food chain

Several countries highlighted how the implementation of HACCP food safety management system and an overall risk-based management of food safety/quality remain very challenging. The often unhygienic conditions in the food sector in general (and in slaughter houses in particular), the lack of resources and capacities for proper food handling/processing as well as the management of possible food safety risks from street food were indicated as critical issues to be addressed.

^{1%} of CCEURO Members (that participated in the survey) that have identified the issue

Foodborne pathogens

The high incidence of human cases of campylobacteriosis and salmonellosis, in particular associated with poultry, is of concern. So are foodborne E. coli infections. It was stressed that the true burden of infection with these pathogens is still only partially known and the need for appropriate actions/responses was highlighted.

New distribution channels

Increasing e-commerce was noted to pose considerable challenges to food control. Adaptations of current food control systems were indicated to be required to allow for effective oversight of food retail through alternative channels such as Internet.

Emerging issues

10. The most frequently identified emerging issues included: Issues related to climate change (55%); Issues related to new technologies (50%); Foodborne pathogens (23%); Food fraud (23%); Contaminants (18%); Issues related to food additives (18%); and Mycotoxins (18%). Issues that were indicated only as emerging included mycotoxins (18%); circular economy/recycling (9%); and changes in consumption patterns (9%).

Issues related to climate change

The need to better understand the impacts that climate change may have on the agricultural sector as well as the consequent food safety implications were stressed. In this regard, it was noted that this information could enable food safety authorities to take timely measures to proactively deal with this changing scenario.

Issues related to new technologies

The need to understand the opportunities and risks related to the use of new technologies in food was highlighted, in particular with regard to nanotechnologies and synthetic biology. It was also noted that new onsite or in-line real time detection techniques of zoonotic agents or residues in food could prove to be extremely useful.

Foodborne pathogens

Foodborne pathogens were indicated both as critical and emerging issue. When indicated as emerging, it was stressed the importance of looking also at microbiological contamination in foods of non-animal origin. Foods like fresh fruits and vegetables are often perceived as posing no health concerns, however, the potential of these foods to be associated with food borne outbreaks was recognised in the survey.

Food fraud and Food adulteration

Economically motivated food fraud was indicated in several responses as an issue of great concern. When indicated as an emerging issue, it was noted that food fraud has the potential to cause considerable harm to national as well as international markets and consumers' confidence; it was also noted that the complexity of food chains further complicates effective food control along the food chain against this issue.

Contaminants

The emergence and spread of contaminants, such as marine bio- toxins due to climate change, and arsenic in seafood were noted as emerging issues. Growth promoters, food allergens and hormone disrupting chemicals were also indicated as an important group of emerging contaminants.

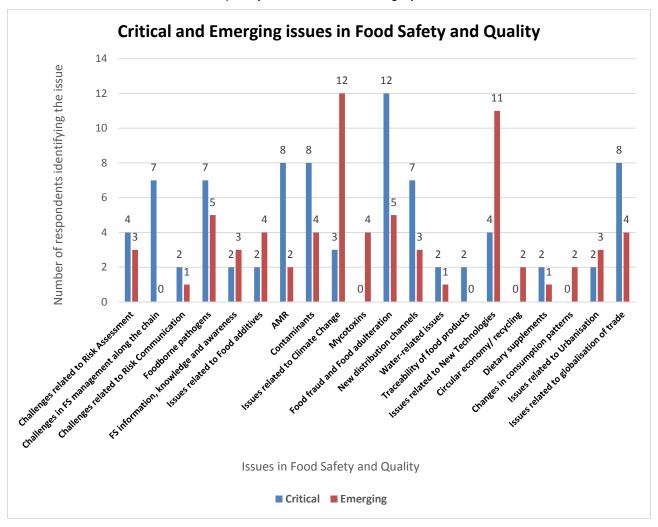
Issues related to food additives

Long term effect of food emulsifiers on the bowel permeability was noted as emerging issue. Many food emulsifiers are listed among permitted food additives, with a wide variety of chemical structures and hydrophilicity. The use of emulsifiers is widespread and increasing. Little is known on long-term effects in humans especially with regard to intestinal barrier integrity and consequent possible modulation of mucosal response and food allergy among the possible outcomes.

Mycotoxins

While mycotoxin contamination is an old food safety problem, there are emerging issues which need to be addressed, e.g. the toxicity of mixtures of mycotoxins. Recent studies show the occurrence of modified chemical forms of mycotoxins as the result of metabolic transformations operated by contaminated plants. These forms, called masked mycotoxins, can lead to underestimation of the mycotoxin content of commodities due to analytical overlooking of the modified molecules. Furthermore, little is known about the toxicity of the modified mycotoxins.

Figure 1. Critical and emerging food safety and quality issues, with the frequency with which each category was identified



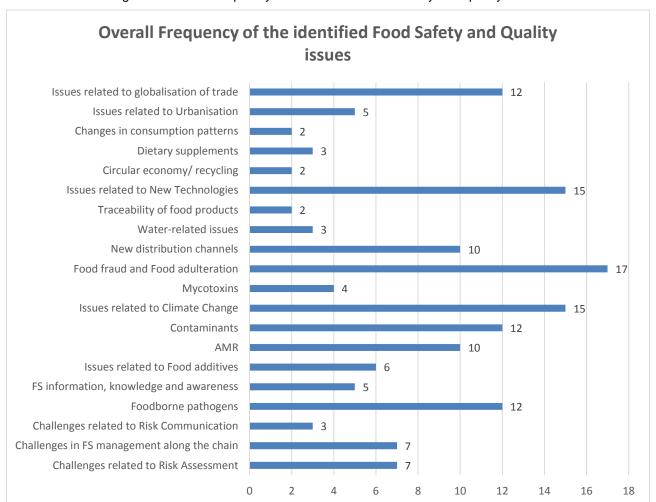


Figure 2. Overall frequency of the identified food safety and quality issues

Conclusions

- 11. Many countries expressed the need for concerted efforts to tackle the issues that have been identified. The results of the survey, which are summarized and analysed in this paper, aim to provide information to support CCEURO's discussion in agenda item 3b on the priorities of the region and possible approaches to address them, by also determining any relevant follow up action and strategies for the various issues identified.
- 12. A variety of foresight methodologies exist², to collect and analyse intelligence to inform broad food safety decisions. The survey conducted in all RCCs is an initial step to support countries in identifying prospective issues that could be of regulatory significance. The results and the lessons learnt from this will help FAO/WHO to provide a proactive guidance on critical and emerging issues
- 13. CCEURO, is requested to provide inputs on the following questions that could guide future action by FAO/WHO in this area:
 - Do you consider the approach of this survey useful?
 - Would you have any suggestions to modify the collection of relevant food safety insights/intelligence?

² Horizon Scanning and Foresight: An overview of approaches and possible applications in Food Safety http://www.fao.org/3/a-i4061e.pdf

Annex

The issues (and the related explanations) described in the responses to the questionnaire, have been grouped into different categories (e.g. Food fraud and adulteration; AMR; contaminants etc.). Table 2 and 3 summarise the critical and emerging issues respectively, ordering them by the frequency with which CCEURO Members have identified them

Table 2. Critical issues in food safety and quality

Category Issues and explanation		
Food fraud and food adulteration	The complex nature of food chains, the globalisation of trade and economic pressure were noted to be important drivers for fraudulent acts in food systems. Different cases of fraud might arise which can be distinguished as adulteration, falsification, counterfeiting (e.g. infringement of intellectual property rights, counterfeiting of pharmaceutical and phytosanitary products), misrepresentation (e.g. through labelling and commercial communication) or endangerment of public health (e.g. recycling of animal by-products back into the food chain, slaughtering in illegal premises /not approved establishments). This topic therefore covers both areas of food safety and food quality, and addressing it requires a proactive and close cooperation between food safety authorities.	
Antimicrobial resistance (AMR)	Massive and improper use of antimicrobials in the livestock sector as well as in aquaculture was indicated as an issue of great concern. The need to better understand the contribution of the food chain to the overall problem of AMR and to adopt a comprehensive/coordinated and international approach to address this issue were stressed. Furthermore, given the increasing interest in recycling waste materials in view of sustainability targets, the need to gain insights on the extent to which systems that recycle animal waste and byproducts may contribute to the dissemination of AMR was highlighted.	
Contaminants	Heavy metals, environmental contaminants, together with pesticides and residues of veterinary drugs, were indicated to be increasingly present in food and feed. Emerging contaminants were noted to be a great concern. In particular, endocrine disruptors that interfere with natural hormone systems, and whose health effects can be felt long after the exposure has stopped, were indicated as a critical issue. There is in fact growing concern worldwide about negative human health and environmental impacts possibly caused by endocrine disruptors. It is therefore important to have a clear picture of the presence and action of endocrine disruptors in food.	
Issues related to globalisation of food trade	The globalisation of food markets has resulted in the globalisation of food chains, and this was highlighted by many respondents as one of the major drivers for the rapid spread of food safety hazards . Increase in international trade, especially when combined with climate change, may in fact contribute to a greater incidence of foodborne diseases, contaminants and toxins in food. It was also noted that mega-regional partnership agreements are setting standards for both trade of goods and regulations concerning food safety; concerns about these standards were expressed as they may compromise the role of the Codex Alimentarius Commission, OIE and IPPC. The need for enhancing food safety early warning systems and traceability has also been highlighted, as well as the need for better harmonization of food safety standards	
Challenges in food safety management along the chain	Several respondents highlighted how the implementation of HACCP and an overall risk-based management of food safety and quality remain very challenging. The often unhygienic conditions in the food sector in general (and in slaughter houses in particular), the lack of resources and capacities for proper food handling/processing as well as the management of possible food safety risks from street food were indicated as critical issues to be addressed.	

Category	Issues and explanation
Foodborne pathogens	The high incidence of human cases of campylobacteriosis and salmonellosis , in particular associated with poultry, is of concern. So are foodborne E. coli infections. It was stressed that the true burden of infection with these pathogens is still only partially known and the need for appropriate actions/responses was highlighted.
	Strongly driven by climate change, global trade etc., the emergence of invasive plant and animal health issues that could pose Food Safety challenges was also noted.
New distribution channels	Increasing e-commerce was noted to pose considerable challenges to food control. Internet traders are often not registered and therefore are not restricted to food control regulations. Adaptations of current food control systems were indicated to be required to allow for effective oversight of food retail through alternative channels. In particular, for food and sport supplements, this issue was noted to be a significant issue.
Challenges related to risk assessment	The potential simultaneous exposure to a multitude of hazards (chemicals, microorganisms and others) possibly through different routes (oral, inhalation and dermal) highlights the necessity to move beyond the single hazard approach. Human risk assessment of combined exposure to "chemical mixtures" was highlighted as a major challenge to scientists, and risk assessors particularly from the methodological point of view in relation to the complexity of the terminology and problem formulations, the diversity of chemical entities, the toxicological profiles and exposure patterns.
Issues related to new technologies	New technologies are being developed at a rapid rate. However, some respondents indicated that more advanced technologies are needed for the detection of foodborne hazards. At the same time, it was noted that for new (and even existing) technologies, the safety and the long-term effects have to be carefully evaluated. In this regard, it was noted, for example, that the potential role of GMOs in the feeding of the growing global population needs to be considered together with any possible associated risk. Furthermore, it was also indicated that often, new technologies are available only in certain countries/regions, thus benefiting only a limited number of nations.
Issues related to climate change	The various climate-change-related phenomena (changes in temperature and precipitation patterns, increased frequency and intensity of extreme weather events, ocean warming and acidification) are thought to present a number of direct and indirect challenges to the safety of foods and water supplies. For example: shifting patterns of algal blooms can expose new countries to marine bio-toxins related fish poisoning; in this regard, it was indicated that climate change influences the spread of transmission of pathogens, increasing the vulnerability of agricultural production for new pests , pathogens and diseases .
Challenges related to risk communication	Many issues in food safety and quality are of a cross-border character; therefore, it was noted that efficient risk communication between food safety managers across countries/regions (and with the consumers) is needed to enhance transparency, and to improve overall food safety and quality globally.
Dietary supplements	The use of supplements is becoming increasingly common. For botanical supplements , it was noted that these might contain active substances, which are sometimes only partly identified and toxicologically characterised . This makes them potentially harmful to consumers, in particular considering the interactions they may undergo in complex formulations such as supplements. Moreover, it was noted that many supplements are sold directly to consumers through alternative distribution channels, e.g. internet , which can create additional challenges.

Category	Issues and explanation
Food Safety information, knowledge and awareness	It was noted that often knowledge and awareness on food safety is still very limited, and this is a critical issue, for which trainings and education programmes are necessary.
Issues related to food additives	With the development of new technologies, the diversity of food additives is growing. In this regard, the need to monitor how the prolonged exposure to these substances may affect consumers' health was noted. Respondents also expressed the need for improved measures to manage allergens e.g. the need to agree upon harmonised levels above which food business operators have to label the presence of allergenic substances .
Issues related to urbanisation	Global population is becoming increasingly urbanised. The impacts of urbanisation on food safety (in terms of both food production and consumption) were indicated as something that needs to be addressed with appropriate service provisions and planning by national authorities. Particular issues identified included the risk of chemical, and biological contamination of urban and peri-urban agriculture food products by anthropogenic (industrial) pollution and the uncontrolled use of fertilizers and pesticides.
Traceability of food products	Considering globalised trade and the complexity of food chains, a critical need was expressed for effective traceability of food products. It was noted that effective traceability could allow for the identification of food fraud events . However, implementing effective traceability systems was highlighted as a considerable challenge.
Water-related issues	Water scarcity due to climate change, conflicts etc. is an issue of global concern. With pressures on water, there is the need to use different grades of water for different purposes, for example for direct human consumption or for agricultural use. It was noted that there is a need to define clean water that can be used for consumption and food production. In order to define different quality grades of water, however, microbiological and chemical criteria need to be developed.

Table 3. Emerging issues in food safety and quality

Category	Issues and explanation
Issues related to climate change	The need to better understand the impacts that climate change may have on the agricultural sector as well as the consequent food safety implications were stressed. In this regard, it was noted that this information could enable food safety authorities to take timely measures to pro-actively deal with this changing scenario.
Issues related to new	It was noted that, with the rapid and continuous development of new technologies in the agri-food sector, the importance of evaluating the long-term health consequences from their use is sometimes being neglected. The need to understand the opportunities and risks related to the use of new technologies in food systems was highlighted, in particular with regard to nanotechnologies and synthetic biology .
technologies	It was also reported that it is increasingly difficult for competent authorities to meet the expectations regarding their inspection and control efforts for food safety, and so it was noted that on-site or in-line real time detection techniques of zoonotic agents or residues in food could prove to be extremely useful.

Category	Issues and explanation
Foodborne pathogens	Zoonotic foodborne diseases count for a large proportion of foodborne illnesses. Control of zoonoses was therefore noted as fundamental to enhance food safety. The risk of microbiological contamination in foods of non-animal origin was also noted. Foods like fresh fruits and vegetables are often associated with healthy eating and perceived as posing no health concerns. However, the potential of these foods to be associated with food borne outbreaks was recognised – e.g. E. Coli in raw leafy greens and other vegetables.
Food fraud and food adulteration	Economically motivated food fraud was indicated in several responses as an issue of great concern, as acts of food fraud and adulteration have the potential to cause considerable harm to national as well as international markets and consumers' confidence. The complexity of food chains was noted to complicate effective food control along the food chain against this issue.
Contaminants	The emergence and spread of contaminants, such as marine bio- toxins due to climate change, and arsenic in seafood were noted as emerging issues. Growth promoters, food allergens and hormone disrupting chemicals were also indicated as an important group of emerging contaminants . The need for better understanding in the distribution of these contaminants as well as their health effects was highlighted.
Issues related to food additives	Long term effect of food emulsifiers on the bowel permeability was noted as emerging issue. Many food emulsifiers are listed among permitted food additives, with a wide variety of chemical structures and hydrophilicity. The use of emulsifiers is widespread and increasing. High proportions of food items commonly consumed contain emulsifiers with the result that the population exposed and the level of exposure are high, especially in industrialised countries where the consumption of manufactured foods is predominant. Little is known on long-term effects in humans especially with regard to intestinal barrier integrity and consequent possible modulation of mucosal response and food allergy among the possible outcomes. According to recent scientific literature, these chemicals could enhance the permeability of bowels and may contribute to the emerging tendency of some chronic diseases such as allergies, celiac disease, Crohn disease, autoimmune diseases etc.
Issues related to globalisation of food trade	Increased international trade may result in new risks formerly unknown in some countries of the world .
Mycotoxins	Mycotoxins remain an ongoing issue in Food Safety and Quality. With climate change, it was highlighted that countries need to be prepared for changing contamination patterns of mycotoxins. Temperate regions like Europe are experiencing recurrent crises of mycotoxin contamination of commodities, mostly cereals, including maize with aflatoxin and DON , wheat and barley with DON . While mycotoxin contamination is an old Food Safety problem, there are some issues which still need to be addressed, e.g. the toxicity of mixtures of mycotoxins . Recent studies show the occurrence of modified chemical forms of mycotoxins as the result of metabolic transformations operated by
	contaminated plants. These forms, called masked mycotoxins , can lead to underestimation of the mycotoxin content of commodities due to analytical overlooking of the modified molecules. Furthermore, little is known about the toxicity of the modified mycotoxins.

Category	Issues and explanation
Challenges related to risk assessment	As the number of contaminants detected in the environment and food is constantly growing, an increasing need was noted for new risk assessment methodologies to evaluate multiple chemicals , taking into account the combined exposure also through different routes (oral, inhalation, dermal).
	Recognising the importance of prioritisation for future work in food safety and quality, the development of a common risk-ranking tool was considered important for the purpose of increased transparency as well as investigating the outcomes of corresponding strategic choices.
Food Safety information, knowledge and awareness	Knowledge and awareness on food safety and quality was noted to be low , in particular among young people. It was suggested to include food safety and quality training in educational programs in schools to improve the knowledge level of students. It was also noted that currently there is no database providing relevant information on national food standards/regulations/requirements of different countries , which among other benefits, would assist stakeholders (competent authorities included) in finding necessary information more rapidly.
Issues related to urbanisation	With global population growth, there is a sustained trend of migration from rural to urban areas. Urbanisation is often accompanied by a shift from home to commercial food production and processing, leading to a loss of traditional knowledge about food safety and quality . Urban areas and cities (and surrounding areas) are increasingly becoming places where food is produced (i.e. urban and peri-urban agriculture), and this can have Food Safety implications due to contaminated water, soil and air.
New distribution channels	The increase in online retailers was noted to introduce new risks, for example through the dissemination of scientifically unproved claims or false products information. E-commerce was also recognised as posing new challenges and complexity to surveillance and traceability systems.
Antimicrobial resistance (AMR)	Over/misuse of antimicrobials was indicated to be a major concern in relation to AMR and consequently for public health. Adopting a preventative and comprehensive approach could significantly contribute to curb AMR. The use of prohibited veterinary drugs was also pointed out as an important problem.
Changes in consumption patterns	Linked to a healthier lifestyle, food that was traditionally cooked is now increasingly consumed raw. While previous traditional knowledge and related cooking practices reduced the potential hazards in these foods, trendy raw food consumption habits seem to be the culprits of the emergence of "old" and new hazards and foodborne disease outbreaks across Europe. Recent examples: (1) Green vegetables (e.g. spinach or kale) consumed raw in green smoothies with a high content of oxalic acid; (2) Raw beetroot salad linked to several foodborne disease outbreaks; (3) shiitake mushrooms consumed raw linked to acute dermatitis; (4) Yersinia pseudotuberculosis outbreaks linked to consumption of unpasteurised milk. The future role that insects could play in food and feed was also noted.

Category	Issues and explanation
Circular economy/ recycling	The promotion of a circular economy, one that ideally aims at minimising waste and pollution, raises questions about the management of food safety risks. For many contaminants, accumulation in different matrices is unknown and quantitative data on contaminants in waste are not available. For example, various types of contaminants have been reported in recycled paper and, the ability of selected contaminants of various types to potentially transfer from recycled paper to foods has not been fully investigated. Recycling of plastic from electric and electronic equipment for the manufacture of black food contact articles may result in migration of unknown substances or substances of unknown toxicity at levels, which could endanger human health. Another example is the use of sewage sludge for agricultural purposes.
Challenges related to risk communication	Considering the lack of awareness about food safety and quality, improvements in science-based risk communication were noted as necessary to raise public awareness about risks and benefits related to their food choices.
Dietary supplements	An increasing tendency towards use of food supplements, including herbal supplements, was noted. Food supplements currently fall between a number of regulations (food labelling, medical claims, health claims, novel foods, nutrition information, herbal preparations to name a few), and their safety is often undefined and data for risk assessment are scarce .
Water-related issues	Due to climate change and the growing global population, there is an increasing pressure on global water supply. Since the agricultural sector accounts for a large proportion of global water use, it was noted that water shortage would have a significant impact on agricultural production. Especially in a context of water scarcity, where the need for water re-use/ recycling and the use of alternative sources of water (e.g. treated wastewater) are growing, it is important to keep monitoring water quality parameters including data on contaminants (both chemical and microbiological) that could enter the food chain thus posing Food Safety and public health challenges. For example, recent reports indicate that some food crops have the ability to concentrate contaminants such as residues of pharmaceutical/veterinary drugs or personal care products from water.