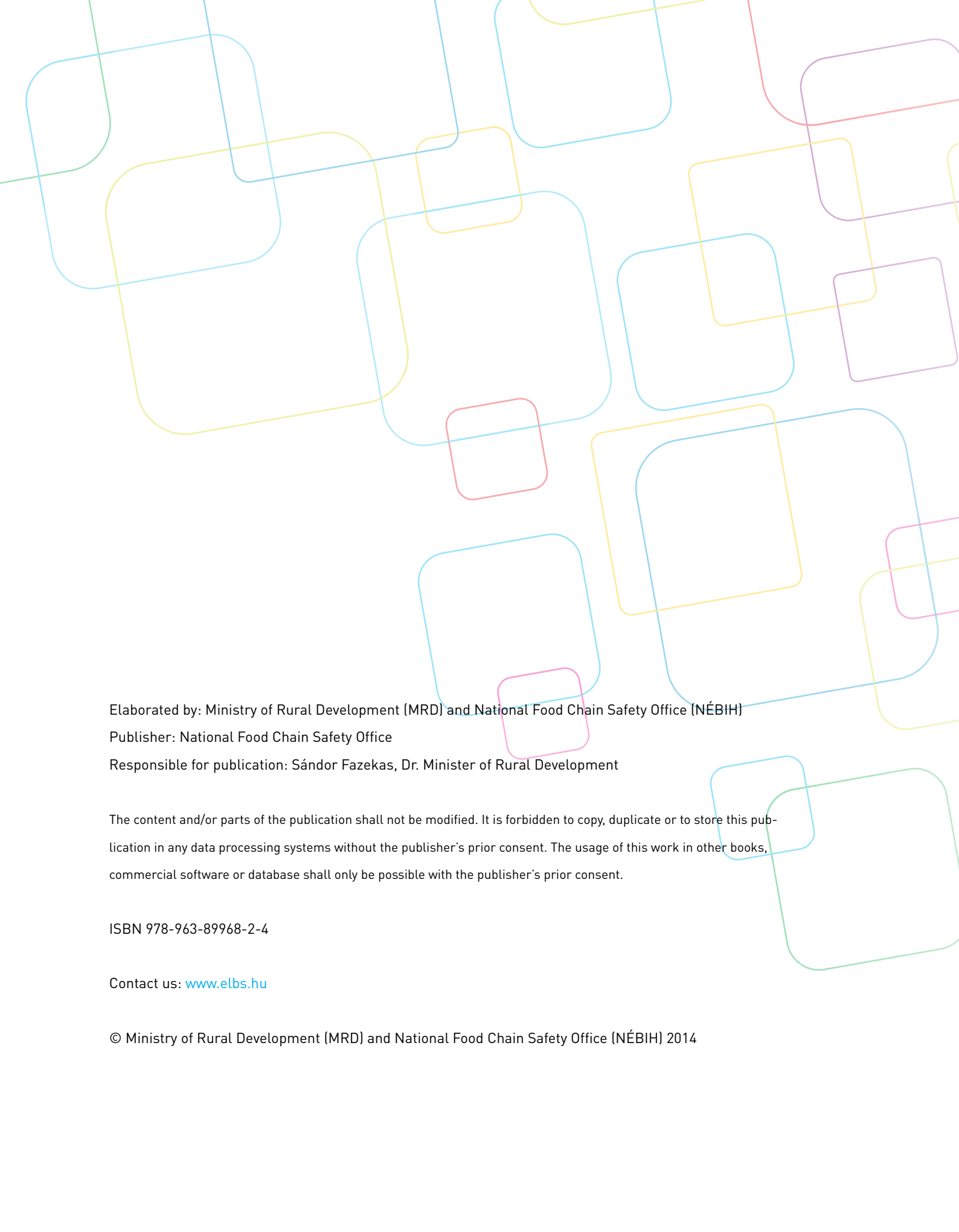




Food Chain Safety

STRATEGY 2013-2022





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Table of Contents

■ Table of Contents	3
■ Executive summary	5
■ Introduction	13
Motivation	15
Time frame	16
History	16
Mandate	18
Authors and Methodology	18
■ Mission and Vision of the Food Chain Safety Strategy	23
■ Concept of the food chain safety strategy	27
Definition of food chain safety	29
Difficulties of the assessment of food chain safety	33
■ Comprehensive analysis of political, economical, social, technological, environmental and legal situation	35
Political factors	37
Economic factors	39
Social factors	46
Technological factors	51
Environmental factors	52
Legal factors	54
■ Evaluation	57
How to improve food chain safety?	59
Basic principles of food chain safety strategy	61
■ Targets of the Food Chain Safety Strategy	67
Target system	69
Role of the government	70
I. Target area – Food chain safety knowledge management	71
I. A. Establishing and operating the knowledge centre	71
I. B. Developing a knowledge network and innovation	72
II. Target area – Control of food chain risks	73
II. A. Control of known hazards	73
II. B. Control of unknown hazards and unacceptable risks	74

■	Programs facilitating the implementation of the Strategy	77
	1. Global information management	79
	2. Introducing transparent risk analysis	81
	3. Reorganization of the laboratory network	82
	4. Building the basis of the knowledge network	84
	5. Modern education and training	87
	6. Partnerships in research and innovation	92
	7. Active public relations	94
	8. Extensive risk reduction	97
	9. Strong and credible authority	103
	10. Successful fight against abuse	105
	11. Protection of critical infrastructures	108
■	Strategic tools	113
■	Financial Plan	119
■	Schedule	125
■	Strategic indicators and monitoring system	129
■	Correspondence with other strategies	135
■	Ex ante evaluation	143



Executive summary

Executive summary



Food Chain Safety
STRATEGY 2013-2022

The first question that pops into many people's mind is why this strategy has been developed **about food chain safety**, and not only about food safety? The answer is relatively simple: food chain safety means much more than food safety.



Until the end of 1900's food chain safety's attention was primarily focused on the traditionally most important elements of critical importance, i.e. slaughterhouses, animal drug residues, etc. However, the increasing number of food scandals has shown that this attitude was no longer adequate. So since the early 2000s, the main objective was to organize a new and modern food chain safety system all over the world, where the focus expanded to all elements of the food chain.

Developed countries including Hungary have made progress in the practical implementation of food chain safety, but nowadays it became clear that all confronted problems cannot be handled with this approach. This is mostly due to the fact that food safety is mainly focusing on protecting food and health. However, in food

production, in addition to food, many other products i.e. pesticides, feed, etc. are also produced and used. Additionally, although the protection of human health is a priority, but it is not the sole aspect of food chain safety. Well-known problems such as the expansion of black economy, the spread of animal diseases and climate change have demonstrated the importance of other areas like economy and environmental protection. It is almost impossible to prioritize between health, and the protection of the economy and the environment. There is a very deep and mutual interdependency among them, so that's why a long-term, sustainable development of those must be done together. This goal can only be achieved in the framework of food chain safety, because it covers all activities from the soil to the table and not only the food safety aspects, but the aspects of crop protection, animal health, animal welfare, environmental protection, economic, quality protection and other aspects as well.

This was how we conceptually arrived to create a medium-term national food chain safety strategy instead of making a food safety program, to outline the main objectives of food chain for the next 10 years. In this framework the mission of the **government** was outlined, which is nothing more than to improve **food chain safety** to protect humans and the **society**.

The mission of the government is planned to be fulfilled **through the protection of health and the economy**, with regard to environmental aspects, where health not just means no illnesses, but the physical, mental and social well-being of the people, furthermore the

protection of the economy means not only the protection of national interests, but also includes transparent economic processes and aspects of sustainability.

The **strategy's vision** is that food chain products (particularly food) will be always **healthy, high quality and safe** as well as that people and the society show a **high level of awareness and responsibility in food production, in trade and in consuming behaviour**. In this context society includes all actors of the food chain, so in addition to companies and authorities, it includes the media, politics, professional, civil, educational and scientific organizations as well.

The next important question was: **What to do to improve the safety of the food chain?** It is really difficult to answer this question briefly, as the complete strategy is devoted to this. Maybe the right answer is that we try to reduce – with environmental considerations – the health and economic risks encountered in the food chain together. Risk reduction has two main options which also present the **two base concepts** of the strategy: in the first one, the government will be responsible for organizing and coordinating the knowledge management in the food chain, and in the other one, we have to strengthen and increase the efficiency of the government's traditional law enforcement function.

In the framework of the **knowledge management program**, a state knowledge centre should be established and the functions of the food chain stakeholders need to be coordinated i.e. a knowledge network must

be set up. Merely the authority becoming a state knowledge centre is by far not enough. Among participants a closer co-operational strategic partnership must be established, including mutual work among educational and academic actors and enhanced cooperation of the government, companies, and professional and civil organizations, professional and civilian public bodies, furthermore by organizing a more active public relations system to society and especially to the media and politics.

In the framework of an **efficient risk reduction by the authority**, a basic task is to keep known risks under continuous control and to improve effective control methods. However we must be aware of the limitations of these tools, there will always be cases, where risks cannot be reduced to an acceptable level. Typically such cases are new, unknown threats appearing when violating regulations, such as food adulteration, unfair trade practices, which cannot be prevented fully with the traditional control systems. In this case, a different risk detection approach and process is needed.

The Hungarian **food chain** and its economic processes form a complicated network; furthermore this network is embedded into a more comprehensive international network. To maintain proper functions it requires a more comprehensive approach in many ways and a network approach on all levels (regulatory, organizational, IT, communications, etc.). However, only the government can do this comprehensive practical implementation among the stakeholders to protect the important

nodes of this network. In this spirit the strategy concentrates on the following topics:

Raising social awareness

Nowadays in Hungary – according to expert estimates – 3 million people get ill each year due to food-borne diseases, although only a fraction of them visit their doctor. For the national economy these diseases pose a burden of hundreds of billions of HUF annually in the form of treatment costs, being absent from work, sick pay, decreasing life expectancy, etc. A significant part of the diseases could be prevented with proper purchasing habits and kitchen techniques and the current situation can be changed on a short term basis with well-focused activities; with campaign activities, **active public relations** whereas on the long term basis; with **modern education**, training and **knowledge distribution**. Moreover the mapping and developing of the social knowledge network should be started to successfully raise social awareness.

Rebuilding the public knowledge base

By the end of 2012 the development of the entire range of the comprehensive Food Chain Control System (FELIR) has begun with the integration of the previously fragmented IT systems of the different areas.

When finished, such an integrated database will be created, that would include by linking all professional areas a transparent **network of information** from the smallest producers to multinational companies. The database will

allow a **transparent risk analysis** and thereby significantly supports a better decision-making in the sector.

Finally, this system will provide a critical mass of information, which will on one hand be a basis to protect certain critical infrastructures; on the other hand, it gives a basis to building a global certification and traceability system for products.

Whitening of the food chain and successful fight against abuses

The whole net income of the visible part of the complete food chain business is 12 to 13 billion HUF per year. However, it is well known that in this sector the share of undeclared income is extremely high, e.g.: according to experts estimate, just in the meat and egg business undeclared income reaches 45-55% of the total. From a National Economy (tax) viewpoint, there are unbelievable amounts of reserves in the food chain, where exploitation can only be achieved in the strategic partnership between NÉBIH and NTCA, as it can be concluded from the few months of practical experience collected. The authority controlling goods flow to uniformly oversee and track the whole network and the more pronounced control method development has a key role in this process.

Strong and credible authority

In the period after 1990 the public opinion on the public administration's credibility has been getting worse. However, the county government office and district office systems

have fundamentally redrawn the map of local administration, pointing out that there is a necessity to strengthen central government functions and to increase the credibility of these bodies. For the development of a strong authority the **reorganisation of the laboratory network** (to support decisions) has to take place and on this basis with new control programs e.g.: Salmonella-reduction, BSE monitoring, antibiotic-resistance tests, etc. a wide range of risk reduction needs to be achieved.

Innovation and economic development in the food chain

A central element of the EU's medium-term strategy is to increase the competitiveness of Europe. Essential tools to achieve this goal – and increasing food chain safety – are innovation and economic development, which areas will receive extra subsidies in the next seven-year budget cycle. In the planned operational model for allocating these resources, a significant part will be given to joint **research and innovation partnership programs** of the government (the authorities), research institutions and businesses. A prerequisite is to strengthen the innovation capabilities and capacities in the authorities, which have already started by merging the Hungarian Food Safety Office into NÉBIH, however, further provisions need to be done.

Summary

The Food Chain Safety Strategy defines 4 strategic objectives and 11 programs to achieve the main goal – increasing food chain safety.

I. Food chain safety knowledge management

- I. A. Establishing and operating the knowledge centre
 1. Global information management
 2. Introducing transparent risk analysis
 3. Reorganization of the laboratory network
- I. B. Developing a knowledge network and innovation
 4. Building the basis of the knowledge network
 5. Modern education and training
 6. Partnerships in research and innovation
 7. Active public relations

II. Control of food chain risks

- II. A. Control of known hazards
 8. Extensive risk reduction
 9. Strong and credible authority
- II. B. Control of unknown hazards and unacceptable risks
 10. Successful fight against abuse
 11. Protection of critical infrastructures

For each of the strategic objectives it is observable that for achieving them an increasingly expanding cooperation among different fields is necessary, and only a food chain control with network approach will be able to provide the framework for this. The direct economic effect of the different strategic actions varies from 1–10 billion HUF to hundreds of billions HUF, and the indirect effect can be measured in 1000 billions HUF. This alone makes it a critical issue from a national economic perspective that the proposed actions can be done over the next 10 years, or not.

In order to achieve targets the highest level of planning is required, which is a national medium-term food chain safety strategy adopted by the government. For the implementation of the strategy an approach spanning over different professional disciplines and a deeper operational integration along the food chain is needed. For the practical implementation it is not a question anymore which authority should provide food chain safety services; the attention is increasingly concentrated on how the food chain supervising authority fulfils its tasks more efficiently. We do not need to include additional central government funds, but we have to make better use of financial assets including food chain management fees.

The resources necessary to guarantee food chain safety including resources from the EU

are only a small fragment of the income of the controlled business area or the cost of the prevented damages.

By establishing an internationally competitive domestic food safety system, we can realize high economic and health profits with comparably low investments.

If we can complete the previously mentioned steps, the food chain will provide better resistance against threats and external environmental changes. This will result in the improvement of food chain safety already in the short term.

In one hand this can serve the improvement of human health protection, and on the other hand the strategy can contribute to the food chain (as a several trillion HUF value national economy area) becoming a future breakout point.



Introduction

Introduction



Food Chain Safety
STRATEGY 2013-2022

The demand for safe food, disease-free, healthy plants and animals is as old as humanity itself, and this need was met in various ways and degrees and could be maintained for longer or shorter periods in history. Many things have been achieved over the past centuries and decades, most plantations and animal stocks are free from diseases and the most serious and even fatal diseases of food-born nature have been almost completely prevented. Nowadays it is customary that a wide range of food and raw food materials are available in Hungary because of more effective preserving methods and a vivid world trade system, regardless of seasons and geographical locations. Hungary – as a member of the European Union – is one of the world's fortunate countries where food chain safety is of very high quality, and in professional and consumer public's perception this even improved in recent years. Nevertheless, there is no reason to lie back, for a safe food chain we have to do many more, even if further progress is becoming increasingly difficult.

In addition, previous challenges are always being replaced or supplemented by new ones, such as; global environmental and climatic changes, pollution and changes in agricultural and food technologies, changes in lifestyle, the deteriorating immune status of the population, counterfeiting, wide spread fraud, the threat of terrorism, the development of test methods, the creation and discovery of other dangerous substances, and the increasing complexity of the food chain. The majority of our food and the surrounding environment consist of living

matter, constantly changing by itself or by human intervention.

Because further development requires more and more resources, we have to focus on prevention and get prepared for potential emergency situations. Tasks and responsibilities are mutual: only the joint effort of companies, the government and consumers can respond appropriately and effectively to the challenges of our age.

Motivation

Globalization, technological (especially IT) development, complexity of business processes have changed significantly over the last period with clearly noticeable effects in the food chain as well. These changes need continuous, multi-directional adaptation from all actors of the food chain, where a coordinated implementation requires a comprehensive strategic approach and planning.

Article 42 (2) a) of Regulation 882/2004/EC also prescribes for Member States to determine the strategic objectives in the area of food chain safety. The implementation of this prescription is possible in such a formalized planning system, which allows including long-term goals, strategy formulation, preparation of operational plans and reviews (follow-up) as well. In order for the food chain safety to reach higher levels, it is necessary to define the main objectives, old and new objectives must be reviewed and priorities must be set. The inclusion of the objectives in a strategic document and organisation into a system helps every

stakeholder to work on their sub target with sufficient care.

Time frame

No one plans his/her life for a year or two. So why should we plan short-term the tasks of such a complex field? If we have (and we do have) long-term goals, they must be fixed, so everyone can take them into account. The need for long-term planning is demonstrated that there are such complex tasks, where the planning of the implementation itself takes a couple of years (e.g. wide distribution of information and raising awareness, reconstructing testing and control systems, etc), and the several years of implementation only follows.

The previous pragmatic, program approach way of thinking has primarily focused on 3-5 year intervals, which is very important from the point of view of planning, but in itself is not sufficient. It had to be recognized that understanding the world, for an effective adaptation a wider range of vision and a comprehensive approach is necessary. As to our present knowledge, thinking in the 10-years perspective provides enough prudence, the European Union and other governmental strategies are thinking in the same time perspective. In addition, the ten-year time frame compels all decision-makers to define truly unbiased, stabile goals and tasks, because it runs across three following election cycles. Obviously in the meantime the Strategy implementation plans of several years' extension must ensure that all government in power requirements are met.

As mentioned above, the Food Chain Safety Strategy is scoped for a 10 years period: it will define goals for the food chain stakeholders in the period between 2013 and 2022.

History

International organizations strongly push to develop strategies for national food and food chain safety, both WHO and the European Union – in parallel to developing their own food safety programs - place great emphasis on promoting and supporting the development of national strategies in the member states. Outside of the European Union, in the target countries for Hungarian food export expect a predictable and reliable food chain management authority to ensure the safety of their citizens. In addition there is an increasing demand from consumers that the governments of the individual member states take effective measures to ensure food safety.

International history

The EU published the document¹, “White paper on food safety” in January 2000 in view to ensure the highest level of health protection to consumers and set the principles of the EU’s food safety and nutrition politics and provided a detailed and scheduled action plan for the necessary actions to be taken into improve food safety in the EU. The most important aspects of those have been published in the 178/2002/EC Regulation² in regulatory form as obligation.

Among international organizations, WHO and FAO continuously send warnings on the

serious situation of food safety. In 1983, the joint FAO/WHO Expert Committee on Food Safety concluded that the consumption of contaminated food is the cause of most diseases in the world, and this is the greatest obstacle to economic performance of nations too. In January 2000 the WHO has confirmed that this conclusion despite significant national and international efforts is still true. The program draws attention to the fact that every country should consider food safety as the most essential public health function and provides financial support for national food safety programs. A uniform monitoring and surveillance system should be developed and the measures taken should be based on risk analysis. Food safety has to be integrated into ongoing educational and nutritional care programs and a coordinated cooperation among the different stakeholders of food safety should be established. Based on this program, the WHO has released its Food Safety Strategy in 2002.³ For the implementation of the European Region Food and Nutrition Policy, the WHO developed a new action plan in 2008.⁴

Naturally the regulation of food chain safety and strategic planning at the international level is still changing: The European Commission in May 6th, 2013 published a package of proposals to strengthen food chain safety regulations in the EU.⁵

The proposal's aim – expectedly comes into force in 2016 – is to define among others the legal framework for the controls of the different sectors connected to the food chain and the uniform control of safety along the complete food chain.⁶

Hungarian history

Since the mid-1970s Hungary had a well functioning food control and veterinary service network, supervising the most important segments of the food industry. The Nutrition Science Working Committee of the Hungarian Academy of Sciences (MTA)' Food Science Complex Committee had started to work on a study in 1993, titled "Recommendations for domestic food and nutrition policy development", and completed it in 1999. Recognizing the importance of food safety issues, the Food Safety Advisory Council (ÉBTT) was established in the fall of 1997, based on similar international examples. Among its members represented were those having an interest in food security e.g. ministries, food control authorities, national bodies, academic institutions, trade unions and consumers. The Council with the help of experts completed the assessment of the domestic food safety situation. This situation analysis was released in 2000 and it was titled: "Food safety situation in Hungary at the turn of the millennium".

With the help of the assessment report the first version of the National Food Safety Program has been prepared in active cooperation with the Food Safety Expert Council and involving renowned experts of the field at the beginning of 2004⁷, before Hungary joined the EU. The Program defined the principles, the main targets and the national priorities to be followed in national food safety policies.

The program was reviewed later, and in 2010 the Hungarian Academy of Sciences released a program titled "Food security – Strategic

foundations of the Hungarian food industry, rural development and food safety”⁸, and in 2011 „Food Safety: Facts, Trends, Tasks. Study of the Hungarian Academy of Sciences and the Hungarian Food Safety Office for the Implementation of the New National Food Safety Programme” was released⁹.

Among the domestic strategy building history the Integrated Multiannual National Control Plan is also to be noted. As the first element of the sectoral policy planning process, which is setting up the objectives, the government’s strategic plans, policies, programs were reviewed in 2008. On this basis and the limited human resources allocated, it was decided that the long-term goals for the control of the food chain, in accordance with Regulation 882/2004/EC should be defined in the new Integrated Multiannual National Control Plan (MANCP).

Since the release of the new MANCP (termed for 5 years), published in 2010, it had to be realized, that for the effective development in the area of food chain safety the different strategies’ relationships must be reconsidered. As a result of this process, it became clear that a new, independent, high-level, strategic document based on professional foundations is necessary in the field of food chain safety, fixing long-term priorities, focus points and objectives.

The legal basis of long-term planning was created by 2008. Act XLVI. was adopted by the Hungarian Parliament about the food chain and its official control, combining the specific

areas of food chain safety in a uniform frame: animal health, feed safety, crop- and food production, trade safety and plant health distribution. Government Decree 22/2012 (II. 29) has established the National Food Chain Safety Office on March 15th, 2012, allowing to combine the cost efficient comprehensive planning and then implementing these plans of the closely related specialized areas in agriculture.

Mandate

According to Article 29. § a) of 2008. Act XLVI. on the food chain and its official control „the Chief Veterinary Officer prepares the medium-term national safety strategy of the food chain, (hereinafter. Food Chain Safety Strategy)”

According to Article 47/A § (1) the Chief Veterinary Officer prepares the food chain safety strategy involving a wide range of stakeholders, which is then adopted by the Government. In order to implement the food chain safety strategy, the Chief Veterinary Officer releases the food chain safety policy program. The policy program also includes an integrated multi-annual national control plan and action plans related to the food chain.

According to Article 47/C. § (1) „the Chief Veterinary Officer reports annually to Parliament on the food chain safety strategy, the multiannual plan and annual audit plan implementation, fulfilment of the objectives and on the use of food chain control fee. The report shall be submitted to the Parliament until 30th June in the year following the referenced year.”

Authors and Methodology

The Food Chain Safety Strategy's (FCSS) authors are – according to Act XLVI of 2008. – the Chief Veterinary Officer and the senior management of the Ministry of Rural Development and the National Food Chain Safety Office (NÉBIH). The strategy development was helped by a workgroup of specialists of these institutions, initially directed by Food Chain Safety Strategy Ministerial Commissioner in charge, and then led by a social commissioner having exactly the same responsibilities.

At the various stages in the development of the strategic concepts and the strategic targeting, both the “top-down” and the “bottom-up” approaches were utilised.

The Strategy's principles and objectives, the high-level target system, the main line of thought, the mission and the vision were determined from approximately one hundred interviews with senior and middle managers of the Ministry of Rural Development and NÉBIH and small group workshops were used as well. These and later activities were coordinated by the Ministerial Commissioner and then by a work team established and directed by him.

It was part of the top-down strategy development process to include the „Food Safety: Facts, Trends, Tasks. Study of the Hungarian Academy of Sciences and the Hungarian Food Safety Office for the Implementation of the New National Food Safety Programme” published in 2011, and “Food security – Strategic foundations of the Hungarian food industry, rural development

and food safety” of the Hungarian Academy of Sciences published in 2010 was also processed.

These documents summarize the results of the various committees of the Hungarian Academy of Sciences' ongoing works since the mid-1990s, as well. The professional preparation of the Food Chain Safety Strategy has actually begun nearly two decades ago by actors in the Hungarian veterinary and food science fields. In parallel, in the official control system major changes have occurred, especially in setting up the legal foundations of food chain control and the development of its organizational structure.

One of the most important starting points in preparing the Strategy was to realize that the national food chain control systems are not solely supervising firms in the national economy, but must be prepared to address global issues and manage new risks. All of these challenges require an effective cooperation with international control bodies and domestic food chain stakeholders, i.e. firms, professional, scientific, and civil organizations and fellow authorities, but above all with consumers.

This is consistent with the Government Decree 38/2012 (III. 12.) on governmental strategic management Article § 6 (8) also: “Governmental strategic management must rely on accumulated knowledge and experience of non-state stakeholders.” Besides the legal obligation, this procedure also requires practical aspects, because of the complexity of the food chain, it is impossible to establish an objective target system without public consultation,

which has the highest social benefits – primarily the health protection of food consumers and to protect the interests of law abiding business.

For the details of the conceptual framework we used the experience and opinion of a broad social and professional circle in accordance with principles of public participation. The Ministry of Rural Development has run general and direct negotiations to achieve this principle. As a part of the negotiations the web site <http://www.elbs.hu> was created providing the means to collect advices about the Strategy's concepts. The site has separately managed the opinions of consumers and food chain business owners and operators. The questionnaires helped to collect detailed views, but they also contained open questions for free expression of thought. On the creation of the website and its purpose, the Ministry of Rural Development informed the public and professionals through press releases to reach a wide publicity. Obtaining the opinions of consumers was achieved by on-line surveys and also by personal interviews. As a result, a total of 1447 people (1014 with personal interviews and 433 with online questionnaire) have expressed their views with regard to food chain safety and its control related issues. The processing of responses was done by members of the working groups. Multivariate statistical methods were used for the analysis of the data. The results are presented in the "Strategic Foundational Documentation". During the preparation of the strategy, besides the individual interviews in accordance with the social participation aspects, learning the

opinions and expectations of the food chain businesses played a major role. On the website, a large number (126) of firms in the food chain have expressed their opinions. The results in processed form are to be found in the "Strategic Foundational Documentation". To complement this on 4th April 2013, a public consultation was held for professional organizations and the press. The 107 registered participants received detailed information on the background of the strategy, its concept, the opinion survey results for consumers and business and the planned target system.

The proper preparation of the Strategy was significantly enhanced by surveying the opinions of the food chain control experts. This has been achieved through online questionnaires – it covered 430 people – and personal interviews, which were held as series of consultations. In this research the potential professional objectives were also defined besides assessing the current food chain state.

Science, research and higher education specialists of the food chain safety could tell their views in personal interviews. In the development of this concept, the Hungarian Academy of Sciences' Presidential Commission of Environmental Sciences' Food Safety Subcommittee, the Scientific Food Science Committee and the Veterinary Science Committee have all actively participated.

At the meetings of the mentioned committees, the Ministry of Rural Development and the National Food Chain Safety Office have regularly reported about the Strategy's preparation

phases, the submitted documents were complemented by the Committees in written form also. It is to be noted here, that in the first stage of preparation, the working group regarded the previous professional recommendations of these committees and their members as a starting point, so there is close harmony between the professional strategy creation goals and its scientific foundations.

Through the professionals participating in the work of these committees every prestigious domestic universities and research institute's opinion could be represented in the Strategy. Moreover, 15 of the regional scientific and academic institutions were directly asked - in the form of verbal and written consultations - during the preparation phase.

The collected inputs were analyzed by the working group also as a whole. The final results were complemented with hundreds of national and international literature source quotations, similar previous themed ministerial

and institutional background document recommendations. During the situation analysis, a SWOT analysis was carried out to the mentioned written documents, in addition to exploring cause-effect relationships, as well as defining and fragmenting objectives, the advantages of the deductive and the inductive methods were tried to be used.

During the work on details of the Food Chain Security Strategy, the above mentioned organizations and stakeholders have been repeatedly consulted, when other ministries, such as Ministry of Human Resources and the Ministry of Public Administration and Justice have been consulted and even negotiations with top officials of the Prime Minister's Office were held.

Reflecting the above process, **“Strategic Foundational Documentation”** summarizes the background information which due to its size and for didactic reasons is not included in the main body of the food chain safety.

¹ Commission of the European Communities: White Paper on Food Safety. COM, 245 1999/719 final

² The European Parliament and the Council of Europe 178/2002/EU Regulation (2002. January 28.) the general principles of food rights and obligations, establishing the European Food Safety Authority and defining the processes in food safety.

³ WHO Global Strategy for Food Safety: Safer Food for Better Health. World Health Organization, 2002. http://www.who.int/foodsafety/publications/general/global_strategy/en/index.html

⁴ WHO European Action Plan for Food and Nutrition Policy 2007-2012. WHO Regional Office for Europe, Copenhagen, 2008. <http://www.euro.who.int/en/what-we-do/health-topics/disease-prevention/food-safety/publications/pre-2009/who-european-action-plan-for-food-and-nutrition-policy-20072012-2007>

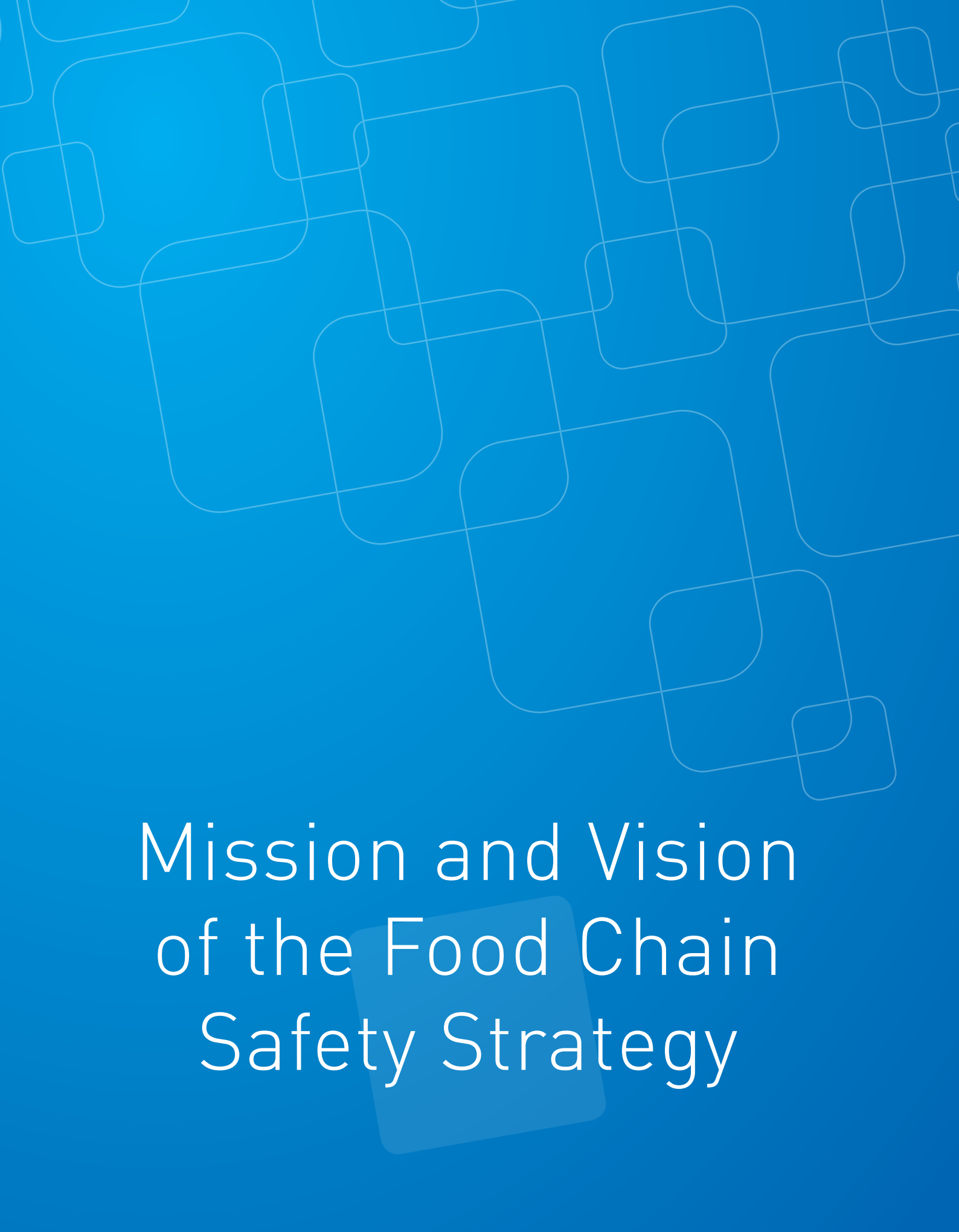
⁵ Press release of the European Commission: http://europa.eu/rapid/press-release_IP-13-400_hu.htm

⁶ Press release of the European Commission: http://europa.eu/rapid/press-release_IP-13-400_hu.htm

⁷ Hungary's National Food Safety Program, 2004. http://www.nebih.gov.hu/data/cms/151/944/EB_program_2004.pdf

⁸ http://mta.hu/data/cikk/12/70/39/cikk_127039/elelmezesbiztonsag_net.pdf

⁹ http://www.nebih.gov.hu/data/cms/151/945/EB_program_2010.pdf



Mission and Vision of the Food Chain Safety Strategy

Mission and Vision of the Food Chain Safety Strategy



Food Chain Safety
STRATEGY 2013-2022

The strategy's mission is to protect people and society by improving food chain safety.

This mission is intended to be achieved mainly through protection of health and economy, with environmental aspects considered, where health includes not only to be free from diseases but also physical, mental and social well-being too; furthermore protection of economy covers beyond enforcing the nation's economic interests also purity and sustainability of economic processes.

The vision of the government is that the food chain products (particularly food) should be healthy, high quality and safe, and the people and the society should show a high degree of awareness and responsibility in the manufacture, sale, use, or consumption of those products.



Concept of the food chain safety strategy

Concept of the food chain safety strategy



Food Chain Safety
STRATEGY 2013-2022

Definition of food chain safety

In order to understand the basic purpose of the strategy and to define appropriate goals we must define what do we mean by food chain safety. Food chain safety is only a few years or decades old concept, it has various definitions. Defining it is crucial in this strategy, because the exact definition is necessary to define and break down objectives. To get closer to the concept of food chain safety, let's examine its elements separately.

What is food chain?

According to the pragmatic definition of the Integrated Multiannual National Control Plan; the food chain can be defined as processes along the chain from "soil to table" and products resulting from these processes having direct or indirect impact on food.

Figure 1. is showing the main products and processes of the food chain and their simplified logical relationships to one another.¹⁰

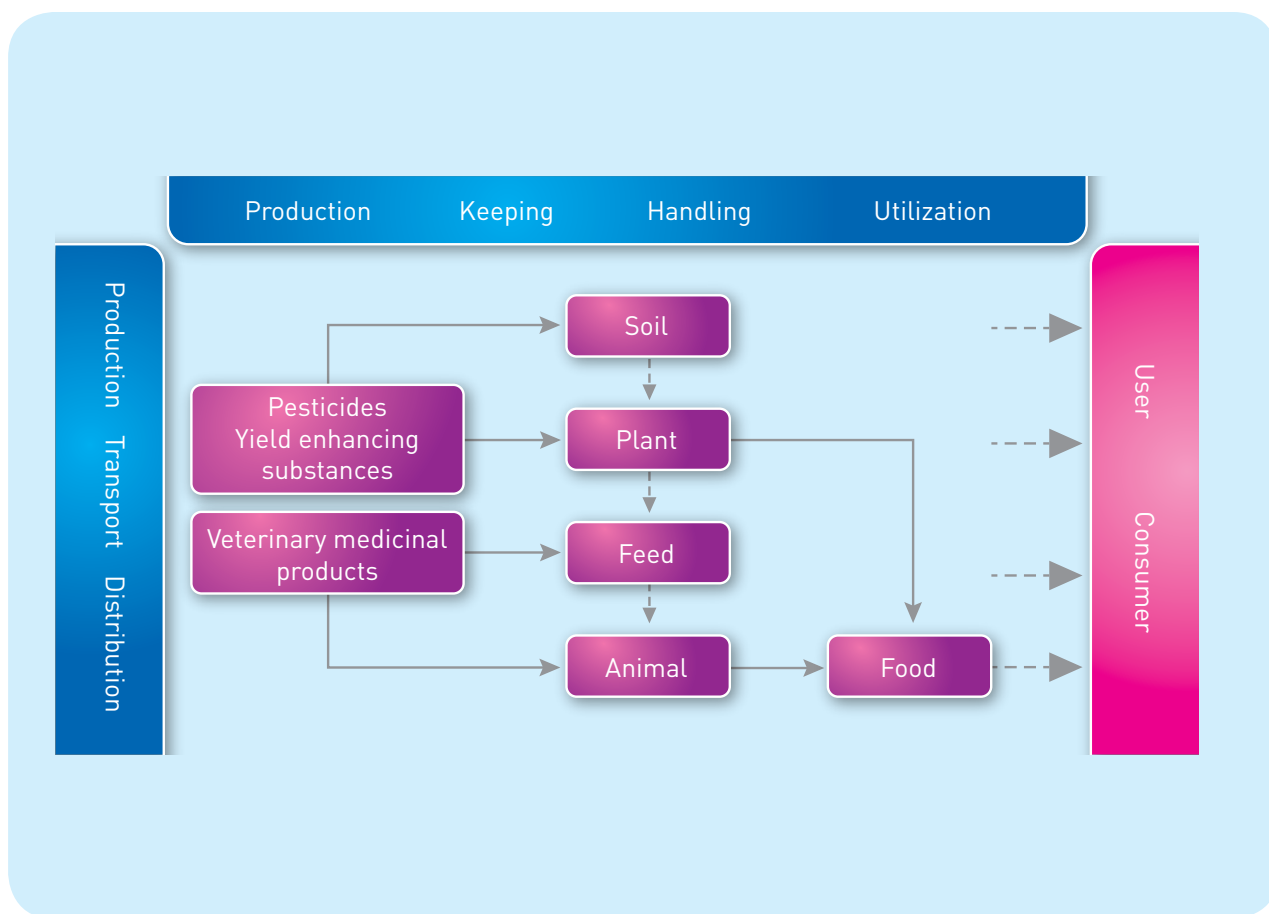


Figure 1: Major products and processes of the food chain

The Act XLVI. of 2008. on the food chain and its official control uses the following term: „Food chain means all processes, where actors have direct or indirect impact on food, during soil conservation, agro-environment, plant production, plant health, pest control, during the manufacture, sale and use of veterinary medicinal products and licensed products, and during the production, transportation, storage and sale of feed and food, the farming, transporting and sale of livestock, during animal health, plant and animal by-product handling, storage, transportation and use.”¹¹

The Act’s concept reflects the food chain control approach; from the scope of the law it can be concluded that the food chain is a set of minor or major actions, which are partly overlapping each other.

But is the food chain more than the sum of its constituent products and processes? This may be better string, they’ll make a pepper-wreath. However, if we don’t tie them on a string, they won’t make a wreath understood by the one-minute short novel from István Örkény: *The meaning of life*

„If we tie a lot of cherry-peppers on a string, they’ll make a pepper-wreath. Although it’s the same amount of peppers, just as red and just as hot. But still no wreath.
Does it only lie in the string? No, it doesn’t.
That string, as we all know, is an incidental, third-rate thing.” Then what?
People capable of brooding over it and taking care not to let their mind wander about, but keep them on the right track may get a scent of eternal verities.”

Örkény István: *The meaning of life* (Az élet értelme)
Translated by N. Ullrich Katalin

Indeed, the food chain is perceived as a very complicated and complex network that can have characteristics of its own as a network: its structure, complexity and vulnerability to hazardous substances or the rate of spreading of a disease are all of a network’s “own” properties, so they are not related, or cannot be deducted from the consisting products and processes.

Accordingly the food chain does not mean only the actors and its activities and the resulting products, but the intricate relationship among them is also very important. **So the food chain can be defined as a complex system of activities, products and actors having a direct or indirect impact on food.**

Who are the actors of the food chain?

The executors of the Strategy are the actors of the food chain. But who are they really? Who are the key actors, who directly or indirectly, but fundamentally influence the success of the strategy to achieve its goals? The most obvious answer is: the three most known stakeholders often mentioned in the food chain field; business operators¹², consumers¹³ and the authorities.

However, we can’t miss the point that in our case the food chain is the central focus, and so we not only include food, but all products, produced in the food chain. And this beyond the previously formed and basically correct perception puts more value on the role of the users of certain food chain products in one hand, and the critical role played by the media, politics, education and science in changing the views of the public on the other hand.

What is safety?

Safety is a condition where people are (or feel to be) safe from threats, risks, injuries. A limited, but more practical version of this definition is, that safety is a condition, when the known hazards are kept under control, so an acceptable level of risk is formed at societal and individual level as well.

For a better understanding of the idea of safety let's take a look at the definition of health defined by World Health Organization (WHO): „Health means the state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”¹⁴. So, health safety can be defined as one's complete physical, mental and social well-being.

The idea of food chain safety can be introduced from the FAO/WHO Codex Alimentarius definition of food safety: to ensure that food will not cause harm to the consumer, when it is prepared and / or eaten according to its aimed use.¹⁶

It is to be seen from the above definitions that the concept of safety besides the measurable, science-based objective parts contains many subjective elements: individual and social experience, legends, prejudices and instincts all have an influence on the perception of safety, so, if the strategy aims to improve food chain safety, these subjective elements need to be addressed too.

What is food chain safety?

From the above definitions food chain safety can be defined as a state of control of risks emerging from the food chain products, processes and the very complex nature of this network structure, providing

an acceptable level of risk for the individual and society. This is further simplified:

Food chain safety is: Ensure that the food chain does not pose an unacceptable health or economic risk to individuals or to society.

It is important to note here, that at the end of the food chain some degree of risk always remains, so the total elimination of risk cannot be guaranteed, only an **acceptable level of risk**. The WTO SPS Agreement introduced the concept of Appropriate Level of Protection (ALOP).

The ALOP is the appropriate level of sanitary or phytosanitary protection: **The level of protection deemed appropriate by the Member establishing a sanitary or phytosanitary measure, to protect human, animal or plant life or health within its territory.**¹⁶ Some countries use the Tolerable or Acceptable Level of Risk definition.¹⁶

Both definitions express, that zero risk does not exist and the government have to decide – in agreement with the society – with limitations to the available resources (because it is theoretically impossible to control everything everywhere!) and priorities, what level of risk is acceptable at the national level and what public health goals are to be achieved.

For a proper determination of food chain safety, related ideas of food safety and food security need to be given, and their relations to the present strategy. In the traditional approach food security focuses on having the adequate amount of food and food safety concentrates on the safety of food.

On the contrary, food chain safety not only focuses on the food (as end product) but it focuses on the whole chain, on its processes, including all produced, and processed products, consequently

it includes entirely food safety and certain areas of food security as well. Figure 2 shows food chain safety's relationship to these and its relationship to agri-environment protection.

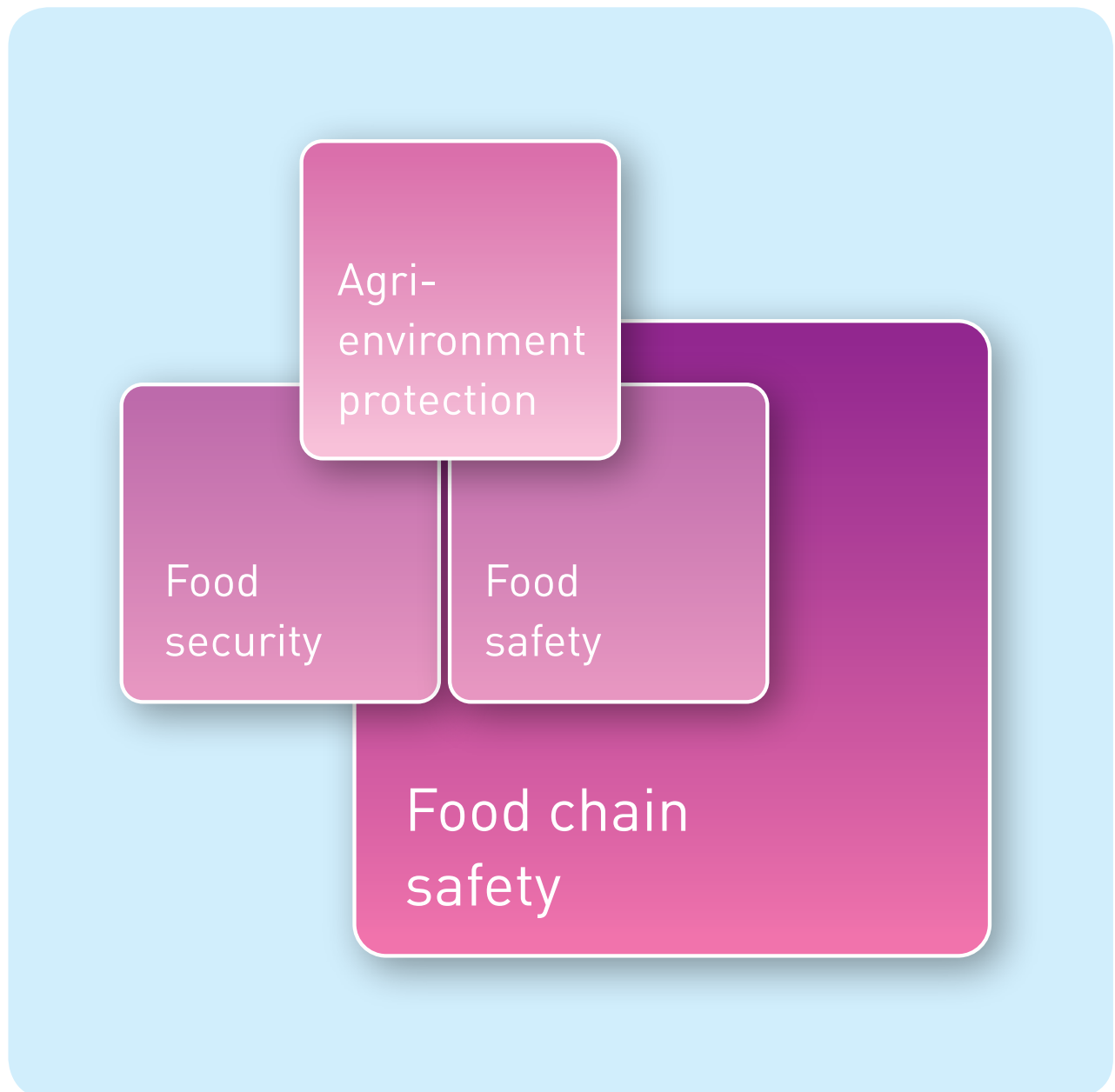


Figure 2: The relationship between food chain safety, food safety, food security and agri-environment protection

The Food Chain Safety Strategy – see above – covers the areas of food security and agricultural environmental protection connected to food chain safety, however it does not cover other strategies –such as the National Rural Development Strategy 2020 – on agricultural policy, food policy, environmental issues, that are only indirectly related to the safety of the food chain.

As introduced earlier, the ultimate goal of the strategy is to continuously improve food chain safety. To improve the situation, the current state of Hungarian food chain safety needs to be assessed and it is to be examined, how and who can improve the current situation in food chain safety.

Difficulties of the assessment of food chain safety

The assessment of the current situation is not straight forward for several reasons. **Only very few people understand** the underlying concepts of the food chain, even within the authorities, sometimes the idea of food chain safety is mixed with the idea of food safety. Moreover, the judgment of food chain safety is not only based on objective facts, but is influenced by beliefs and personal experience **(subjective factors)** as well.

But is subjective judgment a problem? Does it block the growth and development of good food chain safety? According to this Strategy, it does. In spite of the expanding scientific basics and evidencebased healthcare systems in recent decades, sometimes even in professional circles strongly subjective arguments, not or

inadequately supported by scientific facts and evidences are practiced.

In the mid 20th century, several studies have shown^{17,18} that experts'(!) forecasts do not reach the accuracy and reliability of mathematical-statistical models (nevertheless, good mathematical-statistical models need high professional expertise, and many experts).

In addition to correct forecasts the current situation assessment is influenced as well by the distorting effect of individual perception. According to surveys this is true not only to outsiders but also to the authorities: for example according to the results of the online survey conducted among professionals of food chain safety for this strategy, the perception of hazards and risks in many cases contradicted overall accepted norms, and it was very similar to non-professional views

In addition the realistic assessment of the current situation on objective foundations is complicated because actors of the food chain have different knowledge, information about food chain processes, products and actors. This **information asymmetry** is typical among actors, but it is most characteristic in the relationship between the business and the consumer, i.e. business knows much more about its product than the consumer who buys it or the government, who cannot – and it is not the government's duty to – stand behind every process of the business' production and marketing activity.

For a proper definition of objectives – despite the difficulties – it is necessary to analyse the current situation, summarized below. The “Strategic Foundational Documentation” contains general and detailed analysis of the situation too, as well as a SWOT analysis. However, the current strategy document intends to show the general environment with a PESTEL analysis.

¹⁰ Hungary’s Integrated Multiannual National Control Plan, 2010-14. Ministry of Rural Development, 2010.

¹¹ Annex to Act XLVI. of 2008. Glossary, Article 21.

¹² The idea of business used here includes all actors in the food chain, from plant and animal farmers to commercial actors directly in contact with the consumer (user) or the catering business further including the producers of such special food chain products as pesticides, yield enhancers, veterinary medicinal products or any other substance in an expected contact with food.

¹³ The legal framework focuses primarily on the food consumer.

¹⁴ Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948.

¹⁵ General Principles of Food Hygiene CAC/RCP 1-1969. Adopted 1969. Amendment 1999. Revisions 1997 and 2003.

¹⁶ WTO Agreement on the application of sanitary and phytosanitary measures, Annex A,5.

¹⁷ Meehl, P.E. Clinical versus statistical prediction: A theoretical analysis and a review of the evidence. Minneapolis: University of Minnesota, 1954.

¹⁸ Sawyer, J. Measurement and prediction, clinical and statistical. Psychological Bulletin, 66, 178-200, 1966.

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Comprehensive analysis
of political, economical,
social, technological,
environmental
and legal situation

Comprehensive analysis of
political, economical, social,
technological, environmental
and legal situation



Food Chain Safety
STRATEGY 2013-2022

In view of the domestic food chain safety situation the major factors were summarized using the PESTEL model, where the following aspects were reviewed: political, economic, social, technological, environmental and legal aspects.

The issue of food chain safety receives a worldwide attention. WHO estimates that the number of illnesses associated with food consumption is rising continuously all over the world, in industrialized countries 30% of the population are affected each year¹⁹, in Hungary this number is estimated to be 3 million (mostly unreported). Food chain safety improved nowhere in the world to the level of expectations and technical advances, moreover even opposite tendencies can be observed.

Threats related to food consumption have reached a new dimension, the risk has become global. Products manufactured anywhere on Earth can reach any country in no time and product transmitted pathogens and pollutants can be consumed by any of us. In addition to the already known and frequently-occurring diseases, new types of food chain safety hazards are occurring. It is to be noted e.g. the increasing transmitting role of food of plant origin causing an epidemic or the increasing role of commensalist bacteria and other pathogens in the spreading of antimicrobial resistance.

Political factors

In Hungary and in other countries a high degree of sensitivity for the food chain safety has evolved and this has a significant impact on the administration policy's expectations: pressure on the control authorities and the demand for

their efficiency and effectiveness has increased. These changed over the past decade, initiated the transformation of public administration, the unification of diverse administrative structures – both in general and in respect of the food chain administration. This political necessity came into shape, that besides the personal responsibility of the Chief Veterinary Officer, the National Food Chain Safety Office (NÉBIH) was established under control of the CVO, a central office for all functions related to the food chain.

The level of political commitment is also demonstrated by resolving the previously unresolved financing of the activities by reorganization of the official control fee system and by introducing the food chain control fee. The establishment of NÉBIH (controlling the whole food chain), has a great potential, but – along the values and priorities specified in this strategy – the theoretical possibilities have to be converted effectively and efficiently into practice.

The high degree of political sensitivity in itself is not enough to take the appropriate measures, for implementation a high-level bilateral awareness is needed. For the informed decision making, government executive management and the National Assembly need up-to-date information about the food chain. To complete expectations it is required to have an undistorted information channel among the political and administrative government agencies.

Changes in the public administration

Although there is no uniform EU administrative legal background, nor uniform organizational

requirements, nevertheless effort started for standardization: slowly common standards for transparency, accountability, and in respect to some other well-established disciplines in the private sector (i.e.: in the technical, organizational, management, quality control, etc. sectors). Furthermore in connection with food chain control – due to the previously outlined chain-oriented, integrative approach – a tendency can be observed to centralize control authorities and placing them in one hand. So most administrative systems were faced with the problem of large multi-level organizations and the challenges of the effective implementation of common standards. This is no different in Hungary, although the NFSCO runs the food chain related tasks, but the county government offices and district offices are also involved, so as an organization and definitely from an operational aspect the control system will undergo further changes.

The main purpose of the administrative reorganization is a pursuit for cost effectiveness and customer-orientation but two other tendencies can be observed in further changes. In first type the deepest level of organizational formalization (in the good sense of bureaucracy), standardisation, and the much-talked-about overall stability are the goals. The typical example is the system of county government and district offices, where administrative issues can be handled well in the long term, which can be standardized to the tiniest detail, such as in approval processes. This is particularly important in public administration because

citizens should be able to handle their issues with similar and in a predictable manner anywhere in Hungary. Of course the reorganization has risks: a powerful, centralized administration may not handle professional contents at the right place and at the local levels local interests may overwhelm the community interests, decreasing the level of controls and sanctions.

The other emerging tendency is, where the same goals are targeted, but priorities will be different with regard to high level objectives. It becomes of utmost importance, how powerful an organisation is, and how fast and effectively can the organisation give answers to upcoming problems (e.g. food scandals, pesticide adulterity, etc.) or if it is able to prevent these problems. Here also uniform processes are necessary, but priority is given to adaptability, flexibility, high level of knowledge, to sharing this knowledge, to advanced communication skills, where goals can be achieved by an intuitively thinking, learning organization long-term.

Typical such competencies are needed for certain not uniform tasks e.g. in the case of controls.

Due to limited resources, and the limited number of professionals in Hungary the setting of priorities can only be defined by central administration, where the first step was meant by establishing NÉBIH. It must be emphasized that in the long term the risks of food chain safety can only be prevented or decreased, if professionals in the local administration know their operational and supervised territory, local producers and business, the specialties of

local production and who appropriately and timely control the production area, the biological basis, the input materials of agriculture, including their use and commerce. This is the way to avoid that a technological failure during primary production will pass through the complete food chain.

Economic factors

Global economic environment

The global economy up to 2010 was constantly growing (3.2% per year on average during the period between 1980 and 2010²⁰) but this trend changed due to the economic crisis and it is very difficult to make any predictions now. However, it is clear that developing countries are facing a further expansion. It is predicted that by 2050 China will be the world's largest economy with a 28% share ahead of the U.S. (14%), India (12%), the EU (11%) and Japan (3%)²¹.

This will drastically affect the demand for food chain products and trade structure: in one hand it will increase the demand for food and other food chain products, as a result of the expansion of these countries, on the other hand, products from developing countries will appear increasingly on the global market. Of course this affects Hungary's food chain: in addition to serving emerging markets attention must be given to products of these third countries, appearing on the Hungarian market. Similarly, attention needs to be paid to the further expansion process of the EU because the increase of the internal market (both on the producer and the consumer side) will challenge food chain safety and the associated legislation

process. A special emphasis needs to be given to the expected growth of **protein demand**. The lifestyle changes resulting from the economic growth of developing countries is the main driving force behind this process. The annual 1% increase of the GDP has a special effect on consumption of different commodities: it will primarily affect the demand for animal protein and these processes will have a great impact on both on the overall market and on the agriculture and food chain of individual partner countries – including Hungary²².

The **volatility** of agricultural products and food prices will be a great problem for the stability of the food chain because uncertainties increase on both the producer/manufacturer side and on the marketing side and this will put great stress to all stakeholders, consumers and governments. There is no change expected in the future in this respect, and this volatility – through economic uncertainty – is a very important negative factor in regard to the interests of black economy as well.

Complex food chain and globalization

Industrialisation and globalization are spreading continuously in all areas of the economy – in agriculture and in the food chain as well. However the sensed globalization is far from finished, actually this process is only the beginning and the world we know is more local than global: both our personal relations and business connections are realised in our direct environment.²³ The trends however are straightforward, and with the increase of the

world's population a further development of the globalization processes are expected. Currently 7 countries in the world (5 EU member states, the USA and China) comprise the kernel of the agricultural and food commercial network and each one of these countries has contact with at least 77% of countries in the rest of the world. One half of the world's food production is exported and the exported part is constantly growing, signalling the globalization processes in foodcommerce.²⁴

From this it follows that the food chain becomes more and more complex, so tracing food paths is harder to follow. While food production is becoming more centralized, certain raw materials, additives and food contact materials stem from producers, where the distance among the localities of operation is of continental size from another and from their users.

Food and other products with the help of sophisticated logistical systems and the more and more liberal international commerce regulations can reach distant locations faster; often their commerce is through the internet and thereby making the traceability even more difficult. As a result of this a single intentional or unintentional contamination can have a consequent endangering of the population of several countries.

The movement of products and persons of previously unknown intensity has most probably a significant effect on food chain safety, measurable only with the most advanced network science tools. These are such new, large scale, fast and far distance displacement

phenomena, that were not known in the previous history of mankind and will definitely enhance the spreading of contaminating substances and pathogens and menace mass, even global poisoning or epidemics. Within this group an especially high risk is associated with the pathogens transmitted by imported items from developing countries. In part these pathogens or contaminations have been previously mostly eradicated or are unknown yet, for which Europe is unprepared.

The Hungarian food economy export was stagnating and showed little increase before Hungary joining the EU, but after the accession it shows a continuous increase. The **increase in imports** speeded up after joining the EU and after a slow-down and a small decrease in the 2006-2010 periods it began increasing again. (Figure 3).

The foreign trade balance of the Hungarian food industry gradually decreased from 2001 on, in 2005 and 2006 it was under 1 billion Euros. Then it shows an improving tendency and has exceeded 2 billion Euros for the first time in 2011. Hungarian export markets show a continuously growing Europe focused character: In the last 15 years the European export share always fell between 90-96%. This tendency continued after Hungary joined the EU, because the growing costs of transportation, the low fraction of products where the high costs of transportation were tolerable and stagnating foreign commercial relations caused the transportation radius not to grow. Therefore Hungarian products are randomly found on

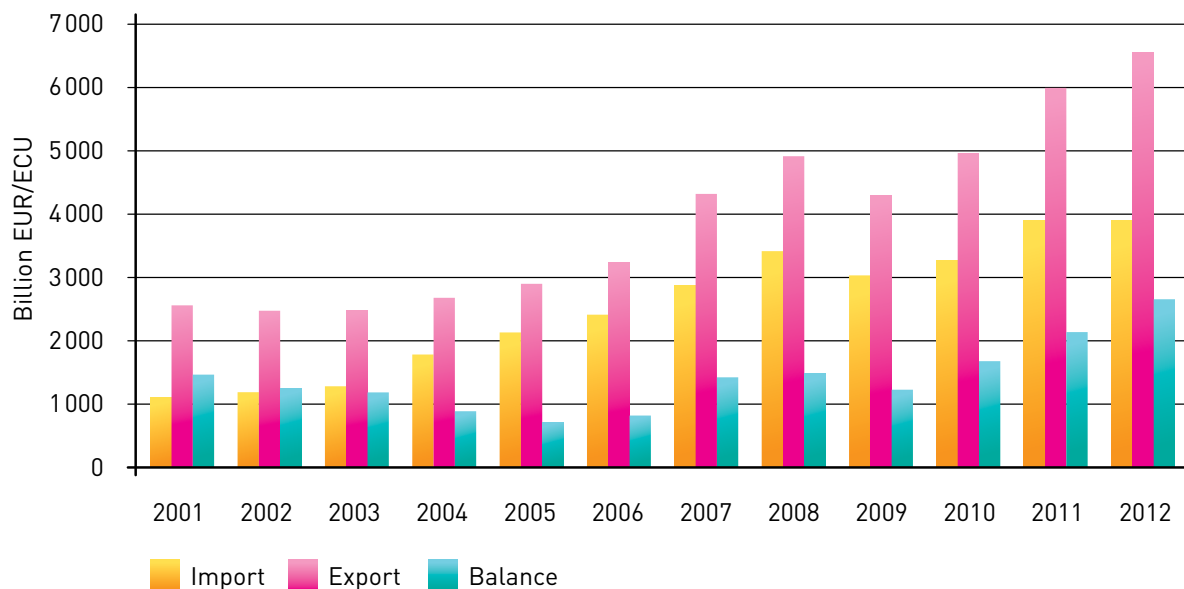


Figure 3. Yearly trends of export, import and balance of the Hungarian food economy (HCSO)

the markets in the USA, China or India, and South-Eastern Asian region showing the most dynamic increasing market is more or less left out from the target markets of Hungary. With the continuous expansion of the EU the export market structure of Hungary is pushed more towards EU member states.²⁵

Concentration and integration

In the food chain two opposing processes take place in the world with regard to the size of business: there is strong concentration and integration in one hand, but the demand for regional and local specific products is also growing. In the member states of the EU the size of an average plot varies a lot and this has a strong correlation with the changes of the

Common Agricultural Policy. It is therefore very hard to forecast the average size of business, so we need to be prepared for both processes and the risks associated with them.

With respect to retail sector concentration of super- and hypermarkets, discount chains and wholesalers is to be observed in the whole world. Multinational companies strengthen their global positions by merging their local competitors. This process – especially in developing countries – is speeding up. With respect to point of sales hyper- and supermarkets and discount chains have the largest share (46.4%), this is followed by comfort retail shops and filling stations (31.3%), and specialised retail shops have an even smaller share (16.9%).²⁶

In Hungary the majority of food production and

retail is handled by large companies, mostly owned by multinationals. Small and medium-sized companies have a role in fulfilling the local and regional demands and in the production of special, small quantity food. The majority of ventures in the food industry in Hungary (nearly 80%) employ less than 10 workers in microcompanies. (With the companies employing less than 50 workers comprise a share of 95% among businesses). The food chain safety

requirements defined in the legal regulations and in the control measures make rarely any distinction between SMEs and large companies or food retail chains, except for showing some flexibility. In an international comparison the degree of the Hungarian concentration is not extremely high, as it lies under the EU average. In the EU the CR-3 indicator²⁷ shows a large deviation, but the majority of member states lie in the 30-50% range (Figure 4).

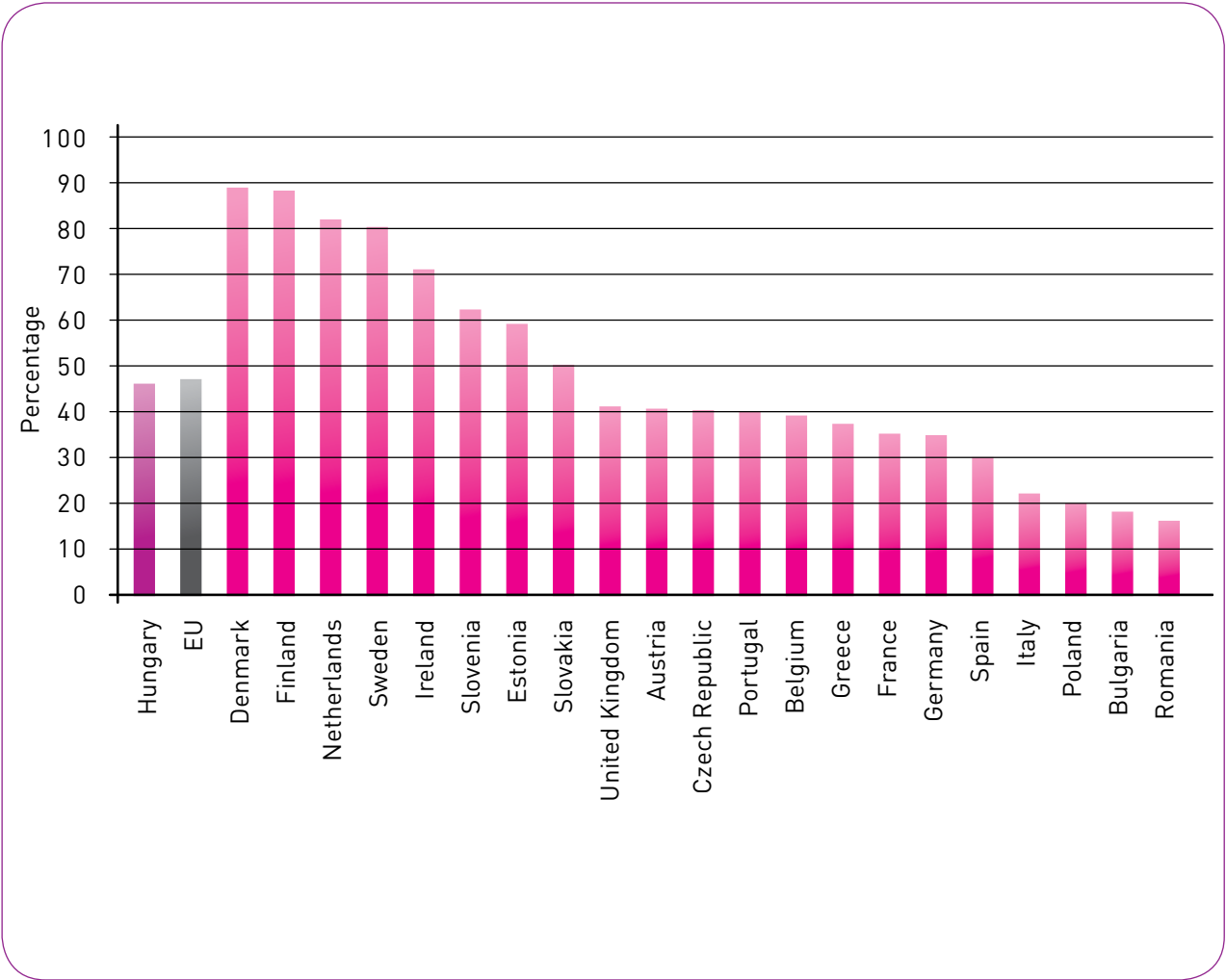


Figure 4. CR-3 indicator for food retail in the member states of the EU, 2010²⁸

The so-called modern marketing channels were acknowledged mainly after the turn of the century in Hungary. In the Hungarian retail market „modern retail” including hyper-, supermarkets and discount chains has risen above 70% by 2011, whereas the market share of traditional retail (independent and other small groceries, markets) decreased in total.²⁹

On the other hand markets have been rediscovered, as spending in markets doubled in the past decade: 70 billion HUF in 2000 to 130 billion HUF in 2011. This means, that the market, as a marketing channel kept its 5% share in the daily consumption of households, a substantial achievement as compared to the continual decrease in the other traditional forms of retail.³⁰

Organic farming

In the past decade the share of organic farming in the EU is showing an undoubtedly increasing trend. The share of plots used for organic farming has grown from 3.6% to 4.1% between 2005 and 2007 and this trend seems to continue: it was 5.5% in 2011.³¹ In Hungary – for the moment – these trends cannot be observed: in 2012 130.7 thousand hectares were cultivated according to organic farming rules, where 106 thousand have been converted and a further 24 thousand were under transmission. There were 2200 organisations involved in organic farming or organic products, mostly (1560) producing in agriculture (including honey producers, collectors of wild plants, and fisheries), 414 were processors and 226 were wholesale, retail and import enterprises.(Figure 5).

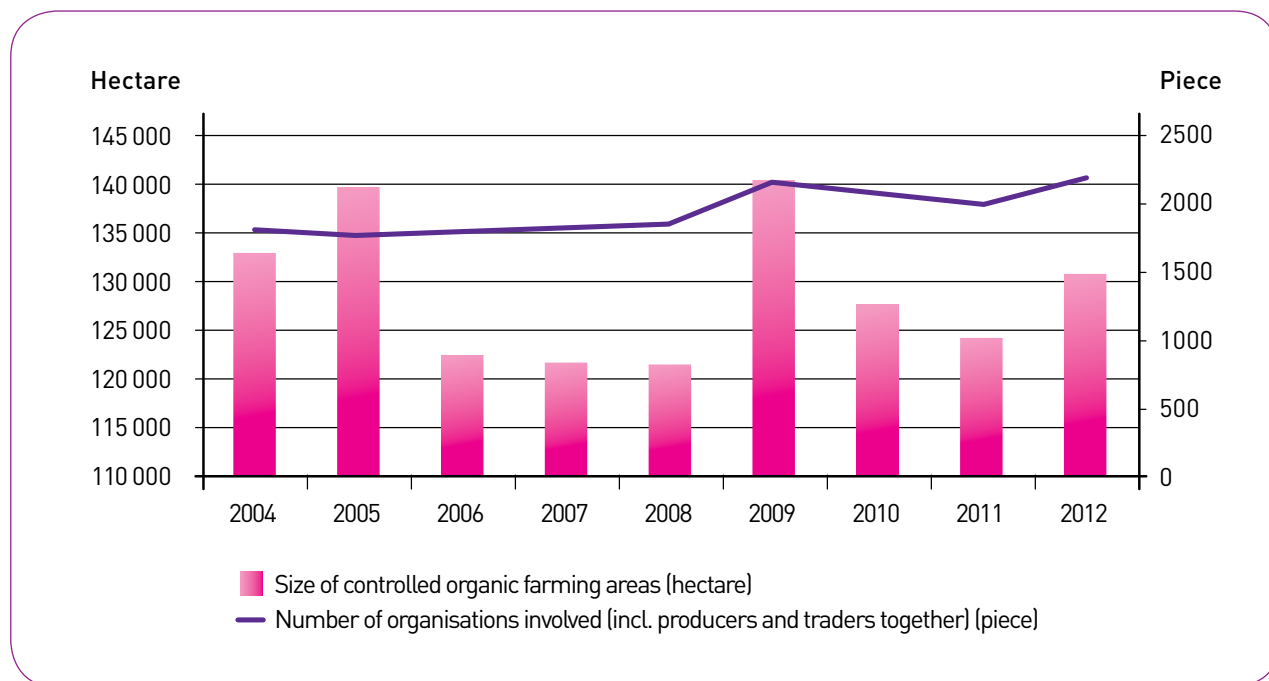


Figure 5. Size of controlled organic farming areas and the number of organisations involved (2004–2012)³²

The size of organic farming plots and the number of organisations involved in organic farming and products stagnates after Hungary joined the EU, although the size of the area involved increased slightly in 2011 and 2012 it has not reached the level it was at the time when Hungary joined the EU. The last small peak showed in 2009, when the new subsidy system was introduced but data proves a number of fallouts from the system. Hungary is far from the long term goal to have 300 thousand ha of organic farming land, which goal has been set first in the 2002 NAKP (National Agrienvironment Protection Program) with target date 2006 and then by the end of the UMVP period (2007-2013). The undesirable tendencies are a consequence partly of the sector's regulation and subsidization policy and partly of structural and market problems.³³

Black market, increasing number of adulteration and fraud, the risk of terrorism

The non-transparency of the food chain is an occasion for those intended actions and their increase, i.e. the black and grey economies, adulteration, fraud and terrorism with a high level of risk incurred. Nowadays the adulteration of food or food chain products (e.g. pesticides, veterinary medicines, etc.) has become internationally driven. The net income of the transparent part of the complete food chain in Hungary is 12-13 thousand billions HUF annually. On the other hand it is a well known fact, that undeclared income and profits are extremely high in the sector e.g. experts estimate

this share in the meat and egg sector to be 45-55%. Adulteration fraud and the intentional contamination of the food chain place a relevant risk to health. The strengthening of international terrorism, the increased number of „failing“ states, that temporarily or for long cannot perform their administrative functions further increase the dangers of intended or random infections. Traditional national food chain control systems cannot efficiently cope with these challenges, therefore a new paradigm and the reform of traditional systems needs to be accepted.

Innovation and economy development in the food chain

Evolution is an imperative characteristic of economic processes. The technological innovation of the past years and decades has fundamentally changed our lives, and this will probably be so in the future. Besides the direct R&D activities of the food chain (e.g. biotechnology, GMO, yield enhancement, nanotechnology, packaging technique, retail traceability techniques) newly developed innovation techniques need also to be considered, that influence all aspects of life e.g. ICT (infocommunication technology). These technological changes affect every aspect of our life, but specifically in the food chain we can encounter such changes, that we are currently unprepared for. Technological innovation furthermore confronts us with ethical-moral issues, where answers will not be easily found due to the complexity of processes and where

solutions will be hard to be understood. The gap between the knowledge acquired in science and that of the general public will increase. In order to lead a discussion to be understood by average individuals in regard to issues in modern technology, a more intensive, proactive, informative communication is necessary.

The support and the national founding of R&D activities in Hungary lag behind the indicators of most member states of the EU. The total R&D budget and spending in Hungary was 0.5% of the GDP in 2011 according to data collected by Eurostat. The EU average of the 27 member states was at 0.7%, but the winner, Finland has a 1.1% indicator. From the database of the Hungarian Statistical Office, in the R&D section data can be found on the number of scientists and innovators employed by the food industry and in the food sciences (2008-2011). Furthermore data on the spending in these fields for scientific purposes and experimental innovation can also be found for the years between 2008 and 2011. In this period the number of scientists and innovators increased by 37% in the sector, but they still only comprise a little more than 1% of the total number of all R&D scientists and innovators in Hungary.

The cost of scientific, experimental and innovation activities in the food industry and in food sciences have doubled in the analysed period. This founding increased from 1.2% to 1.9%, but by evaluating the collected data it can also be said, that the number of food industry scientists and innovators and the spending in this area in Hungary generally

lag behind the respective figures of other EU member states. This is caused by the jobcuts in research institutes, in the closing of certain institutions, low salaries forcing scientists to leave their career, „brain-drain” and the unfavourable domestic tender possibilities. In comparison to international standards the level of infrastructure and scientific instrumentation is also far behind norms. In many areas the instrumentation is inadequate and though the quality level improved in the past 5-6 years, in many respects it is far from acceptable.³⁴

Most of these R&D&I institutions have no assets to cover the budget needed for an investment. Due to this lack of capital the risk-taking ability of the R&D&I institutions is weak. They cannot finance the realisation of their own innovations, ideas. Universities have no resources resulting from their own revenues allocated for research in their budgets. Without researches and innovations in connection to food chain safety the quality of life of Hungary's population cannot be improved efficiently and the food economy will lose to competition internationally.

A central element of the midrange strategy of the EU is to increase competitiveness. An important tool to realise this goal and to reach higher levels in food chain safety is innovation and economic development. These areas will receive substantial financial foundations in the next 7 years budget cycle. According to the operative model most of these funds will be allocated to cooperation programs among research institutes, the government and

ventures. A prerequisite will be to enhance the innovation capabilities and capacities of the authorities, which has already started by merging the Hungarian Food Safety Office into NÉBIH, but further steps need to be taken.

The economic burden of the state and of society

Today in Hungary – according to estimates – many millions of people get ill from food related illnesses, although only a fraction of these people visit their doctors. These kinds of illnesses make many 100 billion HUF expense annually to the state in the form of treatment costs, absenteeism, sick leave, life years lost and in other forms. To increase the days spent in work, effectively and actively not only to avoid illnesses is necessary, but also a correct diet and nutrition is needed. This is the way to an active, creative work force and indirectly to an improving economy.

The relation between agricultural export and the authority

The primary task of the future is to support and to supply with food the increasing population of the world. This is an opportunity for Hungary already in midterm for the agricultural export. To be able to integrate into international commerce the reputation of the authority and its activities are crucial, furthermore the efficient cooperation of the authority with businesses. An example for modelling the role of the authority: domestic companies exported 57.3 billion HUF worth of cattle in 2011. If the value added by the authority was 1% of the value of this export, than

this is more than 0.5 billion HUF. Extrapolating this data it will be apparent, that the reputation of the authority and the efficient cooperation with businesses is worth several billions of HUF.

Social factors

Demographic changes

The world's population will increase to 9.3 billion by the year 2050³⁵ and this will put demographic, social and economic pressure on governments globally. Increasing population will increment social inequalities, a drastic increase of demand for food (especially for proteins) and the problem of an ageing society.

The global increase in population will not affect all countries equally: the EU and Hungary can foresee a decreasing/stagnating population and an ageing society will characterise their situation.³⁶

The average life expectancy in the EU by 2050 will increase from 83 years (2010) to 88 years. In the meantime the number of active workers in the 20-64 age groups will decrease from 232M to 208M by the year 2060. This will result – besides an increasing stress on the social welfare and the pension systems – in an increase in the number of illnesses of the elderly, a decrease of the general resistance of the society, an increased use of the healthcare system and the decrease in the number of the active, fit for work age groups.

The dynamically increasing global population in contrary to the less increasing (stagnating or decreasing) population in the EU, besides the struggle with decreasing workforce in the ageing European countries, forecasts the increase in

migration into these countries. The migration of 1 018 000 persons into the EU in 2010 is to be expected to increase to 1 332 500 persons in 2020 and the total migration into the EU in the 2010-2060 period is expected at 60M people – 12% of the EU population at that time. The undoubted benefits of this migration process will also bring along demographic, social tensions and also a change to different cultural and nutrition habits, where these effects on food chain safety may not be underestimated³⁷.

In the past decade in Hungary the decreasing birth- and decreasing death rates, with the increase of the average life expectancy resulted in an ageing population. On Oct. 1, 2011 250,000 less children, 171,000 less in the 15-39 age group (young active), 92,000 less in the 40-59 age group (elderly active) citizens lived in Hungary than 10 years before. The number of elderly increased by 250,000 in this period.

Among children the number of nursery and kindergarten aged is also less than it was 10 years ago, but the number of elementary school pupils decreased even more. The best fit for work, 20-59 age groups number 188,000 less than they numbered in 2001. Especially the 60-69 age groups increased, the 70-79 age groups number 21,000 less and the 80+ age group increased by 120,000 compared to 2001. The increased population consists mostly of women. Every 10th citizen in the country is 70 years old or older³⁸. This trend according to forecasts will keep going. (See diag. 6. and 7.³⁹)



Diagram 6. Population in Hungary divided by sex and age in 2012 (Compared to the year 2002)

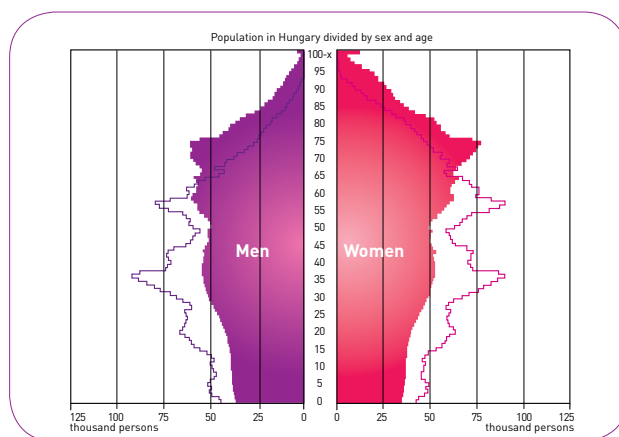


Diagram 7. Hungary's expected population forecast for 2050 (Compared to the year 2012)³⁹

An important social aspect is that although **global poverty** decreased in past decades, the economic boom proved to be more favourable for the rich. So inequalities in society have increased and this gap in income levels is expected to widen in the future⁴⁰. This process – besides the obviously increasing social tension – will have a strong negative effect on the economy, on the transparency of economic processes and also on the black-grey economy.

Changing lifestyle

Food consumption habits are constantly changing both in the EU and in Hungary. Changing habits have a twofold effect. In one hand there will be a strong demand for fresh, less processed, tasty, „healthy“ high quality (mostly in uniform quality) food. This general EU tendency is also present in Hungary, but cost alertness and hunger influence customer preferences more as compared to the average European. According to polls taken by the EU 95% of the Hungarian consumers asked, believe that the price of food is important. This is not much different from the EU average of 88%, but Hungarians asked thought, that this was the most important factor. Furthermore 75% of Hungarians in the survey care for the safety of the food, nearing also the EU average (79%)⁴¹. On the other hand the decrease in physical exercise⁴² is an ever increasing trend and this diversification in lifehabits leads to different food preferences. As a result of these processes complemented with the special needs of the elderly population increase the need for special

types of food. Furthermore other previously not too relevant factors appear in consumers preferences i.e. fairtrade, animal welfare or carbon-footstep, but price will keep on being a very important factor. These factors currently act against each other and will further strengthen the food-diversification processes.

The increasing input of raw plant parts (i.e. sprouts, seeds, leaves) will present a new transmitter for the spreading of infectious microbes and to exposure of certain mycotoxins. The organic (bio) production can bring forward mycotoxins-contamination and bypassing traditional, safe food preservation technologies will increase the risk of microbial infections. With the increase of tourism the risk of importing diseases multiplies. All the more consumers use industrially preprocessed so-called comfort products and eat out of their homes, becoming more vulnerable to further hazards.

Changes in the health status of the population

The number of people having a changed immune state is increasing. Their resistance against infections decreases due to their age or their state (e.g. children, elderly, pregnant) or due to medication. Population resistance is also decreased by artificial chemical substances existing in low quantities in the environment. Commonly known substances having negative effect on the immune system are mycotoxins, dioxins or certain pesticides. On the other hand the immune system can overreact, show allergic symptoms or inflammations to the increasing exposure to these artificial materials.

We have to consider also the widening variety of consumer groups, who due to diverse causes – i.e. food allergy, diabetes, lactose intolerance, coeliac disease – need to keep a special diet. An even stronger food control is to be maintained in the case of these groups, as deliberate adulteration or mistakes by chance in their food can have serious consequences.

An – increasingly – important problem of the European and Hungarian society is **obesity**, reaching endemic numbers.⁴³ In 2010 more than half of the adult population in the EU (50.1%) was obese or overweight.⁴⁴ Furthermore 24% of the 6-9 age groups had a similar problem in 2007⁴⁵. According to the most up-to-date figures Hungary belongs to the most obese countries in the EU (28.5% – EU average: 16.6%). If these trends continue and no counteractions will take place in the form of regulations, obesity and its consequences (type 2 diabetes, heart and circulatory diseases, etc.) will put a large burden on society. The defence against obesity needs a complex strategy, the execution of planned activities need an all governmental will and a multisectoral cooperation, using „Health in all policies” approach. Though this Strategy’s scope does not include the field of nutrition, food chain safety and food quality are important elements of this complex approach.

Level of knowledge and education

Approximately 70-80% of foodborne illnesses – according to data collected by authorities – occur in households, and are caused by not keeping rules of elementary food hygiene or committing

mistakes in accepting newly acquired food consumption habits. Therefore through education and changing consumer habits these illnesses could be avoided. Researches of the topic have shown that comprehensive changes in lifestyle and structures of families do not help the transfer of knowledge on food; previously this knowledge transfer was based on tradition. It can also be observed as part of this research that cooking as a home activity is losing ground. According to consumer surveys the knowledge on food among school children and the elderly is predominantly influenced by the media. The press will take into consideration and will transfer both public and market (advertising) viewpoints during its activities. Less educated consumers will not be able to distinguish these two types of information in all cases. It is also characteristic, that certain events will be magnified by both the media and the consumer (food scandals), whereas on the other hand other events will not be handled with sufficient awareness (e.g. constant microbiologic hazards). As a result the role of the government must be improved in the field of education and knowledge transfer.

The number of students in agricultural and food science higher education is increased in the past 15 years. As a result a real competition evolved among educational institutions to attract new students. It is unfortunate, that this competition is only in numbers and not in quality. It can now be said, that weak or mediocre high school students, with low motivation can very likely find their place in the B.Sc. course of certain universities. These institutions tied

down by the state financing mechanism can hardly enforce quality expectations as to their accepted applicants. Another setback when allocating R&D funds is the numerous parallel existing institutions, decreasing the size of individual funded projects. This does not allow the evolution of really effective, strategically important, function bearing knowledge centres. The educational system in its present form does not give a perspective to professors in most cases, so often the process of contraselection can be observed, when able experts with good practical knowledge leave the educational profession.

In connection with vocational education the non-motivation of students can also be recognised. The career orientation activities of these institutions should be enhanced by the state in presenting food economy, as an attractive career opportunity to students. Another important area in this field is to organise practice opportunities and to stop graduated students from leaving their field of study. In vocational education and in higher education the perspective must be to transfer the most up-to-date knowledge to students. It is very often the case these days that outdated technologies are taught as if they were currently used in practice.

The level of food chain safety knowledge need not only be raised in the population, but it must be improved in certain groups of businesses. It is a problem, that food safety incidents can be traced back in most cases to lack of knowledge or education on the part of the employees or the

management of these businesses. On the other hand, there are no uniform curriculum and test requirements to be implemented to all who work in the food business. A further problem is, that there are no expert centres, where firms or households can get up-to-date expert advice on food preparation or preservation at easily accessible locations, free of charge and with expertise prepared to answer a wide variety of technical questions in due time.

Relation to administrative authorities

Trust in the administration shows great variations and is influenced by the authority's status: under EU lead or member state authority. In a survey lead in 2010 by Eurobarometer it was agreed in overall that EU authorities do everything to increase food safety, whereas it was definitely less so with member state authorities.⁴⁶ The survey has also shown that 70% of the Hungarians asked believed that authorities will react promptly and effectively on food hazards, a figure larger than the EU average (63%). More, than 90% of those asked said that EU authorities could do more to increase the health level of food products. This opinion was also shared by people asked about the national authorities. A little more than half of EU citizens believe, that authorities supply enough information on the risks associated with food. In strong contrast to this 80% of Hungarians in the survey were satisfied with the activities of the authorities. The majority agreed that the tasks of the authorities should include supplying them with information on a

healthy diet and lifestyle. To sum up: both European and Hungarian poll takers are increasingly interested in food chain safety and there is an increasing trend of demand for information in this regard. On the basis of surveys taken in the past 10 years in Hungary it can be stated that the food chain safety events receiving large media coverage have resulted that the attention of consumers is focused on this topic.^{47,48} The public today in many respects is much more conscious than was a few years ago, showed by a proven increasing trust towards Hungarian food products. On the other hand a large group of consumers - mainly due to their price sensitivity - are ready to accept certain food safety risks for price advantages. It is important, that the activities of the food chain control authorities are traditionally praised by citizens and believe that this organisation has an important role in the fact, that Hungarian food products are generally safer. In connection with the Hungarian consumer it can undoubtedly stated, they expect a strong government support to keep their role in managing food chain safety. Despite of this to the majority of the population it is not clear, how the system of the food chain control authority is built up. It is positive, however, that the more open, consumer oriented information system of the NÉBIH, can already show progress: the awareness of NÉBIH in the population is twice as big as the awareness of the Agricultural Office, existing between 2007 and 2012.⁴⁹

Technological factors

Information boom and knowledge based economy

One of the most important changes for us in recent decades was the information boom. Information and knowledge already before have played an important role in the operation of societies, but currently it plays an even more influencing role. Besides the previously controlling factors of society (e.g. traditional authority activities) this will have a stronger and more powerful role. This however has a twofold effect, as information can only make good use, if it is supplied in good quality and is available to the widest group of people possible. With the rapid evolution of information technology and its availability it is possible to acquire and transfer information and knowledge fast and easy. Furthermore besides speeding up this process, there is the possibility for different quality analysis of information and more subtle relationship can be looked for. For the latter the processing of big data is necessary (data-mining) which necessitates the creation of an up-to-date information database system covering the complete food chain. An advantage of such an expert system can be, that it can supply a better support to sectoral and government strategic decision making.

Changes in technologies

The use of new food chain technologies brought along a number of unexpected damage effects causing serious concern. An example is the more than necessary use of antibiotics or

pesticides producing in resistant pathogen and pest cultures. The food demand of a quickly increasing population needing a more variable diet cannot be supplied by traditional agricultural technologies. Both animal husbandry and plant cultures have turned to intensive production, where the use of agricultural chemicals, yield enhancers and animal medication is unavoidable, thereby polluting the environment, the raw materials and final agricultural products.

In the food industry partly due to efficiency requirements and to satisfy special consumer needs and partly as a consequence of natural technical innovation – new or not widely spread process technologies are used, where long term effects can only be vaguely assessed. The long term effects of modifications in animal and plant genetics, nanotechnology, intelligent packaging materials or other technological developments cannot be judged reliably today.

As a side effect the development of biotechnology increases the risk of intentionally causing damage, i.e. bioterrorism. This risk will be further increased by the previously mentioned destabilizing effects (increased population, decreasing water and other resources, famines due to climate changes, economic crisis, etc.)

Development of analytical methods

With the development of laboratory methods more and more contaminants can be detected. With the sensitive new methods such small quantities of substances can be detected, that the adverse health effect (health risk) is

questionable. The shortage of food supplies necessitates the review of certain food chain safety regulations, especially decisions to condemn and dispose food lots for thriftiness grounds. Decisions should be based more and more on objective, laboratory results based on a proven scientific background, where the non-significant single amounts of contaminants should be evaluated scientifically on their mutual appearance.

There is an ever increasing pressure on food chain safety systems to quickly identify, analyse and react on emerging risks and to monitor and control the increasing quantity and variety of food chain products. This increasing pressure raises practical questions on allocation of sufficient resources to integrate modern analytical techniques, to build up or to increase analytical capacities, since the present institutional system, the instruments and the R&D capacities are insufficient.

Environmental factors

Shortage of resources

The current trend for the demand of water cannot be sustained long term. The current demand is already above the available resources. Demand in 2030 will exceed by 40% of the available resources and by 2050 75% of the world's population will encounter a shortage of water⁵⁰. A similar problem will be the increasing demand for agricultural farmland. By 2050 agricultural production should be increased by 70% to supply the full demand for food and agricultural products of the increased

population globally⁵¹. This productivity increase can be achieved partly by acquiring new farm lands and partly by increasing farm efficiency. The new, more efficient technologies will bring along new side effects: 24% of the 11.5 billion ha farming territory of the earth show signs of decay caused by human intervention (mainly erosion)⁵². Although sustainability is a central guiding principle, there will be strong pressure on farmland and water resources.

Global environmental and climate changes

In comparison to the late 19th century industrial revolution in the last decade the average temperature increased by 1.3°C in Europe⁵³, which trend is still growing. The European target value is a max. 2°C increase, when most negative effect can be avoided. It should also be mentioned among climatic changes that the increased frequency of weather extremes are experienced e.g. by arid and extremely wet periods. In Hungary – just like in the whole of Middle Europe – according to the forecasts the temperature and the number of extreme hot days increases, summer precipitation decreases, whereas in winter it increases (risk of floods) risks of arid periods, forest fires and land erosion is increasing⁵⁴. To manage extreme weather conditions the state of land should be sustained or improved to protect the environment and agricultural production.

The global environment and climatic changes obviously affect agriculture. With global warming the increase of enteral infections is also increasing, furthermore new animal and

plant diseases appear. The changing climate can lead to new food damaging agents, like pests, weeds and mycotoxin producing moulds. Plant cultures are put to increasing stresses and so will increase the risk of pests and the microbial infections transmitted by them. Pathogens due to their genetic flexibility and short reproductive cycles will react fast, and will adjust to their new environment by developing a resistant, stress tolerant, increased virulence or a completely new variant. There are several signs that the vector transmitted diseases conquer new areas (the spreading of blue tongue disease, West Nile virus). The counteracting activities taken can bring along the increase of residues of pesticides and veterinary medicines.

Pollution of the environment

Human activities continuously pollute the natural environment. These polluting agents will find their way in the food chain and thereby affect human health. The mass production of food and foodchain products – agricultural production, farming, food processing, trade, throwaway packaging – will all increase pollution. Alarming examples of environmental and industrial contaminants reaching the food chain were the dioxin pollution of guar gum and meat or the mercury and arsenic pollutions of fish. The pollution of sea water make edible organisms polluted by toxins, radiating particles, viruses or bacteria causing illnesses or even epidemics. Water pollution affects the purity of water used to water plants, which affects the safety of consuming fruits and vegetables. Furthermore

certain plant protection activities have a substantial effect on the natural environment.

Besides the changing environment effects – caused by human activities – on the food chain the food chain itself affects the environment too. In the EU 90 million tons of waste food is produced annually, a third of the total food production worldwide – yearly about 1.3 billion tons – goes to waste⁵⁵, where a substantial part could be fit for human consumption. Most of the waste is produced in households (42%), followed by waste produced by industrial production (39%).⁵⁶ The increase in population in Europe and the volume of food produced forecasts an increase of foodwaste. In the EU the increase will be up to 126 million tons by 2020.⁵⁷ Both the future of this waste, the caused environmental stress and the efforts to decrease this waste from the viewpoint of food chain safety will be of crucial interest in the future.

The role of primary production

A technological error caused during primary production will go through the food chain in most cases. Primary production (crop production, farming) is very vulnerable to certain risks, especially in the intensive, lowcost focused production, which is of great concern to the environment and to food chain safety. The interaction of the environment with primary production is more direct, and therefore this complex process affecting into several directions needs to integrate a great number of environmental aspects.

Legal factors

In the last decades the EU has undoubtedly accepted the principles of the chain approach and prevention. The legal regulations related to food chain all reflect these views („White Paper on Food Safety”⁵⁸, Regulation 178/2002/EC⁵⁹). The basic principles of the EU regulation are the protection of the health of plants, animals and humans and the protection of their environment, chain approach, risk analysis, the precautionary principle, traceability, definition of responsibilities and transparency. The not very simple tasks of the food chain control are based on those: The control of the complete food chain, its processes and products according to the listed principles. This chain approach regulatory background is by no means final: the Regulation 882/2004/EC⁶⁰ describing the official controls of the authority is currently under modification to strengthen integration and to give a more uniform view to all fields in food chain control (plant health, seeds and propagating materials, animal health, feed and food). The European Commission made a proposal on the enhancement of food chain safety regulations public on May 6, 2013. Plans are that with the new ruling effective in 2016 companies can enjoy the advantages of the simpler, science and risk based regulations. Administrative burdens will be reduced and effective means and processes will finance and improve the control and eradication of animal diseases and plant pests. Consumers by the more effective, transparent controls covering

the complete food chain can get more safe products. Besides as an effect of the food chain scandals of recent years (the German E. coli infection of 2011 and the British horse-meat scandal of 2013) the European Parliament expressed the need for an overall traceability. A well executed situation analysis contains a great number of correct statements.⁶¹

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²⁶Datamonitor (2012)

²⁷The CR indicator relates the total income of the given number of biggest companies (generally the first 3, 5 or 10) to the complete sector total income

- ²⁸ Europanel, 2011
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- ⁴⁵ WHO European Childhood Obesity Surveillance Initiative 2008: weight, height and body mass index in 6–9-year-old children
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- ⁶⁰ Regulation (EC) No 882/2004 of the European Parliament and of the Council of 29 April 2004 on official controls performed to ensure the verification of compliance with feed and food law, animal health and animal welfare rules
- ⁶¹ <http://www.europarl.europa.eu/news/en/news-room/content/20130214sto05852/html/Horse-meat-scandal-MEPs-want-better-enforcement-to-ensure-food-safety>



Evaluation

Evaluation



Food Chain Safety
STRATEGY 2013-2022

A well executed situation analysis contains a great number of correct statements. The real challenge is however to decide, which of the statements are of major importance to forecast the future. The makers of this Strategy, the experts believe that the most important ideas for the future are the following:

1. The food chain is a several billion (HUF) worth key area in Hungary's economy, an opportunity sector for the future. The cost of guaranteeing food safety is marginal to the income of their covered area or to the cost of damages prevented. On establishing an internationally competitive food chain safety system (comprehensive risk management) with a relatively small investment a great economical and health profit can be realised.
2. Hungary's food chain, the economic processes involved create a network, however they are also part of a wider international net. To manage well the operation of this network in many aspects a wider view, a network approach at all levels (regulations, organisation, IT, communication, etc.) should be accepted. Only the state has the possibility and also a duty to practically implement this approach, with regard to the stability of the food network the big nodes of the market, the control system and the knowledge network shall be protected.
3. Many more actors can be well identified in food safety, than we would think at first. To supply the stakeholders with sufficient information and knowledge a more complex knowledge management system is necessary, that should cover all aspects of food chain safety.⁶²

How to improve food chain safety?

To improve food chain safety we need to identify **more hazards and then decrease their risk to acceptable levels.** This is a simple statement, but a very complex process and several ways can lead to the goal. In the course of setting up goals the Food Chain Safety Strategy does not target the solution of all problems simultaneously, but sets up priorities and establishes principles. What can these priorities be?

To prevent human, animal and plant diseases we need to focus on 2 goals: In one hand by directly **managing the risks** all actors can have effect on food chain safety even in the short term, on the other hand a long-term indirect activity package, which can bring along more substantial changes needs to be cared for.

The collection of sufficient amount and quality information, the increase of risk management effectiveness and the previously mentioned information asymmetry and to resolve the subjectivity of food chain safety perception are all important goals. Improving information exchange and acquiring knowledge can lead to them. So to **improve food chain safety, it is of key importance long-term to improve the knowledge level of all stakeholders in the food chain.**

The strategy analysis of FAO in 2003⁶³ defined three basic reasons explaining in part, why food chain safety in developed countries is still struggling with challenges.

The three factors are as follows:

1. Primary food production is very vulnerable against certain hazards, especially in

connection with intensive, lowcost preference production. This generates environmental and food safety concerns.

2. There is more and more pressure on food safety and food safety control systems to quickly identify, analyse and react on new hazards, furthermore to monitor and control the growing volume and variety of food products.
3. Recently despite achievements to increase the use of risk analysis further efforts need to be taken to distribute information and to efficiently communicate and to secure that all elements and actors in the food chain participate fully in creating food chain safety.

From the identified three problems two are concerned with acquisition, processing and distribution of information and knowledge, just like one of this Strategy's main focus points. The third problem in FAO's list as #1 calls attention to efficient risk management, supporting another main focal point of this strategy, namely the management of food chain risks.

The European Committee in its „Growth, Competitiveness, Employment – The Challenges and Ways Forward into the 21st Century”⁶⁴ titled document recorded first very precisely, that either to boost economic growth or to do against unemployment **learning must have a key role**. Essentially therefore economic policy, competitiveness and employment policies have induced EU's attention to learning as of most value. Knowledge as a value can be spotted at several interactions among actors of the food chain. E.g.

- besides the most characteristic information asymmetry between producers and consumers – it can be said about the interaction between producers and the state, that state and food chain as a market are in a mutual interdependency: both parties have an interest to develop a stress tolerant, well operating market (food chain) where the government can directly intervene through control regulations and indirectly can or could intervene through knowledge management.⁶⁵

Besides the government and producers consumers play a strong part: besides authorizing the government to represent its interests strongly influences the market by controlling demand. Consumers make their choice primarily along costvalue preferences – although the current Hungarian consumer cannot define value and therefore their decision will be dominantly on price. This situation can be changed by supplying information, help can be offered to the consumer how to define value to them.

To improve the food chain safety situation a lot is to be organised around information and knowledge according to the previously told arguments, therefore one of the keys to food chain safety is to be found in information society (**knowledge based society**). This society includes the entrepreneurs, authorities, consumers, politics, media, namely all actors. The possibly highest level of knowledge should be supplied to all groups to improve the level of food chain safety. This means that an overall „societal knowledge management” is necessary, where this society includes the state also in this context.

Societal knowledge management is: **data, information and knowledge mutually and**

transparently distributed, furthermore an increased communication among all stakeholders. This is the only possibility to prevent risks and to efficiently manage the challenges of a more and more complex food chain.

In everyday practice this means such interventions that e.g. to enhance good hygienic practices to producers, authorities to execute effective controls, consumers use adequate cooking practices, users correctly apply pesticides, politics to define adequate regulations, science to support identifying new hazards, media to report objectively, etc.

What does this all mean? That in the development of this strategy – but also in the everyday work based on this strategy – extra attention should be paid besides the improvement of traditional food chain risk management to effectively collect, process and distribute information. **So it is not only important to do things right** (effective risk management) **but to do the right things** (knowledge management) in order to really diminish risks to acceptable levels.

Basic principles of food chain safety strategy

Actions serving food chain safety are among the most complex tasks of public administration. Accordingly legal regulation and administration cannot cover all possible cases that can occur. Therefore the principles that are considered to be the base of the Strategy and correspondingly the future programs and provisions, are needed to be clearly defined. Throughout the review of the principles of the Strategy we would like to declare

that the Hungarian food chain safety regulation complies with the principles of the EU regulations, however it has to be supplemented according to the Hungarian characteristics.

Comprehensive and preventive approach „from farm to fork”

The safety of food chain products can only be guaranteed by harmonized regulations and control that cover the whole food chain. Elements of the food chain are closely related to each other, thus a contaminated product may affect the entire chain. Clarity of the soil, groundwater and air of the sites, animal and plant species, seeds and propagating materials that mean the biological basis of agricultural production, furthermore the quality and appropriate usage of agricultural input substances (e.g. plant protection products, fertilizers, veterinary medical products), feed safety and quality all together establish the safety of the food chain that has to be followed by hygienic processing and trading of high quality, uncontaminated raw materials. Stakeholders involved in the food chain during their activities need to follow this approach principally through the share of knowledge and wide use of information channels, with special emphasis on prevention. The supervision of food chain has to be organized also according to the above mentioned approach, highlighting the extensive reduction of risks.

Integrated approach

Elements and processes of the food chain cannot be analyzed separately, since all of them have a direct or indirect effect on the quality of the manufactured

foodstuffs or other food chain products. Heterogeneous scientific fields are involved in the maintenance of the safety of food chain products therefore food chain safety have to be analyzed as a complex issue of plant, animal and human health and also as a question of agriculture, food science and technology, in environmental, social and economic context. Accordingly the involvement of all the actors in the knowledge network is essential. In the case of risk management in the food chain not only the safety of the product has to be considered but the protection of agri-environmental quality (soil, drinking water, nature) as well. Food chain safety is a complex system that has to be considered as a network in which food safety, sustainable food production and effects on the environment as well as effects on the environment are all included.

The principles of the Strategy are fundamentally connected to the goals and actions laid down in the National Plant Protection Action Plan (NPPAP)⁶⁶ that was created according to the Article 4 of Directive 2009/128/EC of the European Parliament and of the Council. The primary goal of this Action Plan is the reduction of the risks and effects of plant protection products on human health and environment, and in addition encouraging the development and introduction of integrated plant protection and alternative technologies in the interest of reduction of risks of pesticide usage.

Being consumer oriented

The most important stakeholder of the food chain is the consumer. All activities through the food chain eventually aim to satisfy the claims

of consumers in a broad sense (including end users) and the committed errors endanger mainly consumers as well, either at individual or at societal level.

In connection with the production and consumption of foodstuffs conflicts of diverse interests occur. Among these the protection of the interests of individual consumers (health, rights, economic and social welfare) has an elemental priority – within the frame of acceptable risk levels – and it cannot be subordinated either to economical or to political interests.

Food is a commodity: its production and trade is a profit oriented activity that is realized under the controlled conditions of competitive markets. The duty of the government is to control the food chain and intervention if the behaviour of an economic operator endangers the consumer's health or dishonest practices are followed. Furthermore the broad communication of questions related to the protection of consumers is important in order to allow all of the stakeholders of the food chain to understand this approach.

Transparency and traceability

Food chain safety belongs to common goods, thus in the interest of its maintenance and development the government has to serve public duties. Regarding these duties, development of legal regulations, establishment of the functions of the control system as well as measures and cases respecting the consumers health and interests, it is of essential importance to ensure transparency and publicity. Furthermore it is important in connection with the constitution of the conditions

of community involvement and with the connected preparatory procedures of decision-making.

Principles of transparency have to be implemented in relation to the origin and traceability of food and materials that get into the food chain. Food products are the matter of trust because there is an information asymmetry between the consumer and the producer. This means that at the time of purchase the quality and the safety parameters of the product are not known, and even under scrutiny it cannot be determined. Thus the consumer has to trust the producer, the validity of the statements shown on the product labelling and the credibility of the official control system as well.

This points to the fact that efforts need to be taken for the complete traceability of the food chain namely it has to be guaranteed that the origin of any contamination, infection or any other problem related to food is traceable until the point of origin or from the source until the endpoints, thus until retailers or especially by means of modern IT tools until the consumers.

In the case of harmful event, only an effective traceability system can ensure fast and effective intervention, which is primarily aimed at the safety of the consumer, besides it can result in the protection of the reputation of a business operator or many times the national economy.

Well established scientific background

Humanity had empirically discovered and handled food safety through thousands of years. Food production and consumption was mainly locally organised, only some products were involved in international trade. By the beginning of the

3rd millennium, growth of the international food trade, occurrence of new technologies and new pathogens, furthermore rapid changes in the sociological factors of food consumption created new challenges to humanity, accordingly an effective solution can only be achieved by the use of consistent tools of science. In the interest of these goals the establishment of an effective control system is exceptionally important for the screening of known and unknown hazards, in which also laboratories play a key role.

In Hungary in the regulation of food chain safety the internationally accepted methodology of risk assessment is recognized as appropriate and it will be applied also in the future. Concerning the operation of the sub-systems associated with risk analysis – risk assessment, risk management and risk communication – professional independence has to be vindicated. However closely integrated co-operation of the mentioned fields is required for the sake of reactivity, well supported decision making and efficiency of prevention. Beyond the resources of the organization, in the case of the foundation of control activities in the food chain, expertise of recognized scientific associations has to be resorted creating partnership both in the field of research and innovation.

Precaution and extended responsibility in the food chain

In the cases when the possibility of endangering health is at stake, but the available information is not enough to assess the level of the risk, the precautionary principle has to be followed. During the application of new and more and more

complex production and logistics systems, the complexity of the food chain is being intensified. It is often accompanied by the increase of the number of uncertainty factors. According to the precautionary principle, in case of suspicion of risk, when appropriate information is not available it should be assumed as a serious risk.

Therefore all stakeholders in the food chain have a strong responsibility to act with utmost care in their own competency with regard to food safety. This responsibility exceeds the requirements of regulations and official controls.

Besides the principle of prevention, emphasis has to be given to appropriate reactivity, i.e. all actors in the food chain need to be prepared for both expected and unexpected events and must be able to manage risks fast and effective, and also to mitigate possible losses.

It is the responsibility of the companies to recognize their elemental interests with regard to the health protection of customers. For instance self-control, recognition and adaptation of good practices, creation of risk management scenarios, application of the precautionary principle and systematic monitoring of professional information, attitude of consumers and scientific achievements.

It is part of the extended responsibility of the government to strengthen the role of prevention and to seek contact with companies and non-governmental organizations for the effective communication of food chain safety information, furthermore to contribute to the development of the responsible attitude of the business operators and to make consumers aware. It

is also the responsibility of the government to enforce the principles of Community decision-making, to establish international relations and to strengthen the advisory and societal service nature of the control.

The self-control systems of the businesses that are controlled by the authorities are complementing comprehensively the official control system. The development of these systems has to be carried out by the government and the companies, jointly.

At the same time the responsibility of consumers have to be emphasized. Because of the food chain that is becoming global, the increased volume of commodities, the growing product differentiation and the dynamic changes of commercial channels have all lead to apprise the value of aware consumer attitude so it becomes one of the important parts of the food chain control. In the quickly changing economies the consumer is the first actor who encounters new phenomena, so precaution and awareness (including preparedness to some extent) furthermore openness towards the authorities and companies and the ability for cooperation can efficiently contribute to the reduction of the risks of food chain safety.

Comprehensive risk approach

To reach the main target it is necessary both to establish the principles of a knowledge based society and to manage the risks of food chain safety. For this, it is indispensable to define and list the hazards and risks affecting food chain safety in order to determine clear goals.

Hazard and risk

The detection of more and more types of contaminants is getting possible thanks to the development of laboratory techniques even in smaller quantities. Practically there is no food chain product in which no contamination can be found and there is a certain risk involved in consuming, using such a product.

Although regulations that are in force do define the concept of risk (according to the previous definitions: „risk: the probability of the consequence of a health damaging effect caused by a hazard and the severity of that effect”⁶⁷, namely: risk = severity of the health hazard x probability), risk as an expression is applied both in the Hungarian and in the international professional phrasing extensively. The mentioned application is followed in the frame of the present Strategy since we do not want to limit ourselves solely to the health effects.

Food chain safety risks

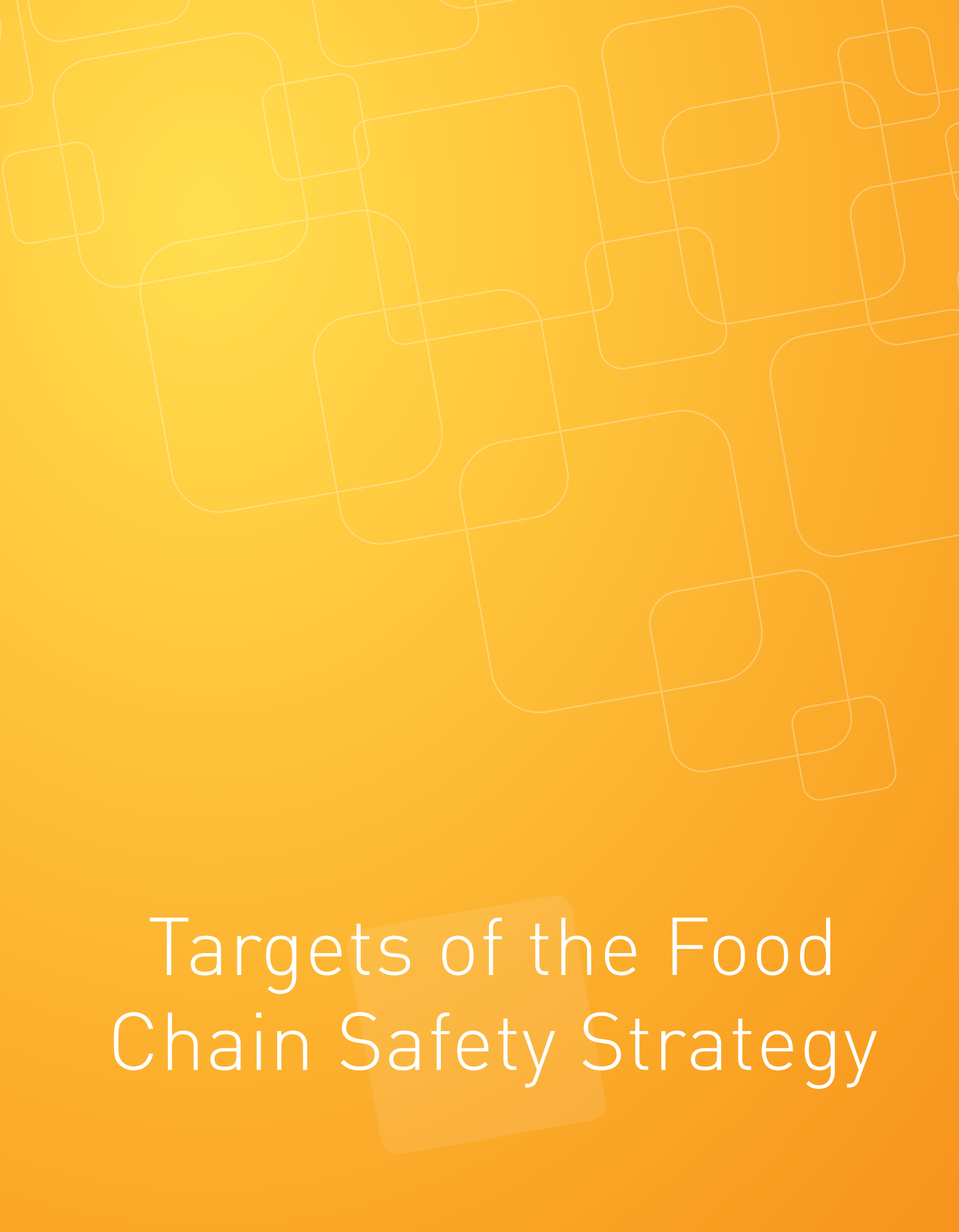
The traditionally health oriented approach to classifying hazards and risks is worth to broaden with other aspects. The risks associated with the food chain – as previously considered – can be classified as follows:

- Human, animal and plant health risks
- Economic (socio-economic) risks⁶⁸
- Environmental risks
- Moral-ethical risks⁶⁹
- System risks⁷⁰

During analysis of risks it has to be investigated where the risk can appear. Risks can appear in each individual elements of the chain, according to the definition of the food chain: in the product, in the process, at the stakeholders or in the whole system (network).

This strategy intends to take into consideration all of the aspects with the risks listed and their place of occurrence.

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- ⁶² Knowledge Management is an organization of all activities to acquire, use and distribute knowledge (OECD, 2005, The Measurement of Scientific and Technological Activities: Guidelines for Collecting and Interpreting Innovation Data)
- ⁶³ FAO's Strategy for a Food Chain Approach to Food Safety and Quality: A framework document for the development of future strategic direction: <http://www.fao.org/docrep/MEETING/006/Y8350e.HTM>
- ⁶⁴ Growth, Competitiveness, Employment – The Challenges and Ways Forward into the 21st Century. White Paper, European Commission, Brussels, 1994
- ⁶⁵ In the area of food chain the government has law enforcement functions. This does not mean however, that the government would want to control the food chain market. The food chain as stress tolerant network is an important analysis area, but this topic leads us out of the scope of this Strategy, to territories of influencing food security and agricultural policy. Food security and food safety are tied together – among others in the following: the actors in food safety creation and management using knowledge management can influence decision makers to set up a stress tolerant network in achieving food security.
- ⁶⁶ National Plant Protection Action Plan <http://elelmiszerlanc.kormany.hu/download/b/aa/60000/National%20Plant%20Protection%20Action%20Plan%20en.PDF>
- ⁶⁷ Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety
- ⁶⁸ Factors affecting harmfully the economy and the social status of society.
- ⁶⁹ Such factors, that cannot be classified to health, economy or environment, but have ethical, religious or other moral effects i.e. specific animal protection programs
- ⁷⁰ Such risks, that effect the complete food chain as a network and can cause it to fall apart (e.g. deliberate damages)



Targets of the Food Chain Safety Strategy

Targets of the Food Chain Safety Strategy



Food Chain Safety
STRATEGY 2013-2022

Target system

According to the previously mentioned concepts, food chain safety means that hazards present in the food chain are identified and risks are managed by the stakeholders in order not to represent health, economic (and other) risk at an unacceptable extent neither to individuals nor to the society. The standard of food chain safety can be improved by possessing up-to-date, objective knowledge that is applied in

practice by the stakeholders. However not only the role of business operators, authority, consumers and users is involved in this, but also the role of other groups of the society, such as the politics, the media, the science, the education, the professional public bodies, and the professional and civilian associations. Taking into consideration all of these, the concept of the food chain safety risk management can be demonstrated as it follows (Figure 8):

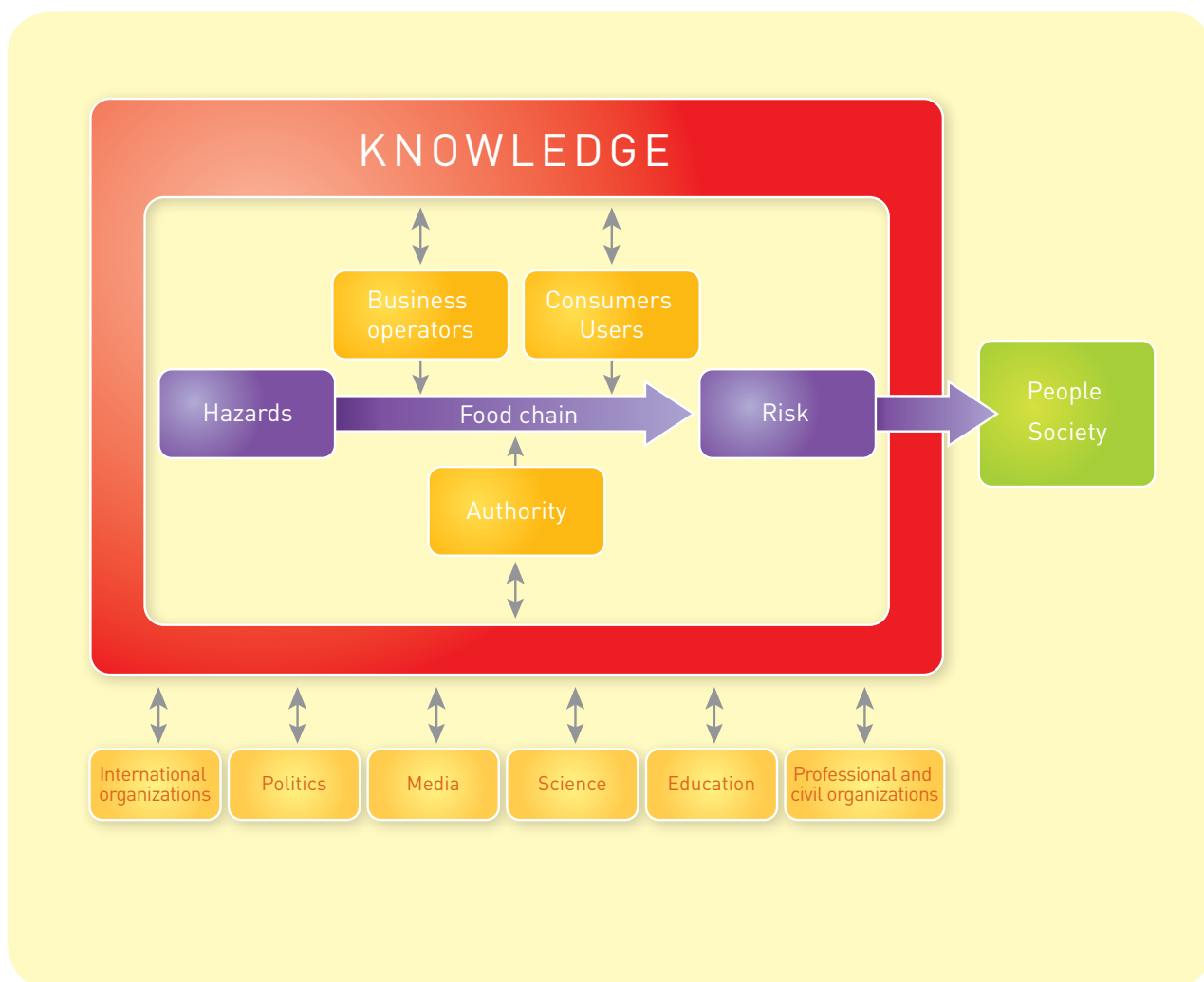


Figure 8. Possibilities of risk management of food chain safety

As it can be seen from the diagram, the enhancement of food chain safety is built up along two main processes. These two processes are the traditional way of food chain risk management (yellow arrows) and the knowledge management of food chain safety (grey arrows). The government inherently has a key role in both. Accordingly the Food Chain Safety Strategy is organised along two target areas which are the Food Chain Safety Knowledge Management and the Food Chain Risk Management.

Role of the government

In order to clearly see the role of the government in the improvement of food chain safety, more precisely in the management of social knowledge and food chain risks, the actors of the food chain and their relations to one another have been identified.

Many actors have an effect on the food chain, but three of them who are identified by the EU regulation of food chain safety, have an important role: business operators, authority and consumers (principally food consumer). With respect to food chain safety, these key roles need to be complemented with the „user“, as a part of the products produced in the food chain (e.g. plant protection products, veterinary medicinal products) doesn't reach the consumers but the users. Besides, science, education, media and politics, furthermore professional, advocacy and civilian associations or professional public bodies have a significant effect as well.

Certainly the actors have different effects and from time to time or from case to case these roles may change. According to the current regulations the business operators are responsible for the safety of the food chain, however the government cannot leave them to themselves. In one hand the reason is the information asymmetry to be reduced by the government on behalf of the consumer. On the other hand, the reason why the government has an enormous role in this field is that it has a constitutional commitment to protect its citizens in all countries of the world. In the field of consumer and health protection not only the assurance of freedom from illnesses, but the assurance of physical, mental and social well being of people – in reference to the previously mentioned WHO definition – has to be included among the duties of the government.

In accordance with the above mentioned tasks, it will be **the responsibility of the government to organize the societal knowledge management along the food chain**. In one hand the authority has – or can have – the most comprehensive objective information on the food chain (not about a particular product – because the business operator holds most of the information about that), the authority is a type of knowledge centre, however at present it cannot fulfil this potential. On the other hand no other actor will ensure the comprehensive sharing of the knowledge, although each actor can be considered as an individual knowledge centre.

At this point apparently a question arises: why does the authority not focus strictly on its tasks connected to public administration (e.g. licensing, control, etc.)? The answer is that, as it can be well observed in developed societies, the traditional role of the authority has been changing. A basic principle is that the authority should intervene at as small extent as possible, should not disturb the operation of the economy, but in the case of intervention it has to be as effective as possible (e.g. by centralized control units.) The degree of authoritative intervention can only be decreased in a well established way if the actors are well trained. This training can be provided through knowledge management.

According to the case studies carried out, among the changes occurred in the past few decades the information explosion was the most significant for us. Information (knowledge) always played an important role in the functioning of the society, but at this time it is becoming even more determining. Beside the previous regulating factors in society (e.g. traditional authoritative actions) it appears in a much stronger and emphasized role.

This is however a double edged sword, as knowledge can only play its regulatory function effectively, if this knowledge is available in sufficient quality and it is available to the widest circle possible. In an information society it can be provided by knowledge centres. In an ideal case the government in virtue of its capabilities is able to play this role regarding to the food chain safety hereby its

regulatory function becomes stronger. In a less ideal situation this role is played by others, and the government accommodates itself to this and it focuses only on the authoritative law enforcement and works within the frame of the regulation possibilities.

I. Target area – Food chain safety knowledge management

That is the mutual and transparent sharing of data and information and the enhancement of communication among all stakeholders.

The process of knowledge management is described differently in the literature, but the descriptions show similarities. In general it incorporates the following elements: **information and knowledge collection (and processing), application and sharing of that.**

I.A. Establishing and operating the knowledge centre

These elements of the knowledge management are covered mainly by the first target area; except the application of the information, that will be discussed in the second target area, the control of food chain risks. For the accomplishment of the second target area on the effective risk management, a high level of knowledge on the hazards and risks is necessary. That knowledge is primarily supported by the scientific risk assessment. If this system will result in a clear and codified knowledge, the authority would be able to become a knowledge centre and by

means of the available knowledge it would be able to organize useful and productive training, information sharing and education on food chain safety. At the moment there are several requirements that are necessary for the authority to become a knowledge centre. Primarily the system of the efficient collection, processing and storage of information has to be organized then the authority has to become competent in the professional analysis of the data and information. A special tool in the collection of information and knowledge is the field of laboratory investigations that has to be discussed separately due to its nature, extent and importance.

I.B. Developing a knowledge network and innovation

In addition it is important to emphasize that all actors of the food chain can be a part of the knowledge network and it is the duty of the government – besides the creation and operation of its own knowledge centre – to harmonize and coordinate the operations of these actors, i.e. the establishment of the knowledge network. Therefore it is not sufficient that the authority becomes a knowledge centre in itself, the establishment of a close cooperation and partnership is necessary. This means on the one hand a more intensive common work with business operators and scientific actors, on the other hand it means the formation of more active public relations with consumers, media and politics. Fundamentally this knowledge network is based on the coordinated cooperation of the individual

actors, but this network connected to knowledge and based on partnership has to be established first.

The cooperation involves a large number of different areas, but the importance of three of these is outstanding because of their influence on food chain safety: thus the tasks of education-training, scientific research and public relations are determined in separate strategic programs.

In consideration of the above mentioned, in the target area of knowledge management of food chain safety the following objectives and programs have been determined:

I. Food chain safety knowledge management

- I. A. Establishing and operating the knowledge centre
 - 1. Global information management
 - 2. Introducing transparent risk analysis
 - 3. Reorganization of the laboratory network
- I.B. Developing a knowledge network and innovation
 - 4. Building the basis of the knowledge network
 - 5. Modern education and training
 - 6. Partnerships in research and innovation
 - 7. Active public relations

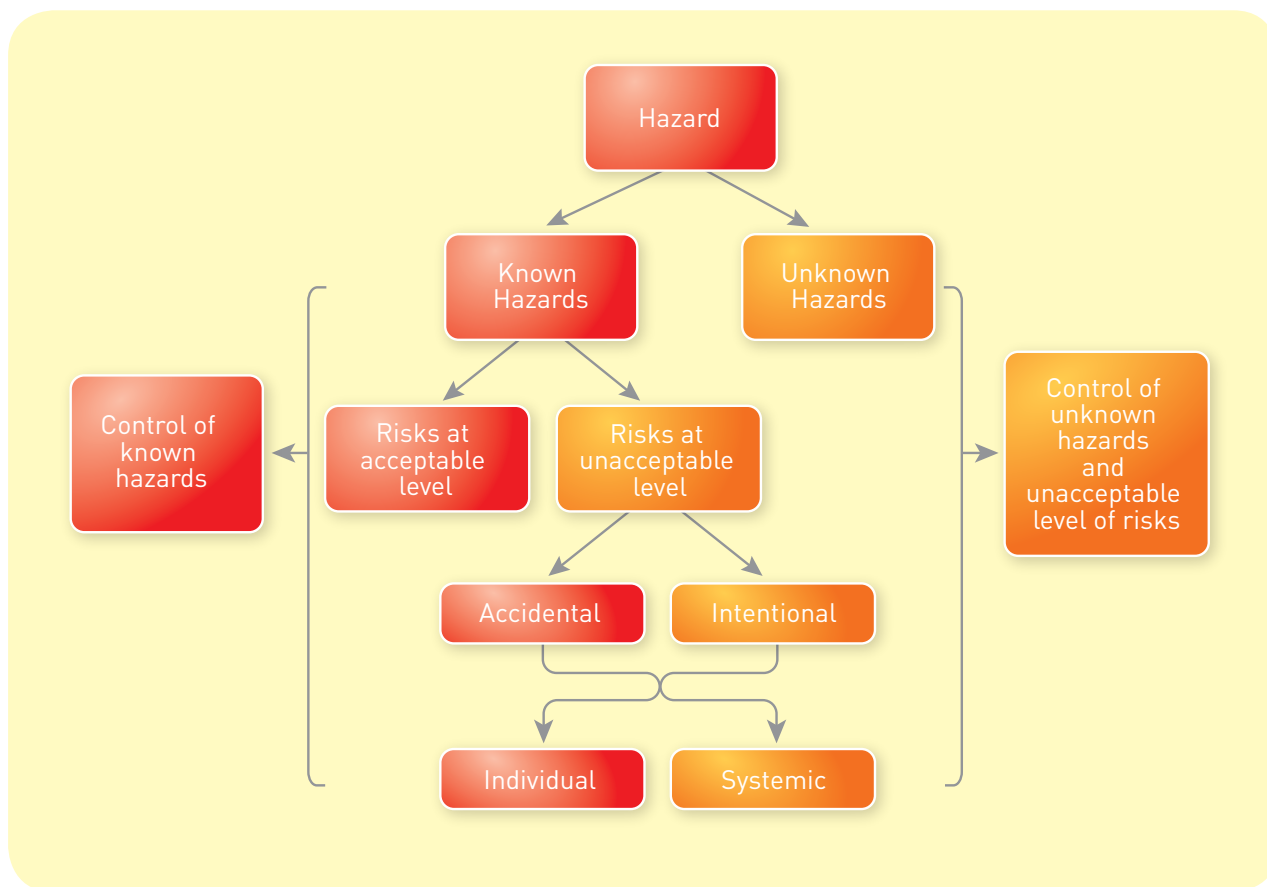


Figure 9. Types of food chain hazards and risks

II. Target area – Control of food chain risks

That is establishing an effective intervention system at all points of the food chain

The certain types of hazards and risks are not detailed previously on the figure demonstrating risk management of food chain safety. In order to be able to identify the objectives, the different forms of hazards and risks need to be analyzed from the food chain safety perspective. The relevant types of hazards and risks from the viewpoint of this strategy are represented in Figure 9. As the figure shows, risk management is fundamentally based on two different characteristics.

II.A. Control of known hazards

It is obvious for everyone, that known risks are needed to be controlled continuously and that their level must be reduced below acceptable limits. Primarily the controlling systems operated by the businesses and the authority are serving this objective.

The effectiveness of the control systems of known risks has to be increased, in one hand by functional changes and by the improvement of the effectiveness of control activities; on the other hand by the extension of professional programs aiming risk reduction to cover an ever wider circle.

II.B. Control of unknown hazards and unacceptable risks

However we must be aware of the limitations of these tools; there will always be cases, where risks cannot be reduced to an acceptable level. Typically such cases are the appearance of new, unknown hazards, intentional abuses such as food adulteration, dishonest trade practices, which basically cannot be prevented by traditional control systems. In this case, a different risk detection approach is needed. The emphasis is on quick action i.e. speed and efficiency will be determinative.

From this it follows that through the second target area, the control of food chain risks, these two strategic goals and the following programs should be defined:

II. Control of food chain risks

II. A. Control of known hazards

- 10. Extensive risk reduction
- 11. Strong and credible authority

II.B. Control of unknown hazards and unacceptable risks

- 12. Successful fight against abuse
- 13. Protection of critical infrastructures

At this level the programs often overlap each other, which is a characteristic coming from the generality and the horizontal nature of them. As objectives are broken down to more detailed targets so will they become clearly separated from another, and overlapping ceases.

However a certain amount of overlapping will always remain, where special attention is needed during the implementation of the Strategy.

The relations of the two target areas, the four goals and the eleven programs that are defined in the Strategy are shown in Figure 10.

THE FOOD CHAIN SAFETY STRATEGY

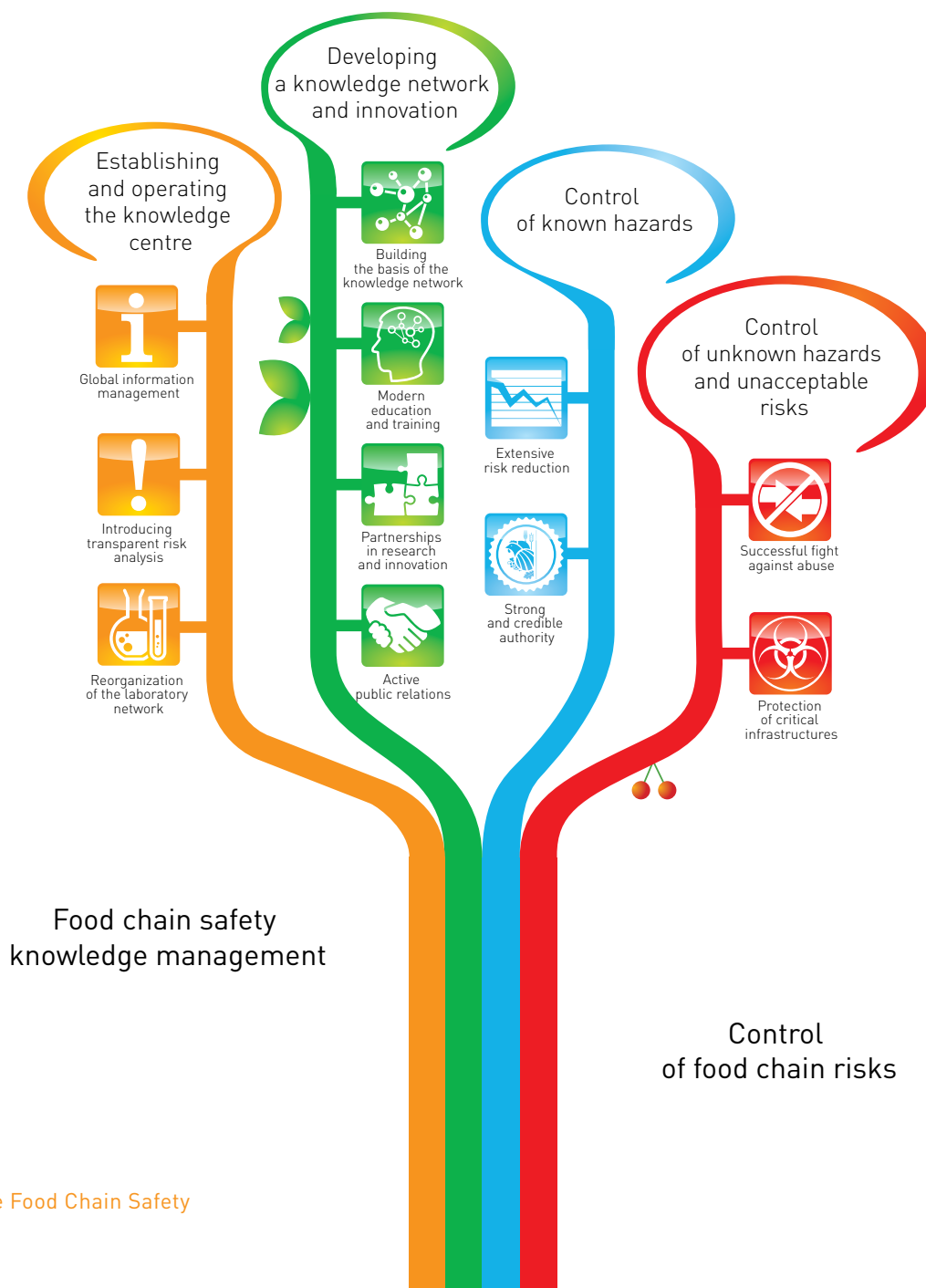


Figure 10. The Food Chain Safety

Programs facilitating the implementation of the Strategy



Food Chain Safety
STRATEGY 2013-2022

I. Food Chain Safety Knowledge Management

I. A. Establishing and operating the knowledge centre

1. Global information management

Comprehensive food chain control information system



The first step of the knowledge management procedure is the information collection and processing. In the present situation the amount of

information is large, it is disorganised and available only in a non-integrated way. In addition rather complex relations can be observed amongst the data and information.

The complexity of the food chain has significantly changed over the past decades. Among the distributed foods the proportion of highly processed or convenience goods is increasing. In the production of these products large number of companies are involved, also when considering a single product. It became also typical that the materials used for production – and often the finished products – arrive from another continent, delivered by several intermediaries to the final destination. This process makes the accomplishment of tasks of food chain traceability difficult, such as collection of data required for risk assessment, recall of products in the case of food safety incidents, prevention of the rapid increase of the number of affected people, and the determination of responsibility and accountability.

The food chain is a rather complex and large network in which it is not easy to access information

and determine relations between the elements of information. The prevention, handling and reduction of the previously mentioned risks, as well as the optimal utilization of limited resources is possible by the constitution and application of a cost-effective **risk analysis system** that covers coherently the whole food chain. For this the quality, availability, timeliness and chain-level interpretability of the data of food chain control and investigation need to be improved by the development of a comprehensive, IT-based food chain control system.

The control system has to incorporate all business operators of the food chain including e.g. family farmers, small producers, primary producers, biomass producers etc., and as well as the details of the food chain safety investigations carried out related to their activities. The establishment, the real-time updating and the assurance of remote access of the database is a key task, as the database is the source of the data that is required for the domestic and international data analysis, planning, that is the basis of the improvement of the food chain safety.

Information available for actors has to be an integral part of the system e.g. information on food-borne diseases, data on infringements discovered together with the tax and customs authority, or even the information gathered by ecological certification bodies performing delegated tasks. In parallel the self-control systems of food business operators, which are integrated to official control system, have to be made more effective and the possibility of joining to the information network has to be ensured for them. Besides access and connection

possibilities to the international information systems has to be established as well.

Setting up of an extensive database of food chain actors mentioned above makes it possible in the future to introduce more comprehensive certification systems compared to the currently existing ones, which will be able to help consumers in orientation. On the other hand, the completeness of the system gives the companies a chance to handle a significant part of their administrative tasks in a uniform, mobile and electronic way. Besides of these, although it is less challenging from IT development point of view, but it is of a great importance by its role to strengthen the electronic content delivery service functions, as nowadays these are indispensable components of the setting up of the knowledge network.

In addition to the collection of data related to the food chain, emphasis has to be put also on exploring relations between data: researches on the food chain considering it as network facilitate actions that make the operation of the food chain more transparent. Thus these researches contribute to the enhancement of our country's defence capacity and the effective functioning of the food chain safety risk analysis system. Therefore the Strategy supports those types of researches and in parallel it prepares the food chain control body for the reception and appropriate processing of such information.

In the course of the system development special attention is needed to be paid to sensitive data stored within the system (data classified as a state secret, sensitive from national economy point of view, or assigned as confidential data), thus it

must be ensured that the information system is independent from other systems. Since these data provide guidelines when disasters occur, e.g. input for handling of animal epidemics, such IT solutions have to be chosen that are able to guarantee the continuous functioning of the authority even in the case of the break-down or dysfunction of other systems.

Planned actions:

- Establishment of centralized food chain control information system and database (IT-based system; electronic content delivery service function)
- Connecting data of other authorities, control bodies and self-control systems of food business operators to the unified food chain control database (data security and independence)
- Implementing certification systems for better consumer orientation
- Supporting research with regard to the food chain as a network (identifying relations between data; network research; data mining)

2. Introducing transparent risk analysis

Application of elements of the scientific risk analysis in the food chain as a whole



As it was formulated in the previous program, the **reinforcement of the risk analysis system with special regard to risk assessment** is

very important. Risk assessment incorporates complex toxicological analyses, epidemiological surveys, and the analysis of consumer (user) patterns, exposure and environmental impacts. Therefore risks in the first instance can be assessed via research, while decision making process appearing during risk management can be supported by the improvement and application of scientific knowledge, and by the operation of databases. Scientific risk assessment assumes evaluating questions with regard to human, animal and plant health, food and consumer science, environmental and economic issues in a parallel and integrated way.

The risk-based monitoring and sampling principles need to be extended to the entire food chain in order to ensure evidence-based scientific work for all items of the food chain control. It may guarantee the effective control of the food chain safety and the definition of priorities based on professional bases. Besides this the occasional restriction of trade, in order to protect the Hungarian population's health, can solely be justified by properly functioning risk assessment that is based on facts and scientifically supported conclusions. In addition to provide the required input data also the

authorities' ability in processing and analysing data needs to be strengthened. The regular professional analysis in this area is continued to be provided by the control authority of the food chain, in the future though it should strive for building partnership with scientific organizations, professional and civilian associations, professional public bodies and partner authorities.

It is important that these risk analysis systems are **formalized and transparent**, as well as the analysis has to incorporate the whole food chain. Also capacities need to be built up to ensure that the **analysis can take into consideration factors that are not fully identified yet, such as socio-economic, environmental, moral-ethical and system risks**. It is also an important objective to organize the collection and analysis of data derived from the food chain, as well as the collection of **consumer (or user) data** related to foodstuff and food chain products, since these data are required for the exposure assessment of the human population (or the animal and plant population). Currently these data are not available in the required quantity, quality and distribution.

The **independence** of the risk assessment from the actual political, economical and other interests has to be ensured by strict and transparent procedures that apply independency as a special issue and **quality management system** certified by a third party (external auditor).

The risk analysis system has to be prepared for the application of data analytical methods that are different from the former ones, such as network science, data mining, game theory, sociology, psychology, decision theory. Furthermore this

system has to be prepared for the applications of other scientific fields as well, not used and not discovered by analytical and modelling systems connected to the food chain safety.

The **continuous monitoring and analysis of consumer's behaviour** serves effectively the better understanding of the food chain safety situation. Information related to consumer's risk perception and risk communication that are connected to both traditional food chain safety risks and exceptional incidents facilitate the process of making the prevention-based food chain control activities more effective and help the establishment of targeted actions.

Planned actions:

- Development of a modern food chain risk analysis system (executing risk analysis through the entire food chain; identifying socio-economic, environmental, moral-ethical and system risks)
- Collection, processing and analysis of data derived from the food chain (partnership with other authorities, professional public bodies, professional and civil organizations and scientific associations)
- Collection of consumer or user data of food chain products, analysis and monitoring of consumer behaviour
- Introduction of quality management and certification systems for food chain control risk assessment processes (quality management of risk assessment certified by a third party)

3. Reorganization of the laboratory network

Integrated and up-to-date laboratory network



The optimization of the laboratory network (well established and standard examinations) that provides the foundation of national and Community professional decisions and viewpoints has been planned for a long time.

National laboratories have to be prepared for the control of permanently decreasing threshold limits as well as for the analysis of the more and more frequently emerging novel contaminants. The official laboratory network is an essential element of the Hungarian food chain control that is certified (accredited) and possesses the appropriate professional skills. Test results provided by this laboratory network are the basis for administrative procedures, and at the same time produce data for the whole process of risk analysis. This network has to cooperate with private laboratories as well as with research and educational institutions.

The laboratory network of food chain control has been impacted by significant changes in the recent years and decades. Establishing the central competent authority in 2007 initiated an integration process, and then – due to compulsory job cuts – a significant number of laboratories were closed and tasks were rearranged. Currently 29 accredited laboratories are operated by the NÉBIH at 25 locations, with all of the disadvantages of the segregation. The collection of samples necessary for the tests

and their transportation to the laboratories are not uniform processes, they are often poorly coordinated and not effective. Currently an average amount of 900 000 samples are examined at the laboratories of the NÉBIH that represents approximately 2.5 million tests, target parameters and analyses. In addition these laboratories perform national reference laboratory tasks in 57 fields as well.

This heterogeneous laboratory network – even in short term – needs to be made **cost-effective** through the **rationalization** of operations (chemical and equipment supply, sample transport, quality control), through the **development of a modern instrumentation**, and it has to be made **transparent** by the pricing of the laboratory work. In addition it is necessary to **optimize the sampling system** at both planning (optimal utilization of laboratory capacity) and execution level: collection of samples required for the testing based on annual sampling plans has to be dedicated to sampling experts appointed for these purposes.

The reliability and **accreditation** of the laboratory and the testing methods are important legal and methodological questions in the case of food chain events, crisis situations and emerging risks. There is a need for the development of an accreditation and regulatory framework that is more flexible and logical than the present one and allows in special cases the extension of accreditation as well as in the case of reliable test results the extension of the accreditation interpretation of the applied matrices and/or methods. The current system is inflexible, the

necessary changes and developments can only be performed in a difficult and time-consuming manner. From this perspective the accreditation confirming the Trichinella test system has a special status and the implementation of flexible accreditation criteria system in Hungary is indispensable.

In the field of food chain safety professionals performing different laboratory and administrative tasks need to **communicate quickly and constantly**, as the control of food chain is not feasible without having close cooperation between these professional fields. Besides the routine tasks the coordination of emergency situations (extraordinary food chain events) and the management of crisis situations are not sufficiently rapid and effective in the current geographically dispersed system.

In addition, the significant segregation of laboratories, the obsolete instrumentation and the lack of capacities (both in infrastructural and professional perspective) do not enable the participation in major **international grants**, nor the foundation of extensive **research work**.

Beside the abolition of the segmentation it is important to highlight that the regional laboratory network has the advantage of building a direct working relationship with local producers and retailers due to its presence on the spot. Thus these centres are not only involved in the control and sampling, but also in the establishment of knowledge centres as well as in the connection of the business operators and the consumers to the knowledge network and in the improvement of the quality.

The long-term target is the creation of an integrated, up-to-date, high-class and new facility network (with central and regional sites), which is suitable and worthy to perform the multiple tasks of the national reference laboratory, and is able to effectively help the control activities and enables the successful participation in research and investigation programmes.

Planned actions:

- The development of high-class and new laboratory facilities (with central and regional sites) within the food chain control body.
- Rationalization of the operation of the food chain laboratory system, pricing the laboratory work (modern instrumentation, cost-effectiveness)
- Optimization of the sampling system of food chain control (including the planning and implementation level as well).
- Development of a more flexible accreditation and regulatory framework for crisis situations.
- Participation in international research and investigation programmes (continuous method development and research).

I. B. Developing a knowledge network and innovation

4. Building the basis of the knowledge network

Introduction of the principles of knowledge-based society by the partnership, mutual information sharing and education in reference to all actors of the food chain



As it was mentioned previously the actors of the food chain can be perceived as individual knowledge centres and it is the responsibility of the state to get these actors aligned and to coordinate them, i.e. to establish the knowledge network or at least to facilitate the creation of such a network. It is not sufficient in itself that the authority becomes a knowledge centre; in addition the creation of a closer cooperation and partnership with the actors is needed. The main focus of this program is on the cooperation, partnership and mutuality.

One of the key elements of the program is to evolve **strategic cooperation and partnership** with various actors of the food chain. Obviously, from this perspective the most important actors are the **business operators** (including primary producers, producers, processors, traders and catering sector), as well as various professional and civil organizations, **professional public bodies (chambers)**. Businesses have to be encouraged by applying proper incentives, providing information, and by developing clear, unambiguous and feasible requirements. The cooperation should include also the development of industrial best practices and guidelines, which have been successfully applied

in some areas already. The role that professional associations play in training businesses, tracking changes, organizing trainings and courses and in information sharing needs to be strengthened. Besides it is also a target to build up a higher level of integration with the civil organizations: more interactive role should be defined for these organisations.

Support has to be provided to small- and medium-sized businesses operating in possession of the essential basic knowledge, for the development and implementation of internal food chain safety systems that can be operated easily. This support will be provided in cooperation with the Short Food Supply Chain (SFSC) European Agricultural Fund for Rural Development thematic sub-programme.

The Short Food Supply Chain (SFSC) appears now as a recognized development policy objective in the EU aid budget 2014-2020. The EAFRD (European Agricultural Fund for Rural Development) gives the opportunity to the member states to develop particularly important special programmes that are the so-called thematic sub-programmes. The development of the SFSC has been chosen by Hungary. The short supply chain “means a supply chain involving a limited number of economic operators, committed to co-operation, local economic development, and close geographical and social relations between producers, processors and consumers”⁷¹ Therefore the reasoned and well-planned development of the SFSC fits well into the food chain safety strategy, since on the one hand it may be important in raising social consciousness regarding foodstuffs, on the other hand the

numerous and regionally not concentrated actors can pose serious challenges to the authorities in respect of their control and knowledge sharing tasks. Due to these the NÉBIH assumes an active and leading role in developing the SFSC thematic sub-programme and intends to coordinate also the implementation of the programme in the future.

Along with the objectives formulated in the target area of “Establishing and operating the knowledge centre” it is also needed to be fostered to build up an intellectual centre, which can provide information to small- and medium-sized companies on questions related to legal requirements and to professional, technical or other problems (beyond the fundamentals), as well as to clarify who can be contacted in case of further questions. On the other hand it is important to organize forums where business operators have the opportunity to ask questions and receive valuable answers to them.

The authority responsible for food chain control shall also establish partnership with **other organizations maintained by the state**, as the National Tax and Customs Administration (NTCA), the police, the Research Institute of Agricultural Economics (AKI) , the Central Statistical Office (CSO) , the Central Environmental and Food Science Research Institute (CFRI), the research centres and institutes of the Hungarian Academy of Sciences, the National Agricultural Advisory, Educational and Rural Development Institute (NAKVI) , and last but not least the Agricultural and Rural Development Agency (ARDA). The Hungarian Government has been decided to implement the 4th medium-term consumer protection policy and to execute the action plan of the agreed governmental action (consumer

protection policy) for 2014 as per the Government Regulation 1011/2012 (I. 23). In order to facilitate the realization of these objectives, the official controls executed by the authorities responsible for consumer protection have to be harmonized, furthermore the best practices of public bodies performing consumer protection tasks have to be known and applied in different sectors. A major linkage with the human health sector is food-borne illnesses. In order to prevent and combat the food-borne illnesses the detailed definition of the tasks of authorities responsible for food chain control and health care is indispensable.

Key area of the strategic partnership is the **joint research and development activities** of the state and the industry. In one hand ensuring tender opportunities **could** make the **latest results of researches and new technologies available**. On the other hand the possibility of financing researches has to be ensured for small businesses and in the case of sectors with higher demand of resources joint state and industry research and development possibilities has to be offered. The **involvement in international basic researches** and the participation in the available programs of the Horizon 2020 have to be emphasized; however also the internal incubation preparation has to be encouraged for this.

From the aspect of the development of knowledge networks it is crucial to get the domestic food chain actors linked to the **international knowledge networks** and the enhancement of the international presence as well. In one hand this is the only way to ensure the access to the latest technical information, on the other hand the international

cooperation makes the discussion of different view-points and information possible. The unified approach and organization of food chain control allows the representation of Hungary's interests in international affairs related to food chain safety. By the enhancement of the judgement in the EU's decision-preparation and decision-making processes and by undertaking a more active role than the present one the international estimation of the Hungarian food chain control can improve; the national interests can be better represented. Circumstances are – at least theoretically – given: the European Commission intends to standardize the legal regulation of the whole food chain from farm to fork.

In addition cooperation has to be developed and actively maintained with **various bodies of the EU** (DG SANCO, EFSA, etc.) as well as with **other international organizations** (FAO, WHO, ECDC, OIE, etc.). It is also equally important to establish close cooperation with **foreign partner institutions** and authorities, to enable mutual information and knowledge sharing, to exchange experience and best practices, to apply joint control and to use common international databases, as well as to start research. In this cooperation diverse collaboration projects with partner institutions has to play an important role as well.

Planned actions:

- Strengthening the strategic cooperation and partnership between business operators, professional and civil organizations, professional public bodies (chambers) and organizations operated by the state.
- Developing industrial best practices and guidelines to facilitate the application of the best available technologies and to distribute best practices.
- Help to develop the food chain safety self-checking systems (supporting the building of voluntary traceability and quality systems)
- Ensuring the connection to international knowledge networks and the involvement in close cooperation with foreign organizations (DG SANCO, EFSA, FAO, WHO, ECDC, OIE, international partner institutions, etc.)

5. Modern education and training

Mutual knowledge sharing



Based on the previously mentioned information, the creation of food chain safety is a complex challenge, which – partially – can be achieved through the implementation of an integrated educational-training-informative system that is scientific based, takes the experiences of risk assessments and food chain control into consideration, and uses multiple tools targeting wide range of society. To achieve this, even the allocation of EU resources needs to be carried out with prudence, because adequate financial assets are necessary to develop themes, to elaborate new curricula, to build up the integrated system and to share the knowledge.

Education of children

At least 70-80% of food-borne illnesses – according to official data – occur in households due to non-compliant food hygienic conditions, therefore with proper information distribution and by changing consumer habits this could be avoided. In the development of consumer behaviour, skills and attitudes acquired in the childhood play a crucial role. Considering this information gathering about food chain safety should be started already **in the nursery and in the kindergarten**. It has a dual purpose to address this topic to children in an early period: in one hand we then speak directly to the children, on the other hand through this age group also the parents, i.e. the adult society is easier to reach. The heterogeneity of the society is mostly

represented in the pre-school generation; it is maybe the kindergarten where the underprivileged ones cannot keep up with the others, for some children it is often the first encounter with the need to wash their hands before eating. Pre-school education needs to be carried out in a playful and joyful manner.

For the primary school the **food chain safety topics have started being included in the National Core Curriculum** and will also get integrated in particular curriculum frameworks. In parallel it is necessary to develop a **single module for the food chain safety**, in order to match the one school day concept. It is an important aspect when designing the module that each part should be usable as background material for other courses as well (chemistry, biology, natural sciences, environmental studies, techniques, lifestyle and practice), as well as to adapt them independently in the course of extracurricular educational sessions. In this area it is important to build up cooperation with nutrition and environmental science and also with certain objectives of the consumer protection policy. Students need to be addressed not only as consumers but also as potential future food business operators, researchers, etc. In order to ensure food chain safety trainings are effective, **teachers must be given the opportunity to acquire an up-to-date knowledge** in the framework of the regular tertiary education or trainings.

Secondary education

Fewer and fewer young people think there that are good opportunities in the Hungarian agriculture and food industry. As a result the majority of

students applying for admission for vocational education arrive with low motivation and the minority of professionals who are dedicated enough to graduate are instantly looking for opportunities abroad. In the various industries of food chain are therefore a lot of low-skilled or unskilled workers working and high fluctuation can be observed. This jeopardizes not only the quality policy objectives of the national food economy but also poses direct food chain safety risks.

The previously mentioned programs aiming at the education of the children must be continued in secondary schools as well. However the **vocational school system in the food chain safety area should be established in a more concentrated way**. The technological equipment at each training location can be kept up to date this way, corresponding to industrial practice or even at a higher level. As part of the knowledge network the technologically advanced training locations can contribute to the further education of professionals doing **consultancy work** and working in the industry (**lifelong learning**). In order to decrease burden to food companies, it needs further investigation how the vocational schools can get involved in **providing the essential basic knowledge** to people working in the food chain ensuring they are aware of food hygiene. There is a need to **assess and review the professional level of textbooks** and notes used for educating and training people working in the food chain production, processing, trading, and catering area. As professional associations know the market demands well and are recognized by the state, they should be given more influence in the periodic reviews of the curriculum.

Higher Education

In the agricultural higher education it is in general a problem to get the successful and exemplary well-prepared professionals involved in the education system. However, it is even more important for academic teachers to acknowledge their **teaching and research activities on an international level**. According to this the relevant requirements need to be better defined, as well as the prerequisites must be provided for the educational work and employment of teaching staff.

The number of institutions providing **higher education in agricultural and food science** has considerably increased in the last 15 years. This resulted in the particular institutions seriously competing for the students, which competition unfortunately refers to quantity, but not quality. Due to the constraints of the funding mechanism it is really hard for the institutions to formulate real quality standards regarding their students. In distributing the research and development funds it is also a disadvantage to manage a large number of parallel trainings, which can lead to the fragmentation of resources. This does not allow establishing efficient knowledge centres, which would be able to provide the food industry with strategic functions. With the **establishment of three or four education centres** the currently available material and intellectual resources could be concentrated, which would result in having real university level engineering studies in place, with this to guarantee a higher level of theoretical knowledge and depth in sciences. Other institutions on the other hand should strive to provide the industry

with the required engineering trainings that are more practical than the current BSc courses.

The **higher education system of plant protection** needs further review, with special regard to how the general agronomic knowledge and latest scientific findings are incorporated in the practice-oriented and integrated trainings. The possibility of implementing an undivided, five-year MSc course in the education of doctors of plant protection should be considered. It needs to be ensured that there are highly qualified professionals with food chain preference educated and trained: the environment-friendly use of renewable natural resources, as well as applying the integrated plant protection as an integral part of the technology are key areas of the entire production process.

In the case of **veterinary education** which is closely linked to the food economy there is only one institution in the country, and this facilitates the concentration of the know-how. However it can be observed that while the veterinary education at clinics has moderately developed (in line with the economic situation of the country); the educational system related to livestock and food production has not changed. The lack of adaptation to the new circumstances is indicated by the fact that the majority of graduating students is turning either to the pet or equine medicine; there is no perspective for them to get involved in agriculture. Given that certain tasks of the food chain control can only be performed by veterinarians, it is especially important that vacancies due to retirement or other reasons for leaving of veterinarians are to be filled only by veterinarians. As there have been no professional successors of those retiring from

the regional veterinary society, this has led to a total aging process; experts consider the current system being sustainable for the upcoming 5 years at most. Forceful measures are needed in order to start influencing these processes in the higher education already; for this it is essential to **approach practical needs, to explicitly strengthen the food chain approach and to improve veterinary students' skills in food chain safety, public administration and management.**

In health care, i.e. in the **medical education and in trainings for health care workers** it is of great importance to learn the scientific basis and practical aspects of food chain safety, to acquire new information and to keep the knowledge up-to-date. It is essential in the early diagnosis of food-borne illnesses, in investigation of human part of food poisoning and food infections, as well as in providing consultancy to groups with increased health risk. Therefore **human health care and veterinary education must be better synchronized**, and the **scientific and practical cooperation** of the representatives of these two professions needs to be supported. Similarly it would be advisable to **synchronize the curricula of veterinary, agricultural and food engineering education** in the food chain safety area.

Also progress needs to be made in the area of training **food chain control professionals**. One of the most important requirements of executing official controls is the uniform approach. In the food chain control area professionals are working with different educational background, qualification and professional experience, such as veterinaries, human physicians, food engineers,

plant doctors, agronomists, horticulturists, etc. In order to implement an effective food chain control it is necessary to ensure that the professionals at different level of education are trained on a **regular, uniform and structured way, both on basic and advanced studies**. Only this way is expected to have a consistently high quality control work with same approach in place across the country.

Training system

Due to the continuous and dynamic development of knowledge regarding food chain and owing to the expansion of knowledge material, the previously acquired knowledge becomes insufficient over time, and the constant, lifelong learning (LLL) becomes inevitable. It concerns all actors of the food chain, including companies dealing with food chain, authorities, science professionals, whose up to date qualification and professional skills become a necessity today. The conditions for lifelong learning need to be created for the professionals involved in the food chain, with this ensuring that in different training systems in the food chain safety area ie. from the primary school on to specialized secondary and higher education and finally as part of postgraduate school-based and non-school-based trainings a coherent and up to date knowledge level should be developed.

Planned actions:

- Education of the most important consumer, hygiene and food chain knowledge for children going to nursery or pre-school (development of thematics; expansion of the National Core Curriculum; execution of basic and advance trainings for teachers)
- Transformation of the vocational schools' system in the area of food chain safety, their operation as advisory centres, periodic trainings of those working in the food chain (involvement of vocational schools in basic skill trainings; supervision of textbooks and notes; creation of conditions for practical trainings)
- Facilitating the introduction of food chain approach in specialized higher education (supervision of plant protection trainings; enhancement of public and food chain safety preparedness in veterinary trainings; coordination of human health and veterinary education)
- Integrated basic and advanced trainings for food chain control professionals (creating conditions of training system)

6. Partnerships in research and innovation

Introduction of a knowledge-based society's principles through an active and scientific food chain research network



The questions related to the food chain safety raise more and more scientific problems, which should be in any case answered in order to ensure

the long-term safety of the consumers of Hungarian foodstuffs and the competitiveness of the food industry. For maintaining the food chain safety both in the European Union and in Hungary the risk analysis methodology is being used. One of the fundamental principles of the risk analysis is the science-based risk approach.

The greatest global challenges of the 21st century may have intensive, in some cases adverse, in other cases unpredictable effects on the food economy and also on food and feed safety. The global environmental and climatic changes lead to the spread of new pathogens, for example, new pollen-producing weeds with allergenic effects and molds producing mycotoxins.

New technologies are developed (for example the methods of modern biotechnology, nanotechnology, cloning) in which new foods and new methods of diagnosis are evolving. These tools appear to be promising in many ways; however, they represent new challenges in the food chain safety. Among the risks we can find those as well that are known for several

generations, however yet causing a multitude of diseases each year.

In the field of **food chain research, development and innovation** there is a need to build up a partnership between the parties, and the coordination and facilitation of this – due to the required access to resources, information and professionals – should be ensured by the state.

Involvement in basic research which are useful from the sector's perspective

In all areas of the food chain safety it is extremely important not to leave out our country from the international circulation and these international trends would not only need to be monitored, but also some initiatives could be started. This is especially true for basic research: if we cannot become part of international R&D networks, or after a while even driving force of it, we could completely fall behind, and this may result in food chain safety consequences. Thus, the possibility of accessing international research results and conferences must be ensured, one needs to take part in international research projects and in the work of several collaborative networks. It is also particularly important from the perspective that the resources available for basic research are primarily from EU-sources or resources, which are available at international level.

Encouraging applied research usable in practice

Since the Hungarian food industry's resources and capacities do not allow winning the price competition, using the innovation the focus should be transposed on products

and services which are less sensitive to prices. Therefore applied research usable in practice needs to be encouraged (consumer preferences, product and technology development, sustainability, food chain safety, corporate governance, etc). During research emphasis should be placed on sustainable food production and seeking a balance between competitiveness and sustainability.

Technology transfer and knowledge transfer

The vast majority of businesses does not have their own development capacity, and does not know and are not able to use the results of research and development. Therefore it is necessary to develop the effective organizations and operating conditions of the technology and a two-way knowledge transfer (how new knowledge is made available, what information and research is required), in particular respect of small and medium-sized enterprises (e.g. central and regional knowledge centres, development of technology transfer network, dissemination of best practices and research plants, knowledge regarding food chain safety). The collaboration of producers, processors and research centres in developing new products, processes and technologies must be facilitated.

Facilitating the application of best technologies available

A significant number of companies are working with obsolete technology, and their investment resources are dedicated to change the technically unfit equipment and to execute the

most necessary renovations. The technology gap causes a significant competitive disadvantage. It is essential that the companies' developments are not only focusing on keeping the same level, but according to their strategic objectives they acquire the "best available technology" during their developments, which significantly contributes to the improvement of the food chain safety in addition to increasing competitiveness. Therefore subventions and other tools should focus on applying the most appropriate technologies in terms of efficiency, quality, food chain safety, sustainability. Particularly the small and medium-sized companies need to be supported in learning about and choosing advanced technologies through public databases and consultancy.

Preparing for the R&D&I

Our country's vital interest is to participate in the basic researches, as well as to promote the national R&D&I activities. However neither certain institutions nor the state is prepared enough for this. In order to support this, a 5-year incubation period should be launched in order to build up appropriate institutional capacities, skills and competencies and to give sufficient time to the state to prepare for its moderating role. During the incubation period – and also later on – the young researchers engaged in food chain safety can play an important role. Particular attention should be paid to planning the utilization of EU funds, in order to have adequate financial resources available over the next seven years for achieving the above goals.

Planned actions:

- Preparing for the R&D&I (providing incubation period, a network of young researchers)
- Involvement in basic and applied research useful from the industry's perspective (international and domestic research, participation in conferences and joint research and development of industry and government)
- Promoting of basic and applied research useable in practice (consumer preferences, product and technology development)
- Central and regional knowledge centres, development of technology transfer network (co-operation of primary production, processing and research facilities in the development of new products, and procedures)

7. Active public relations

Evolving active public relations (PR) system in the food chain



A healthy diet, healthy lifestyle and gastronomy have become extremely popular topics both in the media and in the public discourse. This positive process should be further encouraged by using the tools available for the state, in order to raise the general level of knowledge about foodstuff, to improve the quality orientation, and to easily suppress the pseudo-scientific products often posing risk to our health. This process also allows presenting to the society in an objective way what sort of consumer and social benefits are associated with the consumption of good quality domestic food.

As it was previously explained, it is not possible to eliminate all risks from the food chain; only an acceptable level of risk can be considered. Basically, the government of a country in agreement with the society must determine depending on the available resources (since it is theoretically not possible to have control over everything!) and on the priority of tasks, what degree of risk is considered acceptable at national level, and what goals regarding public health they try to achieve. This **social dialogue needs to start at an acceptable level of risk**, as this level of risk - in addition to the professional and scientific analysis – is a very important basis of risk reduction programs.

It is also necessary to have an interactive

dialogue in place with consumers in other subject areas, as well as it is necessary to achieve a high level of risk communication, and to ensure that data and information with regard to food chain safety are familiarized. During the food chain safety scandals that occurred over the past decade there was a strong social demand for credible information from a trusted source. It is also important that consumers are treated as equal partners by the authority that responds to requests, considers the public opinions, and assesses their expectations in decision-making situations. The risk assessment and risk management professionals must be prepared for liaising with the media.

In this changed market situation the conscious consumer plays an ever more important role, who as a partner – obviously holding its own interests in mind – gathers information, votes with its money in a conscious manner, and notifies the authorities about encountering non-compliant products. A change of the communicational practice has also been urged by the high rate of home illnesses (and a significant latent part is not reported), and the fact that the family community's capability to share the knowledge about hygiene, proper food storage and food preparation shows a declining trend.

The risk communication activities must be split into crisis communication (official communication of the food chain incidents) and general risk communication (communication related to food-borne diseases, household hygiene, food chain information, conscious consumer behaviour etc. as well as presenting

the Strategy, official activities and expected results).

For the **general food chain safety risk communication and public education** the most important target is the prevention and the reinforcement of risk avoiding behaviour. Here obviously the focus is not primarily on the training of professionals, but to build up a conscious consumer society: make the role of the customer visible, namely that the requirements formulated by the customer (e.g. what and where to buy off the shelf) have an impact on both production and trade.

All of these may be facilitated by ongoing content creation, which attracts the attention of the target groups of certain information. From content creation point of view, feedback and quick response are of high importance. A regular presence on the free media platforms should be pursued (related to interesting news, and periodic press releases, communications reflecting on frequently asked issues). Targeted awareness campaigns may also be an important and cost-effective tool for the improvement of food chain safety. It is also necessary to carry out an annual assessment on the knowledge, expectations and concerns of Hungarian consumers regarding food chain safety. This effectively serves – based on many countries' examples – the purposes of exploring critical points in the food chain safety risk communication that will help to plan the direction of communication for the future. Using the same communication elements also the food chain business operator side should be addressed, i.e. the demand (consumer) and

the opportunity (operator) should be treated simultaneously.

In contrast to above the aim of the **crisis communications** is to stave off the threat as quickly as possible during food chain control events. This should continue being considered as official duty only, and the effectiveness should be improved and methods should be modernized. In alerting the public journalists who got acquainted with the operation of the domestic food chain control system and its actors at previous and for the future planned “civil and journalism trainings” will have an important role.

All this plays a prominent role because in the event of an incident, not only the immediate danger, but the hysteria can lead to serious damage as well. The damage caused by food chain safety scandals on public health and on economy often does not show any proportionality.

The food chain safety risk communication principles

Credibility: Business interests are not allowed to get involved in risk communication, and even the appearance of this should be avoided. The consumer has the right to know the truth in all circumstances. Furthermore, efforts should be made to build up an atmosphere of trust. An important tool of this is to nominate a person for making speeches for the authority who is accepted by the society, professionally trained, certified, constantly accessible for the media, concise and easy to understand when making announcements. With this, damages caused

by information deriving from a less competent source (whether intentional or bona fide) can be reduced.

Clarity: The communication should strive for using a clear and simple language that is easy to understand. If it is necessary to use technical terms, those should be explained. The important new terms should periodically be presented also via educational programs.

Transparency: It should be made clear to citizens and to the media which organizations play what sort of role and what tasks are to be performed during risk management. It is also for the clarity that general public will be informed not only about the launch of some procedures, but also about the accomplishments and the results.

Reflexivity: with the creation of a two-way communication it is essential to properly handle the issues raised by consumers and answer the questions raised by the media the soonest possible. In the absence of this a communication vacuum will be created, which provides a breeding ground for the dissemination of unfounded information, and the excitation of gratuitous scandal.

Community involvement: in policy decisions – wherever possible – it must be ensured that citizens have the right to express their opinion, or via surveys it needs to be mapped which standpoints are present in the society and these should be justifiably considered when making decisions.

Prevention: Tracking trends of food-related illnesses, timely exploration and handling of the causes of the problems are important tasks. In

many cases, strengthening of civil consciousness in a certain way may be enough to avoid a crisis. Prevention is especially important in the food chain safety risk communication area because sometimes serious illnesses causing irreversible damages can be prevented using steps taken in right time.

Planned actions:

- Building Information Systems (building public affairs)
- Dissemination and strengthening of consumer awareness related to information on a healthy, balanced diet, and quality surplus on prices.
- General risk communication on both the consumer and enterprise side (social dialogue on the acceptable level of risk, prevention, strengthening risk avoiding behaviour)
- Ensuring crisis communication in official food chain control events.
- Creating two-way communication (early handling and responding to complaints)

II. Control of food chain risks

II. A. Control of known hazards

8. Extensive risk reduction

Intervention along the whole food chain in order to reduce food chain safety risks



Based on what has been set out in the introduction and when determining the objectives, there is a need to implement a framework program that

defines how agents causing specific food chain risks should be reduced. The risk reduction plans set out in this program are essential for the social dialogue to determine the acceptable level of risk, and to achieve an acceptable level of risk as a result of this dialogue. Risk reduction programs with clear objectives are also important in setting up criteria to measure the changes in the food chain safety.

The „extensive risk reduction“⁷² program intends to reduce risks along the entire food chain and – according to the previously mentioned – aims to deal with not only the traditional health risks. The program is of course closely linked to the „Partnerships in research and innovation“ program, as in many cases certain basic research or diagnostic methods are lacking to start with effective risk reduction programs. Risk reduction includes also the testing of compliance with the legal regulations being in force, for example drinking water used in the processing of products must meet the quality standards in every aspect. This means that in addition to those listed here, all of the efforts to reduce the known risks are part of the program.

Minimizing the risks in primary production is

an important pillar of guaranteeing food chain safety and damage prevention. The starting point of food chain safety is to preserve the quality of the humus topsoil, and one of the key issues is the traceability of the quality of agricultural materials, including seeds, pesticides, yield enhancing substances and of various non-hazardous waste. To ensure this it is important to control the biological basis of agricultural production, such as animal and plant breeds, seeds and propagation materials, as well as the monitoring of the regular use of agricultural input materials, and reviewing the method and frequency of sampling.

In addition to inspection and restriction on production safety threatening elements (deterioration of soil quality and appearance of quarantine pests), to reduce the hazardous environmental impacts to a lowest possible level appears to be an important task along with the effective control over the professional and safe distribution and use of pesticides for the safety of food consumers.

Biological hazards

Management of phytosanitary hazards and risks

For implementing food chain safety it is essential to protect against insect pests threatening the production of plants. This applies to both indigenous and not indigenous species. Pests deriving from other continents are extremely threatening the natural and production environment, as a result of global trade and climate changes the risks have increased considerably in recent times. The focus should be

more on prevention and rapid response instead of current slow responses to the appearance of pests. Pests must be uniform ranked on EU level. Tools need to be improved in order to prevent the occurrence and natural spread of pests. Tools used for distributing products within the EU should be modernized and developed (plant passport and protected zones), and additional resources must be provided in order to apply these. The social demand for both the production and the protection of the natural environment has been increased (“greening”).

Fight against pests that are already known in cultivated plants is essentially based on farmers’ practice and has a direct effect on reducing the use of pesticides. In case of not indigenous pests there is an indirect relationship with food safety, but it is part of the food chain safety. The purpose of the plant health regulatory activities in cooperation with producers is to prevent such pests from entering or spreading, with this reducing the need for applying any further protection technologies, and consequently reducing further chemical loads on products and on the environment.

Another important role of the plant health in the food chain is to ensure that the propagation material used for the production is healthy and pest-free.

In the coming years in the field of plant health priority is on monitoring the **grape leafhopper** (*Scaphoideus titanus*) that is to be blamed for spreading **Flavescence dorée**, reducing the

spread of ***Ralstonia solanacearum* bacteria in surface waters causing potato wilt**, and exploring the causes of the **apricot apoplexy**, as well as keeping the pests (*Anoplophora-species*) threatening our hardwood under control and carrying out targeted control on wood packaging materials’ distribution.

Eradication programs against contagious animal diseases

Over the past years, due to a reduced financial budget there has been also fewer resources allocated for the implementation of eradication programs. However, it is clear that one of the most important factors affecting the competitiveness of livestock production is the health status of stocks available. The more disease-free animals are bred in a country, the more favourable conditions can be achieved in the unified market of the EU and international market. It is a priority that with the implementation and use of an integrated control system the range of eradication programs should be extended and supported also by public funds. The authority’s ability to react should be constantly maintained and crosschecked by performing regular simulation exercises, and should be based on the direct and fully administered chain of command of the chief veterinary officer and deputy CVO. The most important animal diseases – whereby the target is to achieve a free of disease or special status- are the followings: **Aujeszky’s disease, PRRS, IBR, classical swine fever, swine and poultry Salmonella, BSE, brucellosis, bovine tuberculosis.**

Food microbiological hazards

The consistent implementation of **National Salmonella Control Programme** is of high priority. The rate of progress can be tracked with the help of a food chain-wide monitoring program; if necessary, the procedures used in the control programme should be amended. The costs of the National Salmonella Control Programme should not be borne by the farmers, processors and distributors only; the state is also required to provide related budget and financial support in the future.

Taking into account the international experience and trends a **Campylobacter control program** needs to be started along the food chain.

An objective is to rethink maintaining the **Trichinella** free status in terms of responsibility of the farmers and the authority, as well as in respect of the use of potentials of the regulatory environment.

The national laboratory and control systems must be prepared for the **diagnostics of viruses that cause food-borne diseases**, so that it can later provide appropriate inputs to risk reduction programs.

The **protection against the spread of antibiotic resistance** can be achieved via well-coordinated inter-professional collaboration. Targeted therapy, prevention of unnecessary antibiotic usage in medical and veterinary medical treatment, the use of antibacterial agents in the right order and proper treatment at therapeutic doses are essential. The continuous control, testing, characterization of the spread of antibiotic-resistant microbes and resistance-conferring

genes, and the analysis of new threats, as well as the collection of data and the analysis on antibiotic consumption are also required. In 2011 the European Commission published an action plan to prevent the increasing risks deriving from antimicrobial resistance; domestic measures should also be taken according to this.

Chemical hazards

The rules of sampling and the requirements of testing methods required for the examination of the chemical contaminants and **mycotoxins** should be strictly enforced in Hungary as well. It is important to provide the authorities with continuous trainings in order to get acquainted with regular sampling procedures, to practice them and to ensure that necessary legal and practical terms are in place to do so. From chemical food chain safety perspective mycotoxins are of top priority. Three of fusarium toxins, the deoxynivalenol (DON), the F-2 and T-2 can be found in domestic grain products. A significant number of samples are contaminated with DON. The European intake estimates indicate that the presence of DON, T-2 and HT-2 toxins concern the public health. Therefore, the development of reliable and sensitive methods and collection of further occurrence data is needed. It is reasonable to examine fusarium toxins, but emphasis should be put on the examination of fumonisins (fumonisin B1 e.g.), for which very few data is available. Especially at risk are those suffering from celiac and consuming a lot of corn-based products, since fumonisin occurs mainly in corn. In addition, due

to the impact of climate change we need to be prepared for an increasing level of aflatoxins, both in the areas of prevention and diagnostics. The **pesticide residues** may become one of the most important risk factors for the chemical food chain safety, therefore the conformity of pesticides need to be ensured (in terms of accompanying materials, degradation products, cleanliness etc.), along with frequently and high quality monitoring of the compliance of Good Agricultural Practice (GAP) and residues' levels. Beyond the continuous monitoring it is of utmost importance to implement production technology systems that are capable of reducing the risks and impacts of pesticides on human health and on the environment. For this a uniform and integrated production management system should be designed and implemented that keeps the protection of the environment and health in mind, ensures profitability, biodiversity and the conservation of natural resources, furthermore which is of high-quality and produces adequate amount of healthy products. Risks deriving from **residues of veterinary medicinal products** according to results of official tests are low. Substances having anabolic effect have not been detected in domestic food and biological monitoring samples for the last years, despite the fact that the scope of the residues steadily being examined is expanding to meet EU expectations. However, strict supervision with regard to animal health controls and targeted monitoring should continue, particularly with regard to possible illegal or irresponsible drug use, which is a cause for concern.

With respect to metals, especially **cadmium contamination** requires special control and attention, including also the amount of cadmium in fertilizers. This way the soil could be contaminated, which may increase the contamination level of crops.

The **arsenic** content of drinking water (and of course water used in different areas of the food chain) is also a critical issue in some areas of the country. Satisfactory solution of the problem requires the collaboration of all actors in the food chain.

The level of exposure of **dioxins and dioxin-like PCB's** to the human organism is decreasing in our country according to WHO tests of breast milk and is lower than in Western European countries. The food chain safety incidents with extensive dioxin contamination and with foreign origin however, warn that the specific control of dioxins is still required.

Polycyclic aromatic hydrocarbons (PAH's) have been found in a wide range of products, but their limit almost – except for some smoked fish preserves – only occasionally exceeded the regulatory limit. Considering the PAH's possible carcinogenic effect performing extensive testing is reasonable, especially regarding critical product groups. In addition also technologies and products that may generate PAH's should be specially checked and tested.

Regularly repeated investigations on naturally occurring toxic substances cover mainly the alkaloid tests on cyanide, methyl alcohol, and nitrate in vegetables. Due to the number of

cases recently occurring regarding **morphine** and thebaine content, poppy can be considered objectionable. The continuation of these studies, as well as the prevention of the distribution of inadequate import -lots from unknown origins- constitutes an important food safety issue. Reduction of water pollution caused by **nitrates** deriving from agricultural activities and prevention this in nitrate vulnerable areas also constitute an important goal. The former intensive control of nitrate content of vegetables has significantly dropped following the EU accession, since the EU standards apply only to the two vegetables (spinach and lettuce), and permit a very high nitrate level. It is of priority to collect data with regard to the nitrate limits in carrots and potatoes, which play an important role in the most vulnerable young children's diet.

The monitoring and control of **natural and artificial isotopes** occurring in the environment thus in the food chain are carried out regularly for both domestic and import products. Committed doses provide information on risks related to radioactive isotopes that is affected by both the measured activity concentration values and the evolution of consumption habits. Beyond the control of contamination over the normal period it is the sector's responsibility to prepare for nuclear emergency situations, to help the government in decision-making about the usability of elements of the food chain, and to advice on food edibility in crisis situations.

Foreign substances intentionally added to foodstuff, especially **additives** have been in the focus of consumer attention and concern

at a time. Unfounded rumours, controversial research results and legitimate concerns occur. Monitoring type examinations on additives are being carried out on a regular basis in our country, based on the results in most cases the additive-content of food complies with the limits set in the regulations. The prescribed consumption level of additives does not pose risk to the consumers' health. However, due to possible non-compliance there is a need to have a well-planned, risk-based examination in place that monitors the proper usage of additives by examining an adequate number of samples. We also have to prepare to take part in developing case studies on additives, for which more detailed information is needed about food consumption and also further extensive assessment studies are required.

Emerging risks

Due to globalization and the increasing world trade, new threats may be identified and in our country so far unknown or unusual pathogens may appear. Still undiagnosed pathogens cause a large proportion of gastrointestinal infection. Based on the literature the importance of certain parasites, such as protozoa (*Cryptosporidium*, *Cyclospora*) is growing. It is possible that via import food so far not occurring bacteria and viruses may enter the food chain of our country.

The transformation and possible formation of infectious agents may cause significant economic and health risk (e.g. new type avian influenza, resistant E.coli etc.) quickly and in large areas.

Animal welfare

Animal welfare is part of our every day. Replacement of hen caging, dangerous dogs' bite or animal experiments for research of pharmaceuticals have all professional, social, political, economic and legal impacts. The European Union, as the strongest determining factor of the Hungarian economy addresses the welfare issues of the major domestic species (cattle, pigs, chickens) in the food chain. The safe and gentle keeping, transport and slaughter of individuals of those species will not only be addressed at the level of official controls, but it also constitutes basis for the development and launch of new products marking system according to the EU Animal Welfare Strategy 2006-2010.

In Hungarian agriculture trademarks are widely used for many products. These trademarks refer either to the quality or the place of origin of the product. A large number of surveys and media news, however, show that consumers are interested in the welfare of animals, whose meat and other products will end up as food on their table. Given this, animal welfare labelling system has not yet been introduced in Hungary, in line with international and especially with EU trends. As a component of the Food Chain Safety Strategy we are aiming to develop and use the **“Animal Friendly Hungarian Product” (ÁllatBarát Magyar Termék) label.**

Planned actions:

- Minimize the risks associated with primary production (conservation of natural resources and sustainable agricultural state of the environment, preserving especially soil fertility, providing seed and propagation material protection)
- Control programs of protection against phytosanitary pests (ensure pest free status of propagating materials; monitoring of grape leafhopper causing Flavescence dorée; *Ralstonia solanacearum* bacteria causing potato wilt; apricot apoplexy; *Anoplophora* species)
- Initiation of eradication programs against epizootic diseases, completion of ongoing eradication programs in order to achieve exemption or special status (Aujeszky-disease, PRRS, IBR, classical swine fever, BSE, brucellosis, bovine tuberculosis)
- Control programs of food microbiological hazards (Salmonella Control Programme; *Campylobacter* control program; *Trichinella* free status, food-borne viruses, protection against the spread of antibiotic resistance)
- Control programs of chemical hazards (mycotoxins, pesticide residues, residues of veterinary medicinal products, cadmium, arsenic, dioxin and dioxin-like PCBs, PAHs, morphine, nitrate pollution, additives)
- Protection against emerging risks
- Animal welfare: introduction of Animal Friendly Hungarian Product label

9. Strong and credible authority

Prevention with the enforcement of standards



The most important change in Hungary's food chain safety system is that in recent years the domestic regulatory structure – being in charge of controlling the food chain – has been transformed. The former official control's approach was typically focusing on the end product and the actions of authorities contained a number of unnecessary overlaps, which made both the food chain business operators' and the authorities' work difficult in a case of emergency. The modern food chain safety cannot be visualized without a complex and preventive control of the entire food chain. Focusing only on the final product the safety of the food chain cannot be ensured. In an emergency situation, only a unified controlling and monitoring system covering the entire food chain is capable for an immediate intervention. The more than century-old Animal Health Service, and the Plant Protection and Soil Conservation Service were the basis for this, which through their clear-out traditional values effectively contributed to the overall approach. In the restructuring process the creation and adoption of the Act XLVI of 2008 was of critical importance; it laid down the foundations of a new and unified regulatory system that even by considering international standards is an exemplary way to be able to implement the monitoring of the entire food chain in a preventive

and proactive manner. Despite of the demand of breaking down the food chain control into professional areas, more authorities are being established, but the facts and the results are clearly in favour of unification and to keep the food chain control integrated.

Hungary aims to preserve these values in the field of food chain control, but at the same time also to use more efficiently its potentials. The assurance of food chain safety and food security, the reduction of vulnerability, the strengthening of quality control, and the protection and maintenance of critical infrastructures are questions of national security.

The institutions of the food chain control system should be **made stronger and more effective**, to which taken into account the principles of subsidiarity the **direct chain of command** should be maintained and through a systematic process management **bureaucratic official activities are to be kept at the lowest possible level**. The structure and powers of the authority fitting to the government's strategy should be constantly **adapted to the current tasks**.

Organizational restructuring in recent years, the integration of the regional agencies into the county government offices and district offices are all considered challenges that need to be addressed. Most important prerequisite for effectiveness improvement is that the activities of each unit of the competent authority should be made in line with the **food chain approach**, also the

information flow within the organization need to be speeded up, and the work of central entities that have been worked in different organizations, but performing similar activities in prior years should be aligned. Application of **quality management principles** within the organization, their clear and consistent enforcement, strengthening the communication within the organization at central and local levels of service are tools that should play a greater role in the future organization management.

Due to changes taken place in recent years, although NÉBIH is coordinating tasks related to the food chain, in the execution also the county government offices and district offices are affected, therefore from organizational and operational aspects the control system should be considered in any case. Efforts should be made to utilize the coordinative **function of county government offices** amongst other authorities in the general business-related authorization and registration processes. In addition, however, in order to ensure an effective handling of cases also **central controls** with national competence should be carried out, for which the organisation needs to be prepared for both in terms of capacity and competence perspective.

To enhance effectiveness it is essential to **organize risk-based systems** for all the control, sampling and screening activities, as well as utilizing resources based on cost and benefit. Food chain control must be made transparent by calculating the costs of completed activities, and assigning the resources to activities (including all monitoring, sampling and testing activities), with

this made acceptable to the wide professional society, as well as it should be ensured that the available resources – with special regard to food chain control fee – are used in a **cost-effective way**. An indicator system measuring the performance of food chain control work should be introduced.

The changing role of the authority depends not only on the expansion of the knowledge management, but the **restructuring of the traditional control tasks** are an area of possible development. The potential of using the official activities as a service, as well as the basics for official certification and qualification systems (e.g. smiley system) should be worked out. In addition and as part of the extension of the knowledge network the goal is to involve the professional and non-governmental organizations as well as public bodies in the food chain control activities.

In order to solve these tasks, the official structure of the **human resource (human capital) system** should be reviewed. In a knowledge-based society the knowledge is the key factor in social value creation, i.e. the focus is on the person himself and therefore an organization's ability depends on human resources and the quality of human capital.

For implementing and executing the programs of the Food Chain Safety Strategy it is essential to develop human capital and different resources (responsible for technical and economic analysis, communication, quality management, central control, etc.). This is the only way for the food chain safety service to recover its social appreciation.

Planned actions:

- Integrated food chain control system with preventive and proactive monitoring (control focusing not only on the final product, but on the entire process)
- Operating a direct chain of command at the food chain control authority
- Development of system-wide process control at the food chain control authority (risk-based organization of control and sampling systems; keeping bureaucratic regulatory activities at a low level)
- Developing a central monitoring and control system with national competence, creating institutional arrangements in background
- Use of quality management principles and introduction of certification systems to support official activities of the food chain monitoring body
- Human capital development at the food chain control body

II. B. Control of unknown hazards and unacceptable risks

10. Successful fight against abuse

Enhancing the effectiveness of the fight against black and gray economy



In order to protect the interests of consumers and fair business we must act decisively and effectively against unfair business, forgers and fraudsters. It should be made clear that this practice can't be accepted and tolerated by the society, thus in this regard „zero tolerance“ shall be announced.

The definition of adulteration in the food chain refers to intentional non-compliant production or distribution of products, especially if the produced or marketed products threaten the health of the consumer, which fail to meet the quality standards as defined in the specifications or in the product sheet or which are suitable for misleading the final consumer.

The main purpose of combating counterfeiting and fraud is to ensure that the consumer is only exposed to products in the market which are produced under legal circumstances and which of good quality, verifiable and safe. In addition, counterfeiting and fraud cause significant economic damage to the owners producing original goods, so their legitimate interest is in curbing the counterfeiting. From a national economic perspective, there are incredible reserves in the food chain, the exploitation of which, as practical experience shows can only

be realized based on the strategic partnership between NÉBIH and NAV. Another potential strategy can be seen in the information-sharing and cooperation between the authority and the individual supply chains. The authority responsible for different professional areas, overseeing the network and monitoring the production flow plays a key role, as well as the massive development of control methods.

Food chain safety is threatened not only at a national, but also at a global level by adulteration and fraud, which affects along with the foodstuff other substances present in the food chain, such as seeds and propagating materials, feed, pesticides, veterinary drugs, food and feed additives and accompanying documents.⁷³ Apart from the political, economic and criminal implications caused by fraud, these are capable in the long run to negatively affect the health of consumers and undermine consumer confidence as well as our country's food economy and competitiveness, furthermore our country's international reputation.

The fight against adulteration and fraud can only be realized by a wide range of collaboration, the assets and power of the food chain control authority alone are not enough. Prevention of counterfeiting in addition to other usual and routine tools requires also **legal, tax and investigation tools**. Top priority is to **strengthen the cooperation** between companies and the authorities, as it is a mandatory task of the companies to inform the authorities about all food chain safety incidents and products subject to complaints that have been marketed, and

to arrange the recall of such products at its discretion.

The food chain control and border control authorities should actively **monitor the possibilities of occurrence and signs of the deliberate contamination** of food chain before placing on the market, in the distribution, as well as during transport and also in terms of market control framework. The suppression of counterfeiting in the food chain should be supported by the **regional and temporal coordination of the various fellow authorities' control activities**, taking advantage of wider legal and control tools, which are available in a single action. Internationalization of food, feed, veterinary drugs and pesticide counterfeiting requires also an absolute **international cooperation** of the authorities. For this a practice should be developed to allow regular consultations and joint actions. Hungary's membership in the Schengen union forces the authorities specifically to enhance the execution of in-depth controls on pests, spread of diseases, adulterated veterinary drugs and pesticides, transport associated with substandard food as well as opportunities arising as a VAT-fraud. It is necessary **to raise awareness** among FBOs that food, pesticides, veterinary drugs of unknown origin are not considered being safe, and their use can result in serious liability consequences. Business activities or companies not known by the authorities, due to the tendency of being non-compliant and the lack of food chain safety responsibility system may not result in

a safe product. Emphasizing the importance of prevention, emphasis should be placed also on education and proper information sharing for the public, with this raising awareness of the potential for increased health risks. It is necessary to raise awareness among consumers by confirming that the food of unknown origin is not considered being safe.

Those who are operating the food chain safety monitoring and laboratory control systems need to **consciously seek the unusual phenomena**. It is essential to collect sectoral economic data as input to further analysis in the affected areas with fraud; actors of the economy shall be provided with support about **data collection** methodology. The existing and future data collection should be made using a variety of modern analytical tools (data mining, network research), as well as **extending controls on networks** is also required. We need to search for **new technological tools** (e.g., for laboratory development in order to accurately investigate special components) **and solutions** (e.g., biomarkers, tracking devices, smart packaging), which provide new opportunities against fraud with official controls and own-checking. In order to suppress origin forgery of products (e.g. honey, pálinka, etc.) the creation of **maps of origin** may be required. These maps, as reference databases will support anti-counterfeiting.

During the drafting of legislation and food certificate requirements the **precise definition of quality standards** for food chain products should be placed to the fore again. Adulteration by a manufacturer (replacement of valuable raw

materials by less valuable raw materials and additives) can be seen as forgery. It is therefore essential that the legislature together with those producers who want to create quality products define jointly well-defined and measurable product parameters, which can be qualified objectively during an official control, and pose sanctions on non-compliant producers and distributors, including evaluation of the influx of foreign goods, which labelling is associated with the Hungarian traditional food product categories.

Special attention should be paid to the **online distribution** of counterfeit products. Actions against violations committed on the internet with respect to all the food and veterinary drugs and pesticides should be developed.

As defined by law it should be ensured that **organizations engaged in trade** of agricultural and food products, as well as suppliers are acting according to fair business practices. Based on the mutual trust between food production and processing, and food trade organizations such as actors of the food chain cooperation, market relations redevelopment, ethical business standards enforcement should be promoted, and the provision of a balanced market bargaining power between the actors, maintaining the security of the food supply and the confidence of the consumers should be ensured. The current conditions of collaborations with GVH (Competition Authority) and NAV should be reinforced; the investigations should be extended towards smaller business chains and FBOs, and the practical experience should be included in the current legislation.

Planned actions:

- Application of new traceability solutions (flow of goods, authority overseeing and monitoring the network, massive development of control methods)
- Precise definition of quality standards – reduction of counterfeiting origin and prevention of adulteration (create maps of origin, reference databases; measurable product parameters)
- Strengthen strategic cooperation, building partnerships with tax and other authorities (legislative, fiscal, investigative tools and international cooperation)
- Control of online trade
- Suppression of unfair market practices (cooperation of NÉBIH and product chain regulators)

11. Protection of critical infrastructures

Treatment of systemic risks in the food chain



According to what has been described in the goal settings, namely that the traditional food chain control tools are not all-mighty, there will always be cases where the risk cannot be reduced to an acceptable level. Typically, such cases are deriving from natural disasters or emergency situations in connection with human activity (e.g., nuclear accidents, industrial accidents) or intentional abuse which cannot be prevented by using the traditional control systems essentially. In this case, other types of risk-driven approach are needed as well as the focus has to be on quicker management, i.e. the powers, speed and effectiveness become dominant.

Food safety and the safety of food supply are key strategic issues for society. Food chain events requiring extraordinary measures pose worldwide threat to human and animal health and they weaken the trust and consumer confidence in other foods and food chain products. It can lead to panic and in a severe case to supply disruption; the health care system overload can lead to serious financial burden and can adversely affect our long-term competitiveness of domestic products.

The risk of food terrorism (bioterrorism) persists today. The World Health Organization has warned in 2002 that deliberate contamination of food by terrorists is a real risk, and at some point in the food chain, contamination occurring at a

given location can cause extensive, global public health impacts. Although politically oriented food terrorist events rarely come to light, there is an increasing possibility that any chain store or company's products will be poisoned or can be subject to such threats. This can result in significant economic and moral damage and can cause panic. The current threat due to the mass production and global trade is more than ever. Technology has developed a lot, and it is not difficult to obtain toxic and infectious substances, as well as the related information just simply by searching the Internet.

Recognizing the vulnerability of the critical infrastructures– including food chain facilities – the European Union adopted Council Directive 2008/114/EC of December 2008 on the identification and designation of European critical infrastructures and the assessment of the need to improve their protection, which should be incorporated in our country's legislation as well. Hungary also started the drafting of the concept regarding the national critical infrastructure protection which covers also food chain safety.

Today, the modern society is highly dependent on the existing infrastructure systems (power supply, water supply, computer networks etc). The safe food and water supply is of critical infrastructure elements, but in protecting these there are society, government and business tasks defined. Therefore, both the government and food companies should be prepared to prevent and eliminate intentional food contamination, counterfeiting and possibility of fraud.

In preventing intentional contamination of

the food chain, the FBOs play a major role. Product traceability and recall functionality constitute important components of corporate responsibility. However, most of the agricultural production system is not properly prepared to put a **recall mechanism** in place; the development of these procedures should be supported. In developing the internal quality and food chain safety system, a reasonable risk arising from deliberate contamination should be assessed and possible defence mechanisms should be put in place. The food chain companies need **help in the preparation and practice of effective crisis management plans.**

For the food chain control bodies it is required to learn different **unusual tools, improve skills and knowledge** when preparing for the risk management of critical infrastructure. The EU and the global alert systems (RASFF, INFOSAN e.g.) allow rapid transfer of information, but these are just initial steps towards setting up an effective, appropriately prepared rapid reaction system. In the protection of critical infrastructures the **analysis of the food chain as a complex network** and the network vulnerability assessment play a key role. The use of **modern computer science methods** – particularly network research – should be anticipated, and this should be incorporated into the food chain data collection and storage system.

The materials used when causing threats intentionally may derive from laboratories as well. That is why the facilities, institutions, laboratories must **enhance the secure storage of infectious, toxic substances, pesticides**

and other chemicals, radioactive materials, and should report any theft or other events of unauthorized use referring to the competent authorities. The clinical, research and control laboratories should be aware of potential risks and appropriate security measures shall be taken in order to minimize the risk of misuse of substances. It is also important to have designated laboratories in the country that are capable of rapidly detecting infectious and toxic substances of unknown origin and nature, and the continuous availability of these laboratories should be ensured.

Existing national official, operational emergency response and crisis management plans should be reviewed of the perspective as they are appropriate to prevent the deliberate contamination of the food chain, to detect infections and to avert the consequences. A national plan should be created and targeted to manage and eliminate food chain terrorist events. The food chain control should plan, exercise and practice all the measures which from the first notification, that is possibly based only on suspicion, can lead to the formation of well-founded, evidence-based prosecution without compromising consumers' health and causing panic.

In developing management procedures for these incidents it also needs to be considered that those managing the events are critical infrastructures themselves. Therefore, the setup of a **nation-wide, quick response, experienced unit is required** to efficiently and reliably coordinate the management of incidents.

Senior staff of government agencies must receive training in **crisis communication**. Both in times of crisis and beyond they should provide accurate, credible and well-founded information on their activities and about progress of the food chain safety situation also for the media and consumers.

Planned actions:

- Mapping of critical infrastructures with food chain approach (network vulnerability testing)
- Defining, developing and supporting of recall mechanisms and procedures in case of food chain contamination
- Preparation and review of national, official, operational emergency response and crisis management plans
- Enhancing the secure storage of infectious, toxic substances, pesticides and other chemicals (facilities, institutions, laboratories)
- National plan to eliminate and handle food chain terrorism (setting up national competence, quick response, experienced unit, crisis communication).

⁷¹ Proposal for a Regulation of the European Parliament and of the Council on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) 11102/1/13 REV 1 of COM(2011) 627

⁷² The program derived from information gained during the strategy works summarizing the potential risk reduction directions. A detailed analysis of the situation can be found in the "Strategic Foundational Documentation". However, the program – in one hand due to the long time period of the strategy, on the other hand because of the complexity of the topic – is not limited to the risk reduction programs merely to the followings: the risk reduction programs supporting the main targets can be defined also in a later point of time when subsequently preparing the measures for the implementation of the strategy.

⁷³ Experts estimate that food adulteration is a constantly growing problem in the world food market. As per today, approximately 10% of all counterfeit products are food products. As per estimates the 1 to 3% of the marketed food is adulterated, but in some countries it could be as high as 10%. It is estimated that the European PPP market is approximately 5 to 7% of counterfeit and illegally distributed. In Hungary, the proportion of substandard quality products is 10%, with respect to adulterated drugs the ratio is around 2%. The rate of pesticide fraud internationally is 5 to 10%, in some Eastern European countries; however, it may exceed 20%.

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Strategic tools

Strategic tools



Food Chain Safety
STRATEGY 2013-2022

The strategy itself is a tool and at the same time the strategy has its tools as well. The relations among these have to be the starting point to see what we have, what we can start to work with. The task of the strategy - as a tool - in a simplified sense is the analysis of the current situation, the definition of the desired future state and the provision of guidance on the achievement of these expectations.

In order to eliminate the differences between the current and future state a lot of things have to be changed. These changes and the degree of these changes themselves predetermine whether the goal can be reached by traditional methods or not; or because of the degree of change an overall system opposition have to be taken into account. As in the last case it is obvious that a conscious change management has to be built up, the necessity of this has to be analyzed in each target of the programs. Certainly it is not excluded, moreover it is desired, that the **change management** tools are used extensively, since this can increase the efficiency of the implementation.

The definition of the contractual framework and the management tools, as well as the efficient utilization of financial methods (e.g. support, improvement and operational costs) play an accentuated role in the Strategic execution.

Definition of structural and institutional framework

Main structural tools are as follows:

- organizational restructuring, reconsideration of human capital;

- systematic process management;
- crisis management, crisis management plan;
- establishment of a program bureau.

The realization of the strategy requires an overall approach that surmounts the specialties and a deeper functional integration along the food chain. In the practical realization it is not a question anymore which authority should undertake the duties of food safety, attention shall be raised rather to the effectiveness of the food chain control authority's work.

The food chain control institutions have to be strengthened and made more effective.

Although all of the tasks related to the food chain are centred at the NÉBIH, the county and district government offices are also involved in the execution. Therefore the control system has to be reconsidered from the structural as well as from the functional perspective.

The coordinative functions of the county government offices have to be utilized as much as possible in **the general authorization and registration processes that connected to businesses and carried out with the involvement of other authorities. By the systemic process management the bureaucratic aspect of the authoritative activities has to be kept as low as possible.**

Moreover in order to effectively handle the priority cases and those which cover more counties, **centralized controls with country wide competency** have to be made, and the whole institution has to be prepared for this regarding capacity and expertise as well.

The wider the area covered by the strategy the more actors needed to be involved and the less can be achieved in the traditional hierarchical functioning of the execution.

This is fundamentally true for the cooperation between the participants, for example cooperation between ministries and offices, but also true for the internal execution within institutions. Also **project management involvement** is needed to be considered at this point. The tool of project management can guarantee framework for the cooperation and also the sequential execution of the tasks in the target system.

Formalized strategic plans try to capture the essence of targets and todos, however at the same time the realization of part of the changes needs the establishment of change management. These tools are not enough yet; the executors have to be endowed with skills that are necessary for the corrective processes they need to perform by themselves. This can only be realized if the contributors of the executive system try to **improve a consciously learning system**.

Change management as well as project management bears the need for a coordinative function, although the Strategy, the traceability of each task and the currency of the strategic plans also raise the need for a **strategic program bureau**. The preparation and support of development of strategy oriented institutions appear as one of the main tasks of the program bureau is to prepare and support the making of the **strategy oriented system structure**.

Regulation tools

During the realization of the strategy the following tools are available:

- legislation;
- policy program, multiannual planning;
- authoritative toolkit, authorization, control, sanctioning;
- audits, accreditation

It also has to be mentioned that the implementation of the programs of the medium-term national food chain safety strategy has to be aligned with other national and sector specific strategies. It is required by Act XLVI. of 2008 on the food chain and its official control that the Chief Veterinary Officer prepares the food chain safety policy program in order to implement the food chain safety strategy. The task and aim of this policy beyond the harmonization is to provide a deeper integration between food chain safety and other programs in terms of source sharing, common tool utilization and common measurement of completion as well.

One of the most successful regulating tools, which can help to achieve the strategy's goals, is the **application of the authoritative toolkit**. Our goal is that the actors of the food chain – first of all the business operators – perform their activities in an appropriate way according to the quality and safety norms of the food chain. In order to achieve this, good practices have to be followed and the level of acceptable risk has to be also defined. Furthermore these parameters have to be controlled and measured as well as sanctions have to be prepared regarding non-compliance.

The Strategy desires to give emphasize to the reduction of the food chain safety risks, since it is obvious that known risks have to be kept under continuous control and their level has to be reduced below an acceptable level. For this the expansion – as wide as possible – of control activities and professional programs aiming the reduction of risks is desired.

Possible financial tools

The most important available financial sources are as follows:

- food chain control fee;
- administrative fees (control and authorization fees);
- central budget sources – for improvement and functional expenses;
- reconstruction of the financial framework;
- financial support system.

For the realization of the goals of the food chain strategy, the harmonized utilization of national as well as European Union sources is needed. From the sources provided by the European Union the **Horizon 2020 framework** has to be highlighted that provides primarily sources for the field of research and innovation.

This framework provides sources for the challenging question for whole Europe such as food security and sustainable agriculture. Aids received from the **Cohesion Fund** as well as the co-financing programs and the **short food supply chain EAFRD thematic subprogram** have to be mentioned as well amongst other EU resources.

Certain part of national resources can be originated from the budget and almost half of it from the **food chain control fee** that was introduced in 2012 and it is paid yearly by the business operators of the food chain. With the introduction of the annual fee all of those businesses and business operators participate in the financing of the authoritative and administrative activities, who have been already had resort to the guaranties and services provided by the food chain control body. By the introduction of the food chain control fee the expenses attached to the tasks of the food chain control body will be covered and at the same time the financial load will be distributed more proportionally between the actors of the food chain.

A part of the assets is available centrally at the Ministry and the NÉBIH; the other part is available at the county government offices.

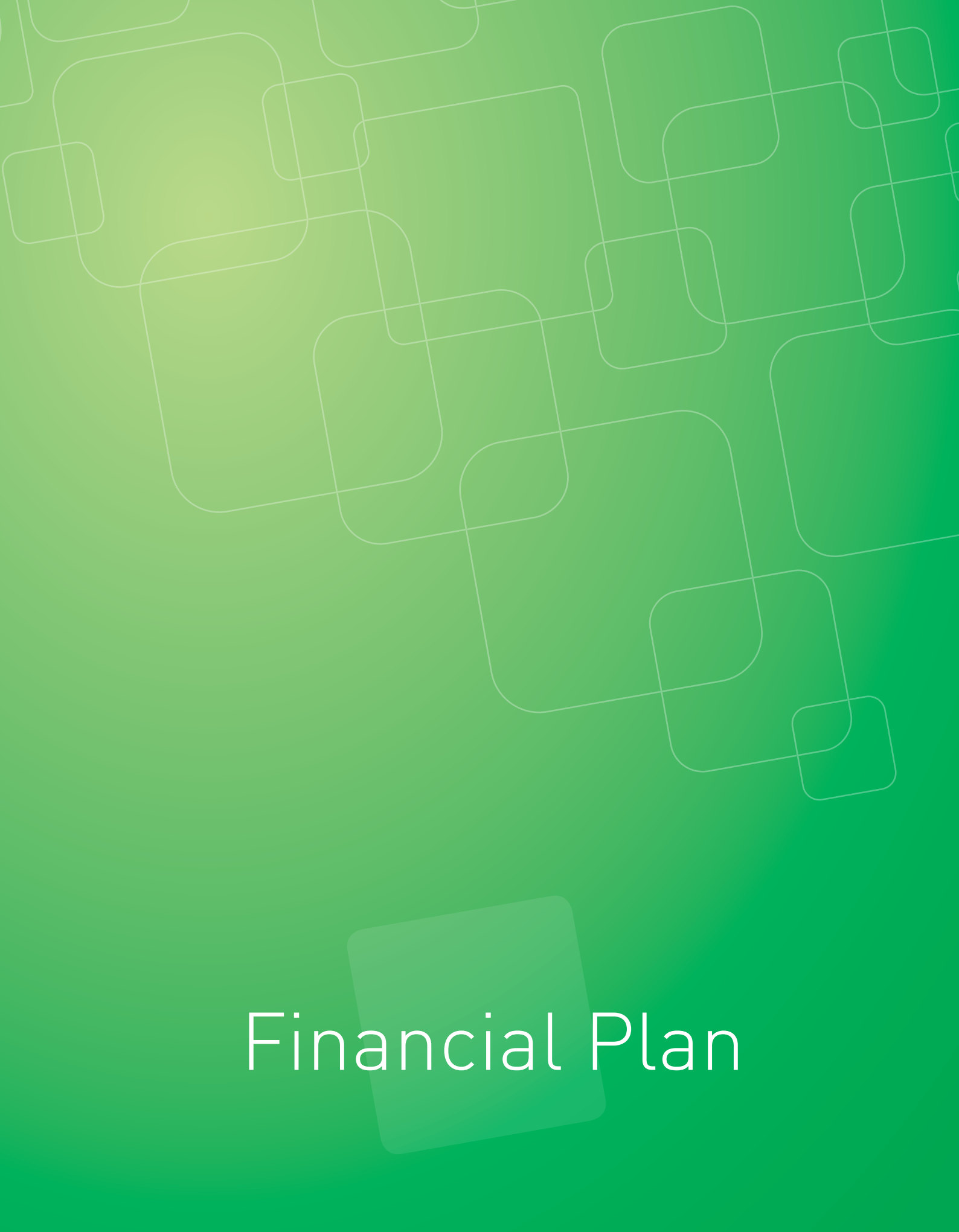
Other tools serving the aims of the strategy

- IT system, electronic services;
- information provision, information campaigns, conference organization, attendance at programs;
- education, training;
- norms and good practices;
- research and innovation.

During the food chain control activities besides classical control tasks, preventive actions are becoming more and more important, such as training of business operators and participation in the development of good practices.

The establishment of a conscious consumer society has to be important for the completion of future desired by the Strategy. Each contributor of the food chain has the prior responsibility to care for food chain safety within its competency.

The presence of data, information and knowledge possessed by the actors of the food chain has only a little benefit. It only becomes a valuable knowledge if it is accessible for everybody and increases through brainstorming.



Financial Plan

Financial Plan



Food Chain Safety
STRATEGY 2013-2022

The strategy formulates the way that is necessary for the achievement of the desired targets, where during the implementation developments and reconstruction are needed. In general the frame of the possible implementation depends on the volume of the depth of innovation, the degree of reconstruction and their financial extent.

The financial plan is not only confined to the division of innovation resources but also allocates the assets for operational purposes. In accordance with the government needs this is aligned with the main goal of the strategy as the government has to convert to a strategy-oriented working method in the area of food chain safety. The available sources should not been spent by the government because of traditional practices but because of the completion of the citizen's and the governance's expectations according to a plan and in a measureable way.

Available resources

The main items of the realization of Food Chain Safety Strategy are the following: central budget sources, fee income (including the food chain safety control fee) and sources from the European Union.

A part of the assets is available centrally at the Ministry and the NÉBIH; the other part is available at the county government offices.

Regarding the data displayed in the resource plan it has to be considered that the information, what was available in 2013, was extrapolated and used for the calculations in advance for the next 10 years. Because of the international and national economical fluctuation and the pending

budget cycle of the EU for the following 7 years can truly influence this.

While calculating the resources it has to be also considered that primarily those direct sources are appraised here which are already available or being outlined. Obviously during the execution of the Strategy, wider involvement of external resources has to be aimed at. But this greatly depends on agreements between each program and other sectors, on the annual budget plans, and on the announcement of funds based on EU resources. However they provide good guidance on the type and amount of the available resources for the implementation of the Strategy.

According to the review of different resources currently a sum of 400 billion HUF can be taken into consideration.

Priorities and the indicative financial table

Aligned with the Strategy's targets the indicative resource sharing is one of the primary and most important tasks of the state so the most significant financial sources have to be assigned to the realization of the risk reduction program.

The county government offices have their available sources – in the strategies current timeframe more than 200 billion HUF – which has to be assigned completely to control and test duties and also for the functional costs of authorization and registration tasks.

This is supplemented by additional central budget source of 100 billion HUF and also EU resources (e.g. co-financing of the support of eradication of contagious animal diseases).

The programs belonging to the target area

of food chain safety knowledge management can contribute to the effectiveness of the risk reduction program and its results have a feedback on the operation of the knowledge management. The two areas cannot achieve goals individually only if they support each other. Programs connected to the „Control of unknown hazards and unacceptable risks” strategic target, are also – on the grounds of network approach - closely related to the areas mentioned above. Thus out of the eleven programs defined by the Strategy, ten primarily serves innovative targets.

According to Article 47B.§ (10) of the Act on food chain safety “The incoming food chain control

fee has to be earmarked for the implementation of duties determined by the food chain safety strategy and by the multiannual and annual control plans. 10% of this fee has to be assigned to innovation. The income can also be assigned to operation.”

For the completion of targets, the incoming food chain control fee has to be supplemented by national and EU resources.

According to these the distribution of the innovative resource of approximately 40 billion HUF among the strategic goals and programs is the following:

Strategic goals	Programs	Distribution of resources (%)	
Establishing and operating the knowledge centre	Global information management	17%	38%
	Introducing transparent risk analysis	2%	
	Reorganization of the laboratory network	19%	
Developing a knowledge network and innovation	Building the basis of the knowledge network	3%	36%
	Modern education and training	14%	
	Partnership in research and innovation	10%	
	Active public relations	8%	
Control of known hazards	Strong and credible authority	20%	20%
Control of unknown hazards and unacceptable risks	Successful fight against abuse	6%	6%
	Protection of critical infrastructures	1%	

The indicative resource distribution between the strategic target areas is indicated below:

Strategic target areas	Strategic target areas	Planned resources	
		Billion HUF	%
Food chain safety knowledge management	Establishing and operating the knowledge center	13.7	3.7%
	Developing a knowledge network and innovation	12.9	3.5%
Control of food chain risks	Control of known hazards	337.6	92.0%
	Control of unknown hazards and unacceptable risks	2.3	0.6%
Technical support		0.5	0.1%
Total		367	

The usage of existing sources as shown above does not require other central financial sources to be included but the financial tools, which also include the food chain control fee, need to be utilized more effectively and the budget allocation system have to be organized. The current allocation structure does not meet the expectations anymore, the less the targets formulated in the strategy, as that was aligned to the previous administrative service fee system. This is extremely important due to the fact that not only the operational framework has to be modified but also the investment allocation to finance the restructure. It also has to be clear that this does not mean more national resource need, it is only about the alignment of the resources to the reality.

Cost-benefit analysis

During the implementation of the strategy approximately 400 billion HUF will be spent within ten years, which can raise the economical question, what is truly on the benefit or profit side. During the answering of the question the strategy creators investigated that through the operation of the food chain control system which are the additional values appearing above basis values. As a result four areas have been identified:

By the improvement of consumer awareness within 10 years several hundreds of billions HUF (cost of illness, absenteeism, sick leave, life years lost) can be achieved.

According to estimates the extent of black and grey markets may reach the yearly amount of

1000 billion HUF. As long as during ten years a progress of 10% is seen, then on the top of indirect profit the income of the government could be increased by several hundreds of billions HUF.

The rise and stability of agricultural export constitutes fundamental part of a balanced national economy. Based on expert estimates it can be stated that the food chain control system means 1% added value to the agricultural export. Relying on this an extrapolation for a 10 year period would give a 50 billion HUF added value.

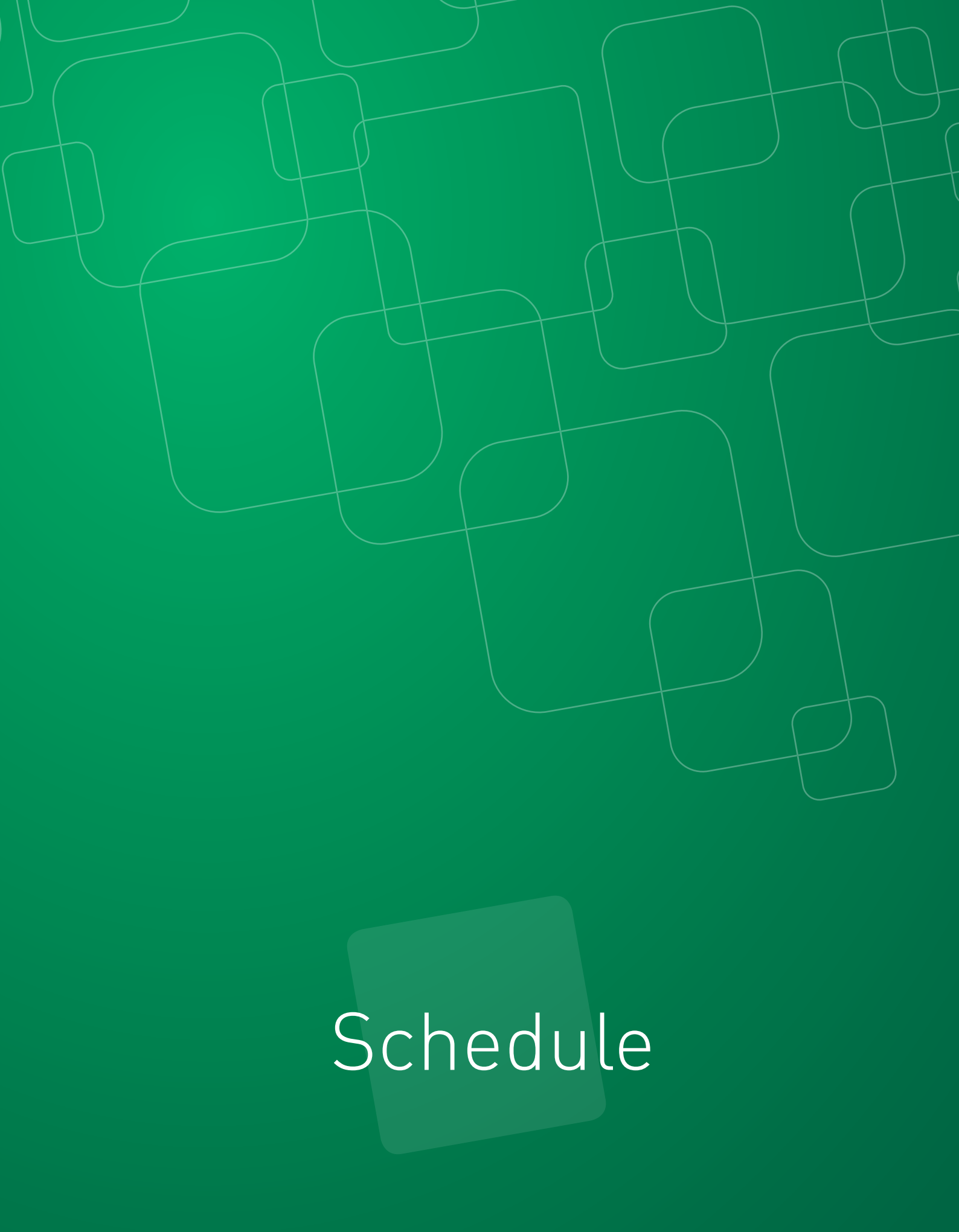
The raise of competitiveness is important in all areas and its main tools include innovation and economy development. In the next 7 years of the EU budget cycle it will be possible to reach the majority of the sources through the cooperative programs of the state (authorities), research institutes and businesses. At the moment the benefit of these cannot be calculated, but as the result of product development we can count with approximately more than 10 billion HUF.

Regarding these it can be concluded that besides the base values, counting only with the significant

additional values, there is a one and a half times benefit in relation to costs. Resources needed for the guaranteed food chain safety including EU sources as well, are just a small amount of the prevented losses and the covered areas income.

Financial traceability and restructuring

The Strategy's budget plan may be well established within the order of targets but the dependency from the macro-economical environment carries many unsecure points. Therefore attention has to be paid to the traceability that has to be included in the food chain safety policy program defined by the Chief Veterinarian and it has to be analyzed and corrected according to the annual budget. During the establishment of the indicator system, besides the definition of performance indicators, financial measurement points are needed as well. In order to ensure transparency, the degree of financial completion, that covers the utilization of the food chain control fee as well, has to be presented in the annual report on the Strategy made by the Chief Veterinary Officer.



Schedule

Schedule



Food Chain Safety
STRATEGY 2013-2022

The Food Chain Safety Strategy's programs are in close connection with each other, basically each program has an effect on other measures. (See: Figure 11.) In this complex objective system the tasks are built upon each other but at the

current stage we cannot complete a detailed network plan. This has to be noted while the targets of the Food Chain Safety Strategy are further analyzed and the food chain safety policy program will be worked out.

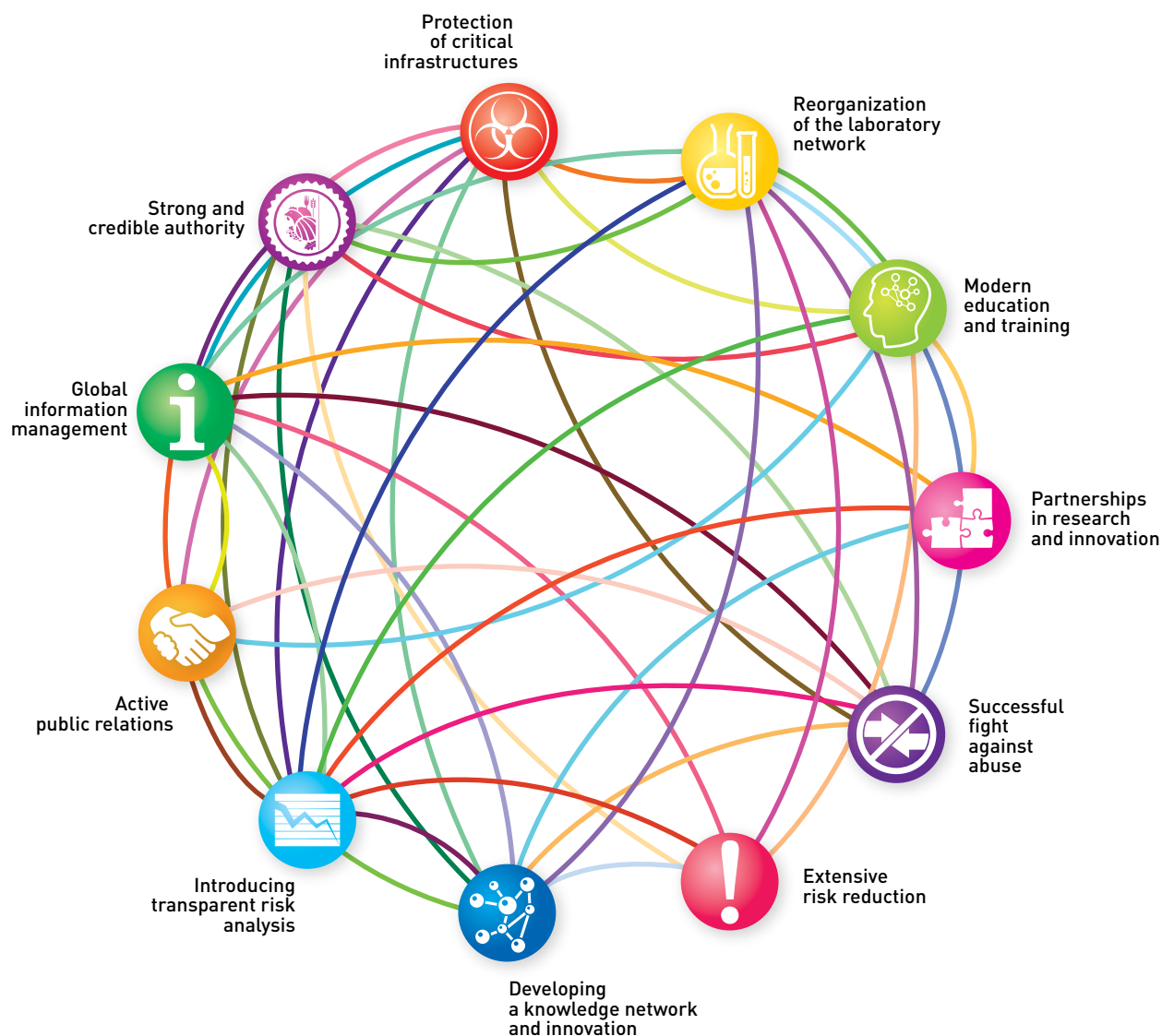


Figure 11. Relationship between the Food Chain Safety Strategy's programs

After the acceptance of the Strategy the creation of the food chain safety policy program has to start immediately. The goals defined within the strategy will be carried out and a detailed strategic indicator system will be worked out according to the predefinitions. At the end of 2013 we have to define a detailed schedule and structure of provisions.

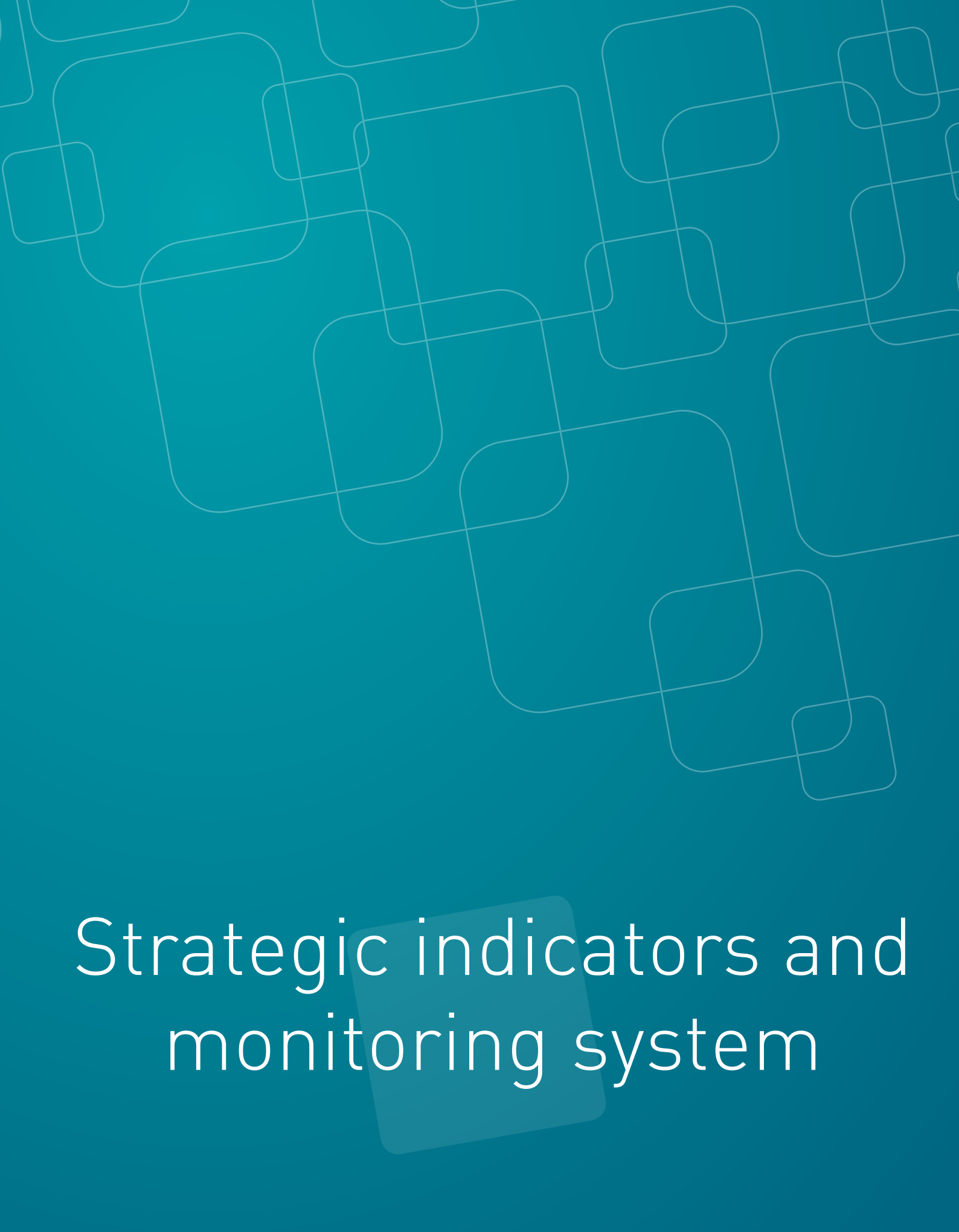
Besides the strategy, supporting change management tools have to be implemented and the introduction and usage of the project management tools have to be carried out as well. The Food Chain Safety Strategy and the food chain safety policy program execution will start at the beginning of 2014.

After the shaping of the programs and the introduction of the actions it also is necessary to sustain them continuously; so this is how the program fills in the 10 year period. In the introduction phase the introduction and the sustainable, operational timeframes can be calculated.

The Food Chain Safety Strategy evaluation has to be completed by indicators each year, but also an overall strategy evaluation has to be made on the following dates:

- in 2016 an intermediate evaluation,
- in 2019 an intermediate evaluation,
- 1 year after completion (in 2023) follow-up evaluation

Program	Timeframe	
Global information management	3 years	
Introducing transparent risk analysis	3 years	
Reorganization of the laboratory network	10 years	
Building the basis of the knowledge network	5 years	
Modern education and training	10 years	
Partnerships in research and innovation	10 years	
Active public relations	3 years	
Extensive risk reduction	10 years	
Strong and credible authority	5 years	
Successful fight against abuse	5 years	
Protection of critical infrastructures	5 years	



Strategic indicators and monitoring system

Strategic indicators and monitoring system



Food Chain Safety
STRATEGY 2013-2022

As previously mentioned the assessment of the current situation presents many difficulties. Among the different factors subjectivity has been emphasized again; it plays a significant role in the judgment of food chain safety and this also has a huge impact – beyond targets of the strategy – on the strategic indicator system.

Risk perception of people differs from the risks defined, calculated and modelled by experts as people do not have basic information, appropriate training and methods for sizing up food chain risks. This fact can be included in decision-making in 2 ways: either to exclude the risk perception of people as it is being unreliable source or to include it as the final target of the strategy is the consumer itself.

It is very important to observe that food chain risk reduction has to be based on objective expert analyses with consideration of the costs and benefit. The natural indicator of this can be the number of saved lives or saved life-years⁷⁴. Besides this – as another perception – it has to be visible that the risk is not an external, independent factor, and – although the risks are real – there is no such thing as real objective risk⁷⁵. It is also an important factor that governments cannot disregard the society's feelings and fears regarding security and risks. From the strategy point of view this also means that the realization of the National Food Chain Strategy should not been measured at experts level only, but also at the level of people and consumers, and this has to be emphasized during setting up the indicator systems. Despite the above mentioned difficulties of the objective positioning, it has to be measured whether the food chain safety

situation is getting better through the strategy or not. So also the low level objectives have to be measured, e.g. through different screening test results. Because there are cases when all the low level targets are met and the system development does not occur, so therefore there is a need for measuring performance with regards to higher level general objectives, so outcome and impact indicators need to be defined, and food chain safety can be measured expansively by them. First “zero point” measures and analyses should be carried out for the comparison of the changes.

The 11 programs of Food Chain Safety Strategy include many actions and areas of intervention; introduction of its measuring system is not included within the scope of the strategy. The reason for this is the following: firstly the detailed indicator system would exceed the Food Chain Safety Strategy's current extension, secondly because of the previously mentioned factors, which make the objective measurement of the current situation difficult, the detailed indicator system can be worked out until the end of 2013.

We would like to measure the realization of the Food Chain Safety Strategy and the low and high level objective achievements based on the following indicator system:

- the indicator system contains 11 Complex Program Indicators (CPI) of the programs of the strategy and
- the Food Chain Safety Strategy Fulfilment Index (FCSSFIx) which measures the main goals fulfilment.

The Complex Program Indicators can be derived from indicators of the programs, while the Food Chain Safety Strategy Fulfilment Index can be calculated from the 11 complex program indicators (CPI) and 7 other general indicators. As well as the Food Chain Safety Strategy Fulfilment Index and the Complex Program Indicators system have to be finalized within the strategy's objective breakdown in 2013. Based on this, each of the Complex Program Indicators can be put together from many different sub-indicators, even by using 10 to 20 sub-indicators, while for the Food Chain Safety Strategy Fulfilment Index 40 to 50 different indicators can also be used. The Food Chain Safety

Strategy Fulfilment Index is supposed to monitor the fulfilment of the strategy; it cannot be interpreted as a number itself, it can only be used for trend analysis during the strategy's lifecycle (for comparing to the previous period). During the detailed workout of the complex indicator system, the OECD's guidelines have to be considered.⁷⁶

The zero point measurement of the 11 Complex Program Indicators and the Food Chain Safety Strategy Fulfilment Index has to be done in the beginning of 2014; after this yearly measurement and assessment are needed.

The strategy's indicator system and the needed data are shown in the table below.

Food Chain Safety Strategy Fulfilment Index (FCSSFIx) and the Complex Program Indicators (CPI) starting points			
	Indicator	Data source	Program
1.	Creation and usage of FCCIS	• Proportion of the FCCIS covered professional fields • Proportion of the FCCIS covered businesses • Usage statistics and surveys on usability • Control survey on the registered FBO percentage • Proportion of cases handled within FCCIS	1. Global information management
2.	Effectiveness of risk based system	• Comparative calculations based on results of random and risk based samplings and different risk assessment models (increase in effectiveness comparing to random plans) • Number of monitored hazards	2. Introducing transparent risk analysis
3.	Range and effectiveness of laboratory examinations	• Number/Proportion of risks covered by accredited laboratory examinations • Number of examinations carried out within the new laboratory system • Reliability of laboratory methods compared to benchmark-values • Turnaround period • Number of publications • Amount of support granted in the frame of international tenders	3. Reorganization of the laboratory network

**Food Chain Safety Strategy Fulfilment Index (FCSSFlix)
and the Complex Program Indicators (CPI) starting points**

	Indicator	Data source	Program
4.	Indicators of knowledge network creation and operation	• Number of strategic partners and cooperation agreements • Number of industrial guidance documents • Proportion/Number of non-compliance caused by lack of information • Proportion of certified businesses	4. Building the basis of the knowledge network
5.	Dissemination of the chain approach in professional education	• Number of food chain approach information and learning materials • Trainings held based on food chain approach information and learning materials • Competence surveys of students at different age groups	5. Modern education and training
6.	R&D&I indicators	• Number of patents • Number/proportion of food chain safety postgraduates among workers of NÉBIH • Number of publications • Number of R&D&I activities	6. Partnership in research and innovation
7.	Effectiveness of PR activities	• Output indicators of PR-activities • Surveys	7. Active public relations
8.	Indicators of specific risk reduction programs	• Number of identified hazards • Prevalence/incidence of different hazards • Proportion of non-compliant samples	8. Extensive risk reduction
9.	Recognition, credibility and trustfulness	• Surveys on credibility • Data on corrective actions following non-compliance detected during controls • Proportion and number of businesses taking part in official certification programs • Results of official certified programs	9. Strong and credible authority
10.	Indicators on detected fraud cases	• Number and value of detected VAT fraud • Number and value of detected food chain fraud • Number and value of detected/seized products • Estimations on size of the black market	10. Successful fight against abuse
11.	Preparedness indicators	• Number of simulation practices • Simulation practice results compared to benchmark	11. Protection of critical infrastructures

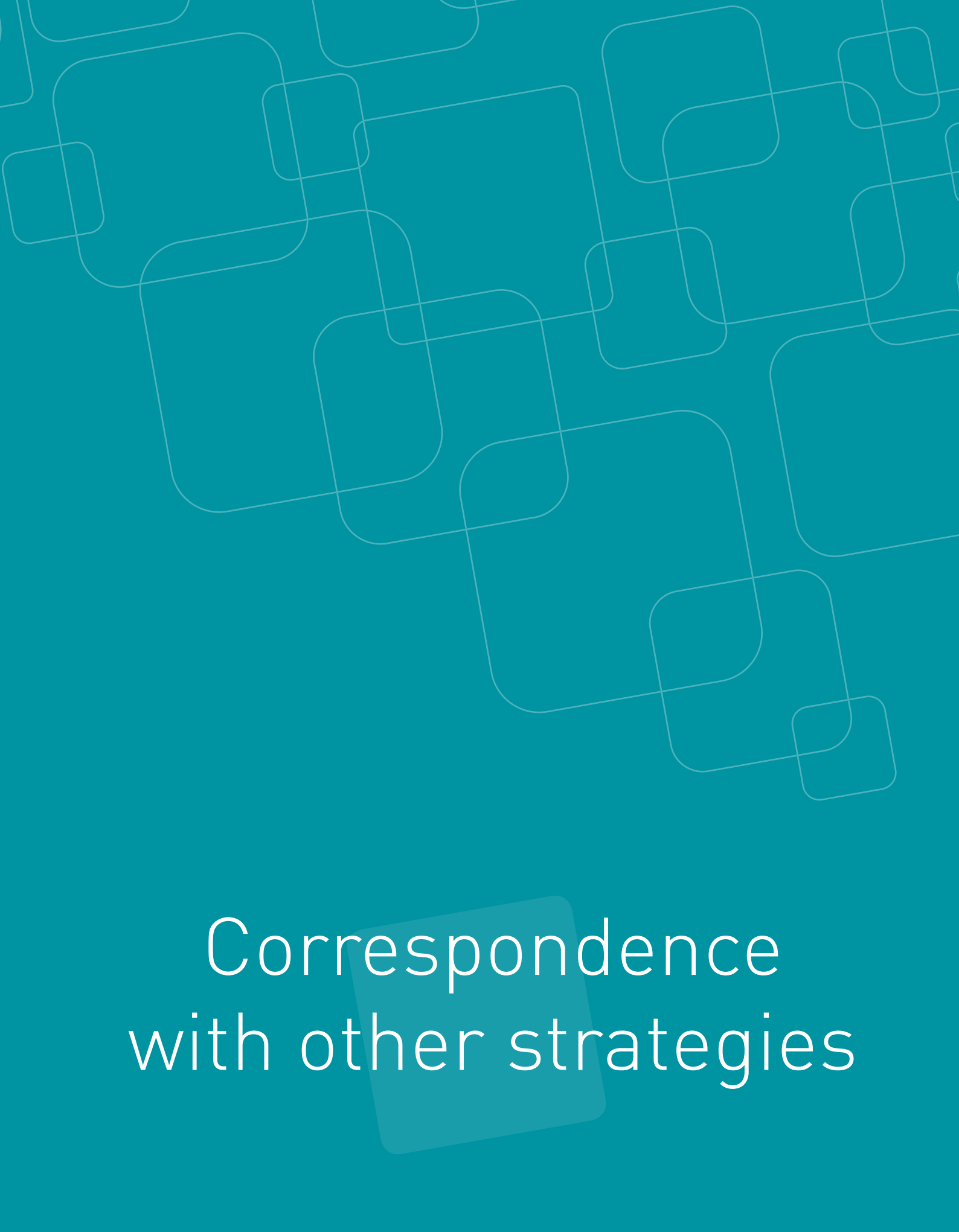
**Food Chain Safety Strategy Fulfilment Index (FCSSFIx)
and the Complex Program Indicators (CPI) starting points**

	Indicator	Data source	Program
12.	Indicator on strategic program fulfilment	• Proportion of program fulfilment • Fulfilment ratio within programs • Reliability of program results	General
13.	Indicator on strategic program resources	• Ratio of program resources used and planned	General
14.	General indicator on food chain safety	• Survey on current status (perception) of food chain safety	General
15.	General indicators on public health	• Number of reported food borne illness cases • Number of reported food borne illness outbreaks	General
16.	General indicators on public health	• Burden of food borne diseases (in DALYs)	General
17.	Indicator on economic burden	• Economic burden of food borne diseases (in HUF)	General
18.	Economic results indicator	• Agricultural export indicators	General

⁷⁴ Kuran, Timur and Sunstein, Cass R., Availability Cascades and Risk Regulation. Stanford Law Review, Vol. 51, No. 4, 1999; U of Chicago, Public Law Working Paper No. 181; U of Chicago Law & Economics, Olin Working Paper No. 384. <http://ssrn.com/abstract=138144>

⁷⁵ Paul Slovic: The Perception of Risk. Earthscan Publ., 2000.

⁷⁶ Handbook on Constructing Composite Indicators. Methodology and user guide. OECD and JRC of the EC. OECD, 2008. <http://www.oecd.org/std/clits/42495745.pdf>



Correspondence
with other strategies

Correspondence with other strategies



Food Chain Safety
STRATEGY 2013-2022

The Food Chain Safety Strategy, which has been adopted as Governmental Decision, is a National Medium-term Strategy, according to Governmental Decree No. 38/2012 on governmental strategic governance and Article a) Paragraph 29 Act XLVI of 2008 on food chain and official control.

The Food Chain Safety Strategy covers the previously defined food chain and food chain safety, but does not include areas connecting to food chain covered and focused by other strategies, e.g. programming rural development or food industry.

In the course of situation analysis and targeting the strategy obviously concerns horizontal domains such as training, education, research and formulates objectives and recommendations maintaining the scope of the field.

Food chain safety due to its multidisciplinary nature, complexity and being a concern of everyone, requires a special, comprehensive approach.

The specific and overall topic suggests that the current strategy is connected to other strategic programs and action plans. It has links with the Constitution and the Government's program accordingly, in line with the National Sustainable Development Strategy and with the most important national strategies and plans (i.e. Széchenyi Plan, Széll Kálmán Plan, Semmelweis Plan, Magyary Plan) and other, already existing comprehensive and sector-based plans and programs (i.e. National Rural Development Strategy and the National Environmental Program).

The food chain safety area has an increasing number of strategic and strategic-like documents; therefore it is necessary to clarify the relationship, roles and objectives of these documents by making clear the function of the Food Chain Safety Strategy.

The relationship between the Food Chain Safety Strategy and **the program of the Hungarian Academy of Sciences on 'Food security – The strategic principles of the Hungarian food industry, rural development and food safety'** is quite close; the origin of the programs indicated by the Food Chain Safety Strategy is included in the following programs of the Hungarian Academy of Sciences: Considering the complexity of food safety; Enhancement of microbiological food safety; Enhancement of chemical food safety; Government, institutions; Enforcement of the responsibility of FBOs; Protection of food chain; High-protection of sensitive consumer groups; Safety of non-traditional foods; Education and communication; Research-development.

The **National Rural Development Strategy (NVS) 2020** is significant in terms of the strategy, as this also defines certain main priorities, targets and planned actions regarding food chain control. Obviously several connections have been found with the strategic area of NVS: "Added Value Increase, Safe Food Supply and Secure Market" because the most important aspect is the protection of the consumers' health, which cannot be subordinated by neither economical, nor political interests. At the same time the elements of wide range risk reduction cannot be restricted only to food inspections;

the supervision of their environmental aspects is equally important regarding the food chain network perspective.

So therefore the followings constitute part of the NVS: Protection and Sustainable Use of National Resources and Values (Soil conservation and mineral management program and Water supply and water quality protection program); Improvement of Rural Environmental Quality (Drinking water quality improvement program); Sustainable Agricultural Structure and Production Policy (Landscape and Agro-Environmental Management Program); Rural Intellectual and Physical Infrastructure, Health Promotion, Viable Rural Settlements, Local Communities (Raising Consumer Awareness Program and Research, Development and innovation program).

The Food Chain Safety Strategy takes into consideration the situation analysis and goals of NVS connecting to food chain safety in order to harmonize the two strategic documents.

Besides the National Rural Development Strategy relationship with the **National Environmental Program**⁷⁷ was emphasized as well. The National Environmental Program and Food Chain Safety Strategy consider similar topics; they are closely connected with special respect to the following fields: Environmental awareness, Environment and health (especially water quality and food safety), Sustainable land use, Protection and sustainable use of our waters, Waste management and Environmental Safety.

The Food Chain Safety Strategy has not been deduced from rural developmental, economical, or environmental protection targets, but – according to the previously defined, main objective – it is a document focusing on sharing data and information related to food chain safety in a transparent and mutual way and on enhancement of communication of stakeholders, thus it aims at a knowledge-based society, it has also several connections with other, horizontal strategic documents.

Particular attention was paid to documents related knowledge-based society, like targets defined in the Lisbon Strategy and **Europe 2020**⁷⁸, highlighting the knowledge as value. According to the priority “Smart growth: developing an economy based on knowledge and innovation” smart growth means strengthening of knowledge and innovation as drivers of our future growth. This requires improving the quality of education, strengthening of research performance, promoting innovation and knowledge transfer throughout the Union, making full use of information and communication technologies, ensuring that innovative ideas can be turned into new products and services that create growth and quality jobs so as to handle European and global challenges of society.

Success needs money and proactive actions and paying attention to the needs of the user and market possibilities.

The **National Research Development and Innovation Strategy 2020**⁷⁹ constitutes the national approach on the previously expressed innovative effort by the European Union.

All of the milestones laid down in the strategy are connected to the programs of the National Food Chain Strategy on strengthening research and innovation: Training of Researchers and Creative experts; Internationally competitive research organizations; Integrated innovation services; Enhancing collaboration and networks; Positioning of small innovative businesses; R&D and technology based enhancing of medium-sized businesses; R&D based integration of internationally owned MNCs.

Besides the above mentioned strategies other horizontal strategies were considered as well, i.e. the **Strategy for Danube region**⁸⁰, the elements of this strategy can be connected to the National Food Chain Safety programs: 4) Water quality restoration and preservation; 6) Reservation of biodiversity, lands, air and soil quality; 7) Building of a knowledge based society; 8) Supporting the development of the competitiveness of businesses; 9) Investment into human resources and skills; 10) Expansion of institutions and strengthening of cooperation; 11) Improvement of security.

The Food Chain Safety Strategy had to be aligned with priority and execution tools of the **National Sustainable Development Strategy 2012-2024**⁸¹. So several pillars of them concern the followings: Knowledge; Health; Public resources; Natural resources; Business asset, employment; Macro-economical balance.

On the whole it is obvious that the goals related to food chain safety due to their importance occur in several horizontal and sector-based strategies and programs as well, but there is

no harmonization with each other. This can lead to the fragmentation of goals and execution because of lack of appropriate allocation of the resources.

The National Food Chain Safety Strategy with its overall topic and level is predestined to provide a framework for heterogeneous strategies focusing on certain subareas. The state sector policy based on the National Food Chain Safety Strategy and the operational implementation and monitoring system can guarantee the practical implementation of intentions and goals. The relation of the objectives, which is illustrated below, gives the basis of the involvement of the strategies in the National Food Chain Safety Strategy framework, providing future integration.

The correspondence with other strategies and the Food Chain Safety Strategy is presented on Figure 12, while the relationship between the main objectives of the strategies and the Food Chain Safety Strategy's programs are shown on Figure 13.

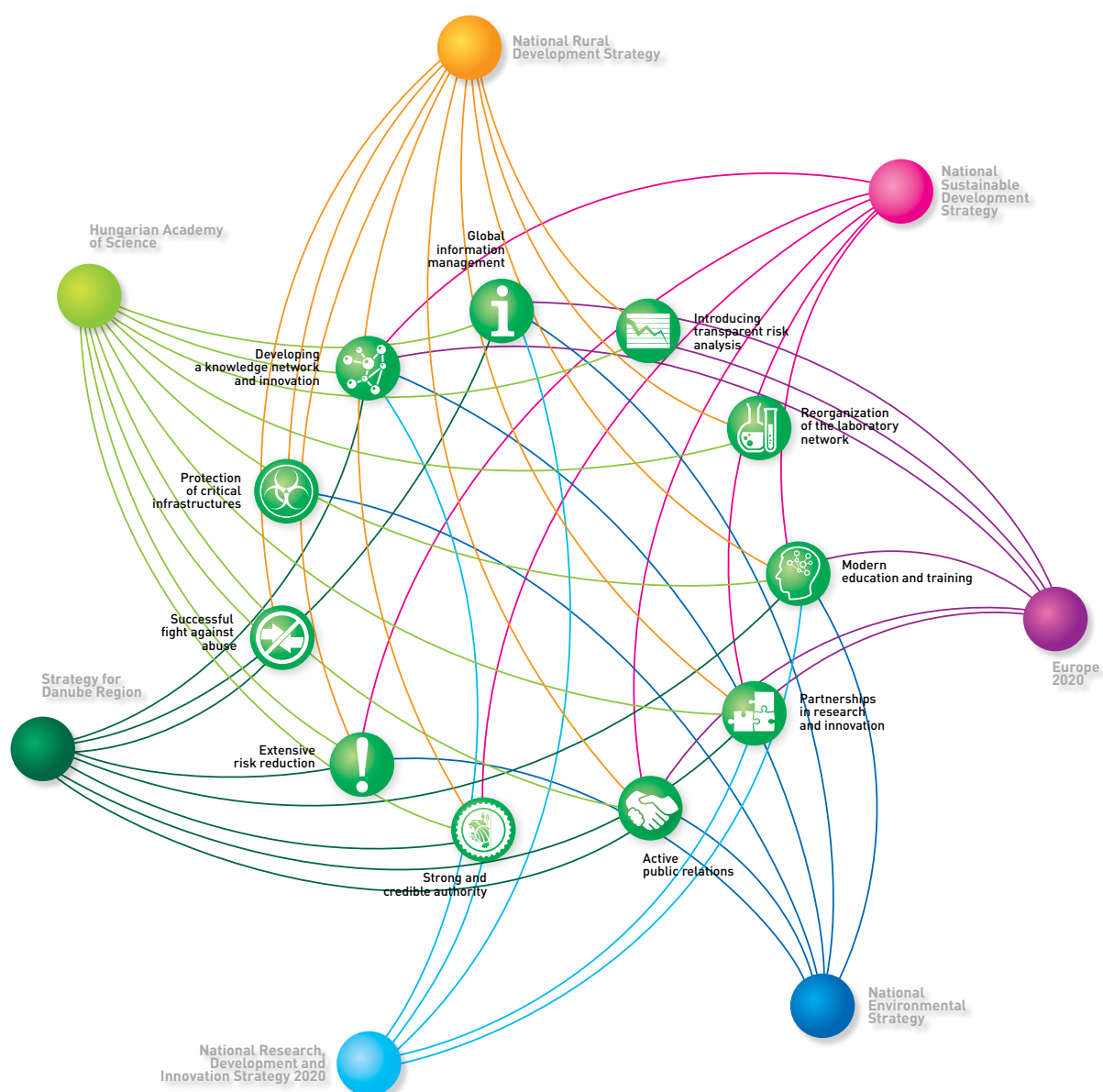


Figure 12: The correspondence between the Food Chain Safety Strategy and other strategies

⁷⁷ 96/2009. (December 9) Parliamentary Resolution on National Environmental Program 2009-2014

⁷⁸ Communication from the Commission. EUROPE 2020th For smart, sustainable and inclusive growth (Brussels, 03/03/2010. COM (2010) 2020 final)

⁷⁹ Investing in the future. National Research and Development and Innovation Strategy 2020th DRAFT created for social consultation 2012. November. http://www.kormany.hu/download/f/36/b0000/Nemzeti_Kutatas-fejlesztési_és_Innovációs_Stratégia_2020_TERVEZET_20121106.pdf

⁸⁰ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions of the European Union Strategy for the Danube Region. Action Plan (Brussels, 12/08/2010., SEC (2010) 1489 final

⁸¹ The concept of national transition towards sustainability. National Sustainable Development Strategy Framework 2012-2024. http://www.nfft.hu/dynamic/NFFS_rovid_OGYhat_melleklete_2012.05.16_vegso.pdf

The background is a solid blue gradient. It features a pattern of overlapping, rounded squares and lines in a lighter blue shade, creating a geometric, abstract design. The squares and lines are scattered across the upper and middle portions of the image.

Ex ante evaluation

Ex ante evaluation



Food Chain Safety
STRATEGY 2013-2022

The Food Chain Safety Strategy's ex ante evaluation is a significant part of a strategic planning process; it is an ongoing interactive assessment aimed at improving the quality of the planned strategic document. The ex ante evaluation – although it cannot predict the success of the strategy – can act as certain quality assurance which helps to define the goals and strategic indicators, ensures the feasibility of objectives, the effectiveness of spending methods and enhances the reliability of the ongoing evaluations in the future.

The Food Chain Safety Strategy – as a national medium-term strategy – is a high level strategic documentation, so the objectives are less operational, therefore it is not easy to set up usual indicators to measure the proceedings and also there is limited room for analysis of options.

We need to pay special attention to these during the further breakdown of the goals of the Food Chain Safety Strategy.

As a summary on the pre-evaluation we would like to show the strategy quality improvements along critical factors.

Situation analysis, raising questions and needs assessment

The basic terms connecting to the strategy were defined in the course of the introduction and the situation analysis (e.g. food chain, and its safety) and the actors of the food chain were also identified. The environment of the strategy was fully analyzed by PESTEL model. In order to ensure that the right questions are raised, during the elaboration of the conceptual framework,

experience and opinions of wide range of social strata and experts were involved.

Altogether 1447 consumers were asked with respect to their opinion on food chain safety and its control, furthermore 126 food chain businesses were asked with respect to the same topic. Experts on official control of food chain safety answered similar questions in the form of online questionnaires and in-depth interviews, besides the situation related to food chain safety, possible professional objectives were also determined during this research.

Experts on science, research and higher education in the area of food chain safety had the possibility to share their opinion about the area via personal interviews. In the composition of the concept the Food Safety Subcommittee of the Hungarian Academy of Sciences Environmental Science Committee, the Hungarian Academy of Sciences Food Science Committee and the Hungarian Academy of Sciences Veterinarian Committee participated actively. Through the experts working for these committees the opinion of many research institutions, universities were built in the strategy and besides this during the preparation phase 15 additional scientific and high educational institutions were addressed in written or oral consultation form.

The situation analysis is extensively strong by the involvement of national experts and wide range of society, and by the surveying of certain synergisms of different strategies, and at the same time by using a deeper review of related literature and specific technologies – especially information technology developments, – which

shall be carried out appropriately during the future assessment of the strategy.

Setting objectives and assessment of options

Besides the above mentioned wide range of social groups, the aims laid down in the previous strategic documents were influencing the intervention areas during the determination of objectives. The process was supported by reviewing many hundreds of national and international literature and many documents of MRD and its institutions with similar topic and nearly hundreds of interviews made with the top and middle managers of MRD and NÉBIH. The advantages of both deductive and inductive methods were used during exploring of casual relationship and targeting and breaking down objectives.

During the targeting process other documents, such as strategies, programs and action plans connected with the food chain were also considered. Therefore the Food Chain Safety Strategy programs are in line with the goals determined in the following strategic documents: program of the Hungarian Academy of Sciences for 'Food security – The strategic principles of the Hungarian food industry, rural development and food safety'; National Rural Development Strategy 2020; National Environmental Program; Europe 2020; National Research, Development and Innovation Strategy 2020, Strategy for the Danube Region; National Sustainable Development Strategy 2014-2024. It is obvious that the goals related to food chain development will appear in the horizontal and

sectorial strategies as well, however without any reconciliation. This will lead to the fragmentation of goals and implementation because of lack of proper allocation of resources. The Strategy's overall topic and level is suitable for providing a framework for the objectives of strategies and programs which are heterogeneous and bring into focus certain subfields.

As mentioned earlier there are only limited possibilities for analysis of options which would mean at this level that according to the actual option some of the programs or an entire whole pillar is not implemented. As it is described in the Strategy, improvement of food chain safety can only be provided in a complex way with simultaneous implementation of all intervention areas. The no-action alternative will result in the collapse of food chain safety, or failure to develop in a sufficient manner, therefore the quality of life decreases, a greater economic burden is imposed on society, Hungarian businesses become disadvantaged at European and international markets, and without having a strategy in place it is not possible to fight against black economy.

Strategic indicators and monitoring system

The indicator system for measuring the realization of strategic goals consists of two levels: besides measuring the realization of the detailed objectives (Complex Program Indicator) – taking into account that even if all goals are achieved but the system is not developing – there is need to measure the achievements of the

general objectives as well (The Food Chain Safety Strategy Fulfilment Index). So during preparation of the strategy general indicators have been set as well, which can expansively measure food chain safety. During the formulation of the indicator system quantitative and qualitative measures of achievement were addressed.

There is a need to measure and assess all the 11 Complex Program Indicators and the Food Chain Safety Strategy Fulfilment Index annually, which provides a suitable frequency for tracing back the achievements and – if necessary – the flexibility of the strategy can be fulfilled by replanning the set of goals or the timing. The current indicator system is based on previous information and international experience but we have to pay attention to the fact that there is no good method for measuring food chain safety as a final general rule. Measuring the fulfilment of the detailed goals will be hopefully carried out smoothly however in case of general indicators measurement we could face a reformulation of the indicator system, that's why it is necessary to focus on their function. During the review of the strategy other benchmarking methods which can help measuring the progress may be taken into account.

Strategic tools and risk management

Tools helping to achieve the elimination of differences between the current and future state. The strategy requires conscious change management and puts project management way of thinking in focus. The strategy explains

the need for the establishment of a separate strategic program office, a strategy-oriented institutional system and the possibility for the enforcement organisation to become a learning system. These will support resource-effectiveness and the handling of risk management.

Resource Plan

The data of the resource plan was calculated for a 10 year period of extrapolation according to the available information in 2013; approximately 400 billion HUF will be used during the 10 years period of strategy execution. Additional values were investigated in the course of resource planning. Based on the analysis it is obvious that calculating only with the added values the cost-benefit ratio is around 1.5.

The resource planning – compared to other governmental strategies – is adequately detailed and during the execution it calculates with national state budget and developmental financial resources provided by the EU. These can influence significantly the quality of realization of sub goals because of EU funds have been not fixed yet. We assume that at least 90% of the final total budget will be available so executability will not be disturbed by changes made to funding.

Summary

According to the ex ante evaluation, which was prepared in line with setting up the strategy, the Food Chain Safety Strategy covers all the identified problematic areas within the timeframe of 2013 to 2022, by setting up relevant goals for all stakeholders.

The indicator system of the strategy is capable of measuring the achievement of objectives and the tools are capable – besides the fulfilment of goals – also of risk management. On the whole the strategy has got all strategic content and formal elements, and compared to other international strategies it is adequately detailed and well-structured. It fulfils all criteria what we expect from a national midterm strategy and according to reviewing of the possible critical points the strategy is realistic.

Out of the possible risks we have to highlight that covering more election cycles can disrupt the execution of the strategy which requires later a lot wider social involvement and conciliation during the development of certain programs.

The breaking point in the future development of the strategy may trigger a deeper synthesis with environmental sustainability and more comprehensive integration of the results of international researches on food chain safety and achievements of technological developments.

By the establishment of an internationally competitive national food chain safety system we can achieve a significant economic and health-related profit with a small investment, so as to enable the achievement of the vision: ongoing availability of healthy, high quality and safe food chain products (especially food) and high level of awareness by people and the society in the course of production, trade, usage or consumption of food are required.