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Nordic Council of Ministers

Safe and wholesome food

Nordic reflections

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Safe and wholesome food

Nordic reflections

Safe and wholesome food

Nordic reflections

Conference of the Nordic Council of Ministers
Reykjavík, Iceland
14 – 15 October 2004

Grímur Valdimarsson,
Conference Chairman and Proceedings Editor

Sigríður Stefánsdóttir,
Conference Executive Director and Proceedings Editor

Alda B. Möller,
Conference Secretary and Proceedings Editor

Reykjavík May 2005

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Conference Proceedings**

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Nordic co-operation

Nordic co-operation, one of the oldest and most wide-ranging regional partnerships in the world, involves Denmark, Finland, Iceland, Norway, Sweden, the Faroe Islands, Greenland and Åland. Co-operation reinforces the sense of Nordic community while respecting national differences and similarities, makes it possible to uphold Nordic interests in the world at large and promotes positive relations between neighbouring peoples.

Co-operation was formalised in 1952 when the Nordic Council was set up as a forum for parliamentarians and governments. The Helsinki Treaty of 1962 has formed the framework for Nordic partnership ever since. The Nordic Council of Ministers was set up in 1971 as the formal forum for co-operation between the governments of the Nordic countries and the political leadership of the autonomous areas, i.e. the Faroe Islands, Greenland and Åland.

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Preface

This book is the Proceeding of the Conference:

Safe and wholesome food Nordic reflections

which was held in Reykjavík on October 14-15, 2004.

The conference was one of the chief events hosted under the Icelandic chairmanship of the Nordic Council of Ministers in 2004 and was supported by a special grant from the Nordic Council of Ministers, which is gratefully acknowledged.

The Conference was organized by the Ministry for the Environment, Ministry of Agriculture and Ministry of Fisheries in Iceland, supported by a Steering Committee and a Scientific Committee as described in the Conference Prospectus. This work is also gratefully acknowledged.

In 2002, a Ministerial Declaration on Food Safety in the Nordic countries was issued in the so-called Greenland Declaration, which states that:

“The Nordic countries should be a driving force in ensuring safe food of high quality through sustainable production by influencing international negotiations and agreements on food safety as well as by strengthening consumer influence in the area of food safety and wholesomeness. Together with the Nordic strategy on sustainable development, this declaration now forms a basis to the extensive and fruitful cooperation on food safety in the Nordic countries.”

In August 2004, the Nordic Food Ministers, in their meeting in Akureyri, Iceland, approved a Declaration on Food, in which enhanced cooperation of the Nordic countries in the field of food and common emphasis clearly emerged.

Under the auspices of Nordic cooperation on food, the first category of bearings for the sustainable development of food safety has been developed and published in the report titled: “Sustainable development of food safety”, available from the Nordic Council of Ministers.

The conference in Reykjavík was intended to give a broad view of new challenges for food safety and wholesomeness in an increasingly globalized market, and to analyse aspects of these challenges. It reviewed recent and near-future key developments to ensure that the food supply in the Nordic countries remains safe and wholesome.

The Conference was attended by food policy makers in the Nordic countries, food industry specialists, scientists engaged in research on food safety and nutrition, food regulators, public health workers and consumer representatives.

Reykjavík, May 2005

Acknowledgements

The Conference Steering Committee wishes to thank the following for their valuable contribution in the conference preparations, its successful outcome, and preparation of the material for publication in the Conference Proceedings:

First and foremost, the organizers thank the following, who were the main speakers:

Mr. Roger Aertgeerts, World Health Organization,
Ms. Jackie Bannister, Bakkavor Group, United Kingdom,
Ms. Daniela A. Battaglia, Food and Agriculture Organization,
Mr. Roland J. Cormier, Canadian Food Inspection Agency,
Mr. Anthony Cox, Organisation for Economic Co-operation and Development,
Mr. Jón Gíslason, European Free Trade Association Surveillance Authority,
Dr. Unni Kjaernes, National Institute for Consumer Research, Norway,
Mr. Geoffrey Podger, European Food Safety Authority,
Dr. Barbara O. Schneeman, Center for Food Safety and Applied Nutrition, US Food and Drug Administration,
Ms. Christina Schröder, World Trade Organization,
Mr. Per Unckel, Nordic Council of Ministers.

The expertise of these people and their willingness to share their knowledge resulted in a most valuable outcome of the conference.

The contribution of the initiators of the four main discussion themes and the co-chairs in the discussion sessions is also gratefully acknowledged. They were:

Dr. Jón Árnason, Laxá Feedmill Ltd., Iceland,
Ms. Brynhildur Briem, Consumer Association of Iceland,
Dr. Helga Gunnlaugsdóttir, Icelandic Fisheries Laboratories,
Mr. Halldór Runólfsson, Icelandic Veterinary Services.
Ms. Bente Stærk, Nordic Council of Ministers, and
Mr. Knud Østergaard, Danish Food and Veterinary Administration, Denmark.

The Steering Committee sought collaboration with the Food and Agriculture Organization (FAO) of the United Nations to have Dr. Grímur Valdimarsson, Director of its Fishery Industries Division to act as Chairman of the Conference. The Committee is very appreciative of FAO's positive response and commitment to the Conference. In addition the following FAO staff assisted in reviewing the papers:

Dr. Richard Grainger, Chief, Fishery Information, Data and Statistics Unit, FIDI,
Mr. Jochen Nierentz, Senior Fishery Industry Officer, FIU,
Dr. Audun Lem, Fishery Industry Officer, FIU,
Ms. Londa Vander Wal, Agricultural Economist, ESNS,
Dr. Leo Hagedoorn, Project Coordinator, ESNS.

The work of Dr. Grímur Valdimarsson and his colleagues at the FAO is most gratefully acknowledged.

The Steering Committee would also like to thank the following members of the Scientific Advisory Group for their valuable help in planning the Conference Programme:

Mr. Jón Gíslason, EFTA Surveillance Authority,
Ms. Elín Gudmundsdóttir, Environment and Food Agency Iceland,
Mr. Halldór Runólfsson, Icelandic Veterinary Services,
Dr. Sjöfn Sigurgísladóttir, Icelandic Fisheries Laboratories,
Dr. Laufey Steingrimsdóttir, Public Health Institute of Iceland.

Reykjavík, May 2005

The Conference Steering Committee:

Mr. Ingimar Sigurdsson, Ministry for the Environment, Iceland (Chair)
Ms. Sigríður Stefánsdóttir, Ministry for the Environment, Iceland
Mr. Kristinn Hugason, Ministry of Fisheries, Iceland
Mr. Hákon Sigurgrímsson, Ministry of Agriculture, Iceland
Mr. Knud Østergaard, Danish Veterinary and Food Administration, Denmark,
Ms. Kari Bryhni, Norwegian Food Safety Authority, Norway,
Dr. Stuart Slorach, National Food Administration, Sweden
Dr. Grímur Valdimarsson, Food and Agriculture Organization (FAO)

Summary

Modern food production technology, marketing and transport systems, together with liberalization of trade have created a truly global marketplace for food, but at the same time put the issues of food safety and quality into a new perspective. It is acknowledged that even though food production systems normally perform well to deliver safe foods they can never make food completely free of risk. The current food safety strategy of many countries is to take into account the whole food chain from primary production to the consumer and to build the responsibility of each party into the regulatory structure.

The conference on Safe and wholesome food gave an overview for food safety issues in the entire food chain. Experts from WHO and FAO focused on drinking water and animal health issues, while a food technologist from a large manufacturer of fresh prepared foods discussed the complex task of satisfying the requirements of the law, the consumer and the customer. The consumer voice was also heard through a presentation on the study of consumer trust in food in a number of European countries. Functional foods, and especially the issue of labelling requirements, was also presented by an expert from the US Food and Drug Administration.

The influence of WTO agreements on national policies and regulations for food products was the subject covered by a WTO counsellor. The WTO Agreements explicitly address the right of governments to give priority to health protection, while ensuring that unjustified barriers to trade are not imposed.

In the European Union the new and revised food and feed legislation forms the basis for all future official control activities in the food chain. The legislation also defines the responsibilities and requirements that business operators have to fulfill. Two presentations focused on different aspects and significance of this new legislation.

The Executive Director of the European Food Safety Authority (EFSA) described the functions of this new scientific body that was set up to contribute to improved food safety in the EU and answers to a key requirement for timely and accurate scientific information. EFSA aims to improve the way that

EU risk assessment is carried out and increase consumer confidence in EU risk assessments.

An expert from the EFTA Surveillance Authority talked about the safety of the food chain, chiefly with reference to EU food legislation. He discussed the responsibilities of not only official control authorities but also of business operators and outlined new provisions for traceability, requiring food and feed businesses to be able to identify any operator that has supplied the businesses with food or feed, food-producing animals or ingredients for production of food or feed. Furthermore, he outlined national control systems, crisis management and the Rapid Alert System for Food and Feed (RASFF).

The ability to trace, follow and identify uniquely a product unit or batch through all stages of production, processing and distribution has become a management tool which may be utilized in the food chain for different purposes. The importance of traceability was discussed by an expert from OECD, whose focus on the issue was from several perspectives: that of the consumer, of industry and of governments, with a special reference to fish products. Traceability is important for safety and quality, marketing and cost savings, and as a tool to improve resource utilization.

Finally, an expert from the Canadian Food Inspection Agency discussed the need for knowledge networks as a means of keeping abreast of emerging food safety and quality issues. Science-based risk analysis is increasingly used to develop national food safety requirements. The need for current and pertinent scientific and technical knowledge is often proving to be a limiting factor in conducting this analysis effectively.

In an open discussion forum the conference dealt with questions about openness of information on food-safety issues, and more particularly how this information should be presented to consumers. It also discussed ways for the food industry and authorities to manage food safety issues in the media. Food labelling, especially as it relates to food intolerance and allergic reactions, was also debated and finally the conference discussed various aspects of ethical farming.

Sammendrag

Moderne teknologi inden for fødevareproduktion, markedsføring og transportsystemer har sammen med frigivelsen af handel skabt en sand global markedsplads for fødevarer, men har samtidig sat fødevaresikkerhed og kvalitet i et helt nyt perspektiv. Det er anerkendt, at selvom fødevareproduktionssystemer almindeligvis udmærket klarer at levere sikre fødevarer, så kan de aldrig frigøre fødevarer fuldstændig for risiko. Den nuværende fødevaresikkerhedsstrategi går i mange lande ud på at se på hele fødevarekæden fra den primære produktion og til forbrugerne, og at indbygge et ansvar for hver part i reglerne.

Konferencen om Sikre og sunde fødevarer gav en oversigt over fødevaresikkerhedsspørgsmål i hele fødevarekæden. Ekspert fra WHO og FAO fokuserede på drikkevand og dyresundhed, medens en fødevaretekniker fra en større producent af friske tilberedte fødevarer diskuteret den udviklede opgave at opfylde lovens, forbrugerens og kundens krav. Forbrugernes stemme blev også hørt via en præsentation af en undersøgelse af forbrugernes tillid til fødevarer i en række europæiske lande. Funktionelle fødevarer, og især kravene om mærkning, blev også præsenteret af en ekspert fra US Food and Drug Administration.

WTO aftalernes indvirkning på national politik og regler om fødevarer blev omtalt af en WTO rådgiver. WTO aftalerne omhandler udtrykkeligt regeringernes ret til at prioritere beskyttelse af helbredet, samtidig med at det sikres, at der ikke indføres uberettigede handelsbarrierer.

I den Europæiske Union udgør den ny og reviderede fødevare- og foderstoflovgivning grundlaget for alle fremtidige offentlige kontrolaktiviteter i fødevarekæden. Lovgivningen fastlægger også det ansvar og de krav som forretningsdrivende skal opfylde. To præsentationer fokuserede på forskellige aspekter i og betydningen af denne ny lovgivning

Den administrerende direktør hos Den Europæiske Fødevaresikkerhedsautoritet (EFSA) beskrev dette nye videnskabelige organs funktioner, som blev etableret for at bidrage til øget fødevaresikkerhed i EU og svarer for et centralt krav om rettidig og nøjagtig videnskabelig information. EFSA agter at forbedre måden, hvorpå EU vurderer risici og øge forbrugernes tillid til EU's risikovurdering.

En ekspert fra EFTA's tilsyns- og kontrolmyndighed talte om sikkerheden i fødevarekæden, især med relation til EU's fødevarelovgivning. Han diskuteret det ansvar, der ikke kun ligger hos offentlige kontrolmyndigheder, men også hos forretningsdrivende, og beskrev nye bestemmelser om sporbarhed, som kræver at fødevare- og foderforretninger skal kunne identificere enhver leverandør, der har leveret fødevarer eller foderstoffer, fødevareproducerende dyr eller ingredienser til produktion af fødevarer eller foderstoffer til deres virksomhed. Yderligere beskrev han de nationale kontrolsystemer, krisestyring og det hurtige alarmssystem for fødevarer og foderstoffer (RASFF).

Muligheden for unikt at spore, følge og identificere en produktenhed eller en batch gennem alle niveauer i produktionen, bearbejdningen og distributionen er blevet et styringsværktøj, der kan udnyttes i fødevarekæden til forskellige formål. Sporbarhedens betydning blev diskuteret af en ekspert fra OECD, som fokuserede på emnet fra forskellige synsvinkler: forbrugerens, industriens og regeringens, med særlig relation til fiskprodukter. Sporbarhed er vigtig for sikkerhed og kvalitet, markedsføring og omkostningsbesparelser, og som et værktøj til at forbedre udnyttelsen af ressourcer.

Endelig diskuteret en ekspert fra Det canadiske fødevaretilsyn behovet for vidennetværker som en metode til at holde sig ajour med nye sikkerheds- og kvalitetsemner. Videnskabsbaseret risikoanalyse anvendes i stigende grad ved udvikling af nationale fødevaresikkerhedskrav. Behovet for aktuel og relevant videnskabelig og teknisk viden viser sig ofte at være en begrænsende faktor for en effektiv gennemførelse af analysen.

I et åbent diskussionsforum behandlede konferencen spørgsmål vedrørende åbenhed omkring information om fødevaresikkerhed, og især hvordan denne information skal præsenteres for forbrugerne. Man diskuteret også mulighederne for fødevareindustrien og myndighederne til at håndtere fødevaresikkerhedsspørgsmål i medierne. Fødevaremærkning, specielt vedrørende overfølsomhed og allergiske reaktioner, blev også debatteret, og endelig diskuteret konferencen forskellige aspekter vedrørende etisk landbrug.

Programme

Safe and wholesome food Nordic reflections

Programme
Thursday October 14,
9.30 a.m. – 4 p.m.

Chairman: Dr. Grímur Valdimarsson, Director,
Fishery Industries Division, Food and Agriculture
Organization (FAO) of the United Nations

Presentations

Safe and wholesome food: Nordic perspectives

Mr. Per Unckel, Secretary General of the Nordic
Council of Ministers

The European Food Safety Authority

Mr. Geoffrey Podger, Executive Director, European
Food Safety Authority (EFSA)

The World Trade Organization (WTO) Agreements' influence on national policy and regulations for food products

Christina Schröder, Counsellor, Agriculture and
Commodities Division, World Trade Organization

Coffee

How do you run a food business to satisfy the requirements of the law, the consumer and your customer?

Ms. Jackie Bannister, Head of Food Technology,
Bakkavor Group, United Kingdom

Consumer trust in food - in Europe and in the Nordic countries

Dr. Unni Kjaernes, Senior Researcher, National
Institute for Consumer Research (SIFO), Norway

Controlling the safety of the food chain

Mr. Jón Gíslason, Deputy Director, Food Safety and
Environment Unit, European Free Trade Association
(EFTA) Surveillance Authority

Lunch

Functional foods

Dr. Barbara O. Schneeman, Director, Office of
Nutritional Products, Labeling, and Dietary
Supplements, Center for Food Safety and Applied
Nutrition, US Food and Drug Administration (FDA)

World Health Organization (WHO) programmes on food safety and drinking water

Mr. Roger Aertgeerts, Regional Adviser, Water and
Sanitation, WHO Regional Office for Europe, World
Health Organization (WHO)

Animal health and feed quality

Ms. Daniela A. Battaglia, Animal Production Officer,
Food and Agriculture Organization (FAO) of the
United Nations

Coffee

Traceability in fisheries

Mr. Anthony Cox, Senior Analyst,
Fisheries Division, Organisation for Economic Co-
operation and Development (OECD)

Knowledge networks on food safety: A basis for risk analysis

Mr. Roland J. Cormier, Program Officer, Fish,
Seafood and Production Program Network -
Atlantic, Canadian Food Inspection Agency (CFIA)

Reception by the Mayor of Reykjavík, 6 p.m. – 8 p.m.

Address: Mr. Árni M. Mathiesen,
Minister of Fisheries, Iceland

Programme
Friday, October 15,
9.30 a.m. – noon

Discussion session

Chairman: Dr. Grímur Valdimarsson, Director, Fishery Industries Division, Food and Agriculture Organization (FAO) of the United Nations
Co-chairmen: Ms. Bente Stærk, Senior Adviser, Nordic Council of Ministers, and Mr. Knud Østergaard, Chief of Office, Danish Food and Veterinary Administration, Denmark

Theme 1: **Food safety - are there issues specific to the arctic region?**

Initiator: Dr. Helga Gunnlaugsdóttir, Department Head, Icelandic Fisheries Laboratories, Iceland

Theme 2: **How can the food industry and authorities prevent or manage food safety scares in the media?**

Initiator: Dr. Jón Árnason, Nutritionist, Laxá Feedmill Ltd., Iceland

Theme 3: Is food labelling sufficient, especially as it relates to food intolerance and allergic reactions?

Initiator: Ms. Brynhildur Briem, Lecturer in Food Science and Nutrition at the Iceland University of Education, and Representative of the Consumer Association of Iceland

Theme 4: **Ethical farming and animal wellbeing - a luxury or a necessary response to public demands?**

Initiator: Mr. Halldór Runólfsson, Chief Veterinary Officer, Iceland

Address by The Icelandic Minister for the environment

Ms. Sigríður Anna Thórdardóttir, Minister for the Environment, Iceland

Introduction in one of the discussion sessions.

Safe and wholesome food: Nordic Reflections

Address by Sigríður Anna Thórdardóttir,
Minister for the Environment, Iceland

Dear conference participants

The highlight of the Icelandic Presidency in the Nordic Council on Food Safety is without doubt this International Conference on Safe and Wholesome Food. Our aim for this conference was to provide a forum where the different perspectives of food safety and wholesome food would be brought to the table and discussed. I sincerely hope that we have succeeded in our endeavour to look at the matter from the point of view of consumers, the industry, the surveying authorities and the relevant international organisations.

The presentations have provided us with very useful information brought forward by people with unique knowledge in the field. We have during the last two days attempted to shed a light on where we stand as food producers and furthermore what should be our priority actions in the months and years ahead in order to ensure that the Nordic countries keep their leading edge in fostering food safety and wholesome food. Your contribution during this conference has been extremely helpful towards that goal.

I believe that the Nordic countries are in the forefront regarding food safety and wholesomeness. Nevertheless, it is necessary for us to acquire a better overview of the present situation in a broader context than relating to the Nordic countries. In our present age of the well informed consumer, the society's requirements are constantly increasing regarding processing methods, labelling and general consumer information. Therefore we must ensure that laws and regulations in this field will take consumer needs fully into account. The present time demands that the food we consume is both safe and wholesome.

Due to increasing international trade in food products, enhanced cooperation and integration of methods for risk assessment and risk management for food safety must be pursued, not only within the food sector of each country but also in the international community as a whole.

In August the Nordic Food Ministers in their meeting in Akureyri approved a Declaration on Food, in which enhanced cooperation of Nordic countries in the field of food and common emphasis clearly emerged.

In the Akureyri Declaration on Food, the Nordic Food Ministers reiterate that to achieve set goals on a sustainable food chain "from farm to fork", encompassing the health and welfare of animals together with the quality and safety of food, the legislation on food safety must be based on the main principles of risk assessment. Both internal quality control of food companies and government inspections must be efficient. Emphasis must be placed on surveillance of the environment and food at all stages of production, covering the entire food chain from "farm to fork".

Under the auspices of Nordic cooperation on food, the first category of bearings for the sustainable

development of food has been developed in the report titled: "Sustainable development of food safety - new bearings in the Nordic countries".

Indicators on food safety are useful tools for monitoring whether trends are in the right direction and may also be utilized as guidelines on risk assessment in the future. The food ministers were also unanimous in strengthening Nordic cooperation on food research, having in mind the benefit for the whole population as well as specific target groups.

I think it is extremely important for the Nordic countries to continue working together to achieve the goals set to ensure safe and wholesome food for consumers. Having been in the forefront on food safety matters, the Nordic countries can have a substantial influence on the development of these

matters in international fora. Each individual state must nevertheless be prepared to examine its own organization and administration of food affairs to improve efficiency. In Iceland we plan to meet these challenges by simplifying and strengthening the administration of food matters through the enactment of a single body of legislation on the subject and placing it within one ministry and a single organization.

I would like to use this opportunity to thank the Nordic Council of Ministers for supporting this conference with a generous contribution.

I would also like to thank all the presenters and participants for their contribution and the chairman of the conference Dr. Grímur Valdimarsson for his important part in leading this conference to a successful conclusion.

Safe and wholesome food: Nordic Perspectives

Mr. Per Unckel

Secretary General of the Nordic Council of Ministers

Welcome to this important conference, which is organised by three Icelandic ministries: the Ministry for the Environment, the Ministry of Agriculture, and the Ministry of Fisheries, together with the Nordic Council of Ministers.

Safe and wholesome food is a very important and timely topic from a variety of views: It has become somewhat of a Nordic trademark towards the rest of the world, but it is also a topic that interests the public in general. In my previous experience as an active politician, I learned from strategists 10-15 years ago, that the specific topic of safe food was probably going to be one of the most important and dividing party-political issues. My reply was "Fine !", because if politicians are rushing to the top to promote safe food, then we are living and acting in the best of political worlds.

For the benefit of those who are not familiar with the Nordic Council of Ministers, I would like to introduce it briefly to the conference. The Nordic Council of Ministers is called Nordiska ministerrådet in Scandinavian languages. The Swan symbol and the accompanying word Norden is nowadays the trademark for all the Nordic co-operation, and is used in all languages. Although a Scandinavian word, it is also used in English and other languages around the world.

The Nordic Council of Ministers is the official organisation for the co-operation between the Nordic governments. The Nordic Council is an older and smaller institution for the inter-parliamentarian co-operation. The five Nordic countries are members of both organisations, together with the autonomous territories of Aaland, the Faroe Islands and Greenland.

The Nordic Council of Ministers has an annual budget of approximately EUR 120 million, with the major financial areas of activity being the following:

- Education and science
- Culture
- Environment
- Health
- Children
- Agriculture, forestry, fisheries and foods

Close to 20% of the budget are devoted to activities in Russia, Estonia, Latvia, and Lithuania, based on co-operation that has taken place for many years. This long-standing co-operation is especially significant as regards the Baltic countries, now entering into a new phase as they have become members of the European Union.

Very briefly, the Nordic Council of Ministers is organised in such a way that each of the five countries appoints a co-operation minister, who is delegated responsibility for coordination of the Nordic co-operation programmes. In addition to co-operation ministers, the Nordic Council of Ministers consists of quite a number of specialist Council of Ministers composed of Nordic ministers within different policy areas such as the labour market, education and research, trade and industry, the environment, culture etc.

Presidency of the Nordic Council of Ministers is held by each of the countries in turn for a period of one calendar year on a rota basis. In the year 2004, Iceland is responsible for the chairmanship of all the councils of ministers within the organisation. The overall responsibility for running the activities of the Nordic Council of Ministers lies with ministers for Nordic co-operation, supported by a secretariat in Copenhagen. In addition, the secretariat has an office based in Russia as well as offices in each the three Baltic countries.

The activities carried out within agriculture/forestry, fisheries and food are among the important policy areas of the Nordic Council of Ministers. All these areas are headed jointly by one Nordic Council of Ministers. It has not always been so, but it is a sign of the holistic view that the governments in the Nordic countries want to take on the important subject of the food chain that is also the topic for this conference. Under the ministers, senior officials for the specific areas of food, fisheries, and agriculture/forestry prepare their activities. Thus we have the Nordic Committee of Senior Officials for Food (CSO - Food), the Nordic Committee of Senior Officials for Fisheries (CSO - Fisheries) and the Nordic Committee of Senior Officials for Agriculture/forestry (CSO - Agriculture/forestry).

One can say that the Nordic Council of Ministers is working primarily in two directions in this field. Through working groups, we are trying to develop policies that are forwarded to the senior officials or to the ministers for their implementation. Parallel to the policy statements, projects of different kinds are taking place in order to show how policies could be implemented in practice. In addition, there are institutions - for instance, the Nordic Gene Bank - that are carrying out work in an independent way but under the auspices of the Council of Ministers.

Among the policies and recommendations within the area of food safety the following may be mentioned:

- Nordic policy for increased food safety
- Nordic – Baltic policy for increased food safety
- Nordic labelling policy
- Nordic recommendations for nutritional labelling
- Nordic recommendations for nutrients intake
- Nordic action plan for better life quality through diet and physical activity - in preparation.

Before dealing in more details with the policies and strategies of the Nordic Council of Ministers, just a few words on the international arena of today. We are working, needless to say, in an international and global society, not only with regard to the environment, agriculture and related areas, but even more so as regards economy, trade and businesses. We have, in practice, a globalised food market today, and the industries in this part of Europe are increasingly adapting themselves to these new circumstances. To a great extent, this will influence the way that governments and others have to tackle the challenges and also make use of the possibilities being given by the globalised economy.

From an environmental point of view, the globalisation of our societies clearly plays an increasing role in forming the strategies that we need to adopt.

From a Nordic point of view, we would like to play as important a role as possible in the framing of the relations and developments in this globalised world. Three of the five countries in the Nordic area are members of the European Union, the other two having a special agreement with the Union, in the form of the European Economic Area (EEA) and, for all practical purposes, operating in many areas as if they were members of the Union. It goes without saying that a great deal of our activities within the Nordic area are targeted towards playing an active role within the European Union, thus bringing our values and our way of looking at these issues into a broader European scope. One of these, as I just mentioned, is the holistic view of the food chain, focusing on sustainable production in the broad sense of the word. A special Nordic value often pointed out is that a high degree of consumer protection is, and should be, a trademark for dealing with food and related issues. We have noticed that the Nordic Council of Ministers' reports are well known within the international organisations and in Europe and have a wider application than in the Nordic countries.

The Nordic Council of Ministers has recently carried out a study of the food industries in the five Nordic countries, in order to identify how they have adjusted to the new globalised circumstances. The agro-food industries in the five Nordic countries differ very much with regard to internationalisation, composition, and ranking in the economy. Denmark has probably the most international food industry, followed by Norway, Iceland, and the Faroe Islands. According to the study, Denmark is the only country in the Nordic area that is actually a net exporter of food today.

One of the major activities of the Nordic Council of Ministers within this broad sphere of food, agriculture, fisheries, and the environment, is contained in an agenda or *strategy on sustainable development*. We first developed this agenda a couple of years ago, being probably the first regional organisation in the world to present a total agenda on sustainable development issues. It was very well received and was a stimulus for other countries, not least our own, to adopt similar agendas on a national level, and it has been used as an input in other international organisations to do the same within their ranks.

This agenda has now been in operation for the first “round” including action plans for a four year period and we have just finished the revision of the strategy, taking into account the results that were obtained from the discussion of the first version. The second “round” of action plans covers the years 2005–2008. The new sustainable agenda combines not only the different environmental issues, but also important social and economic issues. This new strategy will be used within the Nordic countries to further develop their national strategies and will be at the disposal of other organisations, both in Europe and elsewhere, to make use of as they wish.

Some of the most important issues of the strategy on sustainable development are concerned with food as almost half of the number of objectives in the action plans cover the food chain and related issues. Two important pillars in this area are 1) Food safety and 2) Diet and health. Besides setting objectives for the development within these areas we have also established proposals for indicators that can measure whether the actual development goes in the right direction. As an example, the objective of “Strengthen knowledge about the relationship between diet, nutrition and health” is combined with the following proposals for indicators: “The percentage of the population with obesity”, “the intake of fruit and vegetables in our societies” and “the number of schools that do not have sales of confectionary or soft drinks”. It will always be arguable what kind of indicators one should use in order to compare countries in a reasonable manner. What we offer is not the final answer, but a number of suggestions for indicators that may be appropriate. From this point of view, we tend to look at ourselves as pioneers in order to stimulate further discussion in other countries and in other organisations.

The Nordic Council of Ministers for agriculture/ forestry, fisheries, and foods is following up on the overall strategy on sustainable development in their day-by-day activities and a more specific action programme for the years 2005–2008. The action programme takes a holistic view on the food chain, and the overall objectives and prioritized activities cover:

- Structural and economic development
- Food and health
- Bio-diversity and genetic resources
- Collective benefits
- Research and development (R&D)
- Information and competence building
- International work

Also here the issue of food safety is combined with that of quality and diet, the overall objective for “food and health” being “*to secure the diversity of healthy and safe food of good quality that provides the consumers with the possibility to choose a diet that will contribute to good health*”. The Nordic Council of Ministers has made the following the focus areas for food and health:

- Diet and health and physical activity
- Contaminants
- Animal health and animal welfare
- Consumer dialogue
- Control systems
- Monitoring
- Risk assessment
- Research and development

Research and development is essential to achieve our objectives. The Nordic Council of Ministers is in the process of reshaping its entire co-operation within R&D, not only in the food safety sector, but in all areas. The fact is that the five Nordic countries are small nations that must compete in the area of R&D. In order to be more competitive in an international market we must combine our efforts. The Nordic Council of Ministers is therefore establishing a Nordic research and innovation area with two pillars, i.e. on the one hand, a Nordic Research Board (NRB, Nordforsk), that aims to combine the national priorities of the individual Nordic countries, and, on the other hand, the Nordic Innovation Center (NICE) that is trying to stimulate activities in order to bring good research activities into business. The Nordic Council of Ministers for agriculture/ forestry, fisheries, and food has decided to join in such an overall strategy in order to see whether we can combine our forces in an intelligent way in order to be more competitive in an international market.

One example of such co-operation is that the Nordic Council of Ministers and the Nordic Innovation Centre have initiated a SAFEFOODERA, which is a network of research programme managers and has the vision “to build a staircase to European excellence in food safety research programming through trust and mutual understanding”. This is now being carried out with the financial assistance from the European Union. This is the way that we would like to see our activities carried out, i.e. initiatives taken, strategies adopted, and other countries and organisations joining in to help us fulfill the ambitions that we have stated in our agendas.

My wish to the participants of this conference is that they will find it useful professionally and will be able to take back a great deal of new knowledge in the important field of food safety.

The European Food Safety Authority

Mr. Geoffrey Podger,
Executive Director, European Food Safety
Authority (EFSA)

I would like to introduce to you the European Food Safety Authority (EFSA), but start by making the point that we have regarded all the Nordic countries as equal partners in the Authority since its inception, and that we have very much appreciated the help, support and co-operation that we have had with them.

Functions of EFSA

EFSA is basically a scientific body that is trying to contribute to improved food safety in the EU by carrying out the following major tasks:

- Improving the way that EU risk assessment is carried out,
- Increasing consumer confidence in EU risk assessments,
- Ensuring close collaboration between national bodies and EFSA,
- Enabling improved collaboration between the many different stakeholders and coordinating their input,
- Providing the right information to consumers at the right time,
- Providing the right information to government, industry, NGOs and other stakeholders at the right time.

Improving the methods for European Union risk assessment has the ultimate aim of getting the science right, but we also undertake this work in order to increase consumer confidence in food, which is very much a key aspect of what we're doing. This involves processes which are very normal in the Nordic countries, but which are certainly not normal in the whole of the European Union, such as total openness of process, involvement of stakeholders, and making the best use possible of communications media.

EFSA is not a body on its own. It is very closely co-ordinated with the national authorities and intends to strengthen the relationships with stakeholders.

The final two points on the above list are very important, i.e. dealing with real food issues and avoiding unnecessary alarms over panic issues that have no justification. There is a key need to provide timely and accurate scientific information, and we see that as one of our chief challenges.

Having said that, EFSA on its own certainly can't do everything. It is important to understand that there are limitations to our role, unlike many national food authorities, although not all.

What EFSA cannot do

EFSA cannot be responsible for food safety and nutrition policy and legislation. It cannot take charge of food safety controls, labelling or other such issues. Furthermore, we do not, in any way, seek to substitute ourselves for national authorities who have more than enough things to do themselves. And finally, we have to be realistic about our ambitions. It may be nice to think we can solve all the problems of the world, but in fact, like everybody else, we have to prioritise.

EFSA management and staff

EFSA is run by an independent management board that has taken a decisive key role in protecting the independence of the European Authority. This is very important and we protect our independence, first and foremost, by giving ourselves the role of taking on tasks by our own choice and by not having our agenda dictated by others. We also very strongly seek to ensure that the questions that we are asked receive balanced and sensible scientific

responses. A good example of that are questions about animal health problems or issues. We always also include a food safety component since there can often be tensions between animal health and food safety. We do our own priority setting, we are very open indeed in terms of our processes and outcomes, and we have very much taken the view that we cannot simply do what might be called “conveyor-belt science”. We have to give ourselves the time necessary to solve difficult scientific problems.

The European Authority is still quite a small body with close to 100 staff, having grown from 20 in February 2003. We anticipate that we will end up with about 250–300 staff. We are genuinely multi-national and multi-cultural. At EFSA, you’re quite as likely to hear French, Dutch, or Spanish being spoken as you are English. And we are very much trying to build up links with national authorities through having a system of national secondees, who work for EFSA but in due course return to their national authorities.

Scientific experts panels

It is important to make the point that our scientific work is not conducted simply by our own staff. Indeed, all the major – and most important – work we do is carried out by external scientific expert panels. The panels are composed of people who are nominated from within the European Union and beyond and they are very much the “workhorses” of EFSA. The expert panels were established in June 2003 and they have already produced over 100 opinions with 150–200 opinions expected in 2004. EFSA tries to provide scientific judgments over the whole range of work in an area that has been undertaken so that reliable and best value judgments are available on scientific risk assessment matters across the European Union.

We are very keen, on the one hand, that there should be no mystery about the operations of the panels, and therefore we hold open meetings with stakeholders, consumers, industry and academics. But on the other hand, we have also been keen that the members should be able to discuss things in private, challenge each other, and not feel that, in making their decisions, they are oppressed in any way by outside vested interests. We have taken a very strong view over disclosure of interest, and we have stated clearly that we not only wish to see an act on disclosures of financial interest for members of our panels, but that we also want to look at where people have previously made decisions, which inevitably commit them to one

view or another. As many people will know, there is a risk that you find that food safety conclusions are endorsed by a variety of organisations – which, on the surface, is very persuasive – until you discover that, in fact, the same experts sat on each panel in each organisation. And that is something we need to avoid. We need to be responsive to our critics.

We are also trying to provide more support to our external scientists than we have in the past, which is why we are creating our own internal scientific expert services to provide more expertise.

Our relations with national authorities are very crucial. There is a forum called the Advisory Forum, chaired by myself as the Executive Director of EFSA, and attended by all the Nordic countries, which links the European Authority with national authorities. Much of the work we have done so far has been aimed at exchanging information rapidly and improving our ability to act together, particularly in a crisis. An extranet system for this exchange was established in the summer of 2004, and we have already had the first of a variety of crisis management exercises, which will be reinforced by making sure that all the national authorities in EFSA can communicate by video conference.

The reasons for the need for exchange of information are quite clear. As this conference shows, food safety is a global issue. Issues arising in one part of the European Union or the EEA can very easily affect another body. It is very easy to take decisions without having full knowledge of what other member states may have found, or what the view may be from EFSA. Therefore we plan to have a system that will enable everyone to have more consistent, more coherent and comprehensive advice, which we can all happily act on.

EFSA involvement of stakeholders

Stakeholders are important to EFSA. One main meeting with all our stakeholders has been held and individual panels have also met with them. In addition, we have had an expert scientific conferences on dioxin and PCB exposure, which was held in June 2004, and another on microorganisms in food and feed is due in December 2004. There will be another stakeholder conference in Berlin at the beginning of November. We make a great effort to attend conferences and meetings because the lesson learnt from the food crises across Europe is that if stakeholders do

not feel that they have played a legitimate part in determining processes, in being able to influence bodies, then they will just not have confidence in the results. It is therefore essential that we carry our stakeholders with us if we want to keep a high level of consumer confidence.

It is worth making the point that we do have strong relations with the European Parliament, and that on a number of issues we are working directly with them.

We commissioned an initial survey of EFSA and how it was doing. This report, which is published and available on our Website, indicates, on the whole, quite promising outcomes in terms of the quality of the work and the quality of the staff, but it also indicates what has been a difficulty for the Authority from the start, which is, to put it simply, that everyone thinks EFSA should give priority to their own area of work. The European Parliament would like us to give priority to its work, the Commission would like us to give priority to its work, and also many of our stakeholders would like to be able to directly commission EFSA to give work. The Authority has to find a way of balancing out these competing demands. Clearly, there are problems with the actual volume of work that is scheduled and there are concerns about how we can manage to finish it all.

In the beginning there was criticism of the time it took to start the European Authority. There was a real problem, which still remains, between the separation of risk assessment and risk management. This was done in the European Union context because of the feeling that, during the BSE outbreak, politics had got too mixed up with science, and those who had made decisions had not been able to see clear statements of the scientific facts. The separation of risk assessment and risk management causes difficulties for risk communication, when in fact citizens very clearly want not merely to know what the risk is, but also want to know what is to be done about that risk, what they should do themselves, and any further action that is needed. Therefore, we and our colleagues in the Commission, who remain the risk managers, are having to engage in a variety of exercises and discussions to try and work out how we can combine risk assessment and risk management again. And there is a further challenge to us, which is to try and use more of the external sources of expertise, within the European Union and beyond, for our work.

EFSA is moving its headquarters to Parma in Italy. The move enables the Authority to establish its own identity, and it enables us to establish our identity in a part of Italy which has long traditions of high technology production as well as traditional food production. The main disadvantage is the transport problem, but nevertheless, we are reasonably confident that this will improve in time.

Future challenges

A review of the Authority will be published in 2005, which is likely to concentrate on precisely what the task of EFSA should be. We have issues of workload management, which require several more imaginative approaches as to how to do the work. We need to reinforce the links with national authorities, and above all else, we need to make a difference. We need to increase the impact that risk assessment can have on those who make the decisions in Brussels, so that the European Union can make decisions that are more proportionate and more in keeping with what is actually needed.

I hope this gives you a glimpse of the activities of the European Food Safety Authority. Let me reiterate that we see EFSA as an organisation that can be helpful to, and wants to work with, the Nordic countries on issues of food safety for our common good.

Reference

Website of the European Food Safety Authority is www.efsa.eu.int

The WTO agreements' influence on national policy and regulations for food products

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Introduction

It has recently been said that “trade is about more than economic efficiency. It reflects a system of values: openness, appreciation of differences, peaceful exchange, opportunity, inclusiveness and integration, mutual gains through interchange, freedom of choice, governance through agreed rules, and a hope for betterment for all peoples and lands.” ²

Recognizing this early, the world community has for more than half a century now exchanged goods over country borders in accordance with negotiated multilateral rules, thus facilitating international trade and minimizing trade disputes. Indeed, the multilateral trading system as we know it today started to be put in place in the aftermath of the Second World War. The Breton Woods negotiators who set up the World Bank and the International Monetary Fund in the 1940s also attempted to create an International Trade Organization (ITO). Conceived as a complement, a “third pillar”, to the Breton Woods institutions, the ITO was to provide international discipline in the uses of trade policies. The attempt failed but resulted nevertheless in the General Agreement on Tariffs and Trade, initially signed by 23 countries, both developed and developing³. Even though it operated as one, it may be noted that the GATT, as it came to be known, was not formally an international organization as such but an international agreement with a secretariat, the rules of which, however, were binding on its members, or contracting parties as they were called.

As has been stressed over and over again, the economic case for an open trading system based upon multilaterally agreed rules is simple enough and rests largely on commercial common sense. It is also evidenced by the economic growth

since the Second World War. Indeed, through the various trade rounds, tariffs on industrial goods in developed countries have fallen steeply to less than four per cent on average today from around 40 per cent before the GATT.

As tariff barriers came down for goods, it became apparent that trade in services (transport, travel, banking, insurance, telecommunications, consultancy, distribution, etc.) and trade in intellectual property (ideas, such as trade in inventions and designs) took on more importance. By the beginning of the 1980s, contracting parties considered that the GATT was no longer sufficient, there needed to be additional rules *inter alia* for services and intellectual property as well as rules to deal with the special requirements of specific sectors and issues such as agriculture or the sanitary and phyto-sanitary problems of certain products, notably farm products, to help countries prosper further via trade. The last multilateral trade negotiation round of the GATT, the Uruguay Round (1986-1994) thus resulted in the creation of the World Trade Organization and in numerous international agreements including those on agriculture, services, intellectual property, dispute settlement and sanitary and phyto-sanitary measures, all of which are legally binding on its Members. The Uruguay Round negotiations also reviewed and reformed some older agreements such as the subsidy agreement and the Standards Code (see below). The General Agreement on Tariffs and Trade, as revised, is of course still the backbone of the multilateral trading rules for goods.

The result is assurance. Consumers and producers know that they can enjoy secure supplies and greater choice of the finished products, components, raw materials and services that they use. Producers and exporters know that foreign markets will remain open to them. The result is

also a more prosperous, peaceful and accountable world.

Virtually all decisions in the WTO are taken by consensus among its Member countries and they are ratified by Members' parliaments. Trade friction is channelled into the WTO's dispute settlement process where the focus is on interpreting agreements and commitments, and how to ensure that countries' trade policies conform with them. That way, the risk of trade disputes spilling over into political or military conflict is, if not eliminated, at least reduced. By lowering trade barriers, the WTO's system also breaks down other barriers between peoples and nations.

It should be stressed that WTO Members are required to modify their national legislation to comply with their WTO commitments. In other words, and it bears repeating, the rules and regulations of the WTO are binding on its Members. When a trade conflict occurs, WTO rules thus have priority over national legislation.

GATT and food safety measures

MFN and national treatment: the basic principles

Since 1948, and prior to the SPS and TBT agreements, national food safety, animal and plant health measures which affect trade were subject to the rules of the GATT. Article I of the GATT⁴, the most-favoured nation (MFN) clause, requires non-discriminatory treatment of imported products from different foreign suppliers, and Article III calls for such products to be treated no less favourably than domestically produced goods with respect to any laws or requirements affecting their sale. These rules applied, for instance, to pesticide residue and food additive limits, as well as to restrictions for animal or plant health purposes.

Article XX of the GATT

The GATT rules also contain an exception (Article XX:b) relevant here, which permits countries to take measures "necessary to protect human, animal or plant life or health" as long as these do not unjustifiably discriminate between countries where the same conditions prevail, nor are a disguised restriction to trade. In other words, where necessary, for purposes of protecting human, animal or plant health, governments were able to impose already under the GATT more stringent requirements on imported products than they required of domestic goods.

Standards Code

Also of interest in this connection is the "Standards Code" which resulted from the Tokyo Round negotiations (1973-1979) and which is the ancestor of today's TBT Agreement. It was a plurilateral agreement, i.e. not all GATT contracting parties had subscribed to it. The Standards Code, more formally called the Agreement on Technical Barriers to Trade, was not developed primarily for the purpose of regulating sanitary and phytosanitary measures, but it did cover technical requirements resulting from food safety and animal and plant health measures, including pesticide residue limits, inspection requirements and labelling. Governments which were parties to the 1979 Standards Code agreed to use relevant international standards (such as those for food safety developed by the Codex Alimentarius) except when they considered that these standards would not adequately protect health. They also agreed to notify other governments, through the GATT Secretariat, of any technical regulations which were not based on international standards.

WTO and wholesome food

Since sanitary and phytosanitary measures can so effectively restrict trade, GATT contracting parties were concerned about the need for clear rules regarding their use. The Uruguay Round negotiating objective to reduce other possible barriers to trade increased fears that sanitary and phytosanitary measures might be used for protectionist purposes. So, coming to today's subject of wholesome food, how do you ensure that your country's consumers are being supplied with food that is safe to eat – "safe" by the standards you consider appropriate? And at the same time, how can you ensure that strict health and safety regulations are not being used as an excuse for protecting domestic producers?

Indeed, food safety, plant and animal health requirements have become increasingly important for agricultural products moving in international trade. The WTO Agreements explicitly address the right of governments to give priority to health protection, while ensuring that unjustified barriers to trade are not imposed. The various governmental authorities responsible for trade, health and agricultural issues must thus all be knowledgeable of the rights and obligations they have accepted under the WTO, in order to make the most effective use of these agreements to facilitate imports and exports.

The SPS and TBT agreements

One key agreement for modern-day world trade in food and food products is the Agreement on the Application of Sanitary and Phytosanitary Measures (the SPS Agreement) which resulted from the Uruguay Round negotiations. Another one is the Technical Barriers to Trade (TBT) Agreement, a revised version of the Tokyo Round Standards Code mentioned before, also as a result of the Uruguay Round negotiations.

Briefly, the goals of these Agreements are to eliminate unnecessary obstacles to trade without undermining the legitimate domestic regulations or standards regarding such aspects of public policy as health and consumer and environmental protection.

Technical regulations, industrial standards and SPS measures are important, but they vary from country to country. Having too many different standards or measures makes life difficult for producers and exporters. If the standards or measures are set arbitrarily, they could be used as an excuse for protectionism and thus can become obstacles to trade. Both the SPS and the TBT agreement try to ensure that regulations, standards, testing and certification procedures and SPS measures do not create unnecessary obstacles to trade.

The scope of the two agreements is different. The SPS Agreement covers all measures whose purpose it is:

- to protect human or animal life from risks arising from additives, contaminants, toxins or disease-causing organisms in food;
- to protect human life from plant- or animal-carried diseases;
- to protect animal or plant life from pests, diseases, or disease-causing organisms;
- to prevent or limit other damage to a country from the entry, establishment or spread of pests;
- whether or not these are technical requirements.

The TBT Agreement, on the other hand, covers

- all technical regulations,
- voluntary standards;
- and the procedures to ensure that these are met, so called conformity assessment procedures;
- except when these are sanitary or phytosanitary measures as defined by the SPS Agreement.

SPS measures thus typically deal with a range of additives, contaminants, processing methods with implications for food safety, etc. Salmonella in eggs or fish would fall under this Agreement. The TBT measures, on the other hand, typically deal with

labelling, quality requirements, packaging, and so on. Limits to the size of fish or to the container you import products in would be a TBT measure.

TBT measures could cover any subject, from car safety to energy-saving devices, to the shape of food cartons. To give some examples pertaining to human health, TBT measures could include pharmaceutical restrictions, or the labelling of cigarettes. Most measures related to human disease control are under the TBT Agreement, unless they concern diseases which are carried by plants or animals (such as rabies). In terms of food, most labelling requirements, nutrition claims and concerns, quality and packaging regulations are generally not considered to be sanitary or phytosanitary measures and hence are normally subject to the TBT Agreement.

On the other hand, by definition, regulations which address microbiological contamination of food, or set allowable levels of pesticide or veterinary drug residues, or identify permitted food additives, fall under the SPS Agreement. Some packaging and labelling requirements, if directly related to the safety of the food, are also subject to the SPS Agreement.

The two agreements have some common elements, including basic obligations for non-discrimination, and similar requirements for the advance notification of proposed measures and the creation of information offices ("Enquiry Points"). However, many of the substantive rules are different. For example, both agreements encourage the use of international standards, but under the SPS Agreement, the only justification for *not* using such standards for food safety and animal/plant health protection are scientific arguments resulting from an assessment of the potential health risks. In contrast, under the TBT Agreement, governments may decide that international standards are not appropriate for other reasons, including fundamental technological problems or geographical factors. Unlike the TBT Agreement, the SPS Agreement also specifies the international standard setting bodies it recognizes.

In other words, sanitary and phytosanitary measures may be imposed only to the extent necessary to protect human, animal or plant health, on the basis of scientific information. Governments may, however, introduce TBT regulations when necessary to meet a number of objectives, such as national security or the prevention of deceptive practices. Because the obligations that governments have accepted are different under the two agreements, it is important to know whether a

measure is a sanitary or phytosanitary measure, or a measure subject to the TBT Agreement.

The SPS Agreement builds on the original GATT rules to restrict the use of unjustified sanitary and phytosanitary measures for the purpose of trade protection. It provides clearer, more detailed rights and obligations for Members with respect to food safety and animal and plant health measures which affect trade. For instance, as mentioned earlier, countries are permitted to impose only those requirements needed to protect health which are based on scientific principles. A government can challenge another country's food safety or animal and plant health requirements on the grounds that they are not justified by scientific evidence. The procedures and decisions used by a country in assessing the risk to food safety or animal or plant health must be made available to other countries upon request. Governments have to be consistent in their decisions on what is safe food, and in responses to animal and plant health concerns.

The fundamental aim of the SPS Agreement is to maintain the sovereign right of any government to provide the level of health protection it deems appropriate, but to ensure that these sovereign rights are not misused for protectionist purposes and do not result in unnecessary barriers to international trade. It is a legal contract between trading nations which permits Members to take SPS measures but not as a protective device.

Sanitary (human and animal health) and phytosanitary (plant health) measures apply to domestically produced food or local animal and plant diseases, as well as to products coming from other countries. These include sanitary and phytosanitary measures taken to protect the health of fish and wild fauna, as well as of forests and wild flora. It might be noted that measures for environmental protection (other than as defined above), to protect consumer interests, or for the welfare of animals are *not* covered by the SPS Agreement. These concerns, however, are addressed by other WTO agreements or rules such as the TBT Agreement or Article XX of GATT 1994.

The SPS Agreement, while permitting governments to maintain appropriate sanitary and phytosanitary protection, reduces possible *arbitrariness* of decisions and encourages consistent decision-making. It requires that sanitary and phytosanitary measures be applied for no other purpose than that of ensuring food safety and animal and plant health. In particular, the Agreement clarifies which factors should be taken into account in the assessment of the risk involved. Measures

to ensure food safety and to protect the health of animals and plants should be based as far as possible on the analysis and assessment of objective and accurate scientific data.

People are entitled to expect that the food they eat is wholesome and safe for consumption. Food borne disease is at best unpleasant; at worst it can be fatal. Consequences of food borne illness include adverse effects on trade and tourism, loss of earnings and productivity, unemployment and litigation. Food spoilage is also wasteful and costly and can adversely affect the economy and erode consumer confidence. One need only to recall the economic cost of BSE (Bovine Spongiform Encephalopathy, also known as 'mad cow disease'), dioxin and the Foot and Mouth disease outbreak in the United Kingdom to see the truth in this statement.

All countries, therefore, need adequate food control programmes to ensure that national food supplies are safe, of good quality and available in adequate amounts at affordable prices to ensure an acceptable nutritional and health status for all population groups. Food control includes all activities to ensure the quality, safety and honest presentation of food, from primary production, through processing and storage, to marketing and consumption. The term has been used to describe a total national effort involving an integrated approach between governments and all segments and sectors of the food industry. Food control is linked to improvement of the health of the population, the potential for a country's economic development and the reduction of spoilage and food losses.

International standards/harmonization

Both the SPS and TBT Agreements encourage WTO members to actively participate in the development of international standards. The SPS Agreement goes further, by specifically identifying three standard setting organizations: the FAO/WHO Joint Codex Alimentarius (Codex), the World Organization for Animal Health (OIE⁵) and the FAO International Plant Protection Convention (IPPC). The SPS Agreement specifies that Members taking measures which conform to the standards, guidelines and recommendations of these three organizations are deemed to be in conformity with their WTO obligations. By extension, not using a Codex, OIE or IPPC standard when one exists can lay a Member open to challenge – as the EC discovered in the *Hormones* case that will be referred to later in this paper. Effective participation extends well beyond physical presence in standard setting meetings. It requires scientific expertise to evaluate the

potential effect of proposed standards on national production and the capacity of the country to actually implement the standards.

The SPS and TBT Agreements also encourage governments to establish national measures consistent with international standards, guidelines and recommendations. This process is often referred to as *harmonization*. The WTO itself does not and will not develop such standards. However, most of the WTO's Members⁶ participate in the development of these standards in other international bodies. Measures conforming to such international standards are, as mentioned, presumed to be consistent with the rules of the SPS and TBT Agreements as well as with GATT 1994.

The SPS and TBT Agreements have significant implications for the Codex Alimentarius Commission. Specifically, Codex standards, guidelines and other recommendations have been identified as the baseline for consumer protection under the SPS and TBT Agreements. In this environment they take on unprecedented importance with respect to consumer protection and international food trade. As a result, the work of the Codex Alimentarius Commission has become the reference for international food safety requirements.

It bears repeating that the SPS Agreement explicitly permits Governments to impose restrictions on international trade when these are necessary to protect human, animal or plant health from certain risks, *provided* that it can be demonstrated that the trade restriction is indeed necessary to protect health, that is, that there is scientific evidence of potential health risks in the absence of a protective measure. Where there is not sufficient scientific evidence to demonstrate a health risk, and the risk is more than theoretical in nature, a government can nonetheless take a "precautionary approach" and provisionally impose a measure. In these cases, the government must seek further scientific evidence and review its provisional measure within a reasonable period of time.

As concerns the TBT Agreement, it also encourages, as mentioned, Members to use international standards where these are appropriate, to meet the legitimate objectives pursued. And any measure taken under either agreement should of course not arbitrarily or unjustifiably discriminate between countries where identical or similar conditions prevail or create unnecessary obstacles to international trade.

Scientific justification/risk assessment⁷

While WTO Member countries are encouraged to use international standards, guidelines and recommendations where they exist, they may use SPS measures which result in "tougher" standards if there is scientific justification for such a use. Importantly, risk management decisions should be consistent. In comparable situations, governments should not take risk management decisions that are arbitrary and which lead to unnecessary obstacles to trade

Essentially two options are available to governments in order to provide a scientific justification for a trade barrier. The first, and most encouraged by the WTO, is, as mentioned earlier, for governments to base national SPS measures on internationally developed standards, guidelines and recommendations such as those developed by the Codex Alimentarius, OIE or IPPC.

Where such international standards do not exist, or in cases where a government chooses not to use an international standard, the importing country must be able to show that its measure is based on an assessment of the potential health risks. The measures taken must be proportional to the risks. The SPS Agreement sets out some general criteria for risk assessments, but does not detail the methodology to be used – that is the domain of the standard setting organizations: the Codex, OIE and IPPC. Risk assessment is proving to be one of the most critical - and most difficult - provisions of the SPS Agreement.

The requirement that WTO member governments must ensure that their sanitary and phytosanitary measures are based on a risk assessment is one of the major substantive obligations of the SPS Agreement. A risk assessment is the only way in which to evaluate the potential for adverse effects on human or animal health. Without a structured assessment, decision-making is undertaken in a factual, and thus scientific, void.

A risk assessment should identify what are the potential health hazards and consequences, but it does not answer the question of whether these risks are "acceptable". The SPS Agreement acknowledges that it is the sovereign right of governments to decide what is an acceptable level of risk - or to use the terms of the agreement, what is the "appropriate level" of health protection.

Provisional measures

It may happen that available relevant scientific evidence is insufficient. In such a situation, as mentioned above, a Member may adopt a sanitary

and phytosanitary measure on a provisional basis on the grounds of available relevant information using information *inter alia* from pertinent international organizations and from SPS measures in other Members. But the Member must seek to obtain the additional information which may be needed for a more objective risk assessment and review the measure within a reasonable period of time.

Equivalence

The concept of equivalence⁸, one of the key concepts in both the SPS and the TBT agreements, recognizes that an acceptable level of risk (SPS) or legitimate objective (TBT) can often be achieved in alternative ways. The SPS Agreement indicates that if an exporting country can demonstrate that the sanitary measure it applies provides the same level of health protection as required by the importing country, its measure shall be considered to be equivalent. The initial burden is on the exporting country to provide the necessary evidence to show that its product is equally safe. For this purpose, the exporting country must allow the importing country reasonable access to inspect and test products and procedures.

The TBT Agreement, on the other hand, provides that Members shall give “positive consideration” to other Members’ technical regulations and accept these as equivalent notwithstanding possible differences as long as they are satisfied that the objectives of their own regulations are achieved.

The recognition of equivalence helps ensure that health protection is maintained while providing the greatest quantity and variety of safe foodstuffs for consumers, the best availability of safe inputs for producers, and healthy economic competition. Systems-wide recognition of equivalence is, however, uncommon, reflecting the many administrative and technical difficulties faced in this respect. Products-specific recognitions of equivalence are far more common. Recognition of equivalence can be particularly important to developing countries, because the regulations applied by importing countries are usually based on the technologies and practices of developed countries’ industries, technologies and practices which have become increasingly more sophisticated over time. Many developing countries do not have the infrastructure or resources to use these sophisticated production or processing techniques. The SPS Committee has thus been moved to provide guidance in how to interpret the principle of equivalence with its decision set out in G/SPS/19/Rev.2.

Transparency

Finally, in order to enhance transparency, both the SPS and the TBT agreements have provisions designed to ensure that new or amended measures, that are *not* based on international standards, guidelines or recommendations and that may have a significant effect on trade, are made known to trading partners. Whenever a government is proposing a new regulation (or modifying an existing one) which differs from an international standard and may affect trade, they must notify the WTO Secretariat, who then circulates the notification to other WTO Member governments. The notifications are also available to the interested public and can be consulted on the WTO web site⁹. Alternatively, notifications can be requested from the Enquiry Point of the country which is proposing the measure. There is usually one for SPS and another one for TBT but nothing prevents them from being combined.

The Agreements require, moreover, governments to promptly publish all sanitary and phytosanitary measures and technical regulations, and, upon request from another government, to provide an explanation of the reasons for any particular food safety or animal or plant health requirement.

The Enquiry point is an office maintained by each Member which is designated to receive and respond to any requests for information relevant to that country’s sanitary and phytosanitary measures or technical regulations, standards and conformity assessments. Such requests may be for copies of new or existing regulations, information on relevant agreements between two countries, or information about risk assessment decisions. The addresses of the Enquiry Points can be consulted electronically at the WTO’s home page¹⁰.

Technical assistance and special and differential treatment

Both the SPS and TBT Agreements provide for technical assistance to other Members, in particular to developing countries. In the case of the SPS Agreement, Members have agreed to facilitate technical assistance to allow such countries to adjust to, as well as comply with, SPS measures which are necessary to attain, in their export markets, “the appropriate level” of SPS protection. Such assistance may be given either bilaterally or via the appropriate international organizations and be in such areas as processing technologies, research and infrastructure, including in the areas

of the establishment of national regulatory bodies. It could take the form of advice, credits, donations, grants.

As concerns the TBT Agreement, technical assistance on any standards-related issue can be requested by one Member from another, on terms to be agreed by the Members concerned. Such assistance may range from the preparation of technical regulations and the establishment of national standardizing bodies, to the participation in international standardizing bodies and the measures to gain access to the conformity assessment systems operated by other Members.

The two Agreements also have provisions for special and differential treatment for developing countries. In particular, Member should take into account the needs of developing countries in the preparation and application of SPS measures and technical regulations. In particular, when there is scope for a phased introduction of new measures on products of interest to developing countries, longer timeframes should be given to such countries. Other time-limited exceptions may be granted by the SPS or TBT Committee on request.

Dispute settlement

The WTO's procedure for resolving trade quarrels under the Dispute Settlement Understanding (DSU) is crucial for enforcing the rules and therefore for ensuring that trade flows smoothly. Countries bring disputes to the WTO if they think their rights under the agreements are being infringed. The system encourages countries to settle their differences through consultation. Failing that, they can follow a carefully chartered, step-by-step procedure that includes a ruling by a panel of experts, and the possibility to appeal that ruling on legal grounds. Confidence in the system is borne out by the number of cases brought to the WTO: 312 cases by 1 July 2004 compared to some 300 disputes dealt with during the entire life of GATT (1947-94). Some two-thirds of the WTO cases were either settled by a mutually agreed solution before a panel report was issued or were settled at the consultation stage.

There have been several food- or agriculture-related disputes involving the SPS Agreement and one case in relation to the TBT Agreement. The most well-known of the SPS cases is probably the *Hormones* case which is also the first case where the SPS Agreement was invoked. Briefly, as you might recall, the *Hormones* case examined an EC ban on imports of beef from cows treated with

hormones for growth-promotion purposes. The EC claimed the ban was necessary for food safety. The United States and Canada claimed there was no evidence of harm to human health. The Panel found that the EC measure violated Article 3 of the SPS Agreement on harmonization. Although international standards in Codex existed for five of the six hormones in question, the EC measure was not based on these standards; it reflected a higher level of protection but was *not scientifically justified*, as required by Article 3.3. Furthermore, the EC ban was *not based on a risk assessment*, and thus violated Article 5.1. The EC's scientific studies on five of the hormones did not support the ban on hormone-treated meat.

The Panel also found that the EC hormones measure violated Article 5.5, because the level of protection sought for hormone-treated meat was higher than required in comparable situations; these differences were arbitrary or unjustifiable, and resulted in discrimination or a disguised restriction on trade. In particular, in contrast to the ban on hormones for growth-promoting purposes, the EC permitted higher levels of the same naturally occurring hormones in untreated meat and other foods; the use of the same hormones for therapeutic and herd management purposes; and the use of other growth promoters (such as the anti-microbials carbadox and olaquinox, known to be carcinogenic) in swine production. The EC had not invoked Article 5.7, which allows precautionary measures to be taken on a provisional basis, but rather the precautionary principle in general. The Panel found that invoking the precautionary principle did not override a country's obligations under the SPS Agreement and that the precautionary principle found reflexion in Article 5.7 of the SPS Agreement..

The Appellate Body¹¹ agreed with the Panel's finding that since the EC measure reflected a higher level of protection than the international standard and was not justified by a risk assessment, it violated Article 3. It also confirmed the Panel's finding on Article 5.1 that there was no rational relationship between the measure and the scientific evidence submitted on five of the hormones, and found that there was no risk assessment at all for the sixth hormone (melengestrol acetate). However, it reversed the Panel's findings on Article 5.5. The Appellate Body considered that there was a fundamental difference between added hormones and naturally-occurring hormones in meat and other foods, and that the therapeutic use of hormones involved closer supervision and control. Although the Appellate Body agreed that the difference between a ban on hormone-treated

beef and the use of growth promoters in swine production was arbitrary, it did not consider that this resulted in discrimination or a disguised restriction on trade. The Appellate Body also upheld the Panel's finding on the use of precaution and its relationship with Article 5.7.

The only case so far with respect to the WTO TBT agreement is the Sardine case (EC Trade Description of Sardines, 2001/2002). Very briefly, this dispute concerned the name under which certain species of fish may be marketed in the European Communities. The relevant EC Regulation provided that only products prepared exclusively from fish of the species "*Sardina pilchardus Walbaum*" could be marketed as preserved sardines in the EC. The complaining party, Peru, was therefore not able to market its preserved products prepared from *Sardinops sagax sagax* ("*Sardinops sagax*") as "Sardines" in the Community. It claimed *inter alia* that the EC Regulation was contrary to Article 2.4¹² of the TBT Agreement as the EC did not use the naming standard set out in Codex Stan 94 as a basis for its Regulation even though that standard would have been an effective and appropriate means to achieve the legitimate objectives pursued by the Regulation. The Panel and Appellate Body found that there existed a relevant international standard and that there were no reasons advanced not to use it, i.e. the standard in question was not an "ineffective or inappropriate means" of fulfilling the legitimate objective of the EC Regulation.

Footnotes

- 1 The views expressed in this paper are the ones of the author and do not necessarily reflect those of the WTO.
- 2 Robert B. Zoellick, US Trade representative
- 3 123 contracting parties in 1994.
- 4 The original GATT Agreement was revised as part of the Uruguay Round and the revised text, GATT 1994, constitutes an integral part of the WTO. Its rules continue to apply where not superseded by a more specific WTO Agreement. For food safety and plant or animal health measures as defined by the SPS Agreement, the rules of this latter prevail over those of the GATT 1994.
- 5 Also known as the Office Internationale des Epizooties.
- 6 148 as from 13 October 2004, Cambodia being the latest newcomer.
- 7 Article 5 of the SPS Agreement.
- 8 Article 4 of the SPS Agreement and Article 2.7 of the TBT Agreement.
- 9 Search document symbol "G/SPS/N/" or "G/TBT/N".
- 10 www.wto.org, "Documents on Line", search document symbol "SPS/ENQ/" or "TBT/ENQ/".
- 11 The WTO body to which parties to a dispute can appeal the legal findings of a dispute panel.
- 12 "Where technical regulations are required and relevant international standards exist or their completion is imminent, Members shall use them, or the relevant parts of them, as a basis for their technical regulations"

How do you run a food business to satisfy the requirements of the law, the consumer and your customer?

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In the 1980s, the UK was the first country to develop a significant chilled food market and as such pioneered food law and standards governing the manufacture of such products. The UK is still the leading chilled food market in Europe and the world, and continues to grow at a significant rate.

This market is driven largely by the consumer. Significant changes in life style over the past 50 years mean there are more and more families where both parents go out to work and have little time to prepare food. "Dashboard Dining" is commonplace. In the USA, it is estimated that one meal a day is being eaten in the car. The consumers expect the best, but are no longer prepared to pay inflated prices for convenience. Hence the much publicised price wars!

The British retailer has a significant impact on directing the consumers' eating habits and food trends in the UK. They create "partnerships" with food manufacturers - there are no contracts, no written rules. Both parties work together to create successful innovative products.

The regulatory framework that surrounds food manufacture is complicated and changes frequently. How can food manufacturers keep up to date? In the past we could rely on our local health enforcement officers to advise us of changes in food law and what to do; they now do not have the time to visit production sites unless there is a problem. As a result, the small and medium food businesses are suffering from lack of up-to-date information. Being part of a large company that can afford to subscribe to food advisory companies has enormous benefits. The UK retailers, who have representatives that sit on UK and European committees, also guide us. Some of the smaller companies are not so fortunate.

The European regulation EC 178 came into force in 2002 and established food safety as the primary objective of European Law – using "Farm to Fork" traceability as an additional method of managing food safety. The UK has the additional benefit of the 1995 UK Food Safety Regulation, which uses traceability as a legal defence should something go wrong in the manufacturing process which would lead to prosecution. The defence is to show that there is a system (HACCP) in place and to show that it works. This should include a method of documenting what the factory should be doing – the specification, how they should be doing it – the systems and procedures, inspections to check it is being done correctly, labelling to ensure traceability and a series of final product checks including analysis to ensure it has been done properly. Combine this with staff training and the appropriate measures to deal with customer complaints and this system can be your due diligence system. Let's be under no illusions; the reason we have to do all this is commercial - bad news always sells. We have to protect ourselves, our Brand Equity, as once we have lost our good name we may never get it back. Consumers increasingly want to abdicate responsibility for food safety, we live in a name and shame society and the United States compensation culture has crossed the Atlantic. It is estimated that by 2012, 98% of the US population will be suing or be sued by someone else.

How do we, as food manufacturers, survive this? The answer is that we make sure we comply with GMP, HACCP and traceability, and that we are able to document that our factory systems work.

The Bakkavor factory in London produces 400 different types of ready-to-eat products. The employees are 2500 and speak 17 different languages. 80% cannot read or write in English. In fact only 2% of the employees have English

as their first language. It can be difficult for the professionals in the food industry to understand the finer points of what the Law requires, so it is quite a considerable challenge to take the pertinent parts of the legislation and literally “translate it” so our staff can understand.

How do we get the factory workers to understand what they need to do and why? The answer is to break it down into manageable bites. A quality management system (QMS) based on risk assessment of the critical control points in a products manufacture - HACCP. This system identifies all the critical operations in the factory, which can then be assigned to specially trained operatives. Add all these checks together, with a method of auditing that they are being carried out properly and you have the basis of a due diligence defence.

All raw materials delivered to our factories are visually checked against a specification before they are accepted. Incoming ingredients are labelled with a code, which will follow it through the manufacturing process to ensure traceability. If further chemical or microbiological checks are required before release into the factory, the ingredient will be quarantined. Critical ingredients –for example significant food allergens such as nuts and sesame, will be segregated from other ingredients to prevent the risk of cross contamination.

As many operatives cannot read we use colours. In order to segregate meat from non-meat products, both the equipment and the workers are colour coded. Blue for meat, Green for vegetables. Colours identify factory areas. In the high-risk area where cooked foods are handled, the operatives wear white coats and shoes. In the low risk areas, blue coats and green shoes are worn. You can tell a lot about a person's role by their hat colour. Fully trained workers wear white; QC's blue, trainees yellow and contractors are very obvious in their red hats. RED signs identify areas of the factory where critical control points are being tested. This could be sieving a dried ingredient to remove potential foreign materials, or checking the temperature of a product coming out of an oven to ensure that it achieves 80°C. BLUE Signs identify legal CCP's such as weight checks or date coding.

Whilst safety and legality is vitally important, there is no point in manufacturing a product if nobody will eat it! Eating and visual quality are paramount to our business. In order that our staff understand our quality standards and produce a consistent product day in, day out, we use photos in the

factory. Each of our 300 products has a standard showing the ingredients used and how they should be put together. Taste panels are carried out by operatives trained in sensory evaluation, not just by quality controllers, but those involved in product development and daily production. As part of this panel, cooking instructions are checked to ensure the product achieves the correct temperature on re-heating.

Clear labelling is essential. The consumer is demanding convenience, nutritional advice, ingredients breakdowns, allergen labelling – but do they understand the information that we are giving them? More importantly, the critical information can get lost. I believe we have to have a clear common approach to labelling so the customer can understand what we are telling them. Should the labelling of critical information on packaging be regulated using easily recognised logos?

Once the product has been checked for eating quality it will be packed into its sleeve, and date codes and prices are checked for clarity and accuracy. Product is sent to the laboratory for microbiological and chemical testing.

In all these operations documentation is the key. Showing that the check has been done and clearly demonstrating that action has been taken when it does not conform to the specification. If we can do this we can show that the product despatched to our customer is safe, legal and of the agreed quality.

The challenges facing the food industry can be daunting - you don't know where the next scare is coming from. In the past 10 years we have experienced *Cryptosporidium* outbreaks, foot & mouth disease, BSE, dioxins in pork, avian flu, to name a few. However, the solid foundation of a quality management system, combined with good training, experienced loyal staff and management commitment can get through most eventualities.

Remember

“Eating can be hazardous - not eating is fatal!”

Consumer trust in food – in Europe and in the Nordic countries

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Introduction

Consumer trust in food has been on the agenda in Western Europe over the last couple of decades. Public reactions have been observed in terms of shifts in demand, public opinion surveys, and collective mobilisation. The issue of consumer trust also refers to the political agenda and, not the least, to institutional responses. However, while the media have given such issues considerable attention, neither popular nor institutional responses seem to be evenly distributed throughout Europe. In a time of extensive international regulatory harmonisation and market integration, surveys indicate that differences in consumer responses between countries are often bigger than variations between social groups (or regions) within the countries (e.g. Berg, 2000).

The questions are therefore: How large are such variations and changes in trust? And how can they be explained? The idea is that by learning more about the reasons for national variations, one can increase the knowledge about dynamics of trust and distrust and about the role of consumers.

The Nordic countries stand out as a relatively peaceful corner. Why is that? The countries represent common solutions to many welfare issues, but they are quite dissimilar in terms of food policies and consumer responses (Kjaernes, 2003).

This paper will discuss approaches to these questions about variations. Using findings from a European comparative study, it will argue that social and institutional conditions are of major importance, including regulatory as well as market structures, and performance and conditions on the consumer side.

Both research and practical efforts have been dominated by a psychological, cognitive understanding of problems of trust in food (Cvetkovich and Löfstedt, 1999). Trust and distrust are then usually seen as elements in individual responses to information on safety risks, characterised as risk perception (e.g. Scholderer and Frewer, 2003). If food consumption is analysed, it is generally seen as unit acts of decision-making, i.e. food choice at the point of purchase. Whether seen as unnecessary worries or changes in demand, distrust is an anomaly - an imperfection to be avoided. Knowledge and communication are the key answers. In public policy-making, such approaches are reflected first of all in programmes for scientifically based risk communication. Such studies do give insight into individual reactions, but there are also shortcomings. Lack of knowledge and understanding may not be the major explanation to distrust, and consumer education may not (alone) be the most efficient measure (Hansen *et al.*, 2003). Concentrating on individual responses and decisions makes it difficult to explain national variations and large-scale shifts over time. Moreover, risk is often understood only as a safety hazard. We argue that distrust in food should refer to social uncertainty related to a wider set of norms and expectations towards food issues (such as quality, price, ethics, and nutrition) and towards food production and exchange. Rather than seeing distrust only as a lack of trust, we want to investigate whether expressions of distrust can be legitimate or potentially constructive.

As an alternative, we suggest a social and relational framing (Kjaernes, 1999; Seligman, 1997). The term "social" refers to the normative and institutional frames of everyday routines (Harvey *et al.*, 2001; Gronow and Warde, 2001). In our everyday dealings with food, we are not only buyers; we cook and eat food, we are co-producers, media users, citizens, etc. Consumer conditions, expectations

and experiences may refer to all of that. The term “relational” refers to the recognition that with market-based distribution, consumers trust or distrust someone, not something: *“Trust consists of placing valued outcomes at risk to others’ malfeasance. Trust relationships include those in which people regularly take such risks.”* (Tilly, 2004). Food purchase is the key relation. This is where we interact directly with the suppliers of food, with specific systems of food provisioning.

How do we analyse consumers - expressing distrust - as actors with potential agency, while also seeing consumption as normatively and institutionally embedded routinised practices? We must focus on feedback within the market context as well as the roles of food regulators, experts, informers, watchdogs, etc. (see Figure 1).

of responsibility for key food issue, power and control, the role of consumers (individually and collectively), and feedback and audit systems.

Based on this social and relational understanding of trust in food, the aims of the TRUSTINFOOD project are to identify and analyse factors which determine and influence trust in the food supply and information sources, market actors, authorities, experts, NGOs, media, etc., and to link these factors to consumer responses, individually and collectively.

Design and methods

The project is a comparative study including six European countries; Denmark, Germany,

Figure 1.
Consumer trust and distrust as a characteristic of relations between different arenas and actors

The idea is that trust and distrust are not individual matters at all, but instead characteristics of interrelations between different arenas, including consumption, food supply, regulation and civil society. This is illustrated by putting trust in the middle of the triangle. The roles of consumers will depend on factors on the consumer side, such as the structure of the family and the labour market, gender roles, social class, national cuisine, etc., as well as collective consumer mobilisation. But consumption and the role of consumers will also be strongly affected by the structure and performance of the provisioning system, by public consumer protection arrangements and the media, in consumer organisations etc. All of this may vary between countries and regions and may change over time. Important dimensions are the social distribution

Great Britain, Italy, Norway, and Portugal. Public opinion surveys and institutional studies have been conducted in all six countries, institutional studies even at the EU level. The institutional studies in the six countries and at the EU level are based on secondary data, statistics, key informant interviews, and analyses of media debates. We have had a particular focus on two food items, i.e. beef and tomatoes. While beef has received considerable attention over the past decade, tomatoes were selected as representing a more ordinary, routine food item. Institutional analyses have been made; firstly, for each country; secondly, by carrying out systematic comparative analyses; and, thirdly, by combining with the survey data.

The population survey interviews were carried out with CATI (Computer Assisted Telephone

Interviews) in November 2002. Random samples included 1000 in Denmark, Norway and Portugal; 1500 in GB; and 2000 in Italy and Germany³. The questionnaire focused on various measures of trust, practices and strategies (shopping, eating and as citizens), the distribution of responsibilities for key food issues, and socio-demographic background. The first results have been published (Poppe and Kjaernes, 2003). The following charts are based on data from this report, supplemented by data on Nordic opinions from other sources.

Variations in trust

We asked whether the respondents would evaluate a range of 12 food items as: *very safe, rather safe or not very safe*. Four items have been selected in Figure 2, which shows considerable variations in people's trust in food safety, both with regard to different food items and the countries in question. While the British respondents, together with Norwegians and Danes, were generally positive, Germans and Italians were characterised by being much more sceptical. This holds true for all food items, as reflected in the additive index including all twelve items. The Portuguese are in the middle, but with a particularly strong difference between beef and tomatoes. The chart also shows that people have considerably more trust in vegetables, such as tomatoes, than meats, such as beef. A third observation is that people are generally more negative towards processed foods, such as burgers and canned tomatoes, than they are towards the fresh varieties. Following from our

understanding of trust, different food items will represent distinct conditions for trust in terms of safety and other key food issues (*what*) as well as specific systems of food provisioning (*who*). This is easily demonstrated in this study by looking at the differences between the two food cases as well as the distinctions between processed and fresh foods. But we also learn that all of this is being strongly framed by particular conditions within each country.

As a different measure of trust, we also asked the question "*Do you think that the conditions for (prices, quality, farming methods, health, and safety) have improved, are more or less the same or have rather deteriorated over the last twenty years?*" We have calculated the relative proportions of improvement vs. deterioration for each issue. The results show that when adding together the net proportions for all five issues, considerable national variation are found again. (Figure 3).

The British generally have a very optimistic opinion, the majority thinking that conditions have improved for all five issues. This time the Portuguese, together with the Italians, stand out as the most pessimistic, the majority thinking that conditions have deteriorated. People are in general more worried about food quality and nutrition than about safety. In addition, there is considerable concern about food prices in the Euro-zone countries. Even though we wanted to get the views on long-term tendencies, it might be that more recent events have had impacts. Recent media scandals, however, cannot alone account

Figure 2.
Do you find the following food items very safe, rather safe or not very safe to eat? Percentage who says 'very safe', index for 12 food items. Columns add proportions of 'very safe' for four food items, fresh tomatoes, canned tomatoes, beef (steaks, roasts etc.) and burgers.

Figure 3.
Do you think that the conditions for (prices, quality, farming methods, health, safety) have improved, are more or less the same or have rather deteriorated over the last twenty years?
(>1 – net improvement, <1 – net deterioration)

for the results. This is clearly demonstrated by the observation that, while media tend to focus on food safety problems, this is the only issue where there are generally more positive than negative responses.

The relational aspects of trust were particularly emphasised in the question “*Imagine a scandal with salmonella in chicken; would the following actors tell the whole truth, parts of the truth or rather withhold information?*” Actors from various arenas were included.

Figure 4 shows the proportions who would tell the whole truth, where percentages for all actors have been added on top of each other. The tendency of variation between countries is repeated. But this time the Nordic countries rank highest, while

the British are more sceptical. Germany and Italy are at the lower end. Civil society actors, such as consumer organisations, food experts and the media, are most often believed to be telling the whole truth. In the middle we find food authorities. All market actors, including farmers, the processing industry, supermarkets, and politicians, are very rarely believed to tell the whole truth and often to withhold information. This ranking of actors is identical in all countries, but the British stand out as distinguishing less between the truth-telling of various types of actors. We find the same type of distribution for those who think that the various actors would withhold information. Market actors are generally assumed to do that, while civil society actors, at the other end, were generally not supposed to withhold information in this case.

Figure 4.
Imagine a scandal with salmonella in chicken, would the following actors tell the whole truth, parts of the truth or rather withhold information? Per cent who would tell the whole truth, added for all actors.

Openness and transparency have been important topics in discussions about trust. Our results indicate that openness and truth-telling are considered to be quite variable and also that evaluations of truth-telling are associated with other expressions of trust. (For correlation with other indicators of trust, see Poppe and Kjaernes, 2003).

Figure 5 compares our results on truth-telling from 2002 with those from a Eurobarometer survey in 1998, where the same question was asked. All members of the European Union were included in the 1998 survey, and Sweden and Finland have been included in this chart in order to get a more thorough impression of conditions in the Nordic countries. The figure shows the proportions thinking that food authorities would tell the whole truth. We recognise a similar, but not identical, ranking of the countries in the two surveys. Sweden and Finland come out as quite similar to Norway and Denmark in the 1998 survey. There has been a net improvement in all countries between 1998 and 2002 in this case of public authorities' truth-

Taken together, we find systematic variation between countries on most trust dimensions, with high trust in Scandinavia and Great Britain, low trust in Italy, and low or medium levels of trust in Germany (East and West) and Portugal. We find very modest impacts of socio-demographic variables (results not shown here), with an exception for gender. Women are in general more sceptical than men. But this gender difference can, of course, not explain the observed variations between countries and hardly the changes over time.

Rank orders of food items, key food issues and institutional actors are quite or very similar across countries. Trust in food safety seems to have improved in most countries, while other food issues cause more worry. The general tendency is that market actors and food authorities, i.e. actors who exercise direct power over the food supply, seem to have more influence on the levels of trust in food items than experts, the media or consumer organisations.

Figure 5.
Eurobarometer 1998/Trust in Food
2002: Food authorities' truth-
telling in case of a scandal with
chicken (per cent) (Berg 2000,
Poppe & Kjaernes 2003).

telling in a safety scandal, most notably so in Great Britain and in Italy. A similar tendency cannot be observed for supermarkets (documented in Berg, 2000 and Poppe and Kjaernes, 2003), where instead a general decline in trust is indicated. Several points can be made from this comparison. It confirms the impression from the question on long-term tendencies that safety is not the issue that causes most worry. It also shows that evaluations change over time, that these evaluations are quite distinctive in terms of differentiations between key players, and, finally, that the observed ranking of countries in terms of trust in food is quite consistent.

The institutional studies

The aims of the institutional studies were to chart changes in the organisation of public regulatory policies and food provisioning systems, to identify concerns and priorities among selected strategic actors in the food system, their perceptions of each other in terms of roles, responsibilities and conflicts, and to identify the role of distrust in the production of trust - as a search for potential positive achievements of critical consumers. The following are some preliminary observations and conclusions.⁴

In spite of regulatory harmonisation and market integration we find considerable differences. When it comes to public consumer protection, institutional reforms have been instigated in all six countries as well as at the EU level. Most reforms focus mainly on food safety, introduced in the aftermath of the BSE scandal. But the solutions are divergent - sometimes even pointing in different directions. While independence from producer issues has been decisive in Britain and at the EU level, coordination between different public sectors has been more important in countries such as Germany, Norway and Denmark. The Italian endeavours point towards decentralisation and regionalisation rather than centralisation and coordination. Regulations and regulatory reforms in the high-trust countries (Great Britain, Denmark and Norway) are generally characterised by considerable consensus, clarity, and centralisation in their handling of food safety issues, as opposed to controversy and problems with coordination and clarity in the low-trust countries (Germany, Italy, Portugal). It is, however, difficult to distinguish between these aspects and to find out what is most decisive. Yet, as a general tendency, safety issues are becoming better coordinated, while the regulation of other issues, such as nutrition, is less clear.

Roles and the distribution of powers and responsibilities for key food issues vary between the countries. The division of responsibilities between public and private actors is for example very different in Great Britain, where market actors take an active role, and Norway, where the state stands out as the guarantor of trust. The roles and powers of the various actors along the food chain are also very dissimilar. While the big supermarket chains take a leading role in some countries, farmers and/or the processing industry are much more influential in other countries. Moreover, in spite of general tendencies of higher levels of industrial processing, more power to the supermarkets, and global sourcing, there are still large differences in the forms of food distribution and retailing. The reliance on fresh foods sold through small shops and food markets is considerable in countries such as Portugal, Italy and Germany. While the supermarkets represent a very powerful actor and the dominant form of retailing in Great Britain, the Scandinavian distribution systems are even more uniformly based on supermarkets.

Different retailing systems and shopping habits seem to be important for consumer trust. Personal exchange based on the long-term relationships with a local butcher is basically different from the

impersonal, abstract relations which dominate in modern, large supermarkets. The foods sold are also often different in terms of processing and sources, varying between fresh, non-standardised foods from local sources, at the one end, to highly processed, pre-packaged, standardised and labelled items, at the other end. These differences imply that the quality and character of the social relations vary; which actors people need to trust; who people interact with, who takes on responsibility, and who has the power to control. This is not only a matter of market structure and regulatory arrangements, but also performance. Fraud, safety problems, quality that does not meet expectations, lack of transparency, disinterested suppliers or food inspectors, corruption, etc. - are all conditions which may evoke distrust.

The European food systems are subject to considerable restructuring (Lyon, 1998; Harvey *et al.*, 2002). Modernisation processes may lead to trust as well as distrust. The underlying theme is that trust has become more important in interactions between consumers and the provisioning system. Fresh foods sold through local networks and personal exchange are evaluated through personal experiences, direct examination, and the reputation and competence of the salesman. Such evaluations cannot work in most contemporary settings, with extensive and complex systems of processing and retailing. Other references for evaluating the food are needed. An escalating growth of grades and standards means that expectations become more codified. Even though food products have become immensely more complicated and thus more difficult to evaluate directly, they have also generally become more standardised. The standards are ensured through an increasing focus on and control of accountability through quality assurance schemes, traceability, audits, etc. All of this is important in order to build trust by increasing predictability and clarifying the conditions for the transaction. The complexity and lack of transparency, disagreements over which standards are acceptable, as well as reliability and liability problems are elements that may provoke expressions of distrust. The solutions to such challenges are very diverse, linked to the character of provisioning systems, regulatory regimes, as well as the role of consumers.

Looking at the six countries, it is evident that the role that consumers have in the market, in media debates and in politics is variable and sometimes contested. In spite of this variable status, consumers often come out as marginal in decision-making processes. In some countries,

such as Norway, consumers are mostly private family members to be protected (by the state) rather than appearing as actors in their own right. The understanding of consumers as private persons is also prevalent in Southern Europe, but then referring mainly to reliance on the family and local network context, not to public protection. As opposed to this, we find that British consumers, and to some degree also Danish consumers, appear as active - more or less rational - individual shoppers who influence through their purchasing choices. In Britain, in particular, we find a commonly accepted understanding of consumers as active citizens demanding individual and collective influence. In Germany, views are more variable and contested. Many blame the consumers for not being consistent, having contradictory claims, and for being too concerned with price. Consumers, on their part, prefer state protection, while authorities and market actors expect them to take on more responsibility. But this expectation of responsibility is not reflected in possibilities of influence through formalised consumer involvement in decision-making processes.

Does consumer distrust matter? To market actors, drops in sales figures are of course important. But distrust is not always reflected in demand. Nor are such reactions very informative about the background for the distrust or what should be done. Market research and changes in demand are not enough. Representation, mobilisation, public and political attention, as well as individual agency, are important too for expressing a consumer voice. A number of different institutional arrangements have been found which indicate that consumer distrust is acknowledged as relevant input, depending on how the consumer is perceived; as a private family member - to be protected or to take care of himself, as an individual buyer or customer, or as an active citizen with individual and collective agency. In a situation with generally unchallenged consumer trust in food, such as in Norway, a lack of particular institutional solutions do not seem urgent⁵. However, in situations where distrust is prevalent; institutional arrangements providing channels for feedback and recognition of consumer scepticism seem to be important in order to rebuild trust (Braithwaite, 1998). The British case illustrates that. Such institutional arrangements are generally missing in the low-trust countries.

Systems to monitor the food provisioning also seem increasingly important, including complex internal systems, and the openness and transparency to consumer and public scrutiny. However, it is obvious that this cannot be solved only through improved direct relations in the

market. While independent agencies for setting standards and monitoring (third party) have played an important part for a long time, independence seems to have gained a new and more demanding role, where autonomy regarding all types of stakeholders must be demonstrated. This is clearly shown in recent reforms at the EU level.

Concluding remarks

In general, the study supports the view that conditions for consumer trust are influenced by trade policies, regulatory policies, shifts in power in the food chain, technological development, and other large-scale tendencies of structural change. The following points summarise some more specific conclusions that can be drawn from this presentation.

1. Consumer trust and distrust vary considerably and consistently, and cannot be accounted for by individual, psychological explanations.
2. Mechanisms behind trust and distrust include combinations of general, long-term cultural conditions, on the one hand, and institutional structures and performance characteristics of a given provisioning and regulatory system, on the other hand. Trust seems less dependent on consumers' own strategies or resources.
3. Changes in trust are influenced by complex interrelations between these actors and arenas and cannot be limited to single media scandals or carefully engineered public measures (even though such factors may certainly have an impact).
4. There are basic differences between the Nordic, British and South European situations, while Germany seems to be in a transitional state
5. European integration and globalisation have impacts, but these processes are being handled very differently across Europe, due to national economic interests, political traditions, etc.
6. Trust in modern, advanced and rapidly changing food provisioning systems seems to require specific arrangements to recognise and handle consumer scepticism and distrust.

In general, the Nordic countries represent a high-trust area. This may be linked to factors such as modern and reliable food provisioning systems, strong public consumer protection, and a widespread consensus about norms and measures. But while trust relations in some Nordic countries, such as in Denmark, seem to become adapted to an increasingly dynamic and complex market, trust relations are, on the other hand, based on a stable situation of state protection in other countries, such as in Norway.

It must be emphasised that trust phenomena are not static and consumer trust is not won once and for all. Issues causing concern may be shifting. What we are seeing now is perhaps a changing focus from safety to nutrition and quality. Scandals (which cannot be understood as isolated events) referring to a variety of issues may turn into political crises and again erode trust. Changes in food provisioning and regulation seem, moreover, to have impacts. As a more long-term tendency, we may see the emergence of more demanding and critical consumers who are active in the market and in public debates. In such a situation, consumers may turn out to be more difficult to satisfy, but they may also be seen to take more responsibility for various food issues.

Footnotes

- 1 Consumer Trust in Food. A European Study of the Social and Institutional Conditions for the Production of Trust' – TRUSTINFOOD (QLK1-CT-2001-00291). Funded by the European Commission, 5th Framework Programme, Quality of Life, Key Action 1. The project is coordinated by The National Institute for Consumer Research and involves teams at the University of Bologna, Royal Veterinary and Agricultural University and Roskilde University in Denmark, Centre for Research on Innovation and Competition, University of Manchester, the University of Porto, and The Federal Research Centre for Nutrition and Food, Karlsruhe. Publications are available on the project website: www.trustinfood.org.
- 2 The National Institute for Consumer Research (SIFO), Oslo, Norway. Contact: unni.kjaernes@sifo.no.
- 3 The former East and West Germany have been kept separate in many survey analyses because previous studies of trust have indicated that history and different experiences have led to distinct conditions for trust. We have wanted to investigate to what degree trust is influenced by such long-term effects, as compared to more short-term conditions. The overall comparative analyses will, however, concentrate on Germany as a whole.
- 4 Country studies are available on the project website: These are documented in country reports which are published in the working paper series, available on the project website (Bergeaud-Blackler, 2004; Domingues, Graca and de Almeida, 2004; Ferretti and Magaouda, 2004; Lenz, 2004; Nielsen and Møhl, 2004; Terragni, 2004; Wales, 2004).
- 5 Very recent events in Norway indicate that this passive, protected status may be declining, giving way for a more active food consumer role.

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Controlling the safety of the food chain

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Introduction

In the European Union (EU) the new and revised food and feed legislation forms the basis for all future official control activities in the food chain. The legislation also defines the responsibilities and requirements that business operators have to fulfill. In 2002 a Regulation on food law, food safety and establishing the European Food Safety Authority (EFSA)¹ was adopted. This Act is often referred to as the General Food Law Regulation (No 178/2002) and as the legal framework for new legislative measures on food and feed safety and control of the food chain. Furthermore, the legislation on the official control of food and feed and on the hygiene of food and feed has recently been revised. The EU Regulations on official control and hygiene that have already been adopted and published will apply from 2006 and are the following:

- No 882/2004 on official controls performed to ensure verification of compliance with feed and food law, animal health and animal welfare rules;²
- No 854/2004 laying down specific rules for the organization of official controls on products of animal origin intended for human consumption;³
- No 852/2004 on the hygiene of foodstuffs;⁴
- No 853/2004 laying down specific hygiene rules for the hygiene of foodstuffs;⁵
- No 183/2005 laying down requirements for feed hygiene.⁶

In addition to those basic acts a number of requirements have been laid down in the general legislation on veterinary issues, foodstuffs and feedingstuffs (e.g. zoonoses, animal diseases, animal by-products and animal nutrition, drinking water, residues, feed and food additives, contaminants, labelling). These requirements have to be fulfilled by food and feed business operators and enforced by official control authorities.

According to the new legislation the control of the safety of the food chain has to be based on risk priorities. EFSA, in cooperation with national bodies, is responsible for risk assessment, while legislation and feed and food control activities are risk management options managed at Community level and by the competent control authorities in the Member States. Risk communication is also a task, both for EFSA and the competent authorities.

The European Community, its Member States and three States of the European Free Trade Association (EFTA) have an agreement on the European Economic Area (EEA Agreement). The EU food and feed safety legislation, as incorporated into the EEA Agreement⁷, is applicable in these EFTA States. According to the EEA Agreement the EFTA Surveillance Authority has similar monitoring functions regarding the EFTA States obligations, as the Commission has regarding the obligations of the EU Member States.

Definition of responsibilities

Food and feed safety, as defined by the General Food Law Regulation and the new hygiene rules, is the primary responsibility of the food and feed business operators, at all stages of production, processing and distribution. Despite the fact that business operators have the prime responsibility for the safety of food and feed, consumers tend to look to the government and the official control authorities as the ones bearing the major responsibility for protection of human health and consumer interests. This is a discrepancy between consumers' perceptions and the increasing demands directed at the business operators.

The competent authorities of the Member States have the responsibility to enforce food and feed law and monitor that business operators fulfill

the relevant requirements. For that purpose they shall maintain a national system for official control in order to ensure food safety and consumer protection. The national authorities decide how they design and develop their national control systems. However, one of the main goals set forth by new legislative measures is to integrate controls at all stages of production and in all sectors in the field of food and feed. This is often referred to as the “farm to fork” principle.

Official control authorities will also be able to delegate specific control tasks to private control bodies if certain requirements in the official control legislation are fulfilled. Such delegation of tasks will have to be notified to the European Commission and the competent authorities will also have to perform audits or inspections in order to verify that these bodies carry out their duties in a proper way.

The requirements of the General Food Law on the responsibilities of business operators became applicable as of 1 January 2005. Operators shall be able to verify that safety requirements for food and feed are met and this requires that the in-house control (HACCP principles) is functioning properly. This also applies to traceability requirements and withdrawal and recall of products from the market. The aim is to reduce or eliminate the risk due to unsafe products on the market.

At the end of 2004 the European Commission issued a guidance document⁸ to facilitate implementation of the requirements regarding the responsibilities of operators and official authorities, traceability of food and feed, withdrawal, recall and notification duties of business operators and finally imports and exports. The guidelines address practical issues that have been raised by food and feed business operators and national authorities and are aimed at ensuring effective application of the General Food Law Regulation and related acts in order to benefit public health.

Traceability

Recent food safety incidents have led to new legal requirements with the aim of ensuring that business operators and the official control authorities can react swiftly in order to protect consumers. Food and feed businesses will be obliged to withdraw products from the market if they do not comply with safety requirements and recall products from consumers when that is necessary. The operators will also have to notify

users, consumers and competent authorities of such cases and when relevant, these notifications could be distributed through the European Rapid Alert System for Food and Feed (RASFF). However, the operators will not be responsible for notifications to the RASFF notification system. This will be the responsibility of the competent authorities; both with respect to the results of their official controls and with respect to notifications received from food and feed businesses.

Traceability has different objectives, where food safety and the possibility to withdraw and recall unsafe products are of major importance. Other objectives are to ensure proper consumer information and the operators own interests in food and feed trade. In order to be able to withdraw and recall products it is important to establish and apply traceability measures at all stages of production, processing and distribution of food, feed, food-producing animals and ingredients for food and feed products.

The new provisions require that food and feed businesses shall be able to identify any operator that has supplied the businesses with food or feed, food-producing animals or ingredients for production of food or feed. They shall also be able to identify other businesses to which their products have been supplied. This could be called the one step forward and one step back approach, but operators in the food chain will also have to co-operate in order to ensure that products that may be injurious to health can be recalled from the market. All information on traceability shall also be available to the official control authorities on demand.

In order to comply with traceability requirements food and feed business operators will have to ensure that their in-house control is functioning and that products put on the market are adequately labelled or identified to ensure their traceability. However, businesses might also have to amend their daily routines and production policy in order to be able to trace products or ingredients in the supply chain. It could therefore be necessary, depending on the type of food or feed business, to establish internal traceability within the business to facilitate traceability and also withdrawals, if needed. Record keeping is also an issue to be evaluated by operators. The legislation does not stipulate in detail what records should be kept or for how long, but in this context the guidelines issued by the European Commission can be of support for the businesses.

At a European Food Law Conference in 2004⁹, a senior supply quality assurance manager explained that one batch of beef for burgers could come from three to six boning halls, from 12 to 24 slaughterhouses, from 70 to 140 farms, and thus from 1 800 to 12 000 cattle. Furthermore, a batch of chicken nuggets could come from up to four slaughterhouses, around 5 to 20 farms (worst case 50), and thus from 10 000 to 30 000 birds (worst case over 300 000). This should illustrate the need to evaluate the supply policy, in-house control and record keeping for being able to ensure traceability.

The requirements on traceability apply to all operators within the food chain and the General Food Law Regulation is the first European legislation that stipulates such requirements on a horizontal basis. However, additional requirements for identification of products can be found in sector or products specific acts and these would have to be respected, but it has to be evaluated whether they at the same time fulfill the horizontal traceability requirements that have been laid down.

According to the implementation guidance document, referred to in footnote 8, the traceability requirements in the General Food Law Regulation do not apply for third countries. They are applicable from production in the Community and up to export, and from the importer for products imported into the Community. However, all products on the European market have to fulfill the EU legislation, and business operators might also have equal or stricter requirements on traceability in their trade with third countries. Finally, there could be sector specific requirements on traceability of products from third countries (e.g. in the veterinary field).

In-house control

Requirements on in-house control have been developing over the years and from the beginning of 2006 the principles of hazard analysis and critical control points (HACCP) shall be in place, enforced and maintained in all food businesses, except for primary production, where guides to good hygiene practices shall be applied. Similar requirements have been adopted for feed production. However, requirements on hygiene and in-house control allow some flexibility for small food and feed businesses, traditional production methods and limited distribution of primary products. It must be noted that flexibility in enforcement of hygiene and HACCP principles should not compromise food and feed safety

objectives. Furthermore, according to the new EU food and feed legislation, the HACCP-system cannot be regarded as a method of self-regulation, which could replace official controls.

The seven general principles of the HACCP-system are listed in the new European hygiene requirements and these are:

- *Identifying any hazards* that must be prevented, eliminated or reduced to acceptable levels;
- *Identifying the critical control points (CCPs)* at the step or steps at which control is essential to prevent or eliminate a hazard or to reduce it to acceptable levels;
- *Establishing critical limits at CCPs* which separate acceptability from unacceptability for the prevention, elimination or reduction of identified hazards;
- *Establishing and implementing effective monitoring procedures at CCPs*;
- *Establishing corrective actions* when monitoring indicates that a CCP is not under control;
- *Establishing verification procedures* which shall be carried out regularly to check whether the measures outlined above are working effectively;
- *Establishing documents and records* commensurate with the nature and size of the food businesses to demonstrate the effective application of the measures outlined above.

The application of these principles will have to take into account the *nature and size* of the businesses, as specifically stated above for the documentation and record keeping. However, with respect to size, it has been difficult to define what is meant by a *small* food or feed business. The nature of a food and feed business, rather than its size, could therefore be a more relevant criterion for having flexibility in application of the general HACCP principles. As an example, many operators and control authorities seem to agree that catering businesses, including restaurants, could operate without implementing all the HACCP principles by focusing on the most important criteria for ensuring food safety and by applying good hygiene practices. It should be noted that according to the Community legislation the Member States shall encourage the business sector to develop guides to good hygiene practices and guides for the application of the HACCP principles.

The European Commission has been arranging working group meetings at the Community level for discussions on the implementation of the new hygiene rules. At one of these meetings, discussing the implementation of HACCP principles in *small businesses*, a representative from the United Kingdom (UK) told that a project is being

tested on about 2000 catering businesses in the UK, including restaurants¹⁰. The aim is to test whether an in-house control system, based on an integration of good hygiene practices and HACCP principles, is sufficient to ensure food safety and could be suitable for other food businesses. One of the basic principles used is that there is no compromise on food safety. The control system focuses on the 4 C's, Cooking, Chilling, Cleaning and Cross contamination and how these relate to food hazards. The businesses shall have written procedures, e.g. a cleaning schedule, cleaning instructions and record sheets, but record keeping in general shall be as limited as possible. The results of this project are supposed to be published in 2005 and could give an indication of how the new requirements on in-house control might be applied in some sectors of the food chain.

Guidelines are currently being made on the implementation of the new European hygiene rules and the application of HACCP principles in the in-house control of businesses. These guidelines will be of support for businesses and control authorities and should give some solutions on how flexibility can be applied for specific situations in production of food and feed without compromising food safety. The scope of the hygiene rules will also be clarified by giving examples on terms like *primary production* and *primary products*, for which some requirements might not apply.

National control systems, audits and inspections

The European Commission operates control services in order to evaluate competent authorities responsible for food and feed control. The focus of the inspections of the Commission's Food and Veterinary Office (FVO) has been moving from monitoring establishments to an evaluation of the national authorities and it is expected that audits of the competent national authorities will be the main focus of future activities. The FVO is also responsible for missions in third countries. However, the EFTA Surveillance Authority is responsible for inspections on food and feed safety in the EFTA States.

In order to ensure effective operation of official food and feed controls and of animal health and animal welfare rules, the Member States shall prepare a single multi annual national control plan, which shall be implemented as of 2007. The plan shall contain information on the structure and organization of food and feed controls and the control of animal health and animal welfare,

in accordance with the requirements laid down in the legislation and guidelines, which shall be drawn up by the European Commission. The aim is to promote effective, consistent and integrated approach to official controls in all sectors and at all stages of the food chain.

For the first time in 2008 and subsequently every year the Member States shall submit a report to the Commission on the implementation of the control plan and based on these reports, and reports from inspections or audits carried out by the FVO, the Commission shall issue an annual report on the operation of controls within the Community. The report from the Commission shall be made public and can contain recommendations on improvements of national controls, on specific control actions and on coordinated control plans. Audits by the FVO shall be carried out on a regular basis with the main purpose of verifying that official controls take place in accordance with the multi annual control plan and in compliance with EU law. General audits of the control systems may be supplemented by audits and inspections in one or more specific areas.

There are quite a number of differences in the structure and operation of national control systems in the Member States of the European Union. The same applies to the EFTA States. However, the inspections from the FVO and the EFTA Surveillance Authority have shown that several key changes have been made in many Member States, both with respect to the organizational structure of authorities and the operation of food and feed control. There can be no doubt that the recent food safety incidents and the resulting revision of the basic food legislation, the application of the food chain principle and the establishment of the EFSA have influenced these changes, which include:

- bringing the control of different food sectors within one ministry;
- increasing cooperation between authorities at the central, regional and local level;
- setting up a new single/central food control authority;
- transferring responsibility for food control from local to central authorities;
- setting up a food safety agency/body responsible for risk assessment.

Inspection reports published by the FVO and reports giving an overview of a specific theme of a series of inspections carried out in Member States or third countries can be found on the FVO website¹¹ and reports from inspections in the EFTA States can be found on the EFTA Surveillance Authority website.¹² A description of the role of

these authorities and their inspection programmes can also be found on these websites.

Emergencies and crisis management

The BSE¹³ and dioxin crisis have also lead to new legal requirements and risk management procedures on emergencies and crisis, involving the Member States, the EFSA and the European Commission. The General Food Law Regulation lays down measures to be implemented in an emergency situation, where food or feed is likely to constitute a serious risk that cannot be contained by the measures taken by the Member State(s) involved. Furthermore, if the Commission considers that the risk can not be prevented, eliminated or reduced by existing provisions or managed by the emergency measures put in place, then the Commission shall set up a crisis unit and work according to a general plan for crisis management in the field of food and feed safety. The tasks of the crisis unit are:

- to be responsible for collecting and evaluating all relevant information and identifying the options available to prevent, eliminate or reduce to an acceptable level the risk to human health as effectively and rapidly as possible;
- to request the assistance of any public or private person whose expertise it deems necessary to manage the crisis effectively;
- to keep the public informed of the risk involved and the measures taken.

The general plan for crisis management was established by a Commission Decision published in 2004.¹⁴ It is expected that most risk situations can be managed by conventional procedures and that crisis situations will be very few or exceptional. A food or feed crisis is regarded as a situation where a risk is spread or could spread by a large part of the food chain and is likely to spread to several Member States and or non-EU countries. Information that could trigger the application of the general crisis plan could come from the RASFF, Member States, EFSA, FVO, EU epidemiological network, from third countries, international bodies or any other source (e.g. consumer groups, industry, other stakeholders, media).

Each Member State, the EFSA and the Commission shall designate one crisis coordinator for participation in the crisis unit. However, in a crisis situation, only the Member States directly involved will be represented in the unit, in addition to the coordinators from the Commission, the EFSA and other relevant representatives from these parties. The tasks of the crisis unit are

mentioned above and it should be noted that the unit is not responsible for adopting decisions on the management of a risk or for implementing legislation. Its task is to identify options for effective management of the crisis. Secondly, each Member State shall continue to be responsible for controls in its territory. However, the FVO could also be sent on urgent inspections in order to identify or assist in identifying management options.

It is interesting to note that the Commission will also have several management options in the event of a potentially serious risk. In such cases and when it has been decided to react, the Commission shall:

- establish appropriate contact with the Member State(s) directly concerned and the EFSA to request activation of their internal system for crisis management. Where necessary, the mechanisms for sharing scientific data developed by the EFSA in the event of emergencies should be activated;
- where necessary, request activation of the competent laboratories and sharing of their analytical results;
- establish appropriate contact or hold meetings with the Member State(s) directly concerned and the EFSA in order to ensure that all relevant information is shared (scientific data, control data, etc.);
- take action as regards communication, as further laid down in the general plan on crisis management.

It is for the Commission to decide when a potential risk situation will be regarded as a crisis and it is also for the Commission, in cooperation with the crisis unit and the Member States, to decide when a crisis situation can be regarded as resolved. After a crisis an overall post-crisis assessment shall be undertaken and involve the stakeholders and the crisis coordinators.

Rapid alert system for food and feed (RASFF)

The European Commission is responsible for running a rapid alert system for notification of a direct or indirect risk to human health deriving from food or feed. The system is called the Rapid Alert System for Food and Feed (RASFF) and involves the Member States, the Commission and the EFSA. The EFTA Surveillance Authority and the EFTA States, which are parties to the EEA Agreement, also participate in the RASFF notification system. Notifications in the system

are sent as alert or non-alert, depending on the risk established, and the information received is immediately transmitted to all members of the network.

The main principle behind the RASFF is to notify all Member States of any action taken regarding products that could represent a risk for human health and also of products rejected at border inspection posts within the European Union. The number of RASFF notifications has been increasing in recent years, as can be seen from the following table.¹⁵

RASFF notifications 2000 - 2004

	2000	2001	2002	2003	2004
EC notifications					
Alert	133	302	434	454	691
Non-alert	340	406	1,092	1,856	1,897
Total	473	708	1,526	2,310	2,588

EFTA notifications

	2000	2001	2002	2003	2004
Alert	18	35	21	12	46
Non-alert	29	21	35	68	41
Total	47	56	56	80	87

- **Alert notifications** are sent when the food or feed presenting the risk has been distributed on the market and when immediate action is required. Alerts are triggered by the State that detects the problem and initiated the relevant measures taken, such as withdrawal from the market and recall from consumers. The notification should give all members of the network the information necessary to verify whether the unsafe product is on their market, so that they can also take the necessary measures.

Products subject to an alert notification have been withdrawn or are in the process of being withdrawn from the market. The Member States have their own mechanisms to carry out such actions, including detailed information through the media if necessary.

- **Non-alert notifications** (or information notifications) concern a food or feed for which a risk has been identified, but for which members of the network do not have to take immediate action, e.g. because the product has not reached their market. These notifications mostly concern food and feed consignments that have been tested and rejected at the external borders of the EU. Products subject to a non-alert notification have not reached the market or all necessary measures have already been taken.

The European Commission has issued guidelines or criteria to be used by members of the RASFF when sending notifications within the alert system. However, after analyzing the notifications from Member States in 2003¹⁶, a scientist and representative of one of the EU Member States of the Advisory Forum of the EFSA criticized the RASFF at the European Food Law Conference in 2004.¹⁷ He noted that the number of notifications sent by the Member States was quite different (hundreds for some and only a few for others) and that this could hardly be explained by major differences in the general functioning of official controls or the number of unsafe products on the market. Therefore, he called for improvements in the functioning of the RASFF, including clarification of and compliance with the criteria for sending RASFF notifications and more transparent and comparable reporting from Member States.

Conclusions

By adopting the General Food Law Regulation and the revised legislation on official food and feed controls and hygiene, including control of animal health and animal welfare rules, some of the most important actions and objectives set out in the European Commission's White Paper on Food Safety¹⁸ have been implemented. The aim is to ensure a high level of consumer protection and restore consumer confidence after recent food incidences. In the new legal framework it is laid down that:

- business operators have the main responsibility for the safety of food and feed and will have to fulfill legal requirements on in-house control, traceability and other measures to ensure consumer protection;
- the legislation and controls shall be based on the principles of risk analysis;
- the national authorities have to set up and operate a system for enforcing food and feed law and to verify that business operators fulfill legal requirements;
- the competent control authorities have to work according to certain criteria and methods and shall draw up reports on their controls;
- the food chain principle shall be applied with the aim of integrating controls at all stages of production and in all sectors in the field of food and feed;
- the national authorities shall prepare a single multi annual control plan, covering all sectors and all stages of the food chain, and shall report annually to the Commission on the operation of official controls;

- the Commission shall evaluate national reports and give recommendations on improvements in controls and on coordinated activities and is responsible for audits and inspections (by the FVO) on the functioning of official controls;
- the Commission is responsible for operating the RASFF and for evaluating the need for emergency measures and for setting up a crisis unit in case of a serious risk to human health.

With the amended legal framework for food and feed the European Commission is more directly involved and responsible for activities in order to verify and ensure that national authorities have a harmonized and effective approach to the enforcement of food safety legislation and for ensuring consumer protection. However, the legislation does not regulate the structure and overall operation of national competent authorities. In spite of that, and as a natural consequence of new legal requirements, the establishment of EFSA and the application of the food chain principle, authorities must consider whether risk analysis and the official control at the national level could be improved. This is indeed what has been happening in several European States in recent years, where important changes have been made in the structure and operation of food and feed control authorities.

Footnotes

- 1 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. Official Journal (OJ) of the European Union L 31, 1.2.2002, p. 1.
- 2 Published in OJ L 191, 28.5.2004, p. 1.
- 3 Published in OJ L 139, 30.4.2004, p. 206.
- 4 Published in OJ L 139, 30.4.2004, p. 1.
- 5 Published in OJ L 139, 30.4.2004, p. 55.
- 6 Published in OJ L 35, 8.2.2005, p. 1.
- 7 The General Food Law Regulation and the new hygiene and official control Regulations have not yet been incorporated into the EEA Agreement.
- 8 Guidance on the implementation of articles 11, 12, 16, 17, 18, 19 and 20 of Regulation (EC) No 178/2002 on General Food Law. Conclusions of the Standing Committee on the Food Chain and Animal Health, 20 December 2004: http://europa.eu.int/comm/food/food/foodlaw/guidance/guidance_rev_7_en.pdf
- 9 Assuring Traceability to Increase Consumer Confidence, Andy Kerridge, Senior Supply Quality Manager, Burger King, UK. 13th Annual European Food Law Conference 29-30 June 2004, Agra Informa Ltd. Referred to in EU Food Law, July 9, 2004, p. 5.
- 10 The website of the UK Food Standards Agency contains information on the basic hygiene principles to be applied for catering businesses: <http://cleanup.food.gov.uk/>
- 11 http://europa.eu.int/comm/food/fvo/index_en.htm
- 12 <http://www.eftasurv.int/information/reportsdocuments/vetcontrolmatters/>
- 13 Bovine Spongiform Encephalopathy (http://europa.eu.int/comm/food/food/biosafety/bse/index_en.htm).
- 14 Commission Decision 2004/478/EC of 29 April 2004 concerning the adoption of a general plan for food/feed crisis management. OJ L 212, 12.6.2004, p. 60.
- 15 Annual report of the EFTA Surveillance Authority 2004: <http://www.eftasurv.int/information/>
- 16 See the European Commission's Annual report for 2003 on the functioning of the RASFF, final 16.02.2004: http://europa.eu.int/comm/food/food/rapidalert/report2003_en.pdf
- 17 The Rapid Alert for Food and Feed: What Needs to be Changed? Prof. Andreas Hensel, President, Federal Institute for Risk Assessment, Germany. 13th Annual European Food Law Conference 29-30 June 2004, Agra Informa Ltd. Referred to in EU Food Law, July 5, 2004, p. 10.
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Functional foods

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Abstract

“Functional foods” is a term often used by the private sector to characterize foods that are developed and marketed as foods for health; however, this category of foods is not specifically defined by the U.S.A. Food, Drug, and Cosmetic Act (FDCA) or in the Code of Federal Regulations. The characteristic that is most frequently associated with these products is the use of claims related to health or to nutrient content. Under the FDCA, three types of claims are allowed on products that are intended for use as foods or dietary supplements; these include health claims, structure/function claims, and nutrient content claims. Nutrient content claims characterize the level of nutrient in a food; structure/function claims describe the role of a nutrient or dietary substance that is intended to affect normal structure or function of the body; and health claims describe the relationship between a food, food component, or dietary supplement ingredient and reducing the risk of a disease or health-related condition. Health claims, as described in the Code of Federal Regulations, are based on significant scientific agreement. Using interim guidance and enforcement discretion, certain qualified health claims have been allowed for foods and dietary supplements sold in the United States; these claims contain language to qualify the quality and strength of scientific evidence to support the claim since they are based on emerging scientific evidence rather than significant scientific agreement. In addition to these three types of claims, dietary guidance statements, which are truthful and not misleading, are allowed on the label.

Functional foods

“Functional foods” is a term often used by the private sector to characterize foods that are developed and marketed as foods for human health. The International Food Information Council (IFIC) has defined this term as “referring to foods that provide a health benefit beyond basic nutrient content”. However, this category of foods is not defined by the Food, Drug, and Cosmetic Act or in the Code of Federal Regulations of the United States. For all practical purposes, items referred to as “functional foods” appear primarily to be foods for which a claim is made that relates to nutrient content or a potential health benefit. This paper discusses the approach used by the U.S. Food and Drug Administration (FDA) to review scientific substantiation of evidence supporting claims made on food products and dietary supplements.

In 1990, the Nutrition Labeling and Education Act (NLEA) became law in the United States. It provides for the use of nutrient content claims and health claims on products. In addition, the Dietary Supplement and Health Education Act of 1994 (DSHEA) provides for the use of structure/function claims on product labels for dietary supplements. In addition to these 3 categories of claims (nutrient, health and structure-function), manufacturers are also allowed to provide statements that are considered to be dietary guidance on food packages.

Dietary guidance refers to health messages that refer to a general category of foods, such as fruits and vegetables. They cannot imply a health claim for the product by referring to a specific substance in foods or a specific disease state; they should primarily encourage healthful dietary practices. These messages do not need to be pre-approved by the FDA; however, it is useful to consult with experts in the agency to insure that statements are

truthful and not misleading and that they do not contain implied health claims.

Manufacturers can make an accurate quantitative statement to describe an amount of nutrient present in a product, such as 'contains 150 mg of sodium' or 'contains 0g of trans fat.' However, if descriptors are used to characterize the level of nutrient in a food, the statement is considered a nutrient content claim and these claims must be authorized. The descriptors may characterize the amount of the nutrient present by using terms such as 'free,' 'high,' or 'low' or they compare the level of nutrient between foods by using terms such as 'more' or 'reduced.' FDA has developed a process for estimating an amount of nutrient that can be used to define free or low levels that considers how wide-spread the nutrient is among food categories and recommended levels of intake for the nutrient. Such terms are defined so that they are used consistently among food products and become meaningful to consumers. These claims typically apply only when a Daily Value (DV) is established for use on the label. At present the use of terminology to characterize the nutrient level of a product has been defined for calories, total fat, saturated fat, cholesterol, sodium, and sugars. In allowing the use of such terminology, careful consideration needs to be given to the total composition of the food. For example, claims about cholesterol content should consider the amount of total fat and saturated fat and whether these levels are consistent with the intent of the overall message. A full description of the claims allowed and the conditions of use can be found on the website of the Center for Food Safety and Applied Nutrition (www.cfsan.fda.gov). Some consideration is also needed for characterizing foods that are a good or excellent source of a particular nutrient. Such claims are typically based on the established Daily Value for the nutrient.

Structure/function claims describe the role of a nutrient or dietary substance that is intended to affect a normal structure or function of the body. Additionally they may describe the way in which a nutrient or dietary ingredient acts to maintain the structure or function of the body or they may describe general well-being. Another category of structure-function claims includes benefits related to nutrient deficiency diseases; however, such statements need to also characterize how widespread the deficiency disease is in the United States. FDA does not pre-approve structure/function claims; however, the manufacturer is responsible for substantiating and for ensuring the accuracy and truthfulness of the claims. When structure/function claims are used on dietary

supplements the DSHEA requires that they carry a disclaimer statement that indicates that the claim has not been evaluated by the Food and Drug Administration and that the product is not intended to diagnose, treat, cure, or prevent any disease (§101.93(c)). As such, structure/function claims do not refer to diseases or disease states but only refer to maintaining health in normal individuals.

Health claims describe the relationship between a food, food component, or dietary supplement ingredient and reducing the risk of a disease or health-related condition. Health claims have two essential components, the substance (e.g. a food component or dietary ingredient) and a disease or health-related condition. When NLEA was passed in 1990 it allowed health claims that are based on 'significant scientific agreement' (SSA). During the original implementation of NLEA, seven claims were allowed based on monographs produced and reviewed by experts in the field. Subsequently additional claims that meet the standard of SSA have been authorized through petitions to the FDA. In 1997, the US Congress passed the FDA Modernization Act (FDAMA) which provided for a quicker process for authorization of health claims based on SSA. This process allows for the use of authoritative statements from certain entities, such as government bodies or the National Academy of Sciences, to serve as the justification for use of a health claim.

The standard of SSA is based on a high level of confidence in the validity of the relationship between the substance and the disease or health-related condition. Consequently the nature of the relationship is unlikely to be reversed by new and evolving science. If one considers the continuum between emerging evidence and scientific consensus, the evidence would be viewed as closer to consensus on the relationship. Hence SSA is a high standard to meet. Court decisions in the United States struck down the prohibition on manufacturers from providing claims about substance-disease relationships when the science is still viewed as emerging and has not yet achieved the standard of SSA. Of special consideration in the United States is the right of free speech, including certain types of commercial speech, under the First Amendment. In particular the courts indicated that FDA had not shown whether qualifying language might help consumers understand the nature of the evidence supporting a claim and avoid the claim being misleading. Based on these court decisions, FDA is currently using interim guidance to review qualified health claims (QHC) and enforcement discretion to provide

for the use of such claims on foods and dietary supplements. A QHC is distinguished from an SSA claim by language in the claim that characterizes the quality and strength of the scientific evidence because the claim is not based on significant scientific evidence (July 2003 Guidance for Industry and FDA: Interim Evidence-based ranking system for scientific data available at www.cfsan.fda.gov).

The review of evidence for a health claim must address three basic questions:

1) Have the studies appropriately specified and measured the substance that is the subject of the claim, 2) Have the studies appropriately specified and defined the disease or health related condition that is the subject of the claim, and 3) Are any and all of the conclusions about the substance-disease relationship based on the totality of publicly available scientific evidence? In addition the substance under review must be shown to be safe and lawful to FDA's satisfaction, and, if the evidence does not meet the standard of SSA, the quality and strength of the evidence must be evaluated and ranked. In order to address the questions, an evidence-based review system is needed (see for example, Agency for Healthcare Research and Quality. Systems to rate the strength of scientific evidence. Evidence Report/Technology Assessment. Number 47, 2002). It is essential that evidence to support the claim be based on studies in humans. Animal and in vitro studies are useful but not sufficient on their own to substantiate a claim. Among studies in humans, the randomized, placebo-controlled, double-blinded intervention study is the "gold-standard." However, it is not always possible to conduct intervention studies on food and food components in this manner, thus, the studies that are available must be reviewed

for their quality and relevance to support the claims. Such a review should include whether the studies are controlled for confounders and bias, the appropriateness of the study population, and soundness of the experimental design and analysis. Observational data can be supportive of a claim but often are less persuasive scientifically, based on the overall design of the study. Research syntheses such as meta-analysis or review articles are primarily useful for identifying studies for further examination. Once, all of the relevant data are identified, the weight of the evidence as a whole is determined by considering if the evidence in support of the claim outweighs the evidence against it based on appropriate weighting of the studies available and by considering whether a change in the dietary intake of the substance will result in a change in the disease endpoint. A complete description of how various factors are considered is available on the FDA web site (www.cfsan.fda.gov: Guidance of Industry: Significant scientific agreement in the review of health claims for conventional foods and dietary supplements; Interim Evidence-based ranking system for scientific data).

In considering the safety aspect of foods for which health and nutrient content claims are considered, it is important to remember that so-called functional foods remain foods. If ingredients are added to foods for a health benefit, these components may be considered food additives requiring a review of the safety of the additive.

Reference

Website of the Center for Food Safety and Applied Nutrition is www.cfsan.fda.gov

WHO programmes on food safety and drinking water

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Abstract

This paper summarizes the work of the WHO Regional Office for Europe in promoting safe and wholesome foods, based on the Food and Nutrition Policy Action Plans 2000-2005. It recalls the importance of nutrition as a health determinant and reviews socio-economic determinants that limit the nutritional choices. The contribution then reviews two of the major food safety programmes, the WHO Surveillance program for the Control of Foodborne Diseases, and the Global Environment Monitoring System of food contamination. The recent publication of the 3rd Edition of the Guidelines for Drinking Water Quality is discussed as an example of how concepts developed in the food industry, particularly HACCP, are finding new applications and indeed are replacing a purely parametric approach.

1 Introduction

The issue of food safety and quality has become an area of global interest. The present paper introduces the role of WHO in the area of food and nutrition policy with a focus on food safety, and highlights the work done by the Organization under its continuing efforts for the provision of safe drinking-water.

2 Food and nutrition policy

The Food and Nutrition Policy and Action Plans in Europe were endorsed at the WHO Regional Committee for Europe in 2000 and they comprise three strategies: a strategy on nutrition, a food safety strategy and a sustainable food supply strategy.

Acronyms

BCA	Biennial Collaboration Agreement	JEMRA	Joint FAO/WHO Expert Consultation on Risk Assessment of Microbiological Hazards in Food
BfR	Federal Institute for Risk Assessment	NIS	Newly Independent States
CCEE	Caucasus Central and Eastern European Countries	NSF	Nutrition and Food Security Program (of WHO)
CVD	Cardio-vascular diseases	PHI	Public Health Initiative
GDWQ	Guidelines for Drinking-Water Quality	SIGHT	Summary Information on Global Health Trends
GEMS	Global Environmental Monitoring System	TDS	Total Diet Study
GSS	Global Salmonella Survey	vCJD	variant Creutzfeldt-Jakob Disease
HACCP	Hazard Assessment and Critical Control Points	WHO	World Health Organization
IDD	Iodine Deficiency Disorder

Figure 1.
WHO Food and Nutrition Policy
and Action Plans

The approach of WHO Europe towards the provision of safe and wholesome foods is based on these three interrelated strategies, since food supply influences both the safety and composition of food. This framework provides a starting point from which to address the question of how to promote public health through food (Figure 1).

3 Nutrition and food security

The Nutrition and Food Security Program (NFS) encourages the development of food and nutrition action plans, including the development of food-based dietary guidelines and infant/young child feeding strategies, as an integral part of national health policies. NFS supports the development of nutrition information systems which highlight the relationship between food, nutrition and health such as micronutrient deficiencies (iodine and iron deficiencies) and non-communicable diseases.

3.1 Nutrition

Nutrition has three main components

- (a) the health impact of nutritional choices people make: nutrition as a health determinant
- (b) the socio-economic conditions under which people live and their impacts on the nutritional choices people make
- (c) the challenges faced by people living in affluent societies

Poor nutrition makes an important contribution to the burden of disease in Europe. A diet high in saturated fat, energy-dense foods and low in fruit and vegetables is a major cause of cardio-vascular diseases (CVD), cancer and obesity.

CVD and cancer are the top two causes of death in the WHO European region. CVD causes over 4 million deaths per year in Europe. Coronary heart disease (CHD) is the most common cause of premature death, accounting for nearly 90,000 deaths per year (16% of all premature deaths in men and 12% of all premature deaths in women). Moreover, in the countries of Central and Eastern Europe (CCEE) and the newly independent states (NIS), CVD mortality is almost double that in the European Union (EU-15), and is still rising in many countries. Around one third of CVD cases are related to a poor diet. Better diets could also prevent around 30-40% of cancer cases. (WHO, 2002)

Deficiencies in such nutrients as iodine and iron are still prevalent in the WHO European Region. Iodine deficiencies affect around 16% of the European population, and are a major cause of preventable mental retardation. Iron-deficiency anaemia affects millions of people. It impairs cognitive development in children, and increases the risk of illness and death to pregnant women.

3.2 Food security

Socio-economic conditions under which people live constitute a significant determinant for their nutritional choice. Low-income families spend less on foods that protect health, such as fruits and vegetables, and more on energy-dense foods such as fats, oils, white bread, sugar, fatty meats, and they buy these products more often. Higher-income families eat more fruit and vegetables, and spend a smaller share of their total income on food.

In addition, in poorer families some members may deprive themselves of adequate nourishment so that others may get enough to eat. Women in particular are known to skip meals or eat less than

their requirement when needing to protect younger family members. However, poor nourishment before and during pregnancy, low breastfeeding rates, and poor feeding practices continue to result in growth retardation and poor cognitive development. The following table shows the prevalence of stunted growth of preschool children in selected CCEE and NIS countries, and its clear relation with socio-economic development:

Country		%
Croatia (1995 - 1996)	HRV	1
Czech Republic (1991)	CZE	2
Hungary (1980 - 1988)	HUN	3
Yugoslavia (1996)	YUG	5
Romania (1991)	ROM	8
Kazakhstan (1999)	KAZ	10
Armenia (1998)	ARM	12
Turkey (1998)	TUR	16
Russian Federation (1993)	RUS	17
Azerbaijan (1996)	AZE	22
Albania (1997)	ALB	23
Kyrgyzstan (1997)	KYR	25
Uzbekistan (1996)	UZB	31
Tajikistan (1996)	TJK	55

Table 1. Stunted growth in school children

The difficulties facing families in affluent societies to ensure wholesome nutrition should not be under-estimated. A study of twenty Copenhagen families with young children (Holm and Kildevang, 1996) suggests that everyday-concepts of food quality become integrated with concerns for food safety, meaning that the two concepts become blurred in the mind of the consumer. Feelings of uncertainty, helplessness and self-reproach were frequently reported.

3.3 Summary

The nutrition and food security program (NFS) of the WHO provides health professionals and policy-makers with information and tools on:

- Food and nutrition action plans
- Nutrition policy
- Infant feeding
- Micro-nutrient deficiencies
- Food security.

4 Food safety

The WHO food safety programme in Europe ensures that:

- Information on food safety is properly collected and circulated to provide the basis for policy and monitoring
- Health guidelines are updated to provide assistance to countries with current knowledge

- An independent body plays a public health advocacy role as a counterpoint to the strong economic forces acting within the area of food production, retailing and global marketing.

4.1 FAO/WHO Pan-European Conference

In 2002, FAO and WHO organized a joint Pan-European Conference on Food Safety and Quality to identify and discuss the ways to strengthen food safety in the region. Important recommendations included:

- Improving the quantity, quality and timeliness of data collection and reporting at the national level and to the WHO Surveillance Program for the control of foodborne diseases in Europe
- Collecting food microbiology data for risk assessment to assist the Joint FAO/WHO Expert Consultation on Risk Assessment of Microbiological Hazards in Food (JEMRA)
- Strengthening national capacity for monitoring of chemical contamination. Harmonizing data reporting formats across Europe. Particular reference was made to the WHO Global Environmental Monitoring System for Food data structure
- Accelerating the implementation of the Food & Nutrition action plans in Europe
- [Countries recommended] that FAO, WHO, EC and other countries should assist with capacity building initiatives to European countries with special needs.

The recommendations of this Conference were endorsed by the WHO European Regional Committee in 2002 within the framework of the development of Food Safety Strategies for the implementation of the Food and Nutrition Action Plans in Europe.

4.2 WHO Surveillance Programme for the Control of Foodborne Diseases in Europe

The WHO Surveillance Program for the Control of Foodborne Infections and Intoxications in Europe was launched almost 25 years ago. The Program is coordinated by the FAO/WHO Collaborating Centre at the Federal Institute for Risk Assessment (BfR) in Berlin, Germany, and operates under the supervision of the WHO Food Safety Programme in Europe. The Programme has official National Contacts for Surveillance in 51 countries, generally at the Ministry of Health, the National Public Health Institute, or the National Epidemiology Centre. The programme benefits from a solid network of epidemiology centres, which have been reporting official national data for hazard identification and trend analysis during the last 25 years. Country Reports and quarterly Newsletters can be found on the WHO website.¹

Priority lines of work of the WHO surveillance program for control of foodborne diseases in Europe include:

- Strengthening surveillance and promotion of the harmonization of reporting systems
- Coordination with other European and international networks such as the Community Network for Zoonoses, ETERNET, basic surveillance network, specific EU networks on foodborne diseases, the European Food Safety Authority, and WHO networks such as the Early Warning Network in Central Eastern and South Eastern Europe, the Mediterranean Zoonosis Program and the WHO Global Salmonella Survey (GSS)
- A new priority for the WHO Surveillance Programme in Europe is the promotion of the collection of qualitative and quantitative data on food contamination from investigated outbreaks which can be useful for microbiological risk assessment. This is essential to support the work of the joint FAO/WHO Expert Consultation on Risk Assessment of Microbiological Hazards in Food. To date, JEMRA has completed the risk assessment of *Salmonella* in eggs and broiler chicken (FAO/WHO 2004). The risk assessment on *Listeria monocytogenes* in ready-to-eat foods and on *Campylobacter* and *Vibrio* will be completed and published in 2004 on the WHO website ².

These recommendations were endorsed by the WHO Regional Committee for Europe in 2002 within the framework of the development of food safety strategies for the implementation of the Food and Nutrition Action Plans in Europe.

4.3 GEMS/Food Programme in Europe

The Global Environmental Monitoring System (GEMS)/Food was established as an international source of health-oriented, population-based information on human exposure to potential chemical hazards in food. The GEMS/Food Europe was established in 1991 at the European Centre for Environment and Health, Rome Office, to address specific priorities and needs in the European Region. After a period of non-activity, the program was relaunched in 2001. Currently GEMS/Food Europe has national contact points, participating institutions and collaborating centres in 35 countries in Europe.

GEMS/Food joint capacity building activities include: Sub-regional training on Total Diet Studies (TDS) for EU accession countries (Prague-Brno, 2002), an International workshop on Total Diet Studies (Paris, 2004), a sub-regional workshop on chemical food contamination monitoring of

relevance in Central Asia (Almaty, 2003), and several national training courses on Operating programs for Analytical Laboratories for electronic submission of data (OPAL I for contaminants and OPAL II for Total Diet Studies).

Other activities of GEMS/Food included the creation of a European database section of the Summary Information on Global Health Trends (SIGHT), to disseminate the European exposure and intake data³.

4.4 Biotechnology

The WHO food safety programme in Europe has addressed the environmental health aspects of the release of foods derived from modern biotechnology or genetically modified organisms (GMOs) into the environment. The programme organized a seminar in 2001 at the European Center for Environment and Health in Rome to assess the potential Health Impacts of the Release of Genetically Modified Organisms into the Environment.

The WHO food safety programme in Europe has been collaborating with the Joint Research Centre (JRC) of the European Commission on the organization of training courses for detection techniques for GMOs in food. The manual, used in the training courses organized jointly by the Joint Research Centre (JRC) of the European Commission and WHO/Europe, has been published on the Internet and provides the theoretical and practical information on methodologies and protocols followed during the courses. This material is available on the WHO website⁴.

4.5 Technical assistance to countries

The WHO Food Safety Programme provides technical support to countries in a wide variety of areas. Include are: food safety strategies and policies, food legislation including Codex Alimentarius, surveillance of foodborne diseases, microbiological and chemical food contamination monitoring, risk analysis, and application of the Hazard Assessment and Critical Control Point (HACCP) methodology,

The following picture illustrates the WHO technical support to strengthen laboratory based surveillance and microbiological capacities in Europe.

The 16 countries⁵ highlighted in purple colour have completed the three level training of the WHO Global Salmonella Survey (GSS) courses⁶. The ten Russian-speaking countries highlighted in green colour⁷ have participated in the two-level

Figure 2.
WHO technical support to strengthen
surveillance and microbiological
capabilities in Europe

training for microbiologists, and the four countries highlighted in orange colour have requested tailor-made assistance⁸. Main training sites are in Moscow, St. Petersburg, and Almaty. The Institute for Food Hygiene in Warsaw has been designated as the Regional Training Centre for Eastern and South-Eastern Europe.

WHO Europe has developed, and is currently implementing, a project to strengthen food safety for the South-eastern European countries in the framework of the Stability Pact Initiative for Social Cohesion in the Balkans. The initiative is supported by the WHO Europe, the Council of Europe, and the Stability Pact Consortium, and has been co-funded by neighbouring countries such as Italy, Greece, and Slovenia, the Food Safety Authority in Ireland (FSAI), as well as by international organizations such as FAO⁹.

Another important Regional project of WHO Europe is the public health initiative in the Central Asiatic Republics and other New Independent States of Russian language to provide capacity building on Food Safety in collaboration with the many partners including FAO, Centers of Diseases Control in Central Asia and USA, several European Universities, Laboratories or Food Research Institutes and national institutions¹⁰.

Currently, the Food Safety Programme is collaborating with Albania, Bosnia Herzegovina, Bulgaria, Croatia, FYR Macedonia, Georgia, Moldova, Russian Federation, Uzbekistan, Kazakhstan, and Turkmenistan, promoting the establishment of inter-ministerial commissions for the development of national Food Safety Strategies. This is done

under the framework of the Biannual Country Agreements signed between WHO Europe and the Ministries of Health of the WHO European Member States.

4.6 Summary

The WHO Food Safety Programme coordinates collection and distribution of information on surveillance and food microbiological and chemical contamination to provide a basis for policy making in Europe.

The Programme provides technical assistance to countries promoting the coordination of the capacity building initiatives among international and bilateral agencies, in order to cooperate in a synergistic way avoiding duplication of efforts, sharing networks, experiences and resources to optimize efforts to reach common goals.

5. Drinking-water quality

5.1 Guidelines for drinking-water quality

The WHO Guidelines for drinking-water-quality (GDWQ) are perhaps the most important document published in the field of water and health. The new edition of *WHO's Guidelines for Drinking-water Quality* provides a state-of-the-art perspective on issues of water quality and health, and on effective approaches to water safety management.

The third fully-revised edition, released in September 2004, includes expanded coverage on systematic drinking-water safety assessment and management. The complete text of the GDWQ may be downloaded from the WHO website¹¹.

The guidelines describe a “Water Safety Framework” encompassing functions of national regulators, water suppliers, and independent surveillance agencies. The “Water Safety Plan” provides a comprehensive approach to assist suppliers in water safety management, including a comprehensive risk assessment and risk management approach that encompasses all steps in water supply from catchment to consumer. The Water Safety Plan draws on the experience of the food industry in the development of HACCP. It contains the following components:

- *System assessment*: to determine whether the drinking-water supply chain (up to the point of consumption) as a whole can deliver water of a quality that meets health-based targets. This also includes the assessment of design criteria of new systems
- *Control measures*: control measures in drinking-water systems that will collectively control identified risks and ensure that the health-based targets are met. For each control measure identified, an appropriate means of *operational monitoring* should be identified that will ensure that any deviation from required performance is rapidly detected in a timely manner.
- *Management plans*: describing actions to be taken during normal operation or incident conditions, and documenting the system assessment (including upgrade and improvement), monitoring and communication plans and supporting programmes

5.2. Irrigation water

Besides the obvious use of drinking-water as a foodstuff, water quality used in irrigation and other agricultural applications has a direct consequence on the quality of the resulting produce. Quite recently (Robertson and Gjerde, 2001) the presence of *Cryptosporidium* oocysts and *Giardia* cysts has been reported in water samples concerned with field irrigation and in bean sprouts produced in Norway. This report established for the first time that these parasites had been detected on vegetables and fruits obtained in a highly developed country, and consequently has direct relevance for food safety, including exportation.

5.3 Specific guidance

Specific guidance is available on a large number of water-related issues. Most recently, a report has been published on the *Waterborne Zoonoses: identification, causes and controls*. (Cotruvo et al, Eds, 2004). The authors concluded that there is a need for further efforts to develop networks and facilitate regional cooperation leading towards international harmonization for control of zoonotic pathogens across multiple exposure

routes, including food. The importance of cross-sector and interdisciplinary collaboration between sanitary microbiologists and engineers, veterinary scientists, and agricultural scientists and engineers in controlling waterborne zoonoses cannot be understated. Evidence of situations where collaboration could have mitigated the impact of emerging waterborne zoonotic pathogens is amply available in cases of both *Cryptosporidiosis* and *Campylobacteriosis*. Funding would be more effectively directed should the creation of such coordinating bodies occur, incorporating an appropriate range of different expertise.

Conclusions

The aim of this Conference on Safe and wholesome food was to give a broad view of the new challenges in food safety and wholesomeness in an increasingly globalized market, and to analyse some aspects of these challenges.

In this context the WHO Regional Office for Europe is supporting Member States in the development of Food and Nutrition Policy and Action Plans by 2006. The Food and Nutrition Policy and Action Plans comprise three strategies: i.e. a strategy on nutrition, a food safety strategy and a sustainable food supply strategy

This presentation recalled the importance of nutrition as a health determinant, stressing both the differences resulting from socio-economic conditions and the challenges faced by consumers in affluent societies such as the Nordic countries to make informed, health-promoting decisions.

The Food Safety Programme is supporting countries to strengthen their laboratory-based surveillance systems and food contamination monitoring programmes through the WHO Surveillance Programme for Control of Foodborne Diseases in Europe and GEMS/Food Euro. The Food Safety Programme is providing technical support to Member States to develop national food safety strategies within the framework of the Food and Nutrition Action Plans in Europe.

Specific information was given on the WHO Water and sanitation program, including the fight against waterborne zoonoses in which ample room for cross sectoral cooperation exists.

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Footnotes

- 1 www.euro.who.int/eprise/main/WHO/Progs/FOS/Surveillance/20020903_3
- 2 www.who.int/foodsafety/micro/jemra/en/
- 3 www.euro.who.int/eprise/main/WHO/Progs/FOS/Chemical/20040728_1
- 4 www.euro.who.int/eprise/main/WHO/Progs/FOS/Assistance/20020417_1
- 5 Albania, Bulgaria, Republic of Croatia, Czech Republic, Estonia, Former Yugoslavian Republic of Macedonia, Greece, Hungary, Latvia, Lithuania, Republic of Moldova, Romania, Slovak Republic, Republic of Slovenia, Turkey , Poland,
- 6 www.who.int/salmsurv/en/
- 7 Armenia, Azerbaijan, Belarus, Georgia, Moldova, Kazakhstan, Kyrgyzstan, Russian Federation, Ukraine, Uzbekistan.
- 8 Bosnia and Herzegovina, Serbia and Montenegro, Tajikistan and Turkmenistan
- 9 www.euro.who.int/foodsafety/Assistance/20030506_2.
- 10 www.euro.who.int/foodsafety/Assistance/20021010_2
- 11 www.who.int/water_sanitation_health/dwq/guidelines/en/

Scene from the discussion session.

Animal health and feed quality

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Abstract

Food safety systems in both developed and developing countries are facing unprecedented challenges arising from demographic change, the globalization of food trade, shifts in food consumption patterns, increased urbanization and more intensified food production techniques. The intensification of livestock production and the increasing trade in livestock products and live animals, as well as in raw materials for the feed industry, demands greater attention to risk management by all countries.

The production of safe food requires all those involved along the food chain to assume responsibility. The food chain extends from primary production to final consumption and includes farmers, feed suppliers, slaughterhouse operators, food processors, transport operators and distributors (wholesale and retail).

Transmission of diseases between animals and human (zoonoses) occurs frequently in all countries, and is often but not only, the result of ingestion of contaminated food of animal origin. In recent years, food scares associated with *Salmonella* in eggs and poultry products, Bovine Spongiform Encephalopathy (BSE), *E. coli* O157 and dioxin have all had their share of attention. Many food safety emergencies are directly related to animal feed contamination and have highlighted the need to upgrade the relevant legislation concerning feed safety and its implementation, as well as to put in place a system of feed management which will ensure the safety of raw materials and compound feeds entering the food chain through animal production. International standards, codes of practices, guidelines and recommendations on food of animal origin and feed quality and safety are therefore increasingly being developed. It is clear

that undesirable substances such as pesticides, industrial and environmental chemicals, heavy metals, and microbiological contamination of feedstuffs should be rigorously controlled. For the industrial production of animal feedstuffs, the producer or manufacturer should establish quality assurance systems based on the principles of Good Manufacturing Practice (GMP) and the application of Hazard Analysis and Critical Control Point (HACCP) principles. Feed additives should be assessed for safety and approved under stated conditions of use, and antibiotics should not be used in feedstuffs for growth-promoting purposes in the absence of public health safety assessment.

To help its member countries respond to these challenges, FAO is developing guidelines for Good Agricultural Practices (GAP) along the food-chain and has organized several events (expert consultations, electronic conferences, workshops, etc.) on this topic and more generally on Veterinary Public Health and Food and Feed Safety. FAO works with countries world-wide through its Technical Cooperation Programmes (TCP) and General Cooperation Programmes (GCP). It provides comprehensive technical assistance to improve food and feed safety and particularly to address risk management for such issues as Bovine Spongiform Encephalopathy and other zoonotic diseases, food and feed-borne infections, and contaminants.

Livestock revolution

The livestock sector plays an essential role in agricultural and economic development as well as food security. The global livestock output is growing at a rate of 2.5% per year and meat production now exceeds 250 million tonnes per year. World demand and consumption of livestock products is expected to nearly double again in the

next 20 years (Delgado *et al.*, 1999). Most of this increase is expected to take place in developing countries associated with greater population growth and emerging economies, particularly in Asia. As a global average, animal products provide about 16% of the calories in the diet. Meat and other animal products provide essential fatty acids, vitamins and minerals. The livestock industry therefore can be seen to have great economic and nutritional significance in the world as a whole.

The global meat production has risen from almost 150 million tonnes in 1984 to more than 257 million tonnes in 2004, a growth of almost 3% per year for 20 years (Figure 1). In particular, chicken meat production has increased from 26 million tonnes to 68 million tonnes in that period; pig meat production from 57 million tonnes to 100 million tonnes; production of beef and buffalo meat from 50 million tonnes to 62 million tonnes; and sheep and goat meat production from 8 million tonnes to 12 million tonnes. In addition, milk production has increased from 503 million tonnes to 613 million tonnes and egg production from 31 million tonnes to 63 million tonnes in those twenty years (all data from FAOSTAT, 2002).

However, much of the growth has been taking place in developing countries and in a relatively small number of countries, including some of the most populous ones, such as China and Brazil (FAO, 2000). Including these two countries, the *per capita* meat consumption in the developing countries increased from 11kg to 23 kg in the two decades to the mid-90s. Excluding China and Brazil, meat consumption increased from 11kg to only 15 kg. Including or excluding China in the total production figures of the developing countries and the world makes a significant difference for the aggregate growth rates of meat, though not of milk and dairy products, given the small weight of these products in China's food consumption. In particular, the most significant growth in pig production is very dependent on whether China is included in the statistics.

The world meat economy has been characterized by the rapid growth of the poultry sector (its share in total meat output went from 13% to 28% in the last three decades) and, in more recent years, the buoyancy of the meat trade (Figure 2). Although the United States is by far the largest

Figure 1.
World meat production
(FAOSTAT): Since 1960,
global meat production
has more than trebled.

FAO and other institutions suggest (Delgado *et al.*, 1999) that global meat production and consumption will rise from 233 million tonnes (2000) to 300 million tonnes (2020), and milk from 568 million tonnes to 700 million tonnes over the same period. Egg production will also increase by 30%. These predictions show a massive increase in animal protein needed to satisfy the growth in the human population, and with the increasing affluence of the emerging economies.

exporter of poultry meat, it is important to note the importance of a number of developing and emerging economies in this market, most notably Brazil, but also Thailand. China's position is somewhat anomalous, being at the top of both imports and exports, suggesting considerable reprocessing of poultry meat in that country. There is also a large increase in egg production which may be expected to continue (all data from FAOSTAT, 2002).

Figure 2.
Production of different
meats in the world
(FAOSTAT, 2002).

Consumption of milk and dairy products has some way to go before it hits the production limits. Projections concerning the milk and dairy sector, indicate that in the coming years, there will be more rapid growth in the world milk and dairy sector than in the recent past because of the increased demand in transition economies (e.g. China, Brazil) (FAO, 2001). Excluding transition economies, world demand should continue to grow as in the past at 1.6%.

Veterinary public health

Infectious diseases originating from animals (zoonoses) are a constant threat to public health. Annual deaths due to major infectious and parasitic diseases are estimated to be 13.3 million children and young adults (WHO, 2003). Emerging zoonoses are increasingly reported. For example from 1996 to 2004, the World Health Organization (WHO) of the United Nations has reported worldwide outbreaks of *Cryptosporidiosis*, *Leptospirosis*, *Lyme borreliosis*, *Ebola*, *Bovine Spongiform Encephalopathy*, *Severe Acute Respiratory Syndrome (SARS)*, *Influenza H5N1*, *West Nile*, *Nipah*, *Rift Valley Fever*, *Brucellosis*, *E. coli O157*, *Salmonella*, *plague*, etc. (WHO, 2004).

Why do zoonoses emerge? According to WHO (WHO, 2002b), the main reasons are:

- Changing animal production systems
- Higher population densities
- Changes in microorganisms
- Increased trade in live animals and their products
- A greater demand for animal protein

- Increased movements of people (travellers, refugees, immigrants)
- Changing eating habits (ready-to-eat foods; long storage of foods; changes in cooking techniques)

Food-borne diseases (FBD) kill up to 2.2 million people annually, in developing countries; most of them are children (WHO, 2002). However, food-borne diseases affect both developed and developing countries: for example, in USA, 325,000 hospitalizations and 5,000 deaths are reported per year (WHO, 2002). In industrialized countries, up to 30% suffer FBD each year. In USA, *Salmonella*, *Listeria*, and *Toxoplasma*, cause 1,500 deaths each year; unknown agents account for the remaining 62 million illnesses.

Animal feed safety

In order to meet current demand for meat and animal products, a wide variety of systems have been developed to efficiently feed animals. Animal feeding systems range from highly developed systems to less intensive ones. In many countries, poultry and pig production have become almost exclusively intensive in large units. Dairying has followed a similar trend, although grass-based for half or more of the year. In some countries, intensive beef production is carried out but this is increasingly based on grass or maize silage. Sheep production is largely extensive and attempts at intensification have proved uneconomic, although high stocking-rate grazing systems have been sporadically adopted.

The term feed is generally used in its widest context to include compound blends of ingredients as well as forages. Animal feed includes any substance, whether processed, semi-processed or raw which is used for animal consumption. This includes feed of varied origin such as pasture, feed grains and compound feeds, crop residues and agro-industrial by-products. Poultry and pigs require protein supplementation and this protein must be of high quality (balanced for essential amino acids) to sustain efficient growth and feed conversion. Hence, cereals and other energy feeds must be balanced with additional protein meals. Although these may be of vegetable origin (soybean, rapeseed, etc.), they require supplementation with amino acids (lysine and methionine) and the best sources from a nutritional viewpoint are animal and fish meals. In practice, meals of animal origin are less palatable to pigs and poultry and their use has been limited. Similarly, high producing dairy cows require additional protein supplementation to sustain yields. This is because the cow producing 25 litres or more of milk per day cannot consume sufficient energy and must use body reserves during peak lactation, hence there is not enough energy to provide for microbial protein production in the rumen. Research has shown that this is best supplied with "by-pass protein", that is protein not degraded in the rumen (also known as undegradable protein). Again, the best sources of "by-pass protein" are animal and fish by-products.

in the world has increased from 75 million tonnes in 1981 to 150 million tonnes in 2001 (figures in agreement with the FAOSTAT supply utilization account). The corresponding quantity of protein feeds (i.e. protein cakes, fishmeals) has increased from 15 million tonnes to 29 million tonnes. This demonstrates the increase in demand for livestock feed and particularly for poultry, pig and dairy feeds from the feed industry.

Animal feed production is currently one of the most important sectors of activity in agriculture. Judging from FAOSTAT data, worldwide, the volume of feed produced annually now exceeds 10 billion tonnes, while annual compound feed production is in the order of 6 billion tonnes. In 2001, the global per capita manufactured feed use was calculated as 95kg/person, down from the peak of 105kg during 1995-1996. It is worth noting that 10 countries produce 60% of the world's industrially manufactured feed, while 50 countries produce 90%. Close to 4000 feed mills produce the 80% of total feed.

The growth in demand for livestock products suggests that there will be a consequent rise in demand for animal feed, not only of cereals but of other feeds and particularly proteins. It is possible to make broad calculations based on assumptions concerning the use of feed for pigs, poultry, dairy cows and other ruminants (Figure 3).

Figure 3.
Projected growth of world
animal feed production.

Animal meals were therefore incorporated into dairy concentrates up to the time of the emergence of BSE in the UK.

Most of the increase in animal production has been achieved from grain and protein cake. The authors estimates that the requirement for cereals for feed

In recent years, public concern about the safety of animal feed has heightened, especially due to problems that have arisen with BSE (the so called "mad cow disease"), as well as with outbreaks of feed-borne bacterial infections, and feed contamination with toxic agents (e.g. dioxin). These problems have serious implications for food and

feed safety, the development of the animal feed and animal products industry and for international trade in feed and livestock products.

Recent food safety scares related to livestock products and in particular to animal feed:

- 1986/2004 BSE in most of European countries, Japan, Israel, Canada and USA;
- 1996/ 2003 variant Creutzfeldt-Jakob Disease (vCJD) in many European Union countries, Canada, USA and Japan;
- 1999 dioxin in Belgium
- 1990s *salmonellosis* in many European countries
- 1992 and 1996 *E. coli* O157:H7 in USA and Japan
- 1999/2000 *listeriosis* in USA and France
- 2002 Detection of chloramphenicol and nitrofurantoin in Asian seafood

Animal feeds are routinely subject to contamination from diverse sources, including environmental pollution, insects and microbial activity.

The main potential problems for animal feed and livestock industries can be summarized as follows:

- Microbiological and chemical contamination (i.e. mycotoxins, veterinary drugs, agricultural chemicals, infectious diseases agents)
- Bovine spongiform encephalopathy
- Resistance to antimicrobial drugs
- Feed additives such as antimicrobials, growth hormones, etc.
- Possibility of genetically modified organisms (GMO)

Animal feeds may also contain toxins arising principally from specific primary and secondary substances produced by fodder plants (i.e. cyanogens in sorghum and cassava; the aromatic amino acid mimosine in the foliage and seeds of the tropical legume *Leucaena leucocephala*).

It has been reported that there is currently considerable interest in the occurrence of *Escherichia coli* in animal feeds following the association of the O157 type of these bacteria with human illness. The potential for exposure to bacteria also exists when poultry litters are fed to cattle. However, providing the products are adequately heat-processed prior to distribution, the risks of contamination with *E. coli*, *Salmonella* spp. and *Campylobacter* spp. are likely to be minimized or even eliminated. Nevertheless, it is worth noting that *Salmonella enterica* commonly occurs in cattle feeds in the United States, Europe and South Africa, with contamination rates ranging from 5% to 19% (D'Mello, 2004).

Listeria monocytogenes also tends to occur in poor-quality silages and big-bale silage (D'Mello, 2004). When grass is ensiled under anaerobic conditions, the low pH regime ensures that *Listeria* is excluded from the resulting silage. However, in big-bale silage (which is nowadays a very common method of preserving fodder) a degree of aerobic fermentation may occur, raising pH levels and allowing the growth of *Listeria*. Contamination of silage with *Listeria* is important as it causes abortion, meningitis, encephalitis and septicaemia in animals and humans. The incidence of various forms of listeriosis has been increasing in recent years.

FAO reports that at least 25% of food crops (cereals, peanuts, oil seed cake, etc.) are contaminated with mycotoxins (FAO, 1999). Mycotoxins present toxicity for animals and humans and the contamination cause reduction of exports, and economic losses.

Mycotoxins are those secondary metabolites of fungi that have the capacity to impair animal health and productivity. Mycotoxin contamination can be carried through animal products (i.e. milk) to food and there is epidemiological evidence linking chronic aflatoxin exposure with the incidence of cancer in humans. A list of the principal mycotoxins occurring in feeds and forages is given in Table 1, which also indicates the fungal species associated with the production of these contaminants. Mycotoxins contamination of forages and cereals frequently occurs in the field following infection of plants with particular pathogenic fungi or with symbiotic endophytes (D'Mello, 2004). Contamination may also occur during processing and storage of harvested products and feed whenever environmental conditions are appropriate for spoilage fungi.

Table 1: Origin of principal mycotoxins occurring in common feeds and forages (D'Mello, 2004)

Mycotoxins	Fungal species
Aflatoxins	<i>Aspergillus flavus</i> ; <i>A. parasiticus</i>
Cyclopiazonic acid	<i>A. flavus</i>
Ochratoxin A	<i>A. ochraceus</i> ; <i>Penicillium viridicatum</i> ; <i>P. cyclopium</i>
Citrinin	<i>P. citrinum</i> ; <i>P. expansum</i>
Patulin	<i>P. expansum</i>
Citreoviridin	<i>P. citreo-viride</i>
Deoxynivalenol	<i>Fusarium culmorum</i> ; <i>F. graminearum</i>
T-2 toxin	<i>F. sporotrichioides</i> ; <i>F. poae</i>

Diacetoxyscirpenol	<i>F. sporotrichioides</i> ; <i>F. graminearum</i> ; <i>F. poae</i>
Zearalenone	<i>F. culmorum</i> ; <i>F. graminearum</i> ; <i>F. sporotrichioides</i>
Fumonisin; moniliformin; fusaric acid	<i>F. moniliforme</i>
Tenuazonic acid; alternariol; alternariol methyl ether; altenuene	<i>Alternaria alternata</i>
Ergopeptine alkaloids	<i>Neotyphodium</i> <i>coenophialum</i>
Lolitrems alkaloids	<i>N. lolii</i>
Ergot alkaloids	<i>Claviceps purpurea</i>
Phomopsins	<i>Phomopsis</i> <i>leptostromiformis</i>
Sporidesmin A	<i>Pithomyces chartarum</i>

(MBM). There are many indications that BSE causes variant Creutzfeldt - Jakob disease in humans, by consumption of beef products contaminated by CNS tissue from BSE infected cattle.

Already at the beginning of 2001, FAO issued a press briefing that urged countries around the world, not just those in Western Europe, to be concerned about the risk of BSE and its human form, the new variant Creutzfeldt-Jakob disease. In a statement issued in Rome, FAO called for action to protect the human population, as well as the livestock, feed and meat industries. It suggested that all countries which have imported cattle or meat and bone meal from Western Europe, especially the UK, during and since the 1980s, can be considered at risk from the disease.

BSE means of spreading can be summarized as follows (see also Figure 4):

- Meat and bone meal is regarded as the most important means of spreading;
- International trade of meat and bone meal and live cattle facilitated spread of BSE, when the disease had not even been recognized;
- Recycling of bovine tissues as feed led to amplification;

Bovine spongiform Encephalopathy

Bovine spongiform encephalopathy is a progressive and fatal disease of adult cattle characterized by degeneration of the central nervous system (CNS). The causative agent is thought to be composed of an abnormal form of a protein called a "prion". BSE was first diagnosed in cattle in the United Kingdom in 1986. The transmission of BSE is thought to be by oral ingestion by cattle of animal feed containing BSE-infected meat and bone meal

Figure 4.
Spreading of Bovine spongiform encephalopathy

There are currently problems in risk quantification due to the lack of differentiation in trade statistics of meat meals (pig, poultry, fish, cattle); cross-contamination of meat meals and livestock feeds; and the complexity of trading routes and use of compound feed.

To prevent and control BSE, FAO recommends banning the feeding of meat and bone meal to farm animals, or at least to ruminants; strictly avoiding cross contamination in feed mills; removing and destroying Specified Risk Materials (SRMs) from cattle over 30 months; ensuring safe practices in the rendering industry, i.e. treatment of the material at 133°C under 3 bar pressure for 20 minutes and applying surveillance measures throughout production, processing and marketing.

However, considering that every year a considerable amount of meat and bone meal is produced (16 million tonnes of animal by-products are produced in the EU), it is worth pointing out that a total permanent ban on its utilization may have environmental consequences, as well as a negative impact on animal health/welfare and economic effects due to loss of revenues for farmers and the cost of safe disposal.

Challenges ahead and FAO action

Appropriate legislation addressing the whole food chain should be in place, it should be enforced, and subsequently, the proper enforcement should be verified.

International harmonization of codes and standards is needed (e.g., World Trade Organization Sanitary and Phytosanitary Standards, *Codex Alimentarius*). Rapid Alert Systems should be put in place, and it is better if this is done at regional level. National, regional and international coordination and collaboration among the different stakeholders is necessary, as well as public awareness.

FAO plays a role as information broker and tries to develop networks among stakeholders in member states. FAO is concerned with the implementation of the work of the Committees of the Joint FAO/WHO *Codex Alimentarius* Commission, particularly through capacity building in developing and emerging countries.

The *Codex Alimentarius Ad Hoc* Intergovernmental Task Force on Animal Feeding recently developed an internationally agreed Code of Practice on Good Animal Feeding (*Codex Alimentarius*, 2004); the

Codex Alimentarius Commission adopted this Code in 2004. The Code focuses on safe feeds and feed ingredients, the application of Good Agricultural Practices (GAPs), Good Manufacturing Practices (GMPs) and the Hazard Analysis and Critical Control Point system (HACCP) along the feed chain. It also stresses the need for appropriate labelling, traceability and record keeping, as well as for inspections and control procedures.

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Scene from the discussion session.

Traceability in fisheries

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You can trace just about anything these days. Bar-codes proliferate to such an extent that if you stand still long enough, you feel as though one will be attached to you. From simple things like my luggage on my way here to Iceland, to more complex things like individual fish from the ocean to the supermarket. If it is the least bit of interest to someone, then there is a high likelihood that there will be a system to barcode, trace and document it. Technology is changing so fast that the possibilities are seemingly boundless. For example, radio frequency identification tags are increasingly being combined with integrated, high-speed computing systems in factories and supermarkets. And legislation is proliferating just as rapidly, particularly in the area of labelling of fish products.

The identification of the origin of feed and food ingredients and food sources is of prime importance for the protection of consumers, particularly when products are found to be faulty. Traceability facilitates the withdrawal of foods and enables consumers to be provided with targeted and accurate information concerning implicated products.

Traceability is a management tool which may be utilized in the food chain for different purposes, such as for reasons of safety (risk management), quality (prevention of fraudulent practices and consumer deception), and also biosecurity (to prevent malicious adulteration of food).

Traceability provisions have been introduced in the regulatory system of some major fish markets. In the European Community, Regulation 178/2002 establishes the general requirement of traceability at all stages of the production, processing and distribution chain in the food and feed sectors. In the United States of America, the Bioterrorism Act, Section 306, requires food manufacturers to

produce records concerning lot and transportation traceability for all ingredients and food contact packaging that are received into and sent from a food processing or storage facility. At the international level, the *Codex Alimentarius* has included a section regarding product tracing and recall procedures in the Code of Practice for Fish and Fishery Products.

So what does the beckoning world of traceability mean for the fish sector? What are the economic and policy challenges? To answer that I will discuss some of the key challenges, focusing not just on the food safety angle, but bringing in all the other developments that act as an adjunct to the food safety question. It is clear that sustainable production right along the food chain is where we are headed and traceability will play a large role in this.

What is traceability?

First of all, what do we mean by traceability? A standard definition is the ability to trace, follow and identify uniquely a product unit or batch through all stages of production, processing and distribution. Traceability needs to show the path or the history of a particular unit or batch through all the intermediate steps of the production flow and supply chain.

A traceability system has three main components (Derrick and Dillon, 2004):

- **Supplier traceability** which ensures that the source of all raw materials can be identified from records and documentation
- **Process traceability** ensures the ability to identify all ingredients and process records for each individual product produced by a factory; and
- **Customer traceability** which seeks to ensure that the customers for all products can be identified.

Globalisation of the fish industry in terms of sourcing raw materials, processing and marketing has resulted in demands for increased traceability of fisheries products. The increased length of the supply chain provides more opportunities for fishery products to either lose quality or gain the potential to cause harm to the consumer. But it is not just the consumer concerns over food safety that is driving the demand for increased traceability. There are also strong industry and government efforts behind the demand.

Traceability meets a number of needs.

- With respect to food safety, it helps trace products and liability in cases of contamination. An efficient tracing system will identify only those batches of products that are contaminated, speeding response time and reducing recall costs.
- Marketing requirements: In order to differentiate products in the market, businesses may wish to label their products in a way that involves the possibility of tracing the product. The Marine Stewardship Council's certification scheme is a prime example of such a certification scheme.
- Meeting legal requirements: For example, in most countries it is a legal requirement that a claim on a product can be verified to ensure the truthfulness of the claim (origin of product, production method).
- Trade requirements: For example, tracing the origin of imports can be important for the determination of duty assessments, for embargoes, for preferential tariff treatment, etc.
- Accounting purposes (tax, banks, fraud etc.): For example, in cases of money laundering, the ability to trace origins and routes are important.
- Insurance purposes (proof of ownership).
- Technical requirements of companies for inventory management.
- And finally, but by no means least, the concern for resource sustainability has driven the introduction of catch documentation schemes in a number of fisheries.

I would like to focus on the issue of traceability from several perspectives: that of the consumer, of industry and of governments. Each group has different concerns, different priorities and different incentives with respect to traceability. There are potential conflicts, but also potential synergies. The challenge is to identify the “win-win” outcomes and minimise the cost of inefficiencies.

Consumer's perspective

These days, consumers are not only concerned about food safety and quality, but also increasingly about the environmental and ethical characteristics of the products they buy. In general, the market share of labelled food products (not just seafood products) promoting higher quality or better environmental performance is relatively small, typically no more than 10 per cent in most European countries (Nilsson, Tuncer and Thidell, 2004). However, there are often niche seafood markets where the share is much higher.

Information and price are the keys for the consumer. Research shows that consumers claim to be willing to pay for improvements in the quality of the product and the environmental performance of the production method. There is generally an information asymmetry between consumers and producers (Wessells *et al.*, 2001). This is often reflected by consumers who

- Do not have enough information with which to make decisions;
- May not know the limitations of the information they receive; and
- Do not have the knowledge needed to evaluate the information.

The priority so far has been to ensure that consumers are receiving truthful and verifiable information on their product labels. Two recent initiatives - one public and one private - have sought to address this in different ways.

Looking first at the classic case of dolphin-safe tuna and product certification. For domestic harvest of tuna, the United States have introduced a “Tuna Tracking and Verification System”. Harvesters are required to separate the “dolphin-safe tuna” from “dolphin non-safe tuna” from capture through to processing. This means, amongst other things, that the tuna shall be kept and identified in separate holding tanks on board and offloaded separately (i.e. product segregation). To underpin this system there is complete observer coverage for tuna purse seiners above 400 tons carrying capacity. Observers on board keep track of the tuna movements and record information for each haul of dolphin-safe tuna, including catch area, catch time, species and weight, and subsequent storage.

When the tuna is delivered to US canners, the “dolphin-safe tuna” will continue to be kept separated from the “dolphin non-safe tuna” until it is canned. From time to time, the National Marine

Fisheries Service (NMFS) representatives purchase cans of dolphin-safe tuna from food markets, and using can-codes stamped on all tuna cans, the contents of the cans are checked back to their origin to verify that they are indeed “dolphin-safe”.

In contrast, the Marine Stewardship Council's accreditation and certification scheme is a private product labelling scheme, i.e. an ecolabel. The MSC Principles and Criteria for Sustainable Fisheries outline the criteria against which fisheries are certified. Independent third party certifiers, accredited by the MSC, carry out the certification of the fishery to ensure that sustainable management is in place. They also carry out the chain of custody certification which ensures that the fish taken out of the sea is the one that ultimately is labelled and served at the consumer's table.

The chain of custody certification procedure is a very detailed description of what is expected by certification companies, as well as the minimum requirements for information in the chain. The key tracing elements are tagging of catch, segregation and proper identification of fish certified to the MSC standard, as well as a check on the paper trail (e.g. shipping papers, receipts, invoices). It is, in fact, very similar to the requirements of HACCP systems. Certifiers are also required to carry out on-site compliance assessments and periodic reassessments of the chain.

The success of such schemes from the consumer's perspective depends critically on the credibility of the particular scheme. This is influenced by three key factors. First, research has demonstrated that the ownership of a scheme or label is important in helping the consumer decide whether schemes are self-selecting marketing promotion tools or genuine attempts to convey product quality information (Wessels *et al.*, 2001; Jaffry *et al.*, 2004). A significant feature of the MSC is the involvement of stakeholders from the production, retailing and environmental fields in the establishment and governance of the label.

Linked to the ownership question is the need for third party verification of claims by retailers. Independent certification is used in the case of the MSC, while government agencies are used in the case of dolphin-safe tuna. Which is more credible is an open question. Surveys of seafood consumers in the UK and Norway have indicated a slight preference for government certification while seafood consumers in the US appear to be indifferent.

Consumer acceptance of labels increases the more they know about the issue at hand. Marketing involves a public education function as well as label recognition - the two often go hand in hand. For example, the considerable publicity about the adverse effects of tuna fishing on dolphin populations helped to pave the way for the introduction of dolphin-safe tuna in supermarkets. On the other hand, one of the major challenges facing the MSC is the promotion of its label and encouraging consumers to look for it in the supermarket.

Industry perspective

Naturally enough, the industry has different priorities with respect to developments in traceability. Firstly, there are potential cost savings to be made from introducing traceability systems. For example, it will help ensure speedier and less costly responses to quality and safety crises. There are also likely to be cost savings in terms of better inventory management, stock flow and introduction of more efficient processing (Derrick and Dillon, 2004).

Secondly, companies seek to differentiate their products in terms of quality or environmental friendliness, or both, through the use of labelling or ecolabelling. They are seeking an advantage in the market place that they hope will be reflected in increased market share relative to non-labelled products or in increased prices for their products. This seeks to exploit the commercial incentives to help better manage fisheries resources. There is therefore a synergy between resource management objectives and the profit motive of companies. The extent to which the synergies can be realised depends on whether there are net benefits to ecolabelling.

Ecolabelling of fisheries products is not without cost. Only limited data are available on the costs of certification, primarily because it is usually based on agreement between certifiers and companies and depends on the size and complexity of the production process. Some information, however, is available in the case of the MSC certification of the Western Australia rock lobster fishery. The direct cost of the assessment process was in the order of \$A200,000 with the launch and promotion of the MSC accreditation adding a further \$A100,000. The next full assessment due next year is expected to cost an additional \$A100 - 150,000 (Wessells *et al.*, 2001). The license fee for the use of the MSC logo is set at 0.05% of the catch value at the point of labelling, around \$A185,000. There are other costs

in terms of continued marketing and promotion and in incremental management costs resulting from the need to sustain accreditation. But in a fishery with annual export values of around \$A400 million, these costs are not significant in relative terms.

The key question is: do the benefits outweigh the costs? The jury's still out on this one - it is just too early to tell. The benefits for companies marketing ecolabelled seafood lies in consumers' willingness to pay for ecolabelled product over non-ecolabelled product. What empirical evidence there is, suggests that while most consumers would prefer to buy ecolabelled seafood; that preference declines as the price premium increases. The decline is less if consumers are better informed about the issue that the ecolabel addresses. So, once again, education of the consumer is an important component of achieving product differentiation and gaining market advantage.

There is also evidence that preferences differ between countries. For example, Norwegian seafood consumers tend to be more price sensitive than seafood consumers in the US when considering whether or not to pay for ecolabelled seafood product.

Government perspective

Turning to the government perspective, there is clearly an overriding concern over public health. Most governments have strong regulations regarding food safety and quality, but the means of achieving the standards are largely left to the companies, with the regulations being backed by liability and penalty laws.

The more interesting recent developments concern the use of traceability systems to assist governments in managing fisheries resources. This has taken the form of catch documentation schemes which have been introduced by a number of international agencies responsible for fisheries. The main objectives in these schemes are to better track catches and to regulate trade in the product with the aim of stopping illegally caught product entering international trade. These schemes have largely been introduced into high-value fisheries of straddling or highly migratory species (such as bluefin tuna and Patagonian tooth fish).

For example, the Commission for the Conservation of Southern Bluefin Tuna has introduced a "Southern Bluefin Tuna Statistical Document Program". This seeks to ensure that imports of

southern bluefin tuna into any member country of the Convention be accompanied by a document containing information on the vessel having caught the tuna, time of harvest, gear used and area of catch. This document is certified by the exporter and validated by the vessel's flag state authority.

The program relies on exporters and importers certifying that the information provided for the exported bluefin tuna is accurate ("own certification" through validation of documents by an official of the exporting country). The system does not have a follow up inspection or third party verification that the data provided are correct, or any observer requirements.

The Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) and The International Commission for the Conservation of Atlantic Tunas (ICCAT) have similar catch document schemes, although the details do differ, while the US has a system of Certification of Origin of Tuna. The US and the EU also require the labelling of all fish products by country of origin or area of capture.

The main economic benefits from such schemes lie in retaining or increasing fishery value for legal fishers and stopping free riders from reaping the benefits of conservation and management initiatives. However, the cooperation of non-contracting parties to the relevant fisheries conventions is essential in realising these benefits. At the moment there are very limited means of enforcing cooperation, although the use of trade measures may assist in this regard. There is unlikely to be a price premium due to the mandatory nature of the scheme, although prices overall may increase if supply is restricted to the legal catch and the illegal catch is reduced and kept out of the market.

An area of increasing concern to governments is the potential for certification and labelling schemes to have adverse impacts on trade. Fish exporting countries in particular are concerned that these schemes could

- Disguise underlying intentions to protect domestic industries;
- Restrict market access; and
- Erode national competitiveness for those less able to meet or afford foreign labelling and certification standards.

The last of these is of particular concern to developing countries. The quantity and quality of fisheries data is often low in these countries and

the burden of complying with foreign product standards may be disproportionately high.

Concluding comments

In conclusion, it is clear that traceability addresses more than food safety. There are commercial incentives for companies to get more involved in using traceability not just for achieving cost savings, but also for gaining market advantage. Whether this pays off is still open to some question, but the signs are encouraging. Combining traceability and the market incentive to harness companies' efforts to support fisheries management objectives, demonstrates the potential for synergies to be achieved. Ensuring the credibility of these efforts in the eyes of the consumer remains a challenge which will require continued efforts at consumer education on fisheries sustainability issues. But giving companies as well as governments a role in this process increases the chances of success.

Governments are also using traceability systems to support fisheries management measures, particularly to help address illegal fishing in international fisheries. Their success depends on their ability to close the loop around legal fishers, realise the gains from management and streamline compliance to minimise costs.

Traceability is therefore of interest to quite a few people for a range of reasons: for safety and quality, for marketing, for cost savings, for resource sustainability. In a world of sustainable production, where we are interested in sustainability along the whole food chain, food safety and resource sustainability can be mutually reinforcing. And public and private initiatives have a role to play in this new world.

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Knowledge networks on food safety: A basis for risk analysis

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Abstract

With the establishment of the Sanitary and Phytosanitary Agreement, science based risk analyses are increasingly being used to develop national food safety requirements. The need for current and pertinent scientific and technical knowledge is often proving to be a limiting factor in conducting these analyses effectively, more so, considering the multidisciplinary aspects of food safety today. Although product safety and quality information is readily available from the major regulatory agencies, time series for analytical results are not as easily available for trend analysis to measure the performance or effectiveness of these programs. This paper discusses the need for knowledge networks as a means of keeping abreast of emerging food safety and quality issues. It also discusses the need to preserve and properly document analytical results accumulated by laboratories over time, while also ensuring individual privacy and national sovereignty.

Perspective

For the most part, scientific information is generally recognized as the most important element in food safety decision-making processes and program design. This type of information often forms the basis for regulations, policies, procedures, guidelines, control measures as well as mitigation and remediation strategies. Although HACCP-based programs and the Sanitary and Phytosanitary Agreement (SPS Agreement) of the World Trade Organization (WTO) may be considered as recent requirements, these have simply exacerbated the much older and fundamental need for information based on the most current and valid scientific knowledge.

Over the years, food safety programs are increasingly relying on multidisciplinary approaches given the continuous evolution of emerging food safety issues related to chemical and biological hazards. With a desire to have objective and transparent decision making processes, the need to integrate such multidisciplinary information from an applied context can prove challenging.

From inspection to prevention

Prior to the 1980s, inspection services focused their activities towards finding problems in the food product. Operating in a pass/fail scenario, the type of information that these services needed to have was in terms of the type of food, its inherent hazards, and an inspection procedure. Scientific and technical aspects of these services were mostly involved in establishing good critical limits, sampling procedures and analytical methods. Prescriptive in nature, the focus was on product action when a problem was discovered with less attention to the causes. During the 1980s, the shift from an inspection to a prevention approach took place mostly for efficiency reasons. Preventing problems via well designed proactive HACCP-based programs was deemed more cost effective than rejecting final product. This approach also reduced inspection and analytical efforts for processing establishment with good track records, resulting in better deployment of inspection resources towards problem cases.

In fish and fisheries products, a great majority of the food safety regulatory programs adhered to HACCP principles (Ababouch, 2000). Taking a more comprehensive approach, these programs established requirements for plant layout, construction, operations, sanitation and hygiene. As a result, inspection and quality control staff

had to shift their efforts from simply inspecting products and processing plants to identifying potential food hazards, implementing and monitoring effective controls and initiating corrective action upon discovery of non-conformities. An inspector technically became a risk manager involved in audits of systems that included verification of records and procedures (Gagnon, 2000). An inspector could no longer rely on a simple check list as was used in previous inspection procedures (Sperber, 1998). From then onwards, industry and inspection services continuously face a need for current knowledge. Industry needs the knowledge to design effective HACCP plans and inspection staffs, now auditors, needs the knowledge to evaluate these plans.

The food chain approach

With the implementation of HACCP-based programs in the processing establishment, it became apparent that a HACCP plan could not deal effectively with all food hazards, such as environmental contaminants or mishandling of product in distribution. A second shift in thinking recognized that the responsibility for food safety lies with everyone involved with the production, processing and distribution of food (Slorach, 2002), including the consumer (Anklam and Battaglia, 2001). As a practical extension of HACCP, reducing or eliminating food-borne hazards at or near the source along the entire food chain was considered more effective (USNAS, 2003).

The food-chain approach, however, remains a challenging undertaking given the specialization of expert organizations and legislations (Schlundt, 1999). Presently, the practice of assessing risks and implementing controls are mostly conducted via vertical silos of specialty such as epidemiology, food microbiology, food science, veterinary medicine, agronomy, process engineering or the environmental sciences. Not intended to be exhaustive, this list simply underlines the diversity of specialized fields of science involved in every link of the food chain. Entire government, academic and industry organizational frameworks are founded along similar lines.

With the introduction of the food-chain concepts in risk management, new horizontal approaches are required to enable and facilitate inter-disciplinary collaboration and sharing of knowledge. Lately, entire food inspection services have been reorganized to address this new approach (McEacher and Mountjoy, 1999; WHO, 2004).

Complexity of modern food products

Globalization of food trade and consumer demand for exotic foods are indirectly adding to the complexity of today's food make-up from a scientific and technical perspective (WHO, 2004). Trade liberalization and the multicultural fabric of western societies are also adding to the diversity of imported food products. Although globalization is often discussed in terms of export market opportunities, today's consumer has acquired a taste for a variety of foods preparations that comes from all cultures of the world. The travelling consumer and immigration have created a demand for traditional foods or, simply, a demand for food products of one's country and culture of origin. Thus, food safety agencies are experiencing an increased importation of these foods composed of ingredients and produced from processing techniques that are not familiar to local safety and quality specialists.

In addition to safety and quality, the modern consumer is demanding food that requires little preparation with fairly extended shelf-life attributes (Costa *et al.*, 2001; WHO, 2004). This results in a greater reliance on the food sciences and packaging technologies to ensure that these products are safe to eat after their prescribed preparation steps and that they will keep their inherent safety and quality attributes during the expected shelf life (Anklam and Battaglia, 2001). In the early 1980s, the vast majority of fish and seafood products were comprised of mostly fresh, frozen, salted and canned products. These were and are still dependent on processes that have a long history of use and where the performance parameters are fairly well understood. With the decline of major fish stocks, the fish processing sector shifted their efforts towards value-added food, primarily in order to maximize the use of raw material and eventually economic returns (Jonsdottir *et al.*, 1998; Valdimarsson *et al.*, 2003).

Today, food safety agencies have to be in a position to ascertain the safety and quality of novel food products (Anklam and Battaglia, 2001). They have to acquire an understanding of the product attributes and processes to determine if it is produced as per international guidelines and accepted practices such as HACCP. To do so, they need comprehensive knowledge of a broad variety of products, processes and their related food hazards.

Science-based risk analysis

It is primarily the SPS Agreement of the WTO that brought to the forefront of food safety the need for science in the establishment of measures to protect human health, animal health and plant life. After the signing of the agreement in 1995, various organizations worldwide adopted this approach, initiating risk analysis processes. International organizations such as the CODEX Alimentarius also followed with the release of its microbial risk assessment guidance document (CODEX, 1999). Given the need to strive for international harmonization of food safety requirements as stipulated by the SPS Agreement, equivalency of food safety programs can only be adequately and fairly ascertained via transparent processes that are based on factual and current scientific information and data (FAO, 2003).

Risk analysis is the recognized methodology used in the development of food safety standards (WHO, 1995). However, the challenge remains in the human resources needed in the collection of the necessary data for appropriate and transparent decision making processes (Motarjemi *et al.*, 2001).

Data and information

Data and scientific information form the foundation upon which risk and hazard analysis are based. The usefulness of the resulting analysis is primarily a reflection of the pertinence of the scientific documentation and quality of the data. The primary challenge to assess, manage or communicate risk is to identify the appropriate information resources for the analysis. Without sound scientific information based on the best available sources, it is very difficult to produce objective recommendations where overly subjective text can leave the reader doubting the transparency of the risk analysis process (Sperber, 2004). However, it is the accessibility, usability and availability of various data and information resources that are typically problematic.

Accessibility

Accessibility refers to the physical storage aspect of the data and information. Accessibility can prove resource intensive when either data or information have to be re-organized, re-edited, re-formatted or re-coded; more so, given the predominant use of present computing technologies for analysis.

Although data or information stored on paper files can require considerable resources to convert to electronic media, it is the personal computer and the proliferation of personal databases that

are often at the root of the problem today. For the past few decades, the personal computer has proven to be a valuable tool for scientists and experts. Individuals were able to exercise maximum creativity in customizing databases designed to address very specialized needs. Even though some of these databases may not always prove useful outside their original purpose, some contain data series collected with great care over a considerable period of time. Modern analytical instruments also generate extensive data sets. Analysts often retain the data files with the hope that they may have potential use in the future.

Computer technology and analytical instruments are in continuous evolution. Data or information stored on older storage medium such as computer tapes and even punch cards are often un-readable because the original hardware and software can no longer work with the latest technologies.

The life span usefulness of scientific data and information tends to be longer than the life span of modern technologies. Trend analysis needs decades of data. During that time, instruments and storage mediums change. Although institutional or corporate information bases may prove challenging to maintain, it is via the implementation of proper archival processes that data and information can be secured and maintained over time. Maintenance, in this case, refers to the need to continuously maintain data in generic formats that can be read by a variety of hardware and software. It may be ironic to point out that paper information may actually be better than electronic information since the readability of paper will not change over greater periods of time. This is one of the recommendations listed in a joint WHO/FAO consultation on risk management and food safety (FAO, 1997; FAO 2003).

Usability

Even though information and data are abundantly available and readily accessible, the usability may sometime be questionable. With the exception of information published in primary journals, analytical data and grey (secondary) literature in the form of internal technical reports may prove unusable for reasons of coding and validity. Analytical data collected over extended periods of time is particularly problematic. Often, specific data elements such as dates, analytical methods, sampling locations, type of product and even species are missing or incomplete. Furthermore, the data may not have adequate documentation regarding the analytical methods used to properly interpret the results. Similarly, the documentation needed to decipher codes that were used to record

the information on the data sheets can also be a problem. In terms of the grey literature, the text is often written without proper citations traceable to the supporting documentation and data (Bouma and Jones, 2001). Also, this type of publication is rarely peer reviewed.

The true interpretation of information often lies within the corporate memories of colleagues and institutions. Often, data can only be used by consulting with the technical expert that conducted the analysis initially, if he or she is still around and remembers. Lately, this has proven problematic given the older demographic disposition of most institutions today and the growing number of retirements in the near future resulting in the loss of the so-called corporate memory. Hence, it would be imperative to recover and secure existing datasets collected over the years instead of wasting resources to re-create them from scratch given the timeframes needed to generate good time series.

Good information management practices are needed to secure the usability of new and old information. Some institutions are implementing data warehouses and documented archives to secure their information holdings. In some cases, scientists and technical experts sometimes feel uncomfortable with these initiatives, as they fear loss of ownership. Based on the notion that the data they hold is only relevant to their specific field of work, these initiatives are sometime perceived as a waste of time. These initiatives should ensure that proper credit is given to the originator as it is done with primary publications.

Availability

The availability is still much dependant on the abilities of technical experts to tap into the knowledge of their network of colleagues even though literature research capabilities of bibliographic databases of today are very effective tools. For a typical risk assessment exercise, a call for paper and data is issued to the international scientific community with the hope that scientists and technical experts will come forward. In risk analysis undertakings of specific and focused issues, this approach has proven effective. However, this approach can miss important data and information resources when an analysis requires an interdisciplinary approach. What sometimes seem to be a problem of collaboration between experts and specialized institutions can simply be a lack of understanding in terms of the relevance of one's information. Data collected for a specific purpose and narrow scope may prove extremely valuable when pitted against a different context. In a call for information, the topic of the

risk analysis may not spike the curiosity or interest of the scientist working in a less apparent related field. Indirectly, this is one of the reasons teams working on such project still depend on their networks of contacts maintained via conferences and societies.

Knowledge networks based on principles of shared data and information can prove effective in addressing the issues above.

Knowledge networks

A knowledge network is more than the technologies used to store and search information. A knowledge network needs a physical or virtual place to work and meet. Today's information and Internet technologies can greatly facilitate the acquisition and review processes of knowledge networks. A given team working on a specific subject can work virtually from their location anywhere in the world. If anything, Intranet and Internet meeting technologies can minimize the need to travel for face to face meetings, resulting in significant saving in travel costs. Information technologies are, however, often confused with knowledge networks. Networks are mostly thought of in terms of computer technologies. This is often the case with websites when they are launched. Technologies are merely and solely the tools and cannot become the network.

By definition, knowledge is data and information collated and presented within the context of the user (Loew *et al.*, 2004; Cottingham, 2003). More than the simple gathering of information, a risk analysis is basically an exercise designed to collate pertinent scientific and technical knowledge needed in the implementation of adequate control, mediation or remediation measures. Given that the user of such information is likely to be a risk manager in government or industry dealing with a broad range of multidisciplinary issues, such analysis must present information within an applied knowledge context. This is also of particular importance when providing information to the public.

Given the limited resource realities of most institutions today, a risk manager cannot expect to have the same range and depth of multidisciplinary expertise found on risk assessment teams, let alone have the time to review literature. Once a risk analysis has been completed, the original team of experts seldom continues to exist and is often disbanded. Therefore, such analyses are set in a timeframe reflecting the best available knowledge of that time. However, risk managers are always in need of the latest available knowledge as they

have to continuously adapt their risk management strategies to evolving situations. A knowledge network can prove effective in providing a forum of exchange between risk managers and the technical experts. In addition, knowledge networks can avoid duplication of effort when gathering scientific information in relation to a specific food hazard. A pathogen and its pathogenic profile including occurrence in food is relevant in any national setting. Technical experts can share lessons learned and best practices while working within international validation and feedback processes.

A successful knowledge network needs to bring the technical experts together within well established terms of reference and scope. Most of them have limited time available requiring that these types of collaborations be managed properly. A network has to be fostered by a chair or leader that has sound technical knowledge of the field with abilities to bring people together and manage project plans effectively. With food safety issues being highly technical in nature, network discussions often need moderation and even mediation when disagreements of expert opinion occur. These are very much the attributes discussed lately in terms of a knowledge broker.

Knowledge brokers

As a concept, knowledge brokering has been discussed since the late 1990s (CHRF, 2003a) in a variety of technical fields. In Canada, the Canadian Health Services Research Foundation (CHSRF) is studying this approach by holding workshops with the intent of developing and implementing knowledge brokering practices (CHSRF, 2003b). The idea of knowledge brokering is to go beyond simple dissemination of technical information (Gold and Villeneuve, 2003).

Knowledge transfer is widely thought of in terms of scientists producing research results and then disseminating it to decision makers. However, decision makers or risk managers need answers to emerging issues on an ongoing basis with little time and expertise to research the literature. This is where a network of knowledge brokers must focus on synthesizing information in relation to a specific need rather than developing new research. In the field of health services, such network can help decision-makers access, appraise, adapt and apply research. A recent study conducted by CHSRF found that significant brokering is taking place without being recognized as such. Most of it is informal and unrecognized with little resources being attached to the activity.

It is apparent that a similar situation exists in food safety where risk managers are continuously in need of synthesized technical information that is pertinent and applicable in a multidisciplinary context.

Conclusion

Knowledge brokering and knowledge networks are very much an activity of risk analysis. In the risk assessment phase alone, such approach can provide an effective and efficient way of bringing together the expertise and the pertinent scientific and technical information. Although not recognized as such, the extensive work devoted to the implementation of HACCP by government and industry over the past few decades could be considered as knowledge brokering and networking.

Knowledge networks, however, are more than the computing technologies used for Internet websites and knowledge portals. As with any scientific knowledge-based activity, such networks need good project management practices to maintain focus and relevance of subject matter delivered in realistic timeframes. They also need good quality assurance or peer review practices for credibility, validity and transparency. Sound cost-effective knowledge and technology management practices are also needed to maintain the knowledge base and its information resources over time, regardless of the changing technologies or corporate memory. If knowledge brokers and networks can be applied to the fields of health services, it can surely be applied to the field of food safety and quality. After all, food safety and quality is an integral part of health. Food safety is only one step ahead of someone needing the health services.

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Seafood safety – are there issues specific to the arctic region?

Dr. Helga Gunnlaugsdóttir, Department Head,
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The aim of this presentation is to raise some discussion points on the topic of seafood safety and also to point out issues regarding seafood safety that are specific to the Arctic region. For this purpose, two research projects carried out at the Icelandic Fisheries Laboratories (IFL) will be described.

Misleading information and negative discussions regarding seafood safety are common in the media. Seafood is often connected with microbiological safety concerns (e.g. *Listeria*, *Salmonella*) and environmental contaminants (e.g. dioxins, polychlorinated biphenyls (PCBs) and heavy metals). The behavior of environmental contaminants depends in part on the environment in which they occur. Several physical, biological and cultural features of the Arctic are distinct from those of lower altitudes, with significant implication for contaminants (Anon, 2002). One of the special features of the Arctic is the “global distillation/fractionation” effect, i.e. a tendency of some organic environmental contaminants to migrate and deposit in the Arctic region, as explained in detail by Wania and Mackay, 1993; and Wania and Mackay, 1996. According to the global distillation/fractionation model, persistent organic pollutants (POPs) are transferred with air or ocean currents, depending on their volatility, from the source of pollution towards the North Pole, where they accumulate in the cold climate. Another special feature is related to the ecology of the Arctic, since Arctic plants and animals have developed means for coping with Arctic conditions. The ability to store fat is critical for many species, and predators tend to prefer fatty tissues due to their great energy content. These characteristics have a great influence on the uptake of contaminants in food webs. Many contaminants, especially among POPs, are fat soluble and thus accumulate in the lipid phase in the tissues of living beings. POPs degrade very slowly and thus become concentrated in Arctic animals. Moving up

the food web, these concentrations increase in a process called biomagnification (Fisk *et al.*, 2001).

Iceland has been monitoring the marine environment around Iceland since 1989. The monitoring programme is part of Iceland's commitment under the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) and the Arctic Monitoring and Assessment Programme (AMAP). Information is gathered on heavy metals, persistent organic pollutants, and radionuclides. Sampling is standardized according to directions of the International Council for the Exploration of the Sea (ICES). Results obtained in this programme show that the concentration of heavy metals in cod liver from fish in Icelandic waters is low. The concentrations of zinc, copper and mercury are among the lowest values obtained, while cadmium in cod liver from Icelandic waters is high, compared to values obtained in other northern fishing grounds. A likely explanation for this observation is that the natural background values for cadmium are high in Icelandic waters due to volcanic activity (Egilsson *et al.*, 1999; Yngvadottir, 2004).

The concentration of persistent organic pollutants in cod liver from Icelandic waters is also low, especially when compared to cod from the Baltic Sea as shown in Table 1.

	PCB-7	HCB	DDE
Iceland	86	20	48
Labrador	60	33	72
NW-Norway	150		
N-North Sea	260-560	28	160
North Sea/Baltic Sea	160-3200	63	270
Faroe Islands	54	10	45

Ref: Egilsson *et al.*, 1999

Table 1. Comparison of persistent organic pollutants
– Average values (mg/kg, wet weight) in cod liver

The overall results from the monitoring programme of contaminants in marine biota in Icelandic waters indicate that inorganic and organic contamination is very low.

Another research project that is presently ongoing at IFL has the aim to monitor undesirable substances in Icelandic seafood by systematic collection of information on a number of substances and species from Icelandic fishing grounds. Substances measured in the edible portion of fish and shellfish include trace elements, dioxins, PCBs and pesticides.

The results have been published by Audunsson, 2004. Values for dibenzodioxins (PCDDs) and dibenzofurans (PCDFs) in Icelandic seafood are shown in Figure 1.

Values for dioxin, dioxin-like PCBs (DL-PCBs) and total dioxin content in the edible portion of fish in the EU and Iceland are presented in Table 2. Measurements from a total of 157 fish samples (fat and lean fish) from EU waters were included (samples from the Baltic Sea were excluded due to high levels from that region). The values presented in the table reveal that the highest values for dioxin and DL-PCB in fish from Icelandic fishing grounds were equal to the average values measured in fish from Europe, which clearly shows that the content of these contaminants in Icelandic seafood is well below the contents measured in fish from Europe.

Figure 1.
Dioxins (dibenzodioxins and dibenzofurans) in Icelandic seafood compared to limits in the European Union.

Source: Audunsson, 2004

The results show that the highest measured values for dioxins in Icelandic seafood was 0.5 pg WHO-TEQ/g wet weight in Greenland halibut. This is eight times lower than the maximum legal limit in the European Union and six times lower than the limit of action in the EU.

(pg WHO-TEQ/g wet weight)			
Fish in EU 2002-2003, n=157	Dioxin	DL-PCB	Total dioxin content
Average in EU	0.5	1.3	1.8
Highest value in Iceland n=23	0.5	1.2	1.7

Source: Audunsson, 2004

Table 2.

Measured values for dioxins, DL-PCBs and total dioxin content in edible portion of fish in EU and Iceland

Finally, Figure 2 shows that the edible portion of Icelandic seafood also has low concentrations of mercury and that all measured values are well below the maximum limit set by EU.

The overall results from the monitoring of undesirable substances in Icelandic seafood show that they occur at very low levels in the edible portion of products. The highest measured value for organic contaminants was only 10% of the most stringent limits set in the countries that are most important for Icelandic fish exports. The measured values for inorganic contaminants were also well below the limits set by EU.

Figure 2. Mercury levels in Icelandic seafood compared to limits in the EU.

Source: Audunsson, 2004

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Discussion theme 1

Food safety – are there issues specific to the arctic region?

Chairman: Having heard this short presentation the question arises how to use the data for contaminants in food. This has become material for the media. Should fish companies start to point out to their clients that their fish is low in persistent organic pollutants, or PCBs, or dioxin? Will we be able to have clear limits and say to the consumers, “Everything is fine, everything is under control?” Or in the risk context, what does it mean?

Viewpoint: It is very important to have these data. And it's invaluable to have them reaching very far back as well. But the question of how to use them is a sensitive one. We should have them at hand for large-scale buyers, our customers, but it may be inadvisable to start talking about pollutants to consumers. I think we must remember that consumers – say, in Europe or in North America – are not precise on geography. As soon as you start comparing levels – saying for example that the Baltic Sea is heavily polluted but the North Atlantic isn't – the discussion becomes quite muddled. People may then get the general idea that seafood is fairly contaminated. We may have to limit the specific information to the people that really need it, the large-scale buyers and the people that we do business with.

Viewpoint: I have to disagree partly on this. The end user is the consumer buying his product from the large-scale distributor. I think this information should be available for the general public, and it's a matter of putting it out in the right way, which might be difficult, but I think transparency should be the key word.

Franklín Georgsson (Environment and Food Agency, Iceland): As regards the microbiological safety of foods, it is very important that we can inform, at least our consumers, that food products are microbiologically safe. The WHO surveillance programme for food-borne outbreaks

shows that there have been 60 or 70 reported food contamination outbreaks in Iceland in the last 20 years. They have been caused mostly by microorganisms, and only one or two were caused by fish products. This data is already available, and we should inform our consumers and our buyers abroad about these good results.

Chairman: The issue is not what the fact of the matter is. The issue is how much we want to highlight the issues and results. I want to share with you a very brief piece that was published in 2001, after the Food Standards Agency had been set up in the UK to try to re-establish confidence between the consumers and the authorities:

In recent months, the UK has been trembling over food scares and concerns about modern agriculture: over antibiotics in poultry, dioxins in milk, and pet foods sold off as chicken nuggets. And who could forget those classics like Mad Cow Disease? The Food Standards Agency was set up to restore our confidence in food, so why does it flag every potential danger, however insignificant?¹

There is no reason to hide facts, but is there any reason to advertise every remote possibility of carcinogenic substances in our food? We know that dioxins and PCBs accumulate in marine life in the Arctic region but how are we to respond to that issue? It's not an epidemic; but there may be a danger of something looming in the food chain that will cause cancer or other diseases after many years.

Anthony Cox: Firstly, if the figures that Helga Gunnlaugsdóttir put up [for contaminants] are indicative or representative of the rest of the Arctic region, then there is a pretty good story to tell. Secondly, I'd like to put forward the point that we are really talking about risk communication. You

cannot deny the need for consumers to know what they are eating, to get more information, but you can influence the way in which the information is conveyed to the consumer. I think there's a need to keep a strong distinction between the public roles of government in doing this and the private roles. And there is a role for the media to play as well, in terms of ensuring that food scare outbreaks are reported, because the consumers will react to this, and the more you try to hide it, the more consumers will be fearful; they'll be jumping at shadows. So I think it would help to focus on these communication strategies and the various roles that the public and private agencies need to play.

Roland Cormier: Following up on that, I'm of the view that we cannot present data to the consumer in the same way that we present data to scientists as our own colleagues. I look at these data, and I can interpret the information because I have a background in science but there is a problem of communicating information to the consumer; risk communication is the issue. You cannot communicate without thinking about who you are talking to. A consumer looks at the figures and might not understand them in the same way as the scientist. I am of the view that, when presenting information to consumers, you always have to try to present it in the context of something else. You don't just put up a raw diagram saying, "This is the amount of dioxin in cod -or salmon." You've got to put it in the context of, "In your total diet, this is what this particular food product contains." That person has to understand that it's not just one food that might contain some substance, it has to be seen in the context of the entire diet. And you present the information to people in that context. I support the view that the more we try to present information and botch it up, the more it scares consumers, and the more you will have the press saying, "Aha! Something is going on." So, my intervention is: yes, the consumer needs to know, but I think that it is almost a science unto itself, how we present information to the consumer. If I'm presented information about my diet, I'd be thinking: "OK, so there's PCB in salmon; how is that related to the total amount of PCBs I might be eating in my total diet? And should I be worried about it?" I think that's more important than saying, "This is the amount in salmon." It doesn't matter even if we then say, "It's well below this limit."

Question: Do the contaminant levels presented for fish also apply to aquaculture products?

Gudjón A. Auðunsson (Icelandic Fisheries Laboratories): These data also hold true for

aquaculture products in Iceland, because the main feed for farmed fish is capelin, which is a pelagic short-lived species. Levels are in direct proportion to the fat content, so that the main reason for differences between species is the fat content. Farmed salmon and trout in Iceland follow that trend quite well.

Siv Fríðleifsdóttir (former Minister for the Environment, Iceland): The question we are discussing now was a very difficult question for me as the Minister for the Environment some years ago because we were very concerned about the developments in Sellafield, the nuclear reprocessing plant in the UK, and also because of mercury – the rising level of mercury in the world, especially here in the Arctic region – and furthermore about persistent organic pollutants (POPs). With Iceland being a large exporter of fishery products, what should the Minister for the Environment in Iceland do? Should we reveal that we were concerned, or not? Of course we don't want to harm our markets, and we don't want to overdramatize our problem. But we decided to make our concerns known and to work with other nations to get results regarding Sellafield, and concerning POPs, and mercury. So that's what we did. We worked internationally in that field. My view is that we have to tell the truth; we have to tell people the truth in a sensitive way. Otherwise, we will not get the right and necessary pressure in other nations and other communities, and not the understanding of what is happening. If we don't tell the truth we will not put pressure on the industry to behave in a more responsible way. I therefore agree that we should tell the truth, but we should not overdramatize it, and we should compare the results – especially for fish – to other food products.

Chairman: Thank you all very much for interventions on this subject. We will soon move to a new subject, which is closely related. Summing up my thoughts at this point it seems that in the good old days, when the fish inspector or the chief veterinarian had stamped the food, it was safe and good. There was no question or discussion about it. Then came science and risk assessment, saying "Wait, wait. There is really no food that is 100% safe; this is all about risk." I'd like to read a little piece to you from an NGO, when they discovered that governments were going to use the risk assessment to deal with food safety. It's a statement:

We view risk assessment as an amoral mathematical exercise used for the ultimate immoral purpose of determining how many

people will be expendable to the system. How can a government calculate an equation measuring the value of human life and health against of the cost to an industry?²

This is the view of quite a number of people. They want safe food as it was in the good old days. And the scientists have taken that away from them. So how do we bridge this gap?

Footnotes

- 1 Jan Bowman (2001) Food Scares Agency www.spiked-online.com
- 2 As quoted in the publication: SeaQual's Guide to Food Safety Risks in Seafood. Seafood Services Australia (2001), 20 pp.

Scene from the discussion session.

How can the food industry prevent or manage food safety scares in the media?

Dr. Jón Árnason, Nutritionist,
Laxá Feedmill Ltd., Iceland

Life is a risk. Whatever we eat is risky, but the important thing is to be aware of the risk and being able to assess the risk in order to make correct decisions. There are contaminants in the environment and they will tend to enter the food chain, but they have not been put there by the food industry.

Farming of salmonides is a relatively new undertaking and therefore it is probably more under scrutiny than other types of food production. Interest groups have taken the opportunity to use results from research on salmon for their own propaganda.

In 2004, two reports on food scares related to farmed fish were published. There is a reason to believe that they were intended to manipulate public opinion on fish farming for food production. The first report: Global Assessment of Organic Contaminants in Farmed Salmon was published in *Science*, Vol.303, January 9th 2004, and the second report: Global Assessment of Polybrominated Diphenyl Ethers in Farmed and Wild Salmon was published in *Environmental Science and Technology*, August 2004.

There was a very well planned information campaign on the publication of both the reports to all interested parties, except the fish farming industry.

The main issue in both the above publications was the risk evaluation for the contaminants in question. In the first paper, local standards were used to evaluate the health risk instead of internationally accepted standards, but in the second paper no standards are available on the substances in question.

It is important that there are generally accepted standards on permitted levels for different

substances in foodstuffs. There are more or less accepted standards on the allowed levels for substances that can pose a health risk for the consumer. Examples are the standards of the World Health Organisation (WHO), Food and Drug Administration in the US (FDA) and the European Food Safety Authority (EFSA). There are, however, other standards that are valid for certain regions or put forward for special reasons. An example is a standard put forward by the Environmental Protection Agency in USA (EPA).

For those involved in food production it is vital to know what standards to use in assessing the limits for undesirable components in the products. It is also important to know how that food is likely to contribute to the load of contaminants in the diet as a whole.

Companies must try to ensure responsible production in accordance with all relevant official regulations as well as to ensure that the production is acceptable by the public. Companies must also have information on the level of the most important contaminants in their product and preferably an audited system for monitoring the contaminants.

As a matter of fact, it is also important to show that their production is based on sustainable resources.

Clearly, the food industry should be proactive in their information to consumers, and, should try to educate the consumer.

Discussion theme 2

How can the food industry and authorities prevent or manage food safety scares in the media?

Chairman: We have heard the input by Dr. Jón Árnason and I think we'll all agree that his concerns are also the concerns of a large proportion of the food industry.

Roger Aertgeerts: The previous speaker highlighted the importance of communication by the industry towards the public at large. The importance of having an adequate communication strategy, including one designated spokesperson, is vital.

I also noted the comments on differences in standards. The rolling revision process of the WHO Guidelines on Drinking-Water Quality devotes considerable time to consultation amongst all major groups, including but not limited to, representatives from industry and the public at large. We do consider that this buy-in is essential for the general acceptance of the final product. It is worth noting that in 1982, WHO shifted its focus from 'International Standards' to 'Guidelines'. The main reason for not promoting international standards for drinking-water quality is the advantage provided by the use of a risk-benefit approach (quantitative or qualitative) to the establishment of national standards and regulations. The idea is that application of the 'Guidelines' to different countries should take into account the sociocultural, environmental and economic circumstances particular to those countries.

Under the World Trade Organization's Agreement on Sanitary and Phytosanitary Measures (SPS Agreement), food traded internationally must comply with *Codex Alimentarius* standards that are established to protect health of consumers on basis of sound scientific risk assessments. If a country's food safety regulations are not based on such assessments, these may be challenged as non-tariff barriers to trade under WTO rules.

Established in 1963, the Codex Alimentarius Commission has been responsible for the development of international standards, guidelines and other recommendations to protect the health of consumers and assure fair trading practices in food.

The finalization of food standards and their compilation into a code that is credible and authoritative requires extensive consultation as well as the collection and evaluation of information, followed up by confirmation of final results. Creating standards that at once protect consumers, ensure fair practices in the sale of food and facilitate trade is a process that involves specialists in numerous food-related scientific disciplines, together with consumers' organizations, production and processing industries, food control administrators and traders. As more stakeholders become involved in the formulation of standards and as the *Codex Alimentarius* - including related codes and recommendations - covers further ground, so the Commission's activities are becoming better known and its influence strengthened and widened.

For Codex, risk assessments are performed by the Joint FAO/WHO Expert Committee on Food Additives and Contaminants (JECFA) and Joint FAO/WHO Meeting on Pesticide Residues (JMPR) and employ estimates of exposure based on data submitted by countries. Therefore, countries must have exposure assessment data in order for JECFA and JMPR to consider such data when formulating their recommendations. These recommendations form the basis for standards, guidelines and other recommendations of Codex.

Jackie Bannister: Taking things back to a very simple level, I think the customer actually just wants reassurance more than anything else. They don't want to change their eating habits;

what they want to know is the context – if I eat it, how is it going to affect me? As regards the food scares that are going on at the moment, some of the contaminants have always been there, it's just that we've not been able to detect them, but with increased technologies and science, we can now detect them at lower limits – for instance, nitrofurans. But the press officer, or the designated person, needs to put things into context: How is it going to affect me as a consumer? And then they can make an informed decision.

One of the things that I have experienced in the UK is that there is actually a crisis fatigue now. We've had so many of them; people worry about them less and less. There have actually been some quite serious potential food scares, but people just don't care anymore. They're going to eat it; everybody knows that chocolate's bad for them, but nobody stops eating it. As for salmon; I think everybody stopped eating it for a little while, but then they realized they actually quite liked it. BSE - that had a large impact - but people are now back to eating beef burgers in exactly the same way as they always used to. So, I think that with a common-sense approach, if we are dealing with a crisis, all we need to do is say, "Yes, you can eat this; you can eat it in small quantities; it's a cumulative effect, but you have to be the age of 150 and eat two tonnes of this a week before it will actually affect you." That's what they really want to know.

Roland Cormier: I perfectly agree with both your interventions on the issue; I want to stress the importance of information in a proactive way. A little anecdote from Atlantic Canada will serve to illustrate this. This is where all the people from Central Canada come for a vacation, to our beaches to have a great time with their families, and of course, what do you do when you are on a sandy beach and you see clams everywhere? You pick them up, and you cook them in your cottage, and you serve them to your families. In Canada, we have one particular species of whelk that contains tetramine, which is a toxin. It'll land you in the hospital for a few days, but that's about it. At least two years in a row we had major intoxications. One or two families would end up in the hospital; this would hit the media and create a scare, and suddenly nobody would eat shellfish. But, the problem was not related to shellfish. One season we decided to be proactive, did talk shows and had fliers at the tourist centres to explain that whelks are like mushrooms; you all know that with mushrooms you don't pick just any mushroom, because some of them might be toxic. This worked and we've never had a toxic problem with whelk since. So again, coming back to the statement that

I find very important, is: "proactively, go ahead and inform." You will always have the scares. Somebody's going to publish a paper that will create a stir, and you need to have a team in place to deal with that when it happens, as much in the industry as in government. Have we ever had a talk show to discuss what the issue of risk analysis is all about? I don't think so.

Tuija Tellervo Karanko, Ministry of Agriculture and Forestry, Finland. I would like to comment on the need to reassure the public. Unfortunately we had one case of BSE a couple of years ago in Finland, and the animal was put down before it was taken to slaughter because of its strange behaviour. As authorities we needed to react and inform, and I would describe the information with four words, i.e. as timely, open, compassionate, and understandable information. As a result, there was no drop in beef consumption. The person in charge of the information was later given an award by the Association of Finnish Journalists for her action on this matter. What really happened was that we reassured the public by talking openly of what had happened and what actions the authorities had taken and what was the procedure to be followed from that point on. Information was given in good time, and it was given continuously. I remember there were a couple of press conferences each day. The person in charge of the information explained with compassion how she understood that the public was really concerned about this. She didn't undermine their feelings. But she explained the situation in understandable terms, while also explaining traceability in production. At the end she took the problem to a very individual level; to the farmer and his wife, and explained that it was their future that was at stake. This turned out to be a valuable lesson for us all with regard to the media.

Chairman: This reminds us that it is not enough to get the numbers right as the experts frequently focus on.

Viewpoint: I'd like to emphasise the importance of competence in communicating with media. When industries, authorities, or consumer interests are handing out information, or making comments or statements, it's very important to have the relevant competence on the team. Examples are professional journalists in the administration or companies. We may be experts on the subject, but we also have in our society expert competence from journalists.

Viewpoint: I wanted to comment also on the fact that sometimes we have to be very conscious of the motivation that certain people have when they

take an incident and they get media coverage for it. Take the issue of mercury in fish, where their real agenda has to do with environmental quality but they know that the consumer is going to respond to the concern about what's in the food supply. Or we have other groups whose real agenda is an animal rights agenda, and they use that opportunity to scare the consumer. We have to be able to recognise the emotion behind the issue. It's not just a matter of giving people facts and figures but understanding that there may be another agenda that is being promoted rather than just simply a food issue.

Daniela Battaglia: So far we have focused on how to communicate risk assessment information, whereas I think the consumer, to be assured, needs to know about risk management measures taken by the government or the industry. I also wanted to point out the experience of the Finnish government in dealing with BSE. Not only was the issue presented in a very transparent way, but the government also informed the consumers of what they were going to do about it – i.e. spoke about the risk management measures. Finland was the only country where BSE was found but meat production didn't drop, whereas in all the other countries in Europe they denied the presence of BSE and there was a 50% drop in consumption. So, this is a good experience to look at for a future crisis.

Knud Østergaard. I just wanted to support strongly all the interventions regarding the principle of food transparency. I believe that is of the utmost importance, and I think that numerous interventions have demonstrated that there are different ways to prove that this is an important element of our communications strategy. And I think it is interesting also to relate to some of the data in the presentations yesterday, especially the consumer presentations, where there were studies on consumer trust in a number of countries. It is my belief that there is a link between full transparency and consumer trust, because from what I know there is a close link between those countries with the highest consumer trust, both in companies and in the authorities, and those who actually have developed a policy of being fully transparent. And I think it would be interesting if consumer research people, in the future, would try to actually take this element into their research to see if they can establish a link between a policy of transparency and consumer trust in the area.

Another element that would be interesting to take on board in research is, "What kind of consequences do we actually spot on the market

when we have seen these so-called food scares?" In some countries there have been practically no consequences of a BSE case in the market, but in other countries you had a 50% downfall in consumption for a long time, which was a disaster to the industry, basically based on scares and not on science, so to speak. So I think these elements could be taken into future research and it would be interesting for further discussions on this issue.

Anthony Cox: Just following up on that point on trust, I think one of the ways of being more proactive is to ensure that the risk communication is done with a partnership approach. I think there's a need to include the full range of stakeholders in consumer organisations, NGOs, industry, and government, to help improve the credibility in advance of these scares and improve the transparency and hopefully improve the trust. There are some examples around the world of this partnership approach, and I touched on one of them in my talk yesterday on the Marine Stewardship Council. That's not a perfect example, but it is one way in which it has been demonstrated how you could get these apparently quite divergent interests to co-operate in areas where you wouldn't expect such co-operation.

Chairman: I think we have some interesting conclusions here. There is a communication problem and clearly the consumer needs to be reassured that industry and the authorities are doing their job properly.

Presentation for discussion theme 3

Is food labelling sufficient, especially as it relates to food intolerance and allergic reactions?

Ms. Brynhildur Briem, Lecturer in Food Science and Nutrition at the Iceland University of Education and Representative of the Consumer Association of Iceland

In order to achieve a high level of health protection for consumers and to guarantee their right to information, it must be ensured that consumers are appropriately informed as regards foodstuffs, among other things through the listing of all ingredients on food product labels. Complete labelling and product information are fundamental prerequisites for the food market to function with full consumer confidence.

While food labelling is necessary for us all, it is of vital importance for those who suffer from food allergy or intolerance. Even if labelling is not to be regarded as the only medium of information, it is nevertheless important to assist these individuals as much as possible by providing them with comprehensive information on the composition of foodstuffs. If this information isn't on the label, it is impossible for the consumer to avoid foodstuffs that are unsafe for him.

In order to protect the health of those individuals it should be made obligatory to list all ingredients and other substances present in the foodstuff. The EC Directive 89/2003, however, defines the following exception:

Where the composition of the compound ingredient is defined in current Community legislation, and in so far as the compound ingredient constitutes less than 2% of the finished product; however, this provision shall not apply to additives.

Hence, the consumer can still expect some substances that do not appear on the list of ingredients to be present in foodstuffs, and it can make a lot of difference and cause great difficulties for the people at risk. At the same time, the list of allergenic substances and foods that cause allergies is getting longer.

Can the consumer trust food producers? Hopefully so, but even the many consumers that are allergic to monosodium glutamate (MSG) cannot fully trust food labelling.

In the past few years more and more chocolate products have the following clause on the label: "Could contain traces of nuts". Is this hyper-labelling? Are producers in those cases only protecting themselves in case something happens? Are chocolate products not labelled in this way therefore guaranteed free of nuts? This can easily confuse the consumer.

Consumers also have to be able to read the labels. In many cases the lettering is much too small to read and therefore makes no sense.

Finally, two questions:
How can consumers get the necessary information in a simple and effective way?
Is "hyper-labelling" positive for the allergic consumer?

Discussion theme 3

Is food labelling sufficient, especially as it relates to food intolerance and allergic reactions?

Chairman: We know that there are a lot of people who are hypersensitive to extremely small amounts of various ingredients. My question is, can we expect the food industry to cater for very special needs? I, for example, know a person who can never eat in a restaurant, can never go out and buy prepared food, has to cook everything from very reliable sources because of allergy to nitrates, sulphites, almonds, and a number of other things. The question is how far can we expect the industry to go?

Jackie Bannister: Perhaps I can just explain some of the questions that have been raised. The “could contain” statement: why is it on one product and not on others? There are a number of possible explanations for that, one being that one product was made in a factory that handled nut products, and the other one wasn’t, and there’s always the risk of cross-contamination. In our food-manufacturing environment, for one retailer we put “could contains” on everything we make for them. In our company we don’t actually handle nuts on site, but some of our suppliers do. We therefore have to go back to raw materials suppliers and see whether they handle nuts on site and, if they do, we would then have to put a nut warning on the label. If they don’t, there’s always the option that *their* suppliers may handle nuts at some point in time. So how far down the chain do you actually go? There is a certain element of what we call adventurous contamination, where the ingredient might just have cross-contaminated somewhere along the route, even though people aren’t aware of it. The other thing with nuts particularly, in a factory, - with traditional cleaning methods of sanitation, detergent, and hot water - you will not get rid of nut proteins by traditional methods. We’ve actually done some work with one of the retailers in the UK using PCR testing and ELISA testing to find protein residues, and we have found

that nut protein can stay for 3 days in a factory after you have actually cleaned it down.

I believe that one of the things we are actually looking at is “Can we give better guidance?” Not just saying “This product may contain nuts,” but we are now stating “This product is made in a factory which either handles nuts or nut ingredients” or that it may have got contaminated along the way. It then allows the consumer to make a more informed decision based on the acuteness of his condition. It could be Russian roulette, but at least it gives them a better idea of where they actually are. While litigation is as it is, some of the retailers very much believe that they should be putting this declaration on because that is easier than managing the risk in the system, which may sometimes be an almost impossible task.

Annika Y. Nurttila (Finnish National Food Agency): I have questions concerning food enrichment, foods for special dietary use, and allergens. What I would first like to point out is that when the person in question is extremely allergic, or allergic to food in general, the most important thing is that she or he has a good view of how to take care of the condition. So the person has to be well educated by his doctor or nutritionist to know what is too much, and so on and how the individual reacts in different situations. When we talk about food labelling we often forget that the basis is a patient that is well educated on his or her individual allergy disease. I think that is important to remember.

To be very pragmatic, I think that an important question about labelling was put forward. I think we should look at the labelling to see if it is written in a language that the person can understand, and if the text is legible at all. That’s the basic requirement. The information on the label comes second if you can’t read it. I would say that in

Finland we have had a long experience with legislation on food allergies. We've had allergen labelling for a long time, and we've had a really good experience with that, so I think that the new allergen directive is a way to better understand the needs of allergic persons. I agree that perhaps it is not enough, but I want to be pragmatic in that way also. I would still like to say that readability of the labelling texts is a problem because many companies want to put many languages on the package, and then the text becomes very small. So I think we should not forget these very simple things when we discuss labelling questions.

Steinar Adalbjörnsson (Environment and Food Agency of Iceland): My work concerns food supplements, fortification and labelling. First of all, labelling is only one medium to reach the consumer. We cannot underestimate the importance of teaching the consumer how to read the label. No matter how good the label is; we have to follow up with teaching on how to read it. My second point, picked up from a presentation yesterday; made me think. It was stated that the responsibility was not only with the companies on labelling, but also with the consumer on knowing what kind of conditions they had. My comment on that is, yes, they know what they have, but if you don't label it on the product, you cannot choose this food for you and all foods should be available for everybody.

Chairman: What about the issue of mislabelling? Just to remind you of the big scandal in the UK, where it was found that chicken breasts had been pumped up with a peptide solution made from beef without labelling it because it improved the water-holding capacity of the meat and increased weight. We know there are lots of techniques like that. What about the use of compounds in food that are not declared but increase profits? Is it a big problem?

Viewpoint: I think that we are now at a point where I would almost say we know too much. At least we know too much to put it on the label. When I, as a consumer, go to the shop, sometimes I find packages that are unreadable. It has been mentioned that you have several languages, and you have cooking instructions, you have ingredients, warnings; and it's in some cases becoming almost unreadable. I think that we have to foresee in the future that we have to put more emphasis on priorities when it comes to labelling. I think that the legislation not only has to say what should be put on the package, but also perhaps give indications about how large the different messages should be. For instance,

messages relating to allergic reactions should be quite big, but other more general ingredients could be smaller. I think we have to move in that direction and I also think that you have to be aware of all the other media where you can put information. In time, more and more information will have to appear elsewhere than on the package itself. You could have leaflets in the shops about the products or a group of products and you could have information on the Internet. Perhaps you could have a computer somewhere in the stores where you can scan the product and have all the ingredients up there. And I think this will give a better result than trying to press everything in on the back of the package.

Chairman: Is that a way ahead? Supertech information on the Internet? We once played with the idea about fish, that you could swipe its code and you would then know where it was processed, when it was transported – even have a picture of the fisherman who caught it?

Viewpoint: I also think you will have to have priorities on labelling. Perhaps there shouldn't be so many languages. If you look at packages, often the front side with pictures and the brand takes a lot of space, and the legally binding package labelling doesn't have enough space.

The criteria for allergens to be withdrawn from the markets also need to be discussed. I have been looking at product withdrawal notifications, and there are very few notifications on allergens.

Steinar Adalbjörnsson: We have a dilemma on our hands which has been stated in more than one report from the Nordic Council of Ministers. Consumers want as much information on the package as possible, even though they don't understand everything. It is therefore important for the legislative party with input from stakeholders to decide what is necessary and what is suitable on the label.

Bente Stærk, co-chairman: I can confirm that the reports from the Nordic Council of Ministers have indicated that even though consumers do not read all this information in the shops, they definitely want it to be there to be able to read it when they come back home. And simply to give them trust in the product. The labelling gives them the confidence that they can go home and read more about the product. Several reports have shown that this is important to them. On the other hand, I definitely agree with some speakers that we need to look into other media to convey information to the consumers: leaflets, computer-

based systems, etc. And I would like to mention that we are going to make a study on how we can better inform the consumers about the ethical aspects of food production. We will be looking into a different type of information systems and making a socio-economic study of what would be the cost of each individual information system and what would be the benefit to the consumers and society. This may give us some idea of the cost-benefit of different information systems that could be of use in the future. Finally, concerning teaching - we find that to be very important, and I would just like to emphasise school education. We see consumer education as an important part of the school curriculum.

Knud Østergaard, co-chairman: Going back to the basic issue of “could contain,” which has been mentioned by several people, and it struck me in this discussion that different policies were used for different companies. This means that for certain companies you put the “could contain” wording on the labelling for almost all products. It’s a basic question whether that is acceptable. To me it appears to be somehow a misleading kind of labelling; at least it makes labelling not useful to many people. I’m also reflecting on the many debates we have been having in the European Community concerning GMO labelling. The proposal has been made that companies could put “may contain GMOs” on their products because that would solve a lot of technical problems for companies. The fear, however, among most of the Member States was that this would definitely

dilute the issue of labelling because it would be very easy for the industry, just in general, to put on the label “may contain,” and nobody would ever have any idea of whether it actually contained GMOs or not. The whole idea behind labelling is to enable consumers to make an informed choice. It should also enable people with particular health problems, who are sensitive or allergic to certain types of ingredients to make an informed choice. However, if the policy spreads that companies put “may contain” on all types of products, then there is no guidance for those people who have these problems and what can they choose? They will be forced into an impossible situation, so I would like very much to hear the delegates’ view on the principle of the acceptability of such a type of labelling. That is a fundamental issue to my mind.

Roland Cormier: Talking about technology, one thing we have done on the website of the Canadian Food Inspection Agency is to have an area for food alerts. If you have children with allergies, or if you yourself have specific allergies, you subscribe to an allergy alert system, and you receive e-mails at your house or what’s called tele-e-mails, with which, if you don’t have Internet at your home, you’ll have it through your phone. These alerts will say, “This producer has declared that product X may contain nuts,” so at least you can take action. This is a proactive way and it’s a very popular service back home.

Chairman: This will end our discussion on this topic due to our time constraints.

Presentation for discussion theme 4

Ethical farming and animal wellbeing – a luxury or a necessary response to public demands?

Mr. Halldór Runólfsson,
Chief Veterinary Officer, Iceland

Ethics is the science of morals so what is ethical farming?

In the good old days there was family farming and it was based on compassion for animals. There is still some family farming but in the past century industrial farming has evolved, based on increased productivity and profitability. Some aspects of modern farming, including transport and slaughter of animals, can be said to be in contradiction of our cultural and religious values.

What are the animal welfare expectations? This must be looked upon as a global challenge. It's a complex issue, and we must address several factors - cultural, religious, economic, political, ethical, and scientific issues. There is a big difference in cultures between countries but we believe that animal welfare is at a high standard in Western Europe and the Nordic countries and that we are at the forefront of the animal welfare movement. We can afford it - and this maybe will answer the question in the title. Yes, it's a luxury, because if you think about in other countries, such as some Eastern Asian countries, animals are still their tractor, their "workhorse". These people cannot afford the luxury of good animal welfare conditions that exist in many other parts of the world.

We have religious questions - for example, concerning the way in which an animal should be slaughtered; we have economic issues - for example, with long-distance transport of animals; we have political issues - why is bullfighting still tolerated in parts of Europe? We have political issues - in the UK Parliament they debate a ban on hunting foxes with hounds or dogs. And there are many ethical and scientific issues.

The way forward is to get a credible and practical animal welfare strategy for the gradual improvements in animal welfare. This cannot be

done all at once; it needs to be done in stages, and we must accept that as regards animal welfare and animal rights, there is a big spectrum of opinion around the world. It is an emotional issue, and there will be groups at each end of the spectrum that will never be satisfied with the way things are going. This is something that we have to respect. But there has been continuous evolution over the past decades, and legislation - including scientific guidelines and codified standards - has been the critical factor for promoting good animal welfare in many countries. The European Council in Strasbourg has led the way for animal welfare standards, and there is good legislation in many countries. Here in Iceland there is still work to be done. Legislation is divided between two ministries and two authorities, and there are two sets of laws. For better enforcement we should have one ministry, one institute or authority and one law.

Who are the main actors for promoting good animal welfare? To start with, we can talk about NGOs, that are large movements for promotion of animal welfare issues in many countries. In Iceland, such an organization has existed for more than a hundred years. The veterinary profession has also been a force for promoting animal welfare, as it should be. Good animal husbandry is something we learn in our studies. The stakeholders - farmers, the transporters, slaughterhouse personnel - are all important; they must care for animal welfare and they have done so. In most countries there are ministerial advisory committees and local committees for promoting animal welfare. The quality assurance and marketing schemes that are important in many countries are a point of interest and are becoming an issue, for example in labelling. These schemes are quite advanced in some places. As regards traceability for beef: you can perhaps pick up a portion of beef, punch a code on the shop computer, and view the conditions for the animals in that herd.

This is good, because it means that there are people who are using this to say, “My animals are reared under optimal conditions; I have nothing to hide, and I want everybody to know it.”

To promote animal welfare internationally we need the international organisations, such as the WTO and the SPS and the TBT agreements, where the issue has been much discussed. Their support will be very beneficial for the promotion of animal welfare, so that importing countries can make it an issue in trade.

The Organisation for Animal Health (OIE) has given priority to transparency with regard to animal health and protection against diseases (zoonoses). The OIE is one of what the WTO calls the three sisters; it's a reference organisation for guidelines and standards, along with the Codex and the International Plant Protection Convention (IPPC). The OIE/CODEX/IPPC have decided to address the need for a global initiative for animal welfare standards, with the OIE as the main guiding/ruling body; The chief veterinary officers around the world have decided that a global initiative for Animal Welfare Standards should become a professional obligation for veterinarians and be

discussed at the OIE. There's already an animal production safety group working for the OIE, and one of its tasks is to collaborate with Codex in relevant areas, trying to prevent duplication. In 2002, the Animal Welfare Working Group was initiated, having the mandate of a science-based approach to animal welfare. Earlier this year, there was a global conference on animal welfare, animal health, and food safety. It was attended by over 400 people from 64 countries, with most of the organisations for animal welfare present and a great deal of stakeholder involvement.

You may ask what animal welfare and ethical farming have to do with food safety. The answer is that there is scientific evidence that improvements in the welfare of farmed animals will contribute to the quality and safety of food derived from them. I believe that animal welfare has everything to do with food safety. You cannot produce safe food unless you have healthy animals that are living under good conditions.

Finally, there is a need for a more coherent animal welfare strategy and for science-based education for stakeholders and consumers.

Chairing the discussion session.

Discussion theme 4

Ethical farming and animal wellbeing – a luxury or a necessary response to public demands?

Chairman: The floor is open for this important topic.

Christina Schröder: Following on from the presentation, I would like to be bit more precise. The SPS Agreement does not talk about animal welfare; it talks about animal health. As far as I know, it has not been suggested to include animal welfare in the SPS or WTO Agreement because there is an organisation that is, as we were told, on its way to prepare guidelines further down the road for animal welfare and treatment of animals.

Daniela Battaglia: It is true that many people are worried that, with the development of animal welfare standards, in the near future, those could be used as trade barriers against producers in developing countries. They can have an animal production system that is as ethical as, or even more ethical than, the systems in developed countries, but just won't be able to prove it or certify it. What kind of strategies could be put in place, and what kind of role can international organisations play in that? The work of OIE has been mentioned. Are we sure that there is true wide-ranging participation of people and governments from developing countries in setting those standards?

Viewpoint: From a nutritional aspect, for example, in the case of free-range egg-laying hens, they have been shown to lay eggs that are more nutritious, or have higher levels of decosahexanoic acid, which is very important to brain development. So, in addition to the points already mentioned, there may be positive nutritional aspect of the well being of the animals.

Jackie Bannister: I visit Thailand quite a lot, and have visited the poultry factories out there because we import poultry into the UK. I just want to say that it is totally possible for the developing

countries to have a very high standard of animal welfare. In fact, they do it better than we do in the UK. And all that is led by commercial means. If we will pay for it, they will do it. It just goes to show that, in the last outbreak of avian flu in Thailand, the particular supplier that I deal with did not have one incident of avian flu. He had a totally integrated system. The welfare was excellent, and they weren't affected, so I think we can show that we can produce more safe and wholesome food if we do care for the animals that we are looking after. And I think it's economics that will show that in the end.

Chairman: Can I ask you, as a representative from a big food industry group, do the customers really ask these questions: "How do you treat your chicken or your pigs; are the pigs kept clean and nice, do you play music for them at night, or ...?"

Jackie Bannister: Absolutely. They want happy animals.

Gudrún Stefánsdóttir: I am probably the only farmer in here. So I would like to stress the point of animal welfare in the WTO. If a country has a high standard of looking after their animals, and not using drugs in their products, how are they going to be able to keep on farming when the WTO is not going to take animal welfare and use of drugs into their agreement? This may destroy every family farm in the world.

Chairman: Would you like to answer the question, Christina, why the WTO is reluctant to take on board animal welfare?

Christina Schröder: I'm not really sure I can answer that one. It's members who decide on what's going into the agreements. I'm not an SPS expert, but the SPS Agreement takes animal health into account, so if you have healthy animals

because you have been using measures that are non-discriminatory and less trade restrictive and all the rest of the SPS measures, you can do that. It's not a problem. And if you consider that giving animals less drugs and keeping them clean, that's an animal health thing. The use of additives, for instance, contaminants, additives, all sorts of things, can be legislated against according to the SPS Agreement. That does not take into account the way you treat animals as such. That is for the OIE to decide upon guidelines. If, for instance, there is a case coming to the WTO saying, "OK, you're not treating your animals right; you're not doing this; you're not doing that," then if you have been using the guidelines of the OIE, when they come into force sometime in the future, you're normally considered to be in agreement with the WTO. So there should be no contradiction between the SPS Agreement, the WTO rules, and the OIE. They should reinforce each other.

I wanted to address another question, which is sort of funny. The Community has introduced, I believe, rules against penning chickens in too-tight places; they are supposed to be more free-ranging now and be kept in bigger areas. I just heard that Germany has asked for a waiver from those rules for two years. They say that if they have free-ranging animals, they can't sell their eggs because they contain too much dioxin. So there is also a problem there, apparently, with free ranging there might be a problem with contaminants outside.

Chairman: I think it's very important to understand that in the global trading system, as the import duties are being lowered, there is a tendency for parties to replace the "duty barrier" with technical barriers to trade. The WTO has to be very careful in addressing these issues. Of course, the members can decide on whatever they like. But you can just imagine the kind of situation, say in fish trade, if a country says "We want your fish, but we don't want fish caught in nets because that is such a cruel way to catch them". In FAO, we are now having the help of some philosophers dealing with the ethical issues relating to fisheries. The ethicist came to my office and looked at me very seriously with his notebook and said: "How do fish that are being caught, how do they die?" And I told him jokingly that if you were a small capelin inside a big net, you would probably have a heart attack from fear. It was a joke, but the philosopher took it down very conscientiously. So you see, you had better not joke too much about these issues.

Daniela Battaglia: I would agree with Jackie's comment. In many developing countries animal welfare is well practised, and it can continue if the

consumer is prepared to pay for it. However, when we look at the domestic market, in many countries there are already food security programmes, and applying animal welfare standards such as standards for cage size or not using cages at all, would imply some investment in the infrastructure. Who is going to pay that cost? Applying those would mean that the consumer in that country has to pay more for his food, which in many cases is not possible. Are we going to have two different systems, one for export and one for the domestic market? These are all issues that are maybe not going to be solved right away, but I think it might be worth keeping them in mind.

Chairman: I would like close this session by reminding you that the issue of animal welfare is science-based. Finally, I can't resist the temptation of reading to you what the Food Standards Agency said about organic farming.

The Emperor's folly was finally revealed by a small boy, who pointed out that he had no clothes on at all. The role of the small boy in the case of the organic food has been played by Sir John Kerbs, head of the Food Standards Agency, FSA. Much to the fury of the organic lobby, the Agency has issued statements that it knows of no evidence to support claims that organic food is safer or more nutritious¹.

And this is the crux of the issue: however much we want to take into consideration other things, we are committed to scientific evidence, and that's it. Europe did not want the hormone-treated beef from the USA, but in the WTO they couldn't provide evidence that there was anything wrong with hormone beef. Therefore they won that round.

We know that the consumer is king, the consumer wants to be in charge and wants his wishes to be respected, but at the same time he wants the goods to be at a low price, to be wholesome, convenient, etc. He is very difficult to please.

This has been an interesting discussion session. We know that the Nordic countries are highly respected in the food-safety area and I believe they can also have a great influence in the field of animal welfare.

Footnote

- 1 Geoffrey Hollis (2003) "Natural" isn't better. <http://www.spiked-online.com>

The food industry in the Nordic countries

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Introduction

In the Nordic countries there is often a reference to the economic importance of the food sector. Danish pork, Norwegian salmon and Icelandic cod are well known foods on the international market, not to mention a large variety of speciality products. This paper attempts to outline how this sector of the Nordic economy compares with that of other countries. It should be stressed that the figures presented do not include food-related industries such as packaging materials or equipment for food processing. The figures relate to NACE¹ sections A, B and DA, where A denotes agriculture, hunting and forestry; B denotes fishing and fish farming; and DA denotes manufacture of food products, beverages and tobacco.

The food industry in the Nordic countries can be split into two main categories; primary production (NACE A, B) and the manufacture of goods from these (NACE DA). The food industry in these countries has different possibilities depending on geographical factors, such as the area usable for agriculture, its suitability for production, access to fishing grounds and other such factors. They also have different possibilities in exporting food products to the European Union. Denmark, Finland and Sweden are members of the EU which gives them full access to the EU market for food. Iceland and Norway, on the other hand, have access through a special Agreement referred to as the European Economic Area. This Agreement, however, does not cover fish and agricultural products. This means that access to the EU market for Norwegian and Icelandic agricultural products is limited by quotas and tariffs and is very limited in quantity. Fishery products from these two countries, on the other hand, have market access that is close to that of the EU member countries. There is also a difference in the countries' culture and what they stand for in the international

community. The Danish food industry is best known for its agricultural products, such as pork and dairy products, whereas Iceland and Norway are best known for fish. All these factors and many more influence the structure of the food industry in the Nordic countries.

The tonnage of the production is dependent on the above mentioned factors but the value is also dependent on the product mix, the degree of processing, and the markets that each country is exporting to.

To get an idea of the importance of the food industry in each country it is necessary to look at some key aspects of the industry itself in relation to the economy in each country.

Size of the industry in each country

The food industry provides for a basic need. As a consequence, the food sector is not as susceptible to economic fluctuations as many other sectors of industry and its activity is less cyclic than manufacturing as a whole.

The relative size of the food industry varies greatly within each of the Nordic countries. Table 1 shows the value of agriculture, forestry, fishing and manufacture of food products, beverages and tobacco as a percentage of all NACE activities in each country. This gives an indication of the importance of the food industry in the national economy.

Country	NACE A, B % of total	NACE DA % of total	NACE A, B, DA % of total
Denmark	3.3	2.8	6.1
Finland	4.0	2.1	6.2
Iceland	9.8	5.0	14.8
Norway	2.5	2.0	4.5
Sweden	2.4	1.6	3.9
EU 15	2.4	2.4	4.8
EU 25	2.5	2.3	4.8

Table 1. The value of agriculture, forestry and fishing (NACE A, B) and manufacture of food products; beverages and tobacco (NACE DA) as a percentage of all NACE activities in each country (based on Eurostat, gross value added, numbers for 2002).

It can be seen that Iceland stands out in this comparison, due to the size of the fisheries sector. The other countries have a much wider base to build their economy on. Only Iceland, Denmark and Finland are higher than the EU 15 (the 15 Member States of the European Union until 30.4.2004) and EU 25 (the 25 Member States of the European Union). It should, however, be noted that forestry products are included in these figures and they greatly elevate the numbers for Finland.

Proportion of the labour force working in the food industry

One measure of the importance of the food industry in the Nordic countries is the proportion of the labour force working in the field. The numbers in Table 2 show the proportion of the economically active population engaged principally in agriculture, forestry, hunting and fishing, and in the manufacture of food products, beverages and tobacco in 2002. Iceland also stands out in this respect, the reason being the great importance of the fisheries sector. Finland comes in second but it must be noted that figures relating to forestry could not be separated. Forestry is an important industry in Finland and Sweden and the numbers would therefore be lower for the food industry only.

Country	NACE A, B % of total	NACE DA % of total	NACE A, B, DA % of total
Denmark	3.7	2.8	6.5
Finland	5.3	1.8	7.1
Norway	3.7	2.4	6.1
Iceland	6.6	4.2*	10.8
Sweden	2.4	1.4	3.8
EU 15	4.1	2.4	6.5
EU 25	6.2	2.3	8.5

Table 2. Percentage of the employed population engaged principally in agriculture, forestry, hunting and fishing (NACE A, B) and in manufacture of food products; beverages and tobacco (NACE DA) in 2002 (based on Eurostat except Iceland based on Statistics Iceland).

*only fish processing

Comparing the Nordic countries to the EU-15 and EU-25, only Iceland, Denmark and Finland compare to EU-15 and only Iceland is higher than EU-25. The relatively high numbers for EU-25 are due to the large proportion of the population in the new EU countries working in agriculture.

The export of food from the individual countries

Food export in the context of the total export of commodities gives an idea of how dependent the economy is on the food industry and its exports. Table 3 shows the proportion of total export value by type of commodity in 2002. Iceland shows the highest figures, with food exports at 62.56% of the total. Almost all of this is export of fish and fish products. Denmark comes in second with 19% - meat being the most important. Norway shows a figure of 6.47%, - almost all fish-related exports.

Compared to EU-25 (5.7%), USA (6.2%), UK (2.9%) and Japan (0.4%), it can be seen that export of food is quite important for Iceland, Denmark and also Norway, whereas Finland and Sweden do not rely as much on the export of food.

	Denmark	Finland	Iceland	Norway	
Sweden					
Meat and meat preparations	6.34	0.17	0.31	0.02	0.13
Dairy products, birds' eggs	2.50	0.60	0.03	0.14	0.20
Fish, Crustaceans, mollusc and aquatic invertebrates and preparations thereof	3.68	0.03	53.04	5.79	0.62
Feedingstuffs for animals	1.00	0.04	8.88	0.27	0.04
Other food. and live animals	4.31	0.86	0.26	0.18	1.40
Beverages and tobacco	1.17	0.20	0.04	0.07	0.64

Table 3. Export of NACE DA groups as a percentage of total commodities' export value in 2002 (Nordic Statistical Yearbook 2004)

Looking at both exports and imports in NACE group DA (Table 4) gives the cover ratio (%), which is the ratio between imports and exports. A cover ratio larger than 100 means net export and less than 100 means net imports. This table gives an idea of the self sufficiency of the countries in each of these group. It is shown that Denmark, Iceland and Norway are net exporters for the whole DA subsection, whereas Sweden and Finland are net importers. It should be noted that the extent of oil and oil-based exports from Norway has changed the picture for Norway dramatically in recent years, oil and gas exports being more than 50% of total exports in value.

	Denmark	Finland	Iceland	Norway	Sweden
Meat and meat preparations	687.7	91.1	460.6	28.6	21.7
Dairy products, birds' eggs	374.0	237.0	35.6	229.2	61.3
Fish, crustaceans, mollusc and aquatic invertebrates and preparations thereof	169.0	11.6	1650.0	797.8	64.6
Feedingstuffs for animals	82.1	15.6	2817.8	70.7	13.5
Other food. and live animals	124.4	33.9	4.3	8.4	47.6
Beverages and tobacco	96.4	32.1	2.4	13.7	70.3
NACE subsection DA total	196.6	45.7	545.1	164.7	50.4

Table 4. Cover ratio (%), (exports as a percentage of imports) for NACE DA groups for 2002. (Nordic Statistical yearbook 2004)

If the totals from Table 3 are used to represent the export of food from the Nordic countries it may be concluded that the food industry is the largest industry in both Iceland and Denmark. It is also the second biggest industry in Norway (after the oil industry). Paper and telecommunications are the largest sectors in Finland, and paper, telecommunications and road vehicles the largest in Sweden.

Conclusions

The food industry is important to the Nordic countries. This is especially true for Iceland, Denmark and Norway. Iceland is quite dependent on its fisheries, both with regard to employment, its share in the economy and in exports. Denmark is dependent on its exports of food products and export of fish is quite important to Norway.

Other industries are more important for Finland and Sweden and the industry is more diverse in the sense that there are many categories that have a substantial share in exports.

Looking at Europe as a whole as manufacturer of food products, it can be concluded that Iceland and Denmark are well above the average and Norway is also slightly above the average.

References

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- <http://epp.eurostat.ec.eu.int/>
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Footnotes

- 1 NACE: Nomenclature générale des activités économiques dans la Communauté Européenne -General industrial classification of economic activities of the European Union

Prospectus

Conference of the Nordic Council of Ministers, Reykjavík, Iceland,
14 – 15 October 2004

Safe and wholesome food: Nordic reflections

Organized by the Food Ministries in Iceland: Ministry for the Environment,
Ministry of Agriculture and Ministry of Fisheries

Dictionaries define the word wholesome in various ways when applied to food but all the definitions relate to positive qualities to food and the diet. For the purpose of this Conference, the term wholesome food is used for food that can be considered safe to consume over a long period of time and is a part of a varied and balanced diet.

Modern food production technology, liberation of trade, marketing and transport systems have created a truly global marketplace for food. At the same time, globalization of the food trade puts the issues of food safety and quality into a new perspective. It appears from many sources that many food-borne diseases have been on the increase for the past decades. New food-borne pathogens and toxic agents have emerged but at the same time detection techniques and surveillance programmes have become more sophisticated.

Regulations for food production, distribution and trade are intended to ensure safe products for the market. Food safety strategies have been changing and new approaches are being implemented, such as HACCP and more recently risk analysis that facilitates better identification of the food categories, processing and preservation methods posing food safety problems that are difficult to manage. Laws and regulations requiring full traceability of all food components are already in place in many countries. It has become acknowledged that even if modern food production systems normally perform well to deliver safe foods, they can never make the food completely risk free. Hence, scientific risk analysis includes risk communication in addition to risk assessment and risk management. Today, the current food safety strategy of most countries (the EU is a good example) is to take into account the whole food chain from primary production to the consumer, and to build into the regulatory structure, the

responsibility of each party, i.e. the primary producer, processor, transporter and retailer, and finally the consumer. Various terms have been coined to describe this approach including “from farm to fork” or “from stable to table”.

There are increasing requirements for extensive information to be given to consumers about food components, production methods and origin by means of food labelling so that consumers can make more informed choices. Furthermore, increased effort is put into informing consumers on how food selection and preparation can minimize health risks. It should, however, also be borne in mind that unbalanced information on risk and hazard associated with foods may alter consumers' food choices, possibly in a less healthy direction. According to the report from WHO Regional Office for Europe: Food and Health in Europe, published in 2004, nutrition patterns and nutrient composition have a far greater effect on population health than food safety while the latter has commanded the attention from the public, politicians and officials in Europe. High intake of saturated fat, lack of fruit and vegetables, and obesity rank high on the list of major contributors to the burden of disease in Europe, while chemical and bacterial contamination of food fortunately rank quite low on that list. It is therefore of major public health importance not to direct consumers' food choices away from wholesome foods by overzealous safety alarms.

A new global regulatory framework is now fast developing as part of the World Trade Organization (WTO) mechanisms. It attempts to facilitate smooth and fair trade practices by fostering transparent, science-based processes in terms of the regulatory conditions that food-importing countries can impose on their trading partners. With increased liberalization of world trade resulting in systematic lowering of import tariffs, the temptation for

countries to resort to technical trade barriers is of increasing concern.

The principles of achieving harmonization of standards and equivalency in food control systems together with the use of scientifically-based standards are embodied in two binding agreements of the WTO: the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS) and the Agreement on Technical Barriers to Trade (TBT). The SPS Agreement confirms the right of WTO member countries to apply measures that are necessary to protect human, animal and plant life and health. The purpose of the SPS Agreement is to ensure that measures established by governments in the agricultural sector (including fisheries) are consistent with obligations and are not disguised restrictions on international trade. It requires WTO members to base their national measures on international standards, guidelines and other recommendations adopted by the Codex Alimentarius Commission (CAC) where they exist. The SPS Agreement requires SPS measures to be based on an assessment of the risks to humans, animal and plant life using internationally accepted risk assessment techniques.

National authorities responsible for food safety and animal health have the responsibility to decide on the appropriate level of protection that is required in the SPS Agreement. The Nordic countries have a long-standing tradition of high standards of animal health and food safety, for example regarding salmonella bacteria in livestock and foods. Therefore, it is important for the producers of agricultural products as well as consumers in the Nordic countries that this high standard is not compromised by the increase in world food trade and not the least, trade in live animals.

Food safety is high on the political agenda in the Nordic region as well as in the EU and globally for that matter. In June 2000 a cross-sectoral conference was held on food safety in Copenhagen. On this occasion, a significant Ministerial Declaration was adopted. It clearly stated how the Nordic countries intended to contribute towards the realization of the EU White Paper (2000) on food safety.

Among other things, the Nordic Ministers agreed:

- That antibiotic growth promoters must not be present in animal feeds;
- That diseases which are transmitted from animals to human beings (such as salmonella) are to be combated in such a manner as entails no risk of lowering the level of protection in the Nordic countries;

- That genetically modified foods should be subjected to very stringent risk assessment;
- That consumer interests should be in focus.

Several of these objectives go beyond the current EU requirements.

Furthermore, in 2002 a Ministerial Declaration on Food Safety in the Nordic countries was issued, the so-called Greenland Declaration stating that:

The Nordic countries should be a driving force in ensuring safe food of high quality through sustainable production by influencing international negotiations and agreements on food safety as well as by strengthening consumer influence in the area of food safety and wholesomeness.

Together with the Nordic strategy on sustainable development this declaration now forms a basis to the extensive and fruitful cooperation on food safety in the Nordic countries.

It should be noted that the influence of consumers on food safety policies are acknowledged as noted in the above Ministerial Declaration. Today it is common that consumer policies include the promotion of legislation, institutions and information that improve quality of life, ensuring that basic human rights are recognized as well as understanding of people's rights and responsibilities as consumers.

The Conference Aims

The conference is intended to give a broad view of new challenges in food safety and wholesomeness in an increasingly globalized market and to analyse some aspects of these challenges. It will review recent and near-future key developments in ensuring that food supply in the Nordic countries is safe and wholesome. In particular, the Conference is intended for the participation of food policy makers, representatives of the food industry food regulatory authorities as well as consumer organizations. Given the wide scope of the Conference, a whole day will be devoted to structured discussions. These will be about future directions and policies relating to the key themes of the Conference such as wholesome and safe food with full traceability. The salient points from that discussion will be included in the Conference Proceedings. The Conference will help shape future Nordic food strategies and thus be a contribution to the international debate. It is a forum to exchange views on how best to deal with current and future challenges and to delineate desirable future developments.

Participation

The target audience for the Conference includes food policy makers in the Nordic countries, food industry specialists, scientists engaged in research on food safety and nutrition, food regulators, public health workers, consumer representatives and other interested NGOs.

Organizational Structure of the Conference.

The Conference is convened by Iceland on behalf of the Nordic Council of Ministers. It is guided by the three Nordic Committees (Standing Committees for Food, Agriculture/Forestry and Fisheries) whose designated representatives form part of the Steering Committee. The Conference will be conducted in English and all material will be distributed in the English language. Proceedings of the Conference will be produced and will include summaries from all discussions taking place. The Conference will be conducted in two parts each spanning one day. The first day comprises formal presentations by Representatives of major stakeholders, including international organizations. The second day of the Conference is devoted to a Discussion Forum.

The Steering Committee has the overall responsibility for the necessary coordination, smooth preparation, running and follow-up to the Conference. The Committee members are:

Mr. Ingimar Sigurdsson,
Ministry for the Environment, Iceland (Chair)

Ms. Sigríður Stefánsdóttir,
Ministry for the Environment, Iceland

Mr. Kristinn Hugason,
Ministry of Fisheries, Iceland

Mr. Hákon Sigurgrímsson,
Ministry of Agriculture, Iceland

Mr. Knud Østergaard, Danish Veterinary
and Food Administration, Denmark,

Ms. Kari Bryhni, Norwegian Food Safety Authority,
Norway,

Dr. Stuart Slorach, National Food Administration,
Sweden

Dr. Grímur Valdimarsson, Fishery Industries
Division, Food and Agriculture Organization (FAO)
of the United Nations, Rome.

The Steering Committee sought collaboration with the Food and Agriculture Organization of the United Nations to have Dr. Grímur Valdimarsson, Director of its Fishery Industries Division to act as Chairman of the Conference. He has an overall coordination role in the preparation and conduct of the conference. The Executive Director of the Conference is Ms. Sigríður Stefánsdóttir, Head of the Food Division, and Ministry for the Environment. The Executive Director works in close collaboration with the Chairman and is responsible for executing the decisions of the Steering Committee.

Dr. Alda Möller has been designated the Conference Secretary, chiefly responsible for the publishing of proceedings from the Conference.

The Scientific Advisory Group advises the Steering Committee on all matters relating to the quality and contents of contributions to the Conference. It also makes proposals regarding structure and conduct of the Conference and selection of speakers. It will help in identifying persons from the Nordic Countries who are well suited to lead discussions on the three suggested issues: Food safety (and quality), wholesomeness, and traceability. The Committee members are:

Dr. Sjöfn Sigurgísladóttir, Director,
Icelandic Fisheries Laboratories

Dr. Laufey Steingrimsdóttir,
Division Manager, Public Health Institute of Iceland

Ms. Elín Guðmundsdóttir, Director, Office of Food,
Environment and Food Agency Iceland

Mr. Halldór Runólfsson, Chief Veterinary Officer,
Iceland

Mr. Jón Gíslason, Deputy Director, Food Safety and
Environment Unit, EFTA Surveillance Authority.

Finances

The Conference is supported by a special grant from the Nordic Council of Ministers. Responsibility for managing the Conference finances lies with the Executive Director under supervision of the Steering Committee.

CV of speakers and co-authors of papers presented on 14 Oct

Roger Aertgeerts

Education: 1973 M.Sc. Chemistry, State University Ghent, Belgium, 2004 PgD Water Management and Sustainable Development, Staffordshire University, United Kingdom. Additional training: Contract Law, George Washington University, USA

Career development:

- 1973 - 1975 Military service - research laboratories of the Belgian Navy, Brussels
- 1985 - 1980 Researcher, Université Libre de Bruxelles, Belgium
- 1980 - 1983 Associate Expert Environmental Sciences, UNESCO/ROSTSEA
- 1983 - 1985 Expert, Intergovernmental Oceanographic Commission, UNESCO
- 1985 - 1992 Project Director, Belgian Administration for Development Cooperation
- 1992 - 1999 Senior Portfolio Manager, UN Office for Project Services
- From 1999 Regional Adviser, Water and Sanitation, WHO Regional Office for Europe

Publications: Over fifty publications related to water pollution, water management and water-related policy development.

Jackie Bannister

After gaining a degree in Food Science from the University of Wales, Jackie Bannister joined the UK retailer, Marks & Spencer, as a graduate trainee. She spent her first year working in Stores before moving to London to become a founder member of the Recipe Dish Department – the pioneer of the chilled Ready Meal market in the UK.

In 1991 she joined Katsouris Fresh Foods, a small family business in West London, as Technical Manager. It was acquired by the Bakkavor Group in 2000, and now comprises 4 factories employing a total of 2400 people. In her position of Head of Technical she is responsible for the Bakkavor Quality Management System, which ensure the safety, legality and quality of products.

Jackie has practical experience of managing and surviving a Cryptosporidium outbreak, Foot & Mouth, BSE, Dioxins in Pork, Avian Flu, factory fires and floods!

She sits on a number of Industry Consultative committees including Water Quality, Food Safety/HACCP and Allergen Labelling.

Her areas of specific interest lie in factory design, and the setting up and training of suppliers in third

world economies to comply with European law and the UK retailer standards.

Daniela Battaglia

Daniela Battaglia, is currently Animal Production Officer in the Animal Production and Health Division of FAO, with main responsibilities in Feed Utilisation and Feed Safety, as well as Veterinary Public Health.

Daniela Battaglia is Italian. She is an agronomist by training and holds an MSc in Tropical Animal Production and Health from the Centre for Tropical Veterinary Medicine of the University of Edinburgh, UK. Before joining FAO in 2001, she had been working for nine years for the European Commission (Directorates-General Development, Directorates-General External Relations and the Europe-Aid Co-operation Office). During that period, Ms Battaglia had been involved in a wide range of activities mostly concerning the preparation and follow-up of co-operation programmes and projects in the fields of animal production and health; livestock and rural development, mainly in Latin America, North Africa and the Middle East.

Within FAO, Daniela Battaglia is taking care of the analysis, development and implementation of the activities of the programme of "Veterinary public health and food and feed safety". She has prepared and followed-up several projects on capacity building for surveillance and prevention of BSE and other zoonotic diseases as well as capacity building to implement good practices for the feed and the meat industry.

Roland Cormier

Roland Cormier has an M.Sc. in biology from the "Université de Moncton" in Canada with subsequent professional training in computing and information management. Spanning a period of over 25 years, he started his career in fisheries research and management followed by fish inspection with a primary focus on statistical validation of inspection systems and mollusk biotoxins. He has also implemented information technologies and information management practices designed to support fish inspection activities and the Quality Management Program (HACCP based program) in Canada. Since 2001, he has been collaborating with the Food and Agriculture Organization in the implementation of the Aquatic Food Programme.

Anthony Cox

Anthony Cox is currently the Senior Analyst in the Fisheries Division of the OECD based in Paris. Since joining the OECD in 2000, he has undertaken analysis on a range of fisheries management and policy issues, particularly in the areas of fisheries management costs and fisheries subsidies. Prior to joining the OECD, Mr Cox was a Senior Economist in the Australian Bureau of Agricultural and Resource Economics where he was responsible for the fisheries economics research program. The focus of much of this research was on sustainability and trade issues, including analysis of the economic issues relating to quarantine regulations on fisheries products and the use of international environmental instruments in fisheries management. Mr Cox has a Bachelor of Economics and a Master of Economics from the Australian National University and was also a Research Fellow at the East-West Center in Hawaii in 1991-92.

Jón Gíslason

Jón Gíslason is currently Deputy Director of the Internal Market Affairs Directorate of the EFTA Surveillance Authority in Brussels, with main responsibility for the Food Safety and Environment Unit of the Authority. The role of the Authority is to ensure the fulfillment by the EFTA States of their obligations under the Agreement between the EU and EFTA States on the European Economic Area. This includes control of the implementation of EC food safety legislation in the EFTA States and inspections in these States in the field of food safety (food, feed and veterinary issues). Mr Gíslason is on leave from the Environmental and Food Agency of Iceland where he worked from 1984 and as the Director of the Office of Food from 1993 to 2000. He has been chairman of the Icelandic Food Council and Icelandic committees on Food Additives and Foodborne Diseases and has participated in several Nordic working groups on food safety issues.

Jón Gíslason is educated at the University of Oslo where he received a degree in biology and chemistry (Cand. mag.), in nutrition physiology, and in human nutrition (Cand. real.), which included three years research work at the Institute for food hygiene at the Veterinary College in Norway. He has given lectures in nutrition and food safety at the University of Iceland and worked on nutrition education for athletics.

Unni Kjaernes

Unni Kjaernes is Senior researcher, the National Institute for Consumer Research (SIFO); Oslo, Norway. She has a cand.real degree with a major in nutrition from the University of Oslo, where she also worked as a research fellow until she came

to SIFO in 1987. She is now the coordinator of the TRUSTINFOOD project funded by the European Commission and is also a partner in several other EU funded projects. Earlier projects include studies of nutrition policies in the Nordic countries, a large comparative survey of eating patterns in the Nordic countries, Norwegian studies of attitudes towards meat and consumer trust in food. She has a large number of publications within the field of food consumption, consumer concerns and food policy, including a series of articles, reports and books in Norwegian and articles in English. Larger publications in English include, with L. Holm, M. Ekström, E. Fürst, and R. Prättälä (eds.), *Regulating markets, regulating people*. On food and nutrition policy (Novus Forlag, Oslo 1993); the editor of *Eating patterns. A day in the lives of Nordic peoples*. (Report No 7. The National Institute for Consumer Research, Oslo, 2001); and with C. Poppe, *Trust in Food in Europe. A Comparative Analysis* (Professional Report No.5, The National Institute for Consumer Research, Oslo, 2003). More information can be found on www.sifo.no.

Geoffrey Podger

Geoffrey Podger took up office as the first Executive Director of the European Food Safety Authority (EFSA) on 1st February 2003. He was appointed following an open competition throughout the European Union. Mr. Podger was previously Chief Executive of the UK Food Standards Agency which was established in April 2000 to bring about increased transparency and consumer involvement in food safety and related matters.

Geoffrey Podger has been a UK civil servant since graduating from Oxford University in 1974. He has been mainly concerned with public health matters and has worked extensively for the Department of Health in London. He became a Companion of the Order of the Bath (a British decoration for public services) in January 2003.

Barbara O. Schneeman

Barbara Schneeman is currently Director of the Office of Nutritional Products, Labeling, and Dietary Supplements in the Center for Food Safety and Applied Nutrition at the Food and Drug Administration (FDA) of the United States. Prior to FDA she was faculty member at the University of California, Davis, 1976-2004. At UC Davis she was a member of the departments of Nutrition, Food Science and Technology, and Internal Medicine. She served as chair of the Department of Nutrition and for 6 years was Dean of the College of Agricultural and Environmental Sciences. Dr. Schneeman was a visiting scientist at the Cardiovascular Research Institute, University of California, San Francisco

and has served as Assistant Administrator for Nutrition in the Agricultural Research Service of the U.S. Department of Agriculture.

Barbara Schneeman received her Bachelor of Science degree from the University of California, Davis, her Ph.D. in nutrition from the University of California, Berkeley and postdoctoral training in gastro-intestinal physiology at Children's Hospital in Oakland.

Dr. Schneeman's professional activities include membership on the 1990 and 1995 Dietary Guidelines Committee as well as serving as a consultant for FAO on food-based dietary guidelines. She has been a member of the Food and Nutrition Board of the Institute of Medicine-National Academies of Science and chaired committees for IOM on nutritional issues for women in the military and the development of a safety framework for dietary supplement ingredients. She has served on the California State Board of Food and Agriculture, the USDA Research, Extension and Education Advisory Board and on committees for FAO, WHO, the American Society for Nutritional Sciences, and the Institute of Food Technologists. Editorial activities include Associate Editor for the Journal of Nutrition and on the editorial boards for Proceedings of the Society of Experimental Biology and Medicine, Food and Nutrition Series of Academic Press, Nutrition Reviews, Journal of Nutrition, and California Agriculture.

Professional honors for Dr. Schneeman include Fellow of the American Association for the Advancement of Science, Carl Fellers Award from the Institute of Food Technology, the FDA Commissioner's Special Citation and the Harvey W. Wiley Medal, the Samuel Cate Prescott award for research, the Future Leader Award, and several honorary lectureships. She currently has over 120 publications and is recognized for her research contributions in the areas of gastrointestinal function, dietary fiber, lipid metabolism and food-based dietary guidelines.

Christina Schröder

Cristina Schröder was born and raised in Sweden and received her Jur. Kand. (Master of Law) from the University of Stockholm in 1969. In 1969-1973 she pursued Ph.D. studies (international law, international relations, international economics) at the International Institute for Graduate Studies in Geneva.

In 1972-1994 she was International Civil Servant at GATT, Geneva (Development Division, and later Agriculture and Commodities Division) and from 1995 to present time she has been International

Civil Servant at the World Trade Organization (WTO) in Geneva, where she serves as Counsellor, Agriculture and Commodities Division with responsibility for commodities.

Christina Tirado

Dr. Cristina Tirado is the WHO Food Safety Regional Advisor in Europe, responsible for the provision of support to the Member States on the development/strengthening Food Safety Strategies and Policies, and Surveillance and Monitoring Programmes.

She holds a doctorate in Veterinarian Medicine specialized in food science, food technology and food sanitation with a MSc/PhD on Environmental Sciences and Aquaculture from Cornell University. Before arriving to Rome she was assistant coordinator of the WHO Surveillance Programme for Control of Foodborne diseases in Europe at the Federal Institute for Consumers Protection and Veterinary Medicine in Berlin.

Previously Dr Tirado has worked on food safety and on environmental health issues for several private, governmental and non-governmental organizations and international organizations such as FAO.

Per Unckel

1968 - 71	University studies in law at Uppsala University
1971 - 76	National Chairman of the Swedish Young Moderates
1976 - 86	Member of Parliament
1978 - 82	Party spokesman on energy questions
1980	National campaign leader on the 1980 referendum on nuclear power
1982 - 86	Party Spokesman on education and science
1986 - 91	Secretary General of the Moderate Party
1991 - 94	Minister of Education and Science
1994 - 02	Member of Parliament
1994 - 98	Party Spokesman on labour policy questions
1995 - 02	Chairman of the EPP/EDU Standing Committee on Economic and Social Affairs
1997 - 01	Chairman of the Sweden in Europe Foundation
1998 - 02	Chairman of Parliamentary Standing Committee on the Constitution. Party Spokesman on Constitutional questions
1999 - 02	Parliamentary group leader of the Moderate Party
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Modern food production technology, marketing and transport systems, together with liberation of trade are creating a truly global marketplace for food, but at the same time put the issues of food safety and quality into a new perspective. It is acknowledged that even though food production systems normally perform well to deliver safe foods they can never make food completely free of risk. The current food safety strategy of many countries is to take into account the whole food chain from primary production to the consumer and to build the responsibility of each party into the regulatory structure.

The conference on Safe and wholesome food (Reykjavik, Oct. 2004) gave an overview for food safety issues in the entire food chain. Experts from WHO, FAO, WTO and the US FDA focused on a variety of issues, ranging from animal health to functional foods, while a food technologist from a large manufacturer of fresh prepared foods discussed the complex task of satisfying the requirements of the law, the consumer and the customer. The consumer voice was also heard from a study of consumer trust in food in a number of European countries.

The new and revised food and feed legislation of the European Union defines the responsibilities and requirements that business operators have to fulfill. Two presentations focused on different aspects and significance of this new legislation.

Traceability of a product unit through all stages of production and distribution has become a management tool which may be utilized in the food chain for the purposes of safety and quality, marketing and cost savings, and as a tool to improve resource utilization. An expert from the OECD discussed these possibilities, while another expert from the Canadian Food Inspection Agency discussed the need for knowledge networks as a means of keeping abreast of emerging food safety and quality issues.

In an open discussion forum the conference dealt with questions about openness of information on food safety issues, and more particularly how this information should be presented to consumers. It also discussed ways for the food industry and authorities to manage food safety issues in the media. Food labelling, especially as it relates to food intolerance and allergic reactions, was also debated and finally the conference discussed various aspects of ethical farming.

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