



Food and its impact on the risk landscape

Emerging Risk Initiative – Position Paper

November 2013



CRO FORUM

CRO FORUM

The CRO Forum's Emerging Risk Initiative

The Emerging Risk Initiative (ERI) was launched in 2005 to raise awareness of major emerging risks relevant to society and the (re)insurance industry. In 2013 the initiative was chaired by Neil Smith (Lloyd's) and consisted of 9 members representing AIG, Allianz, AXA, Hannover Re, Lloyd's, Munich Re, RSA, Swiss Re and Zurich Insurance Group.

This initiative pursues the following goals:

- Raising awareness and promoting stakeholder dialogue.
- Developing best practice solutions.
- Standardising disclosure and sharing knowledge of key emerging risks.



Table of Contents

1.	Executive summary	2
2.	Introduction	3
3.	Agricultural risk and food supply	5
4.	Supply chain and business interruption	10
5.	Food product recall and liability	15
6.	Environmental risk	22
7.	Political risk and terrorism	27
8.	Conclusions and recommendations	30
	References	31

Authors:

Hélène Abreu and Sara Albert (AXA)

Sandra Gonzalez and Neil Smith (Lloyd's)

Prof. Dr. Ina Ebert, Alexa Mayer-Bosse and Dr. Gerhard Schmid (Munich Re)

Dr. Sandra Burmeier and Dr. Reto Schneider (Swiss Re)

Dr. Florian Hiller and Matthias Scheurer (Zurich)

We would also like to thank all CRO Forum Emerging Risk Initiative member companies for their inputs and comments as well as Professor Michael Winter (University of Exeter) for his expert review.

1. Executive summary

Food risks will become one of the most significant threats facing our society. Food risk relates to both food insecurity and issues around food safety. Food security is built on four pillars: availability, stability, access and use; and food safety refers to the conditions and practices that preserve the quality of food to prevent contamination and foodborne illnesses.

There are many risks associated with food security and food safety which could have serious ramifications for society and our global economy. Unsafe food can cause severe and life-long diseases, while a drop in food production will affect growers, manufacturers, retailers, food-service providers and ultimately local communities and individuals. Insurers will bear some of the risks triggered by food insecurity and unsafe food.

To feed a population of 9 billion by 2050, food production will have to increase by 70%¹, putting our agricultural systems under serious pressure. Food production faces many challenges, such as extreme weather events, price volatility and natural resource constraints, which could lead to unexpected large losses. Agricultural insurance can help manage agricultural risks, stabilise farm income, aid investment in infrastructure and facilitate access to credit. Improving food security also involves how well and wisely we use this precious resource. Discussions about changing diets and minimising waste are vital.

The exposure of food supply chains to the risk of business interruption is on the rise, as business models revolve around an increasing number of suppliers and food companies have adopted a “just-in-time” production approach. Due to an increasing trend for potential failures in the supply chain, how prepared food companies are is key in terms of risk management and highlights the need for an efficient business continuity plan in particular. In parallel, the demand for business interruption coverage and contingent business interruption insurance is expected to increase.

Food product recall and liability are affected by food contamination risk as well as increasing customer awareness and tighter regulation around food. Liability claims are anticipated to become more frequent in the future, at least in highly industrialised countries, due to several factors, including rising obesity and diabetes and increased public awareness of the link between food and health. Recall insurance, as part of enterprise risk solutions, can help show a company’s responsibility, generate confidence among the public and help manage crises.

As population growth continues, food supply will have to be secured from limited natural resources, driving the optimisation of crop yields. This has led to increasing environmental exposure to potentially hazardous man-made substances, such as pesticides and veterinary pharmaceuticals.

Global political instability coupled with government intervention has been a factor in making businesses more vulnerable to food risk and has also increased insurers’ exposure to this risk. Insurers should stay alert to their exposures to political risk and potential food crises, as insured losses could spiral out of control when both issues are combined.

Food risks will require a multi-stakeholder solution with risk management playing a key role in promoting risk mitigation. Insurance companies already offer many solutions which help mitigate food risk, such as crop insurance and product recall, and can play a key role in helping businesses and society address this growing risk.

2. Introduction

The issue of food has been high on the political agenda, and while governments are trying to solve this problem, insurers need to better understand what this risk entails for the industry. The issues of food security and food safety have been examined, and continue to be, in some detail; however, the implications of food risk for the insurance industry have been less well-studied. Food risk represents a challenge for insurers whether directly or indirectly involved with insuring the food industry. This report aims to look at the implications of food for the industry and to examine how different types of cover are impacted and what role insurance could play in managing food-related risks. The report will analyse different lines of business, including agriculture and food supply, supply chain and business interruption, food product recall and liability, environmental risk, and political risks and terrorism. It will examine how these lines are impacted by a variety of risks ranging from regulation to extreme weather events.

What does food risk entail?

Food risk includes both food security and food safety. "Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" as defined by the 1996 World Food Summit². Food security is built on four pillars: food availability, stability, access and use. For food security to be achieved, all four objectives must be fulfilled simultaneously.

The average person needs 2,300 calories per day to live a healthy and active life³. Among wealthy nations, there is enough food for each person to eat 1,100 calories above that benchmark; in low-income countries, national food supplies fall, on average, 100 calories short of the 2,300 benchmark⁴. Food insecurity has always been an issue; however, it is becoming increasingly salient. It was described as one of the largest risks to society in the next ten years by the World Economic Forum's Global Risks Report 2012⁵. Global population growth coupled with urbanisation, climate change, water scarcity and resource competition are posing a real threat to global food security.

Food safety, the other dimension of food risk, refers to the conditions and practices that preserve the quality of food to prevent contamination and foodborne illnesses. Unsafe food causes many severe and life-long diseases, ranging from diarrhoeal diseases to organ damage. Serious outbreaks of foodborne disease, such as the 2011 e-coli outbreak in Germany, have been documented on every continent in the past decade, and in many countries the numbers of illnesses are increasing significantly. Foodborne diseases and threats to food safety constitute a growing public health problem which has become a top priority for governments as illustrated by the 2011 US Food Safety Modernisation Act (FSMA), 'the most sweeping reform of US food safety laws in more than 70 years'⁶. The World Health Organisation (WHO) estimates that foodborne and waterborne diarrhoeal diseases taken together kill about 2.2 million people annually, 1.9 million of them children⁷. Climate change is contributing towards unsafe food as bacteria appear to grow better in warmer and moister environments, while globalisation and more complex supply chains increase the risk of food contamination.

The impact of food risk on society and businesses

The impact of food insecurity and unsafe food can be felt across society and affects businesses as well as the insurance industry. It is crucial that this issue and the risk it presents are properly understood and managed. A drop in food production or unsafe food will affect individuals, communities, growers, manufacturers, distributors, retailers and food-service providers, with the consequences of one incident potentially being felt across the supply chain. This was illustrated by the 2012 horsemeat scandal, which involved both food service providers and food manufacturers, leading to public health concerns as well as serious financial losses and reputational damage for

the companies involved. For example, in June 2013 a UK food retailer experienced a worse-than-expected dip in its UK sales as a result of the horsemeat scandal, and in China its sales plummeted 5% partly because of the bird flu crisis⁸.

Food risk also has regulatory and legal implications for businesses, especially with food safety becoming the subject of many high profile media cases, such as the 2011 e-coli outbreak and avian influenza, and consequently the target of tighter regulations. The European Commission is currently examining the possibility of further developing regulations around the food chain⁹ and in 2011 the US passed the FSMA, as mentioned above. Businesses should stay alert to regulatory changes and developments in food-related litigations, or else they may suffer serious financial losses and reputational issues for non-compliance. Issues around diet-related diseases, such as diabetes and obesity, have also emerged as the focus of many liability claims.

Food can also present societal and geopolitical risks. At a national level, food security presents a challenge for governments. Should governments fail to rapidly address this issue, food risk could lead to instability, protests and political unrest. When food prices were at record highs in 2008¹⁰, riots broke out in a number of countries, including Burkina Faso, Cameroon, Cote d'Ivoire, Egypt and Bangladesh. The threat of agroterrorism, the intentional contamination of food, is another risk businesses should be aware of. There are numerous examples of agroterrorism reported from Kenya to Israel, which include the sabotage of open field crops and water pipes, the contamination of condiments in restaurants, or the destruction of food reserves.



3. Agricultural risk and food supply

Food security is a pressing issue and many of its solutions depend on developing agricultural sector productivity. To feed a predicted global population of 9 billion by 2050, food production will have to increase by 70%¹¹, putting our agricultural systems under serious pressure. Annual cereal production will need to rise from 2.1 billion tonnes today to 3 billion tonnes and annual meat production will have to increase from 200 million tonnes to 470 million tonnes. Meeting this challenge will require significant increases in investment, innovation and collaboration among stakeholders, such as farmers, suppliers, governments and insurers. Enabling food security also involves how well and wisely we use this precious resource. Therefore discussion around changing diets and minimising waste is also required. The insurance industry has a key role to play in providing risk solutions for agriculture and in helping to make food supply more secure and accessible for generations to come.

3. A The emerging risks

While striving to meet the increasing demand for food, agricultural producers face risks from various fields such as production, operations, finance, technology and infrastructure. All of these areas of risk are interrelated and include many emerging risks.

The number of extreme weather events, such as windstorms and floods, has tripled since 1980, and the trend is expected to continue¹². Rising frequency and severity of weather events, driven by climate change, has led to further instability in agricultural production. Flooding is detrimental to crop harvesting and livestock; it can cause soil compaction, soil erosion, oxygen depletion, disease, and nitrogen loss in plants, and can also negatively affect livestock by destroying animal housing. Droughts, in turn, directly impact food production by reducing crop yields. Cyclones, such as hurricanes and tornadoes, can also cause significant damage to agricultural infrastructure, crops and livestock.

Financial risks have increased significantly for agricultural producers due to price volatility in input and output material triggered by supply and demand in both local and global marketplaces. International prices for maize, for instance, dropped 26% in 2009, but then rose again by 12% in 2010 and 57% in 2011¹³. Similarly volatile price patterns have been observed in other basic food ingredients. High energy and oil prices are predicted to affect agricultural products through higher agricultural supply costs (e.g. for fertiliser or machinery) on the one hand and increased demand for agricultural feedstocks used for biofuel production (e.g. maize, wheat, sugar and oilseeds) on the other hand¹⁴.



Natural resource constraints, such as competition for limited water resources between agriculture and other users, and land competition between the production of foodstuffs and non-food crops, such as biofuel, represent additional problems for the agriculture industry. Outbreaks of transboundary animal diseases, such as African Swine Fever or Rift Valley Fever¹⁵, or plant pathogens, such as the wheat stem rust Ug99¹⁶, could further threaten agricultural production, widening the gap between food supply and food demand.

All of these issues have come together to create a more challenging situation for food production. The complexity of the agricultural risk landscape requires a holistic risk management strategy that spans the entire risk spectrum and its interconnectivity.

3. B Insurance

Generally, agricultural risks can be financed with farmers' self-retention, private financial markets, governments and international donors through an appropriate layering of risks¹⁷. The bottom layer includes high frequency, but low consequence, risks which should be retained by the farmers/producers and financed by individual savings or credits. The middle layer includes less frequent, but more severe risks which simultaneously affect many farmers and producers. These can be covered by the insurance industry. The top layer includes low frequency, but high severity risks such as major droughts or floods, which may be transferred to reinsurance markets or backed by governments.

Insurance is a crucial element of agricultural risk management as it can catalyse investment, by acting as collateral for credit or by providing incentives for farm investment due to greater financial security. As such, it can support stability of agricultural production and ultimately also food supply¹⁸.

Agricultural insurance has a long history in the established markets of the US and Europe and has become increasingly prominent in emerging markets too. According to a study by the World Bank, agricultural insurance is currently available in more than 100 countries¹⁹. The structure of programmes differs from country to country and they are primarily driven by socio-economic developments, agricultural practices, infrastructure, and government policies. It includes crop insurance, which constitutes the majority of premiums, as well as insurance of livestock, bloodstock, aquaculture, forestry and greenhouses. Products range from damage-based and yield-based products, which constitute the bulk of premiums, to innovative solutions such as weather-based products (see Box 1).

In addition to providing risk protection for farmers and producers, re/insurers can also contribute to agricultural risk management solutions for governments, communities, cooperatives or large public and private institutions, for example by entering into public-private partnerships (see Box 2) or by setting up micro-insurance schemes (see Box 3).



Box 1: Insurance solutions

1. Crop insurance products

1.1 Damage-based crop insurance products

Named-peril crop insurance covers single perils, such as hail, fire, storm or frost. The sum insured is either based on the value of agricultural inputs, such as seeds and fertiliser, or based on total expected yield. The loss caused by the insured peril is indemnified as a percentage of the sum insured.

1.2 Yield-based crop insurance products

Multi-peril crop insurance (MPCI) covers multiple peril events, such as drought or flooding that can cause widespread losses. The sum insured is based on the value of crops insured, and the pay-out is the yield shortfall below a pre-agreed threshold, multiplied by a pre-agreed price.

An extension of MPCI covers are revenue covers, which are based on yield assessment and crop prices. They pay out when the actual revenue falls short of an expected revenue due to lower yields and/or crop prices.

Area-yield insurance bases pay-out on the shortfall in realised yield of an area relative to its average historical yield. The area can be defined as a group of villages or districts that are homogeneous in crop production and yield. The coverage is based on a guaranteed yield for the insured area, normally in the range of 50-90% of the expected yield.

1.3 Index-based crop insurance products

Index-based agricultural insurance products are becoming increasingly popular as they offer fast, effective and efficient claims settlement processes and are relatively easy to administer. However, the feasibility is dependent on the availability of reliable data and the correlation between index and modelled natural exposure.

Weather-based crop insurance products are modelled using an index of parameters such as rainfall or temperature, which are closely correlated with yield. The insurance pay-out is often defined as a fixed amount which is a function of the deviation of the actual weather parameter from the one that was previously agreed.

Remote-sensing crop insurance products are structured as an index based on satellite observations of plant health or energy absorption, which are correlated with crop yields. The products are designed similarly to weather insurance products.

2. Other types of agricultural insurance products

Livestock insurance covers cattle, swine and poultry against mortality from non-epidemic diseases, fire, natural perils and accidents. Additionally, there is cover for clean-up costs and business interruption.

Bloodstock insurance covers leisure, breeding and race horses against mortality due to accident or disease.

Aquaculture insurance provides coverage for on- and off-shore fish and other types of aquatic farm against losses from natural perils, diseases, algae bloom or predators.

Forestry insurance compensates the owners of commercial plantations against fire and storm losses, with claims payments based on pre-agreed timber values. The costs of fire-fighting and re-establishing the forestry areas can also be included.

Greenhouse insurance provides greenhouse structures with coverage against natural perils, plants against frost and debris from damaged greenhouse structures, equipment against machinery breakdown or fire, as well as certain aspects of business interruption.

In 2011, agricultural insurance premiums worldwide amounted to an estimated \$23.5 billion, with an average annual growth rate of around 20% between 2005 and 2011²⁰. In emerging markets, agricultural insurance premiums more than quadrupled during the same period, and the share of emerging market premiums in total premiums reached 22% in 2011. China and India were the key growth drivers, accounting for 62% of agricultural insurance premiums from emerging markets by 2011. Nonetheless, the global agricultural insurance market remains arguably underdeveloped due to several factors, including high transaction and delivery costs for traditional products in remote rural areas or governmental programmes which may encourage inappropriate use of subsidies which may deter private companies. This underdevelopment is especially pronounced in emerging markets for which agricultural insurance penetration was estimated at a mere 0.2% in 2011. There is therefore significant potential for growth in these markets.

Insuring agriculture has always been and will remain a relatively risky business. Considering the emerging risks outlined above, agricultural insurance is likely to face rising claims going forward. Insurers could, for instance, be confronted with large unexpected losses due to climate change, which might exceed what is currently reflected in the industry's models. Furthermore, high volatility of commodity prices may lead to a more pronounced commodity exposure and to a pricing risk for revenue-based products. Overall, solid underwriting will be critical to ensure that agricultural insurance can further contribute to improving food security.

Box 2: Rice insurance scheme in Vietnam²¹

Vietnam relies heavily on its agricultural sector which secures the livelihoods of more than half of the country's 86 million people. It is highly exposed to natural disasters such as typhoons, flooding and drought and is expected to be strongly affected by climate change. Economic losses resulting from natural disasters already reach up to 5% of GDP in bad years.

Providing effective insurance against crop failure and establishing a safety net for farmers is therefore a priority for Vietnam. In 2011, the Government commissioned a three-year pilot scheme to establish insurance products for rice, livestock and aquaculture, involving the two largest national insurance companies as well as a Vietnamese reinsurer. A reinsurance company has provided advisory services as well as technical support for pricing and loss calculation and acts as the lead reinsurer behind the Vietnamese reinsurer.

Under the pilot scheme, rice production is insured in seven provinces through a yield index insurance product. This pays out automatically to all farmers in an affected area if the rice yield is below the five-year average at commune level and per season. Livestock and aquaculture production are also insured in some communes. For low-income farmers, insurance products are subsidised by up to 100%.

The transaction was the first of its kind in Southeast Asia. Other agriculture-producing countries in the region could benefit from similar approaches as population growth, limited arable land, stagnating yields and climate change continue to widen the gap between food demand and food supply.

Box 3: HARITA project in Ethiopia²²

Around 85% of all Ethiopians depend on farming for their livelihoods, but drought regularly threatens harvests and incomes. Previous approaches to providing drought insurance to the poorest have arguably not been effective due to high administrative costs and the inability of cash-poor smallholders to afford premiums. In 2008, the Horn of Africa Risk Transfer for Adaptation (HARITA) project was launched as a joint initiative to protect Ethiopia's rural poor against rising drought risks.

This innovative weather-index insurance project gives poor farmers the option to work for their insurance premiums by engaging in community-identified projects to reduce risk and build climate resilience (e.g. by improving irrigation or soil management). In the event of a seasonal drought, insurance pay-outs are triggered automatically when rainfall drops below a pre-determined threshold, enabling farmers to afford the seeds and inputs necessary to plant in the following season and protecting them from having to sell off productive assets to survive. In partnership with local microfinance institutions, the model allows farmers the option to bundle insurance with credit and savings.

In its first three years of delivery in Ethiopia, HARITA has shown promising results for future schemes. The project has scaled from two hundred enrolled households in one village in 2009 to over 13,000 enrolled households in 43 villages in 2011, directly affecting approximately 75,000 people.

4. Supply chain and business interruption

4. A The emerging risks

Within the food industry, supply chain resilience is absolutely critical; significant disruption can lead to heavy financial losses and reputational damage for the companies involved. Today's business environment increases the risk of failure as complexity and globalisation make supply chains more vulnerable. This is reinforced by regulatory requirements which are increasingly restrictive.

The delivery of food does not only depend on agricultural production. Many other companies are involved from the manufacturers of fertilisers and seeds to food manufacturers and distributors. In addition, the food processing industry and retail networks, such as supermarkets and restaurants, are essential components in the stability of the food supply chain.



Throughout the world, major shifts in dietary patterns have occurred in the past 50 years. On the demand side, an increasingly urbanised population has changed its preferences toward a higher energy diet with a growing global demand for livestock products. The growing consumption of meat products has led to an increase in livestock production and global trade in recent years. As shown in Box 4, global exports of meat products have increased by 7 times in 40 years, and by more than 4 times for eggs and milk. Poultry meat, in particular, shows the largest increase with a rise of more than 30 times. The food supply chain has been developing in response to urbanisation and changes in dietary patterns and there has been a significant increase in global food trade.

Box 4: Changes in global trade of livestock products from 1967 to 2007²³

ITEM	EXPORT (million tonnes)		
	1967	2007	Ratio (2007/1967)
Beef and buffalo meat	2.41	9.46	3.9
Pig meat	1.48	11.3	7.5
Poultry meat	0.39	12.6	32.3
Sheep and goat meat	0.58	1.04	1.8
Total meat	4.86	34.23	7.0
Eggs	0.33	1.44	4.4
Milk	18.84	93.19	4.9

In parallel, consumers now require higher levels of food safety, quality, and greater traceability. Traceability ensures better identification of the source of problems and therefore can help enable better management of reputational risks for the food industry.

The interconnection between agricultural producers, food processing industries and consumers is becoming increasingly complex due to the globalisation of production, manufacturing and supply processes. With the aim of reducing costs, food processing industries have sought to optimise their supply chain through a rising use of outsourcing and through the development of lean manufacturing processes. In addition, technological improvements in manufacturing and transport processes (including storage and cold chain) have allowed industries to source from overseas suppliers. As a consequence of this longer and more complex supply chain, risks of contamination and degradation of food products have increased.

Regulatory risks

Regulatory risks arise from policy changes at national or global level and will often affect businesses' decisions. A government may impose a product ban which would limit imports and the production of the exporter country. For example, in 1996, international meat markets were affected by the outbreak of BSEⁱ. In response to this outbreak and the risks involved, the European Union (EU) decided to ban exports of British beef. The consequences of this European embargo were heavily felt by British exporters as European countries represented a major part of UK beef exports. This ban resulted in a crisis for the British beef industry with a drop in beef exports and the temporarily closure of slaughterhouses, while livestock farmers and slaughterhouses had to deal with excess beef stocks. Governments can also introduce legislative changes which can influence farmers'

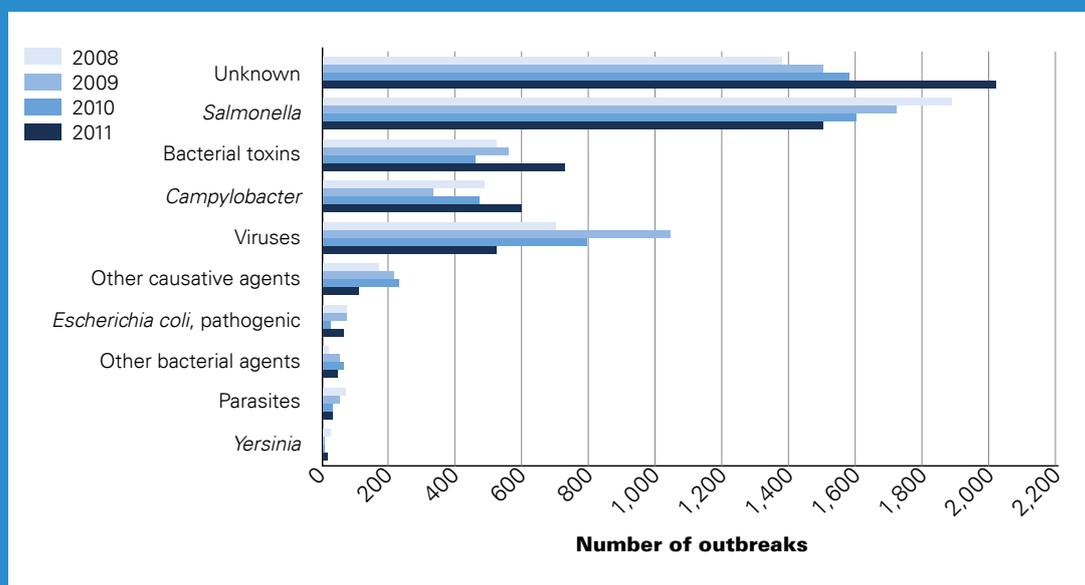
ⁱ Bovine Spongiform Encephalopathy (BSE) is a fatal disease of the central nervous system of cattle, first identified in the United Kingdom in 1986. In 1996, the UK Spongiform Encephalopathy Advisory Committee (SEAC) announced the discovery of a new variant of Creutzfeldt-Jacob Disease (vCJD), a fatal disease of the central nervous system in humans, which might be linked to consumption of beef affected by exposure to BSE.

production. The Common Agricultural Policy (CAP) is a good example of regulatory policy leading to drastic changes in production choices. The CAP was developed to protect and support the agriculture of the member states through providing financial support to farmers. A change in such measures can impact farmers' production and therefore affect the food supply chain. For example, the CAP had some influence on the development of the olive sector: up to 2004, the support of the CAP in this sector was based on production which partly led to greater agriculture intensification and resulted in an increase in planting density and reduced the number of varieties²⁴. Since 2004, the definition of this policy has been changed in order to reduce these side-effects.

Production and operational risks

Weather events can again affect and disrupt the food supply chain as damage due to floods, windstorm, and hail can negatively impact yields, and in extreme cases farmers may lose all their crops. Weather may also cause damage to facilities which in turn may cause further disruption of the supply chain. Other significant risks include crop and livestock diseases and contamination of food products. Food can be contaminated by microorganisms or toxic substances, such as chemical agents, pesticides and heavy metals, during production, manufacturing and storage. For example, meat may be contaminated during slaughter due to poor hygiene techniques. Spoiled food products can also potentially lead to a production loss, loss of consumer confidence and reputational issues. Agroterrorism is another risk that could affect the food supply chain leading to potential financial losses and may harm the reputation of a brand (See section 7 for more details).

Box 5: Distribution of all food-borne outbreaks per causative agent in the EU, 2008-2011²⁵



ⁱⁱ Campylobacter is one of the most common causes of diarrhoeal illness. Most cases of campylobacteriosis are associated with eating raw or undercooked poultry meat or from cross-contamination of other foods by these items. Outbreaks of Campylobacter have most often been associated with unpasteurised dairy products, contaminated water, poultry, and produce.”

Foodborne illnesses are, in general, still experiencing upwards trends in many regions. While a decrease in the number of outbreaks caused by Salmonella and viruses is observed in Europe, in contrast, the number of outbreaks caused by bacterial toxins and by Campylobacterⁱⁱ is increasing. Moreover, there is a continued increase in the number of outbreaks in which the causative agent is unknown (See Box 5).

Outbreaks of livestock epidemics can also lead to losses for the food industry and impact the food supply chain. For example, following the H7N9 bird flu outbreak in 2013, the Chinese authorities fully shut down live poultry markets. Additionally, the production side of the supply chain can be disrupted due to a manufacturing problem as well as by a drop in demand or the introduction of trade sanctions. For example, as a result of the last H7N9 outbreak, consumer confidence in poultry was significantly impacted, causing a decrease in demand. This crisis contributed to a drop in the popularity of an American fast-food company, leading to an estimated 29% drop in its sales in its restaurants in China in April and another decrease of 19% in May 2013²⁶.

Every stage of the food supply chain can face operational problems including processing failures, human error or a failure in IT systems. For example input shortages, theft, fire, or accidents can lead to food processing companies and distributors facing potential business interruption due to the unavailability of the equipment and eventually lead to a loss of revenue.

4. B Insurance

Insurers can help the food industry to understand better their supply chain, particularly their critical suppliers, and to mitigate potential risks. This is likely to improve preparedness in the event of a supply chain failure.

Among the measures that can be encouraged by insurers is developing a comprehensive business continuity plan (BCP), which can help to mitigate losses. A successful and efficient BCP should be based on a risk analysis which includes:

- an identification (e.g. critical activities, critical suppliers and weak points of the supply chain) and evaluation of the risks (e.g. potential impacts of the loss of a supplier)
- a list of measures to mitigate the risk and insure the resilience of the supply chain (e.g. diversification of suppliers; asking suppliers to keep contingency stocks)

Business Interruption and Contingent Business Interruption covers generally require physical damage, either in the insured plants (BI) or in the suppliers' plants (CBI). Therefore, financial losses resulting from a disruption in the supply chain due to non-physical damage are not covered (e.g. the consequences of the contamination of water in the food supply chain). Some insurers are developing insurance coverage for non-physical damages in order to improve supply chain resilience.

Box 6: Insurance solutions

(Re)insurers can support risk assessments of food supply chain vulnerability through the identification of key Business Interruption (BI) and Contingent Business Interruption (CBI) exposures and the estimation of potential accumulation losses:

- To protect against the risk of business interruption, a food-industry company can insure itself to indemnify the loss of profits and continuing fixed expenses resulting from damage to its own property.
- In case of interruption of the supply chain, the financial consequences of this damage can spread within the whole production chain impacting many parties. Contingent Business Interruption covers can offer a protection against a loss of income due to interruption of suppliers' activities.



5. Food product recall and liability

Once a potentially defective product has been sold or distributed to retailers and consumers, liability claims are likely to be imminent. Recalling such a product may avoid or limit harm caused by the product, thereby reducing liability claims. However, any recall of a product can lead to severe reputational issues. Many regulations have been developed to deal with this conflict of interest while protecting consumer rights as effectively as possible. Food products are especially sensitive to this issue due to the direct link between the potential defect of the product and the threat of an unforeseeable range of bodily injuries or even fatalities. Risks connected with food liability and recall are further complicated by the high level of public and media attention which are regularly triggered by these cases.

5. A The emerging risks

Liability issues

With regards to food, product liability serves mainly two purposes: to prevent or compensate for bodily injury; and to allow consumers to make informed choices with regards to eating habits and to the risks connected to the consumption of certain food products or ingredients.

Food product regulation is becoming tighter worldwide. These developments have been driven by both the general desire to protect consumers against health risks and by public outrage following food scandals, most recently the horsemeat scandal in Europe. Stricter regulation may be applied to certain food groups, including novel food or food products containing genetically modified organisms.

In the EU, strict liability for defective products is based on the Product Liability Directive, formally Council Directive 85/374/EEC. Labelling and traceability requirements for food have increased, most recently because of EU Regulation 1169/2011 on the provision of food information to consumers. Additional regulation is in place regarding food supplements (Directive 2002/46/EC) and genetically modified organisms (Directive 2001/18/EC). Food safety in the US is intensely regulated by the US Food and Drug Administration (FDA), most recently under the 2011 Food Safety Modernisation Act (FSMA). Due to the high number of obesity cases in the US²⁷, the focus of food-related regulation has somewhat shifted from food poisoning, such as Salmonella and Hepatitis A, to false advertisement, insufficient labelling and consumer fraud. Since most jurisdictions have some kind of strict liability for defective products in place, national differences between jurisdictions worldwide depend mainly on how the balance between the individual responsibility of the consumer and the responsibilities of the food producers shifts.

Up until now, the most successful liability claims were based on bodily injury caused by either the consumption of food products contaminated with hazardous substances, such as the Chinese milk contaminated with melamine, or infected animal products, including BSE. The 2008 Chinese milk scandal was triggered by the contamination of dairy products, especially infant formula, with melamine: hundreds of thousands of children throughout China were injured and several died, triggering not only criminal and civil litigation but also a severe tightening of Chinese product liability law.



An increasing number of liability claims have recently been based on the intentional consumption of unhealthy food, such as foods with high sugar or fat contents which includes soft drinks, sweets, and fast food. In these cases, the causal link between the food consumption and the bodily injury, for example diabetes, is usually not in question. Instead, the question is whether the producer of the unhealthy product or the individual consumer is responsible for the consequences of the consumption. So far, most jurisdictions have more or less upheld the principle of individual responsibility with regard to known food-related health risks. Any liability of food producers was therefore usually denied, as long as the products were adequately labelled and the consumers not misled about the consequences of excessive consumption. However, food-related litigation based on false advertisement, such as low cholesterol and all natural labelling, and consumer fraud is becoming more frequent, especially in the US, but also in Europe and Australia. Unlike bodily injury claims, which tend to lack the commonality requirement, these claims are likely to be accepted as class actions in the US. Therefore, such liability claims should be considered as emerging risks for the food industry.

Liability claims in the food context are likely to become more frequent in the future, at least in highly industrialised countries where obesity and diabetes are spreading fast and consumers are becoming increasingly aware of the correlation between food and health. Any potential harm to consumers as a consequence of food consumption readily captures public attention and can trigger fast reactions by authorities, including stricter regulation. This is even more so if particularly vulnerable consumers, like young children, are concerned. As a consequence there will be more and stricter regulation as well as stricter enforcement of existing regulation in the future, especially with regards to labelling and to the traceability of food products, which in turn will make breaches of these duties more likely and thus provide a basis for an increasing number of liability claims.

Product recall

Every year a large number of food products come into circulation and companies manufacturing and distributing these products are under increasing economic and competitive pressure. In order to maintain low production costs, products are often manufactured on a large scale, making it difficult to monitor the quality of each individual item. Quality control is usually restricted to sampling, which cannot fully guarantee the safety of all the products, and the manufacturer will remain liable for defective food products in the market.

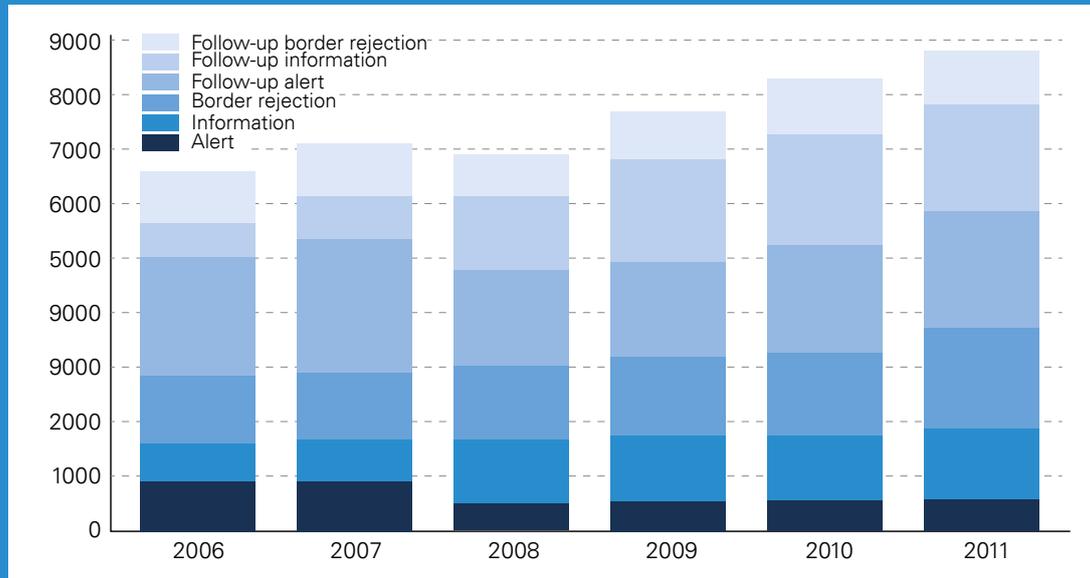
As highlighted above, governments throughout the world have developed a number of regulations in this area aimed at protecting consumers. Since the 1980s the European Community has strengthened consumer protection, beginning with the introduction of the Directive on Product Safety (92/59/EEC), which was subsequently replaced by the General Product Safety Directive (2001/95/EC) in 2004. As a reaction to various food scandals, the RASFF (Rapid Alert System for Food and Feed) was introduced in 2002. The RASFF serves as a tool to exchange information between national competent authorities on food where a risk to human health has been identified and measures, such as withholding, recalling, seizure or rejection have been taken. This exchange of information allows EU countries to take rapid action, verify whether they may be affected and then directly inform the public.

Increasing public awareness of safety issues and improved consumer protection are putting greater demands on manufacturers and their products. Cases of manufacturers having to withdraw defective and potentially hazardous food products from the market, in other words a recall, are increasing in some parts of the world. There are a number of different types of recall as highlighted in Box 8. Food recall in the EU has been on the increase, as highlighted by the rising number of notifications since 2011 (see Box 7); combined with a more risky landscape, the trend for food product recall is likely to continue to rise.



Box 7: Trends in product notifications²⁸

The RASFF annual report for food and feed 2011 shows a rise in notifications between 2006 and 2011.



Alert notification

An 'alert notification' or 'alert' is sent when a food, feed or food contact material presenting a serious risk is on the market and when rapid action is or might be required in another country than the notifying country. Alerts are triggered by the member of the network that detects the problem and has initiated the relevant measures, such as withdrawal or recall.

Information notification

An 'information notification' concerns a food, feed or food contact material for which a risk has been identified that does not require rapid action either because the risk is not considered serious or the product is not on the market at the time of notification. 'Information notifications for follow-up' are related to a product that is or may be placed on the market in another member country 'information notifications for attention' are related to a product that:

- (i) is present only in the notifying member country; or
- (ii) has not been placed on the market; or
- (iii) is no longer on the market

Border rejection notification

A 'border rejection notification' concerns a consignment of food, feed or food contact material that was refused entry into the Community for reason of a risk to human health and also to animal health or to the environment if it concerns feed.

Original notifications and follow-up notification

A RASFF notification referring to one or more consignments of a food, feed or food contact material that were not previously notified to the RASFF is an 'original' notification, classified as an alert, information or border rejection notification. In reaction to such notification, members of the network can transmit 'follow-up' notifications which refer to the same consignments and which add information to the original notification such as information on hazards, product traceability or measures taken.

Rejected and withdrawn notification

An original notification sent by a member of the RASFF can be rejected from transmission through the RASFF system, as proposed by the Commission after verification and in agreement with the notifying country, if the criteria for notification are not met or if the information transmitted is insufficient.

The recall team at most companies normally consists of the Managing Director and the heads of Sales, Research and Development, IT and Communication, and this team will be responsible for the execution of the recall. The execution of a food-related recall shows whether up-front planning was comprehensive and structured. As soon as the company is notified of a defective product, whether by an external complaint or as a result of internal monitoring, the plan must be launched immediately. The response time is the key factor determining the success rate of the product recall. Studies in the US²⁹ have demonstrated that the traditional recall method reaches up to a maximum of 30% of the goods; they have also demonstrated that the maximum run-up period for launching a food recall is 20 days.

The first steps in a food recall include detailed compilation of the affected food delivery, a recall plan addressing the fault and preparation of a communication to inform consumers, wholesalers and sellers.

Product recall is a challenging experience for companies. Companies involved will probably experience a drop in turnover in addition to the direct financial cost associated with the recall. It also may damage a company's image and customers' trust in the brand, which may have taken years to build up at considerable effort and expense. Modern-day manufacturing techniques and production facilities coupled with advanced quality management may be able to reduce the risk of faulty manufacture of food, but they cannot prevent it altogether.

Emerging risks which threaten food manufacturers include the risk of food contamination which is heightened by globalisation, climate change and agricultural systems. Growing trade, migration and travel accelerate the spread of dangerous pathogens and contaminants in food products. Complex international supply chains or networks with long transit distances and times increase exposure to contaminants and complicate food safety management. Severe weather events, such as flooding, may also increase the risk of the contamination of crops in the field. Intensive agriculture and the use of agrochemicals will also impact soil, water and energy supplies, with a significant risk of contamination by fertilisers and pesticides. Trends for mildly preserved food, minimal heating, cold pasteurisation, natural preservatives and for lower salt or sugar contents, increase the risk of pathogenic micro-organisms surviving.

Box 8: Definition and types of recalls

First-party recall

Recall by manufacturers, dealers or importers which have manufactured or dealt with the defective product. With this type of recall, the safety of the product for consumers cannot be guaranteed and the use or consumption of the product may lead to personal injury, physical damage or financial loss. First-party policies provide coverage for the insured's own economic loss incurred as a result of a recall.

Third-party recall

Recall by manufacturers, dealers or importers of consumer goods which they have sourced, distributed or imported from third parties. This may also concern input material, semi-finished products with defects, or the services of suppliers. Third-party coverage applies to economic loss incurred by customers.

Public recall

Recall by manufacturers, dealers or importers via publicly accessible media when the safety of the products manufactured, dealt-in or imported from third parties cannot be ensured for buyers, with special regards for safety regulations, and where use and consumption of the product may lead to injury, damage or loss.

Silent recall

Recall by manufacturers, dealers or importers via pinpointed instructions to wholesalers or other service centres without making any public announcement. In many cases, the defect in the product concerned can be eliminated during the course of routine inspections, provided delays do not raise any concerns with regards to safety.

Recall by a competent authority

This is a recall, ordered by an authority, of defective products which may result in injury, damage or loss. In addition to the actual recall, the authority may also confiscate or destroy the products concerned.

Voluntary recall

Recall at the instigation of manufacturers, dealers or importers of a product they manufactured, dealt in or imported from third parties.

5. B Insurance

Recall insurance as part of a company's enterprise risk management goes some way in demonstrating a company's social responsibility, can generate public confidence and can help in managing crises. The policy cover provided will depend on the risk exposure of the individual company.

Insurance companies are recommended to develop risk management strategies and risk assessments of the food industry, as well as building up special underwriting knowledge in the fields of food and beverages product liability, including the recall of faulty products and malicious product tampering.

Insurance can facilitate risk assessment and the introduction of recall management. The role of insurers is to be a professional partner to their companies in evaluating liability-related recall risks and developing appropriate recall insurance policies. For example, insurers may help determine the risks and potential exposures through client interviews, as well as inspection. They may also provide training in these areas.

Box 9: Insurance solutions

Product Liability Insurance

Product liability insurance covers manufacturers, marketers, suppliers and traders of food products for legal expenses relating to policyholder's losses, injuries or property damage in case of defective or broken goods.

Product Recall Insurance

Product recall insurance covers the costs of recalling a product from the market. For food and beverage industries it is a requirement to have product recall insurance. The coverage typically includes the costs for shipping, customer notification and disposal of faulty products.

Malicious Product Tampering

Product tamper insurance as well as malicious contamination insurance cover the costs incurred and loss of income when products are recalled from the market due to contamination or malicious product tampering.

6. Environmental risk

6. A The emerging risks

Food supply has to be secured for a growing world population from limited natural resources. Therefore, optimising crop yields is vital. Industrialised agriculture is increasingly using fertilisers, pesticides and genetically modified crops to obtain higher crop yields. In addition, veterinary pharmaceuticals for industrial livestock have been developed to respond to growing demand. As a consequence, there is increasing environmental exposure to potentially hazardous man-made substances, such as pesticides and active pharmaceutical ingredients, as well as to genetically modified organisms, such as engineered plants. The potential consequences of such exposures could majorly impact insurance companies. Prominent examples, which will be described below, include the loss of honey bee colonies, developing resistance to crop protection products and contamination of water with pesticides or pharmaceuticals. Recent losses also highlight the risks related to genetically modified plants.

Bee Die-Off / Colony Collapse Disorder (CCD)³⁰

Beekeeping has become significant business within agriculture. Honey bees are the most important pollinators; millions of bee colonies provide pollination services for crops within the US. Some agricultural crops, such as almonds and broccoli, are even fully dependent on pollination services provided by commercial beekeepers and the demand for such services is only expected to grow.

The added crop value generated by honey bees was estimated to be about \$15 billion for the US in 2007. French and German researchers estimated the global added value to be about €153 billion in 2005^{31,32}.

Any severe loss of hives has the potential to impact strongly on the beekeeping industry, leading to economic losses and additional costs for the transportation of hives. It may also severely affect the agricultural industry by reducing crop production due to lack of pollination.

The mass death of bees resulting from the collapse of hives following sudden loss of their worker bees is called Colony Collapse Disorder (CCD). Despite sufficient reserves, the colonies die because they cannot exist without the support of their worker bees. The worker bees usually disappear almost traceless with only a few dead bees found in the immediate vicinity of the colony. Losses of up to 90% of colonies due to CCD have been reported from North America and similar observations have been made in Europe³³.

CCD is a complex phenomenon and it is thought to be caused by a combination of different factors, including stress, pests, diseases, habitat modification and the use of pesticides. Although CCD is not simply caused by acute pesticide poisoning, a class of pesticides, the so-called neonicotinoid insecticides, has recently been suspected to contribute to the mass death of bees.

In 2013, the European Food Safety Authority (EFSA) published the risk assessment results relating to honey bees and the use of neonicotinoid insecticides requested by the EU commission³⁴. These studies raised several concerns but also revealed several data gaps and the need for further assessments to come to definitive conclusions^{35, 36, 37}. Despite EFSA's risk assessment limitations, the EU recently restricted the use of these pesticides for a period of two years³⁸ as a clear link between CCD and the use of neonicotinoid insecticides could not yet be established.

In the US, the use of neonicotinoid insecticides is considered less critical at the moment. With regards to CCD, the US Environmental Protection Agency (EPA) stated in May 2012: "To date, we are aware of no data demonstrating that an EPA-registered pesticide used according to the label instructions has caused CCD."³⁹



In summary, a clear link between neonicotinoid insecticides and CCD has not been established yet⁴⁰, but this class of pesticides is likely to stay in the focus of the public eye. Ongoing research could potentially establish a clear link between neonicotinoid insecticides and CCD or could at least reveal that they are contributing factors to CCD.

Resistance to Crop Protection Products

Weed and pest control plays an important role in agriculture. Food supply has to be secured for a growing world population despite decreasing resources and land competition from biofuels or other non-food products. Therefore, it is essential to achieve higher crop yields. Field crops have to be kept free from competing plants and insect pests. Genetically modified plants have become of increasing importance in this regard. Plants have been engineered to be resistant to certain herbicides, such as glyphosate. The combination of a herbicide and the corresponding resistant agricultural plant allows effective weed control. This is because the application of the herbicide will effectively fight weeds without harming the resistant crop plant. Plants have also been genetically modified to produce substances toxic to insect pests. However, these methods only work as long as the crop protection products are effective and insect pests or weeds do not develop resistance mechanisms.

Resistance of weeds to herbicides and insect pests to insecticides is of growing concern within the agricultural industry. In recent years, herbicide resistant Palmer amaranth, a fast growing weed strongly impacting soybean and cotton crop yields was reported to have spread within the US.

Palmer amaranth was found to be resistant to two common types of herbicides, glyphosate as well as ALS (ALS: acetolactate synthase, an enzyme used for the biosynthesis of amino acids) inhibitors. In some Southern US states, farmers reportedly had to hire workers to remove the weed manually from the fields. Crop losses related to Palmer amaranth were estimated to be in the millions for the US in 2012^{41,42}. Currently herbicide resistant weeds are known for 65 crops in 61 countries. In total, resistance to 21 of 25 known classes of herbicides and to 148 different herbicides have been reported⁴³.



The first cases of resistance to insecticides have also been observed. In order to control corn rootworm, a major pest for corn, genetically modified corn is widely used, which produces an endotoxin acting as an insecticide⁴⁴. Recently, some corn rootworm populations were found to show increased levels of tolerance to this insecticide. The first in-field resistance was reported in 2011⁴⁵.

At the moment, resistance issues are relatively manageable thanks to the increased numbers of pesticide applications, crop rotation and the use of dual mode-of-action pesticides. However, occurrences of resistance phenomena are increasing.

The economic importance of field crops, such as corn, soybeans and cotton is very high. Major losses would have pure financial as well as socio-economic consequences. Today, a significant amount of the crops grown are genetically modified for effective weed and insect pest control, further highlighting the potential problem resistance represents.

Contamination of Water with Pesticides and Pharmaceuticals

Many substances used in industrial livestock farming and modern agriculture represent a potential hazard to the environment. Among them are pesticides as well as pharmaceuticals for veterinary use.

Pesticides can reach surface and ground water from wash-outs, waste disposal and accidents. In surface water, such contaminants pose a potential threat to aquatic organisms. Pesticides can migrate from surface water into ground water which is an important source of drinking water⁴⁶. Even if water treatment is applied, such pollutants may not be completely removed. Therefore, pesticides can pollute our drinking water and pose long-term exposure risks to humans. Even if pesticide concentrations are well below known hazardous levels, such long-term exposures might be critical. The potential health impact of these long-term low level exposures is subject to intensive ongoing research. However, even without clear evidence for any health impact, contamination of ground and consequently drinking water with pesticides can have severe financial consequences (see example in Box 10).

Box 10: Example of ground contamination

Recently, an agrochemical company reached a settlement for a class action law suit in the US. The class action consisted of a huge number of communal water suppliers that detected traces of a pesticide in their water systems. The company agreed to pay \$105 million into a settlement fund to end further expensive legal proceedings⁴⁷.

Pharmaceuticals used in industrial livestock farming also pose an exposure risk to the environment of potentially critical substances. Examples of the severe consequences of such exposures have already been reported (see Box 11).

Box 11: Example of livestock exposure to pharmaceuticals

Diclofenac, an anti-inflammatory drug was widely used for treatment of ailing cattle in Asia. Diclofenac was shown to cause vulture populations to decline by up to 99% in Pakistan, India, Nepal and Bangladesh. Vultures were believed to be exposed to Diclofenac from treated animals that died and were left out for scavengers. Because this substance is toxic to the kidneys, thousands of vultures died of kidney failure. As a side effect of the decline in vulture population, the number of competing feral dogs surged across India leading to an increased number of deadly human rabies infections. After a ban of diclofenac for veterinary use across south Asia, vulture populations started to recover^{48,49}.

Similar to pesticides, veterinary drugs can enter and contaminate surface as well as ground water. The main sources of such contaminations are animal excrement. Active ingredients of drugs are usually not fully metabolised and are excreted unchanged to some extent. They can then reach surface water as well as ground water by elution with the same consequences as described above for pesticides.

Risks related to Genetically Modified Organisms (GMO)

The total area of genetically modified plants increased from 1.7 million hectares in 1996 to 170 million hectares in 2012 with two digit growth rates every year⁵⁰. More than 80% of soy and cotton, about 35% of corn and 30% of rape grown worldwide are genetically modified⁵¹. GMOs have been the focus of a number of related controversies, the key ones being the risks of GM foods

being dangerous to human health, questions over the need for GM foods to be labelled, the role of government regulators, the effect of GM crops on the environment and their place within the industrial agricultural system. While GMOs combine improved yields, greater resistance to pests, and increased tolerance to drought, thereby contributing to food security, potential loss scenarios could include the transfer of attributes from GMOs to non-modified wild plants as well as potential contamination of harvest and consequently food products with GMOs (see example in Box 12).

Box 12: Example of GMO contamination

Although no genetically modified wheat has been approved to date, genetically engineered wheat has recently been found growing on a farm in the US. It could not be clarified whether or not any of the GMO material went into the food supply or into grain shipments. A major concern was that some countries could decide to ban wheat imports from the US. It could not be clarified how the genetically engineered wheat found its way to the farm.

A similar case occurred in 2006, when unapproved genetically modified rice was found in commercial supplies. The company that developed the rice agreed to pay \$750 million to settle claims⁵².

6. B Insurance

Agricultural farming and industrial livestock farming will continue to develop and grow. Consequently, environmental exposure to potentially hazardous substances and the potential for subsequent environmental damage is expected to further increase. Therefore it is anticipated that insurers will face an increasing number of related liability claims.

Crop losses from lack of pollination or from occurrence of resistance to crop protection products could trigger crop insurance as well as product liability policies.

The consequences of long term low-level exposures to humans from water contaminated with traces of pesticides or active pharmaceutical ingredients are not yet well understood and are subject to intensive on-going research. If a clear link between adverse health effects and exposures to such micropollutants is established, significant liability claims would be expected. Given such circumstance, it will be important for insurance companies to identify their exposure, define credible loss scenarios and to manage their portfolio accordingly.

Box 13: Insurance solutions

Environmental liability insurance

Environmental liability insurance protects the insured from bodily injury, property damage and clean-up costs as a result of the dispersal, release or escape of pollutants. It covers the cost of restoring damage caused by environmental accidents, such as pollution of land, water, air and biodiversity damage.

This policy could be triggered in the case of environmental damage, such as soil or groundwater contamination requiring remediation or in the case of loss or impairment of natural habitats or species following intensive application of pesticides or veterinary pharmaceuticals.

7. Political risk and terrorism

7.A The emerging risks

The issues of food scarcity and food safety have major political implications. Global political instability can increase food risks, while food insecurity and unsafe food can heighten political tensions. Food affects a number of areas of particular interest to insurers of political risks, including political violence, war, agriculture, quota, licences and expropriation of assets.

Political violence

Political violence and conflicts can be strongly affected by food insecurity, and water scarcity, as confirmed by various research studies⁵³. Food insecurity, especially when caused by higher food prices, heightens the risk of democratic breakdown, civil conflict, protest, rioting, and communal conflict. It might not be a direct cause of a conflict, and is rarely the only cause; however, combined with other issues, whether political or economic, food could be the factor that determines whether and when violent conflicts will erupt as illustrated by recent examples such as the 2009 Malagasy political crisis. Between 2007 and 2008 food protests and riots broke out in 48 countries as a result of record world prices⁵⁴. In February 2011, the Food and Agriculture Organisation of the United Nations (FAO) Food Price Index reached historical peaks⁵⁵ and this rise in food prices contributed to the wave of protests across North Africa and the Middle East. The threat of political violence to businesses comes in different forms: businesses may suffer collateral damage from nearby acts of political violence or their facilities may come under direct attack. Concerns over political violence have also prevented businesses from investing abroad. Sensitivities around the purchase of land abroad, a potential by-product of food insecurity, can also become challenging for companies involved in that process and even further fuel political instability, as shown by the Malagasy case.



Agroterrorism

Agroterrorism, which relates to the intentional contamination of food driven by political motives, is another aspect of political risk businesses should be aware of. It is defined as the deliberate use of biological, chemical or radiological agents as weapons against the agricultural industry and food supply⁵⁶. This is not a new practice and there have been several cases of terrorist attacks on agriculture in the 20th century. For example, in 1978, the Arab Revolutionary Council poisoned Israeli oranges with mercury which reduced orange exports by 40% and during the Vietnam War, the U.S. used chemical agents to destroy foliage, affecting some crops⁵⁷. Aside from the threat agroterrorism presents to human lives, political stability and food availability, it also reduces the confidence in a country's food safety, potentially harming companies involved in the food industry. Importantly, food contamination can be difficult to trace back, making it hard to prove an agroterrorist terrorist attack.

Government intervention

Government intervention in the food sector is another area covered by political risks. Governments may decide to use a variety of tools, such as quotas, taxes and licences, or they may impose sanctions, which will affect the agricultural and food industries. Governments may raise taxes, subsequently affecting companies' balance sheets whether or not those companies are involved in the food industry. Sugar has often been the target of high taxes; the Philippines, Thailand, Indonesia and Brazil are renowned for imposing substantial taxes on this soft commodity^{58,59}. Export bans can also result in revenue losses for producers. The Ukrainian export restrictions in 2007 and 2008 resulted in revenue losses of more than \$2.0 billion for producers, according to the World Bank estimations⁶⁰. Argentina has been known to administer import restrictions through the means of licenses. Sanctions from a foreign government or an organisation can impact agriculture and food as well, and thereby indirectly affect companies in the food sector. Governments may also confiscate food-related products, such as in recent cases in Venezuela⁶¹.

Following any form of government intervention, companies can incur large losses due to breach of contract obligations, demurrage of ships in ports, unplanned food storage in port elevators and food spoilage due to inadequate storage conditions. This can in turn affect company's credit, leaving lenders in an uncertain position.

7. B Insurance

Most of the risks highlighted above can be covered by a political risk cover; agroterrorism may be covered under terrorism insurance, although it is more likely to be covered by product liability insurance.

It is important for the insurance sector to be aware of its exposure to food risk when assessing and underwriting political risks. As shown above, the risk of food insecurity to political risk is substantial and can expose insurers to large losses. The effect of global political instability coupled with government intervention and rising food price trends of the last ten years are likely to be felt across the insurance sector.

Insurers can encourage businesses to mitigate food-driven political risks, and transfer the risks where appropriate. By monitoring food issues, businesses will improve their ability to foresee any crises and better prepare themselves. Insurers should encourage businesses to build their resilience to political risks and unsafe food and food insecurity. Insurers could also collaborate with key stakeholders, such as governments, to help develop sustainable solutions to food insecurity.



Box 14: Insurance solutions

The perils in a political risk solution may include terrorism and sabotage, malicious damage, riots, strikes and civil commotions, war and civil war, coup d'état, insurrection, rebellion as well as revolution. Some insurers will even include political violence which employs Chemical, Biological, Nuclear and Radiological (CBNR) methods.

It may cover physical damage to property, business interruption, public liability and employers' liability, event cancellation and lenders' interests, as well as currency inconvertibility and non-transfer, expropriation, nationalisation and confiscation, non-honouring of arbitration award, non-payment by sovereign, sub sovereign and state-owned bank, non-payment by state owned banks under loans and letters of credit, non-repossession of mobile equipment, political violence, pre-shipment risks and unfair/fair calling of a bond.

8. Conclusions and recommendations

Food risk, whether food insecurity or unsafe food, has wide ramifications, exposing risk managers and insurers both directly and indirectly to a large number of risks. Different areas of business and different types of insurance cover can feel the impact of food insecurity and unsafe food ranging from crop insurance through to liability. Therefore, it is vital for risk managers to understand all these risks and their interconnectivity. Food risk is not just a risk in itself and it will also fuel other risks. While risk managers are likely to see food-related risks rise, insurers will most probably have to face increasing claims across all lines of business.

The agricultural sector will feel the mounting pressure of having to provide enough food for 9 billion people by 2050 as food production is likely to face a number of challenges. More severe weather events, rising production costs, natural resource constraints and land competition are expected to hinder food production. This will affect crop insurance as well as supply chain, business interruption and political risk covers, highlighting the impact of food insecurity on the insurance industry.

Food contamination, and unsafe food more generally, already poses a significant risk to businesses and the insurance industry. It impacts companies along the whole food chain from producers and manufacturers to retailers and as well as affecting the supply of food, it can endanger people's lives. It is important that insurers are aware of their exposures resulting from unsafe and contaminated food as claims could rise across several lines of business, such as product liability and recall, supply chain, business interruption and political risk. Unintentional and intentional contamination could be made worse by rising temperatures as heat and moisture help bacteria propagate.

Environmental liability could also cause problems for business and lead to increasing liability claims for insurers. The loss of honey bees, resistance to crop protection products and contamination of water by pesticides and pharmaceuticals is expected to impact the agricultural sector as well as food manufacturers and retailers.

The effect of global political instability coupled with government intervention and the trend of rising food prices over the last ten years is likely to be felt across the food industry and risk management more broadly. It is important for insurers to stay alert to their exposures to political risk and to potential food crisis, as insured losses could spiral out of control where both issues are combined.

The insurance industry can contribute towards tackling the issue of food by helping with a multi-stakeholder solution to mitigate food risks. It is clear that ensuring safe, secure and equitable production and distribution of food resources is a key challenge for international organisations and governments. As a responsible industry, which by its very nature increases economic resilience for individuals and enterprise, the insurance sector has a vested interest in enabling and enhancing solutions in this space. This report has already detailed a number of areas of investigation and products under development. For example, insurance companies have produced a significant amount of research on the role that agricultural insurance can play, and other companies are looking at subjects, such as microinsurance and other locally based insurance solutions. However as an industry, insurers also have an opportunity to see whether they can play a wider, more collaborative role in supporting a solution towards one of our generation's major challenges.

References

- 1 http://www.fao.org/fileadmin/templates/wsfs/docs/expert_paper/How_to_Feed_the_World_in_2050.pdf
- 2 Food Security Information for Action Practical Guides, FAO, 2008, <http://www.fao.org/docrep/013/al936e/al936e00.pdf>
- 3 Global food security index, <http://foodsecurityindex.eiu.com/Home/KeyFindings>
- 4 <http://foodsecurityindex.eiu.com/Home/KeyFindings>
- 5 http://www3.weforum.org/docs/WEF_GlobalRisks_Report_2012.pdf
- 6 <http://www.fda.gov/AnimalVeterinary/Products/AnimalFoodFeeds/ucm347941.htm>
- 7 <http://www.who.int/foodsafety/en/>
- 8 <http://www.theguardian.com/business/2013/jun/05/tesco-sales-fall-horsemeat-scandal>
- 9 http://ec.europa.eu/governance/impact/ia_carried_out/cia_2013_en.htm
- 10 <http://ucanr.edu/blogs/food2025/blogfiles/14415.pdf>
- 11 http://www.fao.org/fileadmin/templates/wsfs/docs/expert_paper/How_to_Feed_the_World_in_2050.pdf
- 12 http://www.munichre.com/en/media_relations/company_news/2010/2010-08-05_company_news.aspx
- 13 IMF World Economic Outlook Database April 2012, as cited in "Partnering for food security in emerging markets"; Swiss Re Sigma publication No 1/2013
- 14 OECD-FAO Agricultural Outlook 2013-2022, OECD/FAO, 2013 (<http://www.oecd.org/site/oecd-faoagriculturaloutlook/highlights-2013-EN.pdf>)
- 15 <http://www.fao.org/ag/againfo/programmes/en/empres/diseases.asp>
- 16 <http://www.fao.org/agriculture/crops/rust/stem/rust-report/stem-ug99racetkksk/en/>
- 17 "Agricultural Insurance"; GFDRR 2011, Disaster Risk Financing & Insurance Concept Note (http://www.gfdr.org/sites/gfdr.org/files/documents/DRFI_AI_Concept_Jan11.pdf)
- 18 http://www3.weforum.org/docs/WEF_FB_NewVisionAgriculture_HappeningTransformation_Report_2012.pdf
- 19 The World Bank, 2010, "Government Support to Agricultural Insurance"
- 20 Swiss Re, "Partnering for food security in emerging markets"; Sigma publication No 1/2013
- 21 http://150.swissre.com/protecting_generations/photo4.html#
- 22 <http://www.oxfamamerica.org/publications/harita-project-report-nov07-dec09>
- 23 World Livestock 2011 - Livestock in food security; <http://www.fao.org/docrep/014/i2373e/i2373e.pdf>

- 24 The influence of the Common Agricultural Policy on agricultural landscapes - <http://ftp.jrc.es/EURdoc/JRC73276.pdf>
- 25 <http://www.ecdc.europa.eu/en/publications/Publications/zoonoses-food-outbreaks-report-2011-ecdc-efsa.pdf>
- 26 <http://www.reuters.com/article/2013/06/11/yum-china-sales-idUSL2N0EN1XN20130611?type=companyNews>
- 27 <http://www.cdc.gov/nchs/fastats/overwt.htm>
- 28 <http://ec.europa.eu/rasff>
- 29 US Consumer Product Safety Commission, CPSC, <http://www.cpsc.gov/>
- 30 <http://www.epa.gov/pesticides/about/intheworks/honeybee.htm>
- 31 http://www.ars.usda.gov/is/br/ccd/ccd_actionplan.pdf
- 32 http://www.saarland.de/dokumente/thema_bildung/Edition-Spohns_Haus_Bienen_Endfassung_090720.pdf
- 33 <http://www.epa.gov/pesticides/about/intheworks/honeybee.htm>
- 34 <http://www.efsa.europa.eu/de/press/news/130116.htm>
- 35 <http://www.efsa.europa.eu/de/efsajournal/doc/3068.pdf>
- 36 <http://www.efsa.europa.eu/de/efsajournal/doc/3067.pdf>
- 37 <http://www.efsa.europa.eu/de/efsajournal/doc/3066.pdf>
- 38 http://ec.europa.eu/food/animal/liveanimals/bees/neonicotinoids_en.htm
- 39 <http://www.epa.gov/pesticides/about/intheworks/honeybee.htm>
- 40 <http://www.ars.usda.gov/is/AR/archive/jul12/colony0712.htm>
- 41 <http://www.agriculture.purdue.edu/aganswers/story.asp?storyID=6847>
- 42 <http://www.greenbook.net/news/Aggressive-Palmer-amaranth-weed-found-in-northern-Indiana-176471851.html>
- 43 <http://www.weedscience.com/summary/home.aspx>
- 44 http://www.epa.gov/opbppd1/biopesticides/ingredients_keep/factsheets/factsheet_006484.htm
- 45 <http://farministrynews.com/corn-rootworm-traits/field-resistance-bt-corn-rootworm-trait-documented>
- 46 <http://ga.water.usgs.gov/edu/pesticidesgw.html>
- 47 <http://www.janzenaglaw.com/2013/01/atrazine-settlement-provides-millions.html>

- 48 <http://www.newscientist.com/article/mg19926684.400-rabies-tragedy-follows-loss-of-indias-vultures.html>
- 49 <http://www.guardian.co.uk/environment/2012/oct/30/pakistan-vulture-diclofenac-ban>
- 50 Top ten facts about Biotech/GM Crops in 2012 (Crop Biotech Update Special Edition, 03/28/2013)
- 51 http://www.transgen.de/anbau/eu_international/531.doku.html
- 52 GMO wheat: Modified Wheat Is Discovered in Oregon, The New York Times, 05/29/2013, GMO rice: <https://urldefense.proofpoint.com/v1/url?u=http://www.bloomberg.com/news/2011-07-01&k=VTIXiGvdT7U4yPSpeHcrHQ%3D%3D%0A&r=GFfbkvcnRb6tPNz678Oi%2BD4DdZYDU683TruVz8Aby28%3D%0A&m=j9qcv6IXwizUm%2Fn8Fv%2BIYbxJDnK1UYwTmfp3QxUrN9E%3D%0A&s=563214ea2c93c43cc320c70670c742cef3290e7f5ddbe2261a65987e68d79d9b>
- 53 <http://ucanr.edu/blogs/food2025/blogfiles/14415.pdf>
- 54 <http://ucanr.edu/blogs/food2025/blogfiles/14415.pdf>
- 55 <http://www.fao.org/worldfoodsituation/foodpricesindex/en/>
- 56 <http://emergencypreparedness.cce.cornell.edu/agrosecurity/Pages/AgrosecurityResources.aspx>
- 57 Monke, J. (2006), "Agroterrorism: Threats and Preparedness," Congressional Research Service
- 58 <http://www.interaksyon.com/business/47940/philippines-joins-thailand-indonesia-in-asean-sugar-cartel>
- 59 http://www.sugarinfo.co.uk/website_contents/view/1212261#sthash.6Opl9aVa.dpuf
- 60 <http://siteresources.worldbank.org/INTUKRAINE/Resources/WorldFoodCrisisandRoleofUkraine.pdf>
- 61 <http://www.laht.com/article.asp?CategoryId=10717&ArticleId=357223>

Disclaimer:

Dutch law is applicable to the use of this publication. Any dispute arising out of such use will be brought before the court of Amsterdam, the Netherlands. The material and conclusions contained in this publication are for information purposes only and the editor and author(s) offer(s) no guarantee for the accuracy and completeness of its contents. All liability for the accuracy and completeness or for any damages resulting from the use of the information herein is expressly excluded. Under no circumstances shall the CRO Forum or any of its member organisations be liable for any financial or consequential loss relating to this publication. The contents of this publication are protected by copyright law. The further publication of such contents is only allowed after prior written approval of CRO Forum.

© 2013
CRO Forum

The CRO Forum is supported by a Secretariat that is run by
KPMG Advisory N.V.

Laan van Langerhuize 1, 1186 DS Amstelveen, or
PO Box 74500, 1070 DB Amsterdam
The Netherlands
www.croforum.org

