

Summary Report

Impacts of Climate Change on food safety

Workshop held on 2nd December 2015

Introduction

Climate change is likely to have huge impacts on food safety, both direct and indirect. There will be challenges throughout the food system from primary production to consumption. Global food security is an issue that is receiving increasing attention, but there has been little focus to date on the food safety aspect - even though it is an important part of food security (according to the World Health Organisation definition, food security exists “when all people at all times have access to sufficient, *safe*, nutritious food to maintain a healthy and active life”).

The FSA would like to take a strategic approach in this area, and therefore we organised this workshop to help us understand more about what the key issues are and how to prioritise them, and to identify gaps in our knowledge¹. The workshop programme can be found at [Annex 1](#), and a participant list can be found at [Annex 2](#).

Session 1: Mycotoxins

Introduction and talks

Mycotoxins are toxic substances that are produced by certain fungi (moulds) on crops. They can enter the food chain through food or feed, and can cause both acute toxic effects and chronic health problems (including cancer) in humans and other animals. The formation of mycotoxins is climate-dependent, with temperature and moisture levels directly impacting fungal growth. Evidence shows that climate change is causing increasing temperatures and altered rainfall patterns. Additionally, extreme weather incidents have increased. As a consequence of these changes, increased levels of mycotoxins have been observed in some European crops. The prediction is that climate change will decrease UK spring rainfall and increase summer and winter temperatures over the next 50 years, which is likely to result in increased mycotoxin levels. Our aim is to find ways of mitigating the risks of increasing levels of mycotoxins, without compromising food safety or availability, and without unduly increasing the regulatory burden.

Dr Paul Nicholson talked about plant breeding, highlighting the example of *Fusarium* head blight, which is caused by various mycotoxin-producing *Fusarium* species. He discussed various possible solutions, including the use of breeding to eliminate susceptibility factors, to produce taller varieties of crops with awns (which increase resistance to infection) and to introduce resistance factors from wild relatives.

Professor Simon Edwards focussed on agronomic methods, again using *Fusarium* head blight as the main example. He provided some suggestions for best agricultural practice for minimising mycotoxins in UK wheat crops, based on the most recent

¹ Food Standards Scotland held a related workshop, focussed on mycotoxins. The report is available here:

<http://www.foodstandards.gov.scot/mycotoxins-climate-change-and-food-safety-workshop>

research. He also highlighted the complexities of predicting how various direct and indirect effects will combine to have an overall effect on mycotoxin levels, taking into account the fact that different fungal species will be affected differently by changes in climate.

Derek Croucher gave a perspective from industry. Using several case studies, he highlighted some of the concerns faced by the breakfast cereal industry, including the possibility that climate change and the consequent increase in mycotoxin levels, the availability of breakfast cereals will be reduced. He made clear the need for effective mitigation strategies that keep pace with climate change, and for ensuring that legislation is evidence-based and proportionate.

Copies of the speakers' presentations can be found [here](#).

Outcomes of break-out discussions

Delegates discussed how the effects of adverse weather conditions/climate change on mycotoxin levels could be managed, and whether these approaches would be feasible in the UK. Suggestions included developing mycotoxin-resistant crop breeds, improved fungicide application and learning from the experiences of countries like the USA that already have these weather conditions.

Useful discussions also took place on the impact that climate change could have on the achievability of legislative limits for mycotoxins in food and feed and how legislation could be adapted to accommodate climate change. It was emphasised that risk management measures needed to be realistic and consider consumer exposure rather than take a hazard-based approach. The efficiency and safety of mycotoxin decontamination processes needs to be examined. The implications of setting unachievably low legislative limits, including importing from third countries need to be considered. Another point that was stressed was the need to take a holistic approach to this problem, in conjunction with all the Government Departments involved - for example policy leads on pesticides and mycotoxin contamination - both in the UK and in Europe.

Several positive discussion points were raised; these will be sent to the European Commission in response to their consultation on this topic.

Session 2: Possible impacts of climate change on food safety

Introduction and Talks

The aim of this session was to gain a better understanding of the many ways in which climate change could impact food safety. While recognising that some effects of climate change will be unpredictable, the FSA needs to identify the key safety issues that are likely to arise, to be in the best position possible for protecting consumers in the future.

Lord Krebs presented compelling evidence that climate change is happening now. He explained the role of the Committee on Climate Change's Adaptation Sub-Committee, and discussed the aspects related to food safety that are likely to be in the next Climate Change Risk Assessment (due for publication July 2016).

Dr Iain Lake gave an overview of the ways in which climate change might alter both microbiological risks and chemical risks to food safety. He highlighted that the changing risks and the unpredictability associated with climate change may mean that our current regulations and monitoring systems become inadequate, and emphasised that we must ensure our capacity for surveillance is maintained.

Professor Gordon Nichols used *Campylobacter* case studies to demonstrate methods for examining the links between climate and infectious disease. He presented some possible hypotheses for explaining the seasonality of *Campylobacter* infections, and highlighted the need for better datasets with increased geographical resolution.

Copies of the speakers' presentations can be found [here](#).

Panel discussion

From a wide-ranging panel discussion, the following key issues emerged:

- Climate change may take us to conditions that have not existed before, making accurate predictions very difficult.
- It is necessary to take a system-wide view, and to plan in the context of possible future socioeconomic scenarios.
- Sustainable intensification may not achieve its goals, particularly if it leads to reduced food safety. As well as this approach, we need to reduce waste and make better use of natural resources.
- It will be important to have good response systems.
- We must not become complacent about current controls when thinking about future risks.
- There is a need for good public engagement, to ensure that consumers understand the risks and support the measures being taken to mitigate them.
- One of the biggest challenges is how to assess the relative magnitude of the many possible risks - both known risks and new risks that will emerge – and to make decisions about where to concentrate effort.

Annex 1: Workshop Programme

Session 1: Mycotoxins

- Welcome and introduction: Dr Penny Bramwell and Sarah Hardy (Food Standards Agency)
- Aim of the session: Dr Christina Baskaran (Food Standards Agency)
- Dr Paul Nicholson (John Innes Centre)
- Professor Simon Edwards (Harper Adams University)
- Derek Croucher (British Oat and Barley Millers' Association)
- Breakout group discussions
- Breakout groups report back
- Final comments: Sarah Hardy

Session 2: Possible impacts of climate change on food safety

- Keynote address: Lord Krebs (Chair of the Committee on Climate Change Adaptation Sub-Committee)
- Dr Iain Lake (University of East Anglia)
- Professor Gordon Nichols (Public Health England)
- Moderated panel discussion:
 - Dr John Ingram (Food Systems Programme Leader, Environmental Change Institute, University of Oxford)
 - Lord John Krebs (Chair of the Committee on Climate Change Adaptation Sub-Committee)
 - Professor Guy Poppy (Professor of Ecology, University of Southampton and Chief Scientific Adviser, Food Standards Agency)
 - Dr John Thompson (Clinical Senior Lecturer, Department of Pharmacology, Therapeutics and Toxicology, Cardiff University)
- Closing remarks: Professor Guy Poppy

Annex 2: Participant list

Joanna Abishegam-David	Food Standards Agency
Nick Adams	Alltech
Kofi Aidoo	Glasgow Caledonian University
Giorgia Albeiri	Food Standards Agency
Anton Alldrick	Campden BRI
Carren Amoli	Kitchen Tonic
Steve Atkins	Ultra Supplements Ltd
Diane Austen	British Specialist Nutrition Association
Christina Baskaran	Food Standards Agency
Nuria Batlle	Queen Mary University of London
Matthew Baylis	University of Liverpool
Diane Benford	Food Standards Agency
Tim Bennett	Food Standards Agency
Ian Blakemore	University of Leeds
Irene Bocchetta	Defra
Mark Bond	Food Standards Agency
Alan Botham	2 Sisters Food Group
Penny Bramwell	Food Standards Agency
Stuart Challenor	Tesco
Georgina Collins	Food Standards Agency
Robin Crawshaw	RC Feed
Derek Croucher	Morning Foods (BOBMA)
Giulia Defra	Defra
Angela Doherty	CP Foods UK
Simon Edwards	Harper Adams University
Bernd Eggen	Public Health England
Selvarani Elahi	LGC
Martin Fairless	Northumbrian Fine Foods
Emma Finn	
Martin Forsyth	British Frozen Food Federation
Richard Fuchs	University of Greenwich
Guy Gagen	National Farmers Union
Clare Gaukroger	Anpario
Hamid Ghodduji	London Metropolitan University
Laila Gohar	Met Office
Paul Gosling	Agriculture and Horticulture Development Board
Silvia Gratz	University of Aberdeen
Sarah Hardy	Food Standards Agency
Kevin Hargin	Food Standards Agency
Martin Hillman	
Catherine Howarth	University of Aberystwyth
John Howlett	
Claire Hughes	Marks and Spencer
John Ingram	Environmental Change institute, University of Oxford
Nia Jackson-Jones	Welsh Government
Philip Jennings	Fera Science Ltd
Lauren Kent	Food Standards Agency

John Krebs	Committee on Climate Change
Iain Lake	University of East Anglia
Rachel Lambert	Department for International Development
Bruce Lambourne	Mizkan Euro Ltd
John Lepley	Food and Drink Federation
Sarah Lyster	
Naresh Magan	Cranfield University
Sarah Maloney	Canterbury City Council
Hugo Marfleet	Kemin
Debra Mather	London Borough of Bexley
Anjali Mazumder	University of Warwick
Geoff McBride	Science & Technology Facilities Council
Emma Millar	Alltech
Patrick Miller	Food Standards Agency
Helen Minnice-Smith	Welsh Government
Barry Mirhabib	Brake
Will Munro	Food Standards Scotland
Anne Murcott	SOAS Food Studies Centre
Ciaran Murray	Jordans Ryvita
Gordon Nichols	Public Health England
Paul Nicholson	John Innes Centre
Linda Nicolaidis	University of Greenwich
Lana Oliver	Pet Food Manufacturers Association
Mariam Orme	Food Standards Agency
Mike Peck	Institute of Food Research
Petra Penberthy	Jordans Ryvita
George Perrott	Agricultural Industries Confederation
Alain Pittet	Nestle
Guy Poppy	Food Standards Agency
Ioannis Sakaridis	University of Surrey
Henrietta Sameke	British Meat Processors Association
Azmi Sbaiti	Food Standards Agency
Milan Shah	The Grain and Feed Trade Association
Ian Smith	Food Standards Agency
Neil Spreckley	Biomin UK Ltd
Adam Staines	Biotechnology and Biological Sciences Research Council
Liz Stretton	Food Standards Agency
John Thompson	Cardiff University
Kate Thorne	British Specialist Nutrition Association
Kate Todd	Food Standards Agency
Alan Tollervey	Department for International Development
Keith Turnbull	Weetabix
Manisha Upadhyay	Food Standards Agency
Yvonne Watts	Port of Tilbury London Limited
Justyna Wentworth	Food Alert Limited
Colin West	Maltsters' Association of Great Britain