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Emerging Risks Identification One Health Approach

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Trusted science for safe food



ERI and One health approach



ERI at EFSA: resources/ results/ methods



Methodologies - ER projects



Upcoming work

Why are we interested in emerging risks ?



Anticipation of future risk assessment needs

Data / Knowledge
Risk assessment methods



Help risk manager anticipate or even prevent future safety challenges

One health



The approach

Designing and implementing programmes, policies, legislation and research with a common goal



Areas of work

One Health approach is particularly relevant in

- *food safety,*
- *the control of zoonoses*
- *combatting antibiotic resistance*



Monitoring

What makes the approach to work effectively to detect, respond to, and prevent outbreaks of zoonoses and food safety problems

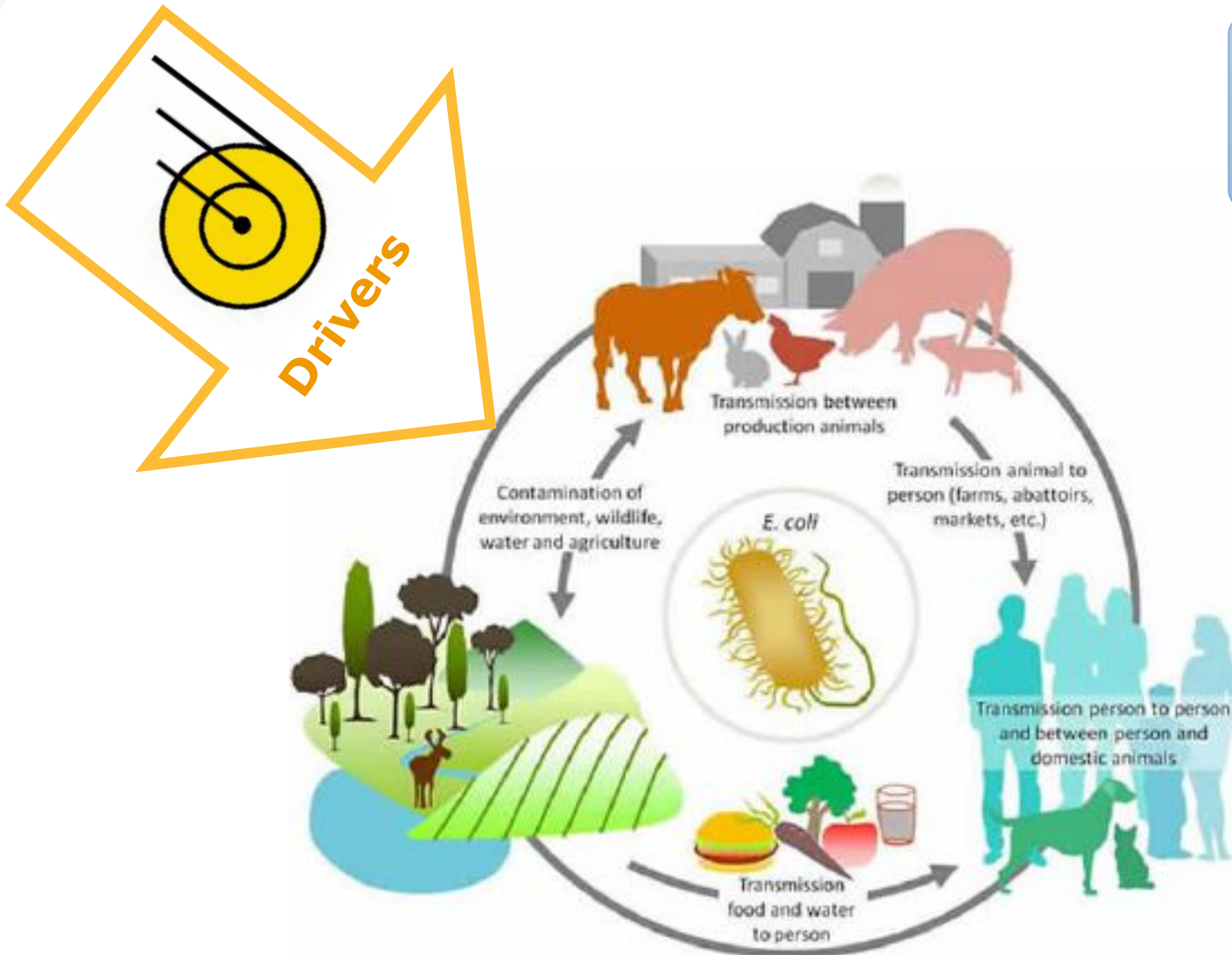
Emerging risk identification system (EFSA)

Programmes, policies, legislation and research are monitored process to anticipate risks

Topics regularly covered by ERI networks discussion and ERI projects

The ERI approach in EFSA include driver analysis and a holistic approach across the food supply chain

Cultural and methodological challenges

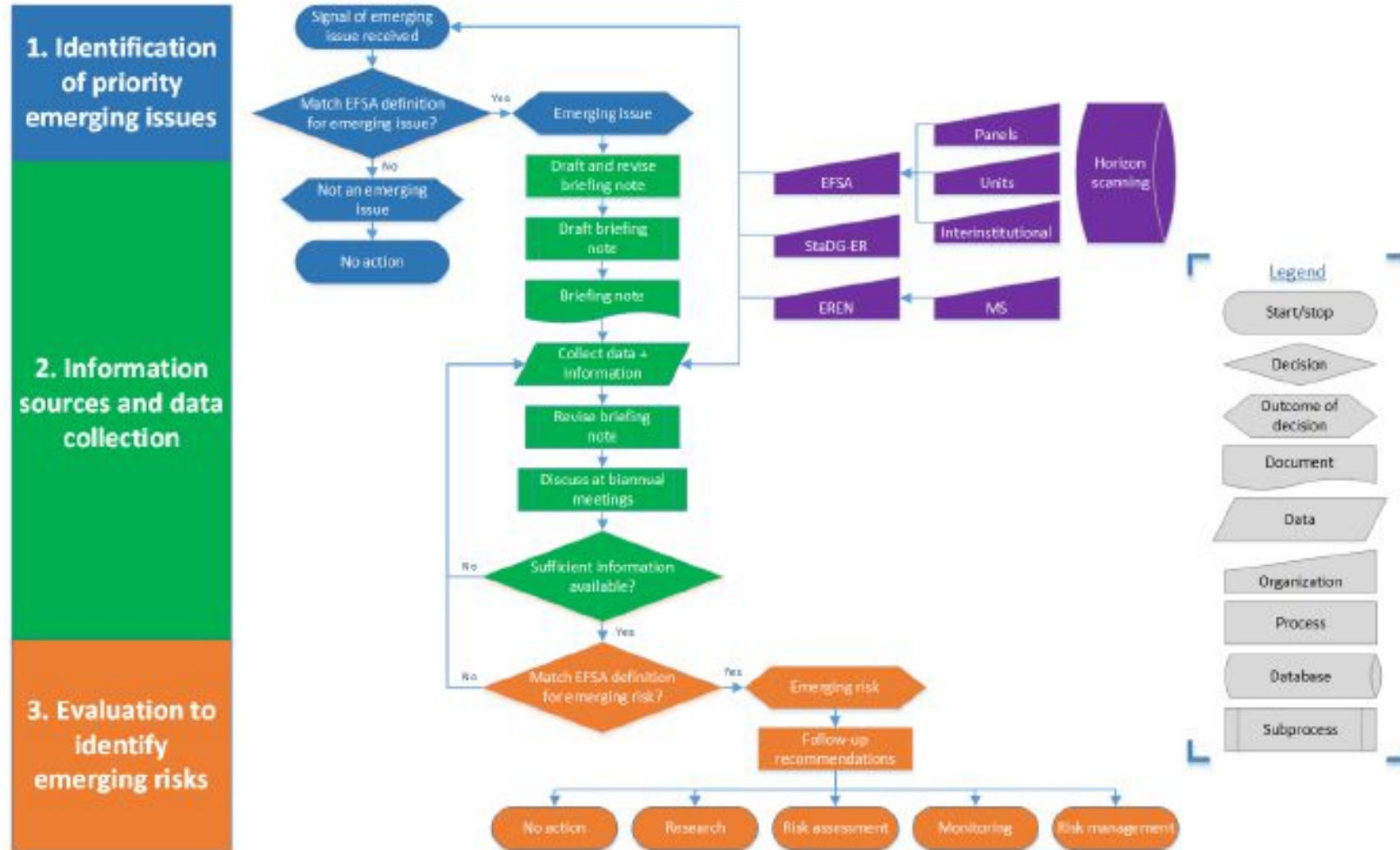


Emerging risk is a local issue with a global dimension

The emergence of a risk involves a combination of changes in **key drivers**

Most drivers for emerging issues are common to human, veterinary, plant and ecosystem health

Pathogen discovery -
Pathway discovery



- Networks of knowledge
- Methodologies development
 - AQUARIUS - Food supply chain analysis for ERI
 - EMCHEM - Emerging chemical risks in the food and feed chain
 - CLEFSA – Climate Change as a driver of emerging risks

Networks of Knowledge



EREN – Emerging Risk Exchange Network – Members states



StDG-ER – Stakeholder Discussion Group on Emerging Risks

International collaboration



International Liaison Groups on Chemical and Microbiological Food Safety

Common templates- agenda



Briefing Note on Emerging Issues

[file name: ID0xxx_ short title]
 [connected FILES to be named: yearmonthday_ID0xxx_Short title]

Title (ID0xxx)

AUTHOR:	
COUNTRY (OPTIONAL):	
CREATED ON:	
LAST UPDATED ON:	
RESTRICTED ACCESS:	<input type="checkbox"/> Yes <input type="checkbox"/> No

Keywords:
 [Use keywords as proposed by GACC <http://www.agricomastree.org/pam/en/>]

[agent (e.g. aflatoxin)], [category of the agent (e.g. mycotoxins)], [nature of the agent (micro/chemical/other)], [matrix], [susceptible groups], [environment], [...]

CLASSIFICATION:
 Microbiological hazard, Chemical hazard, Illegal activity, New consumer trends, New process or technology and Other (e.g. antimicrobial resistance and allergies).

DESCRIPTION OF THE ISSUE¹
 * Include a short description of the issue, mentioning the hazard under evaluation (e.g. which virus, bacteria, parasite, chemical driver etc.). Use the following criteria to explain why EFSA considers this an emerging issue. Evaluation criteria to be considered include at least one of the three criteria listed below.



Emerging Issues – Short description

An "emerging issue" can be defined as one that has very recently been identified and merits further investigation, and for which the information collected is still too limited to be able to assess whether it meets the requirements of an emerging risk. Thus, emerging issues are identified at the beginning of the emerging risk identification process as subjects that merit further investigation and additional data collection (EFSA, 2014).

Please complete the following information for any the emerging issue you may have identified. Use different rows for different issues.

Author: _____

Date	TiBe	Keywords	Description	Information source

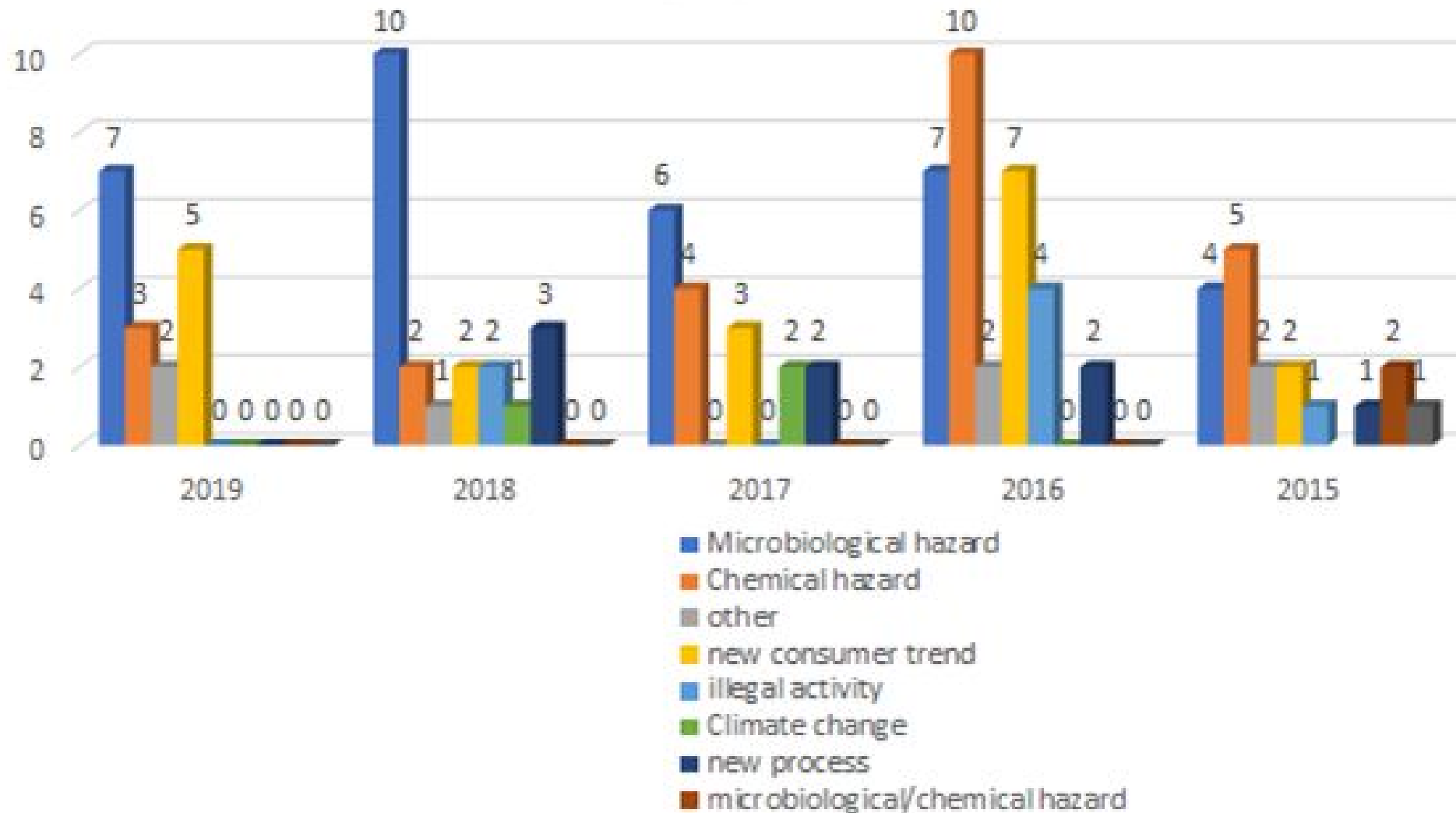
AGENDA

Presentation and discussion of emerging issues

Further information on previous emerging issues

Feedback on EFSA and Member State/Stakeholders activities

Potential Emerging Issues: 2015-2019



1. Example on emerging issue: Azole resistance (ID376)



Azole Resistance in *Aspergillus fumigatus*: A Consequence of Antifungal Use in Agriculture?

Sarah Berger[†], Yassine El Chazli[†], Ambrin F. Babu[†] and Alix T. Costa^{*}

[†]Institute of Microbiology, University Hospital Center, University of Lausanne, Lausanne, Switzerland

Agricultural industry uses pesticides to optimize food production for the growing human population. A major issue for crops is fungal phytopathogens, which are treated mainly with azole fungicides. Azoles are also the main medical treatment in the management of *Aspergillus* diseases caused by ubiquitous fungi, such as *Aspergillus fumigatus*. However, epidemiological research demonstrated an increasing prevalence of azole-resistant strains in *A. fumigatus*. The main resistance mechanism is a combination of alterations in the gene *cyp51A* (TR34/L98H). Surprisingly, this mutation is not only found in patients receiving long-term azole therapy for chronic aspergillosis but also in azole naïve patients. This suggests an environmental route of resistance through the exposure of azole fungicides in agriculture. In this review, we report data from several studies that strongly suggest that agricultural azoles are responsible for medical treatment failure in azole-naïve patients in clinical settings.

Keywords: agriculture, antifungals, azole, *Aspergillus fumigatus*, aspergillosis, resistance, CYP51A, TR34/L98H

INTRODUCTION

Agriculture undergoes many challenges comprising pests, diseases and abiotic stresses, which drastically decrease crop yield (Ricoch et al., 2016). This contributes to important losses to farmers and threatens global food production capacity. A wide range of viral, fungal and bacterial plant pathogens has been known to contribute for these losses. As an example, Cassava Mosaic and

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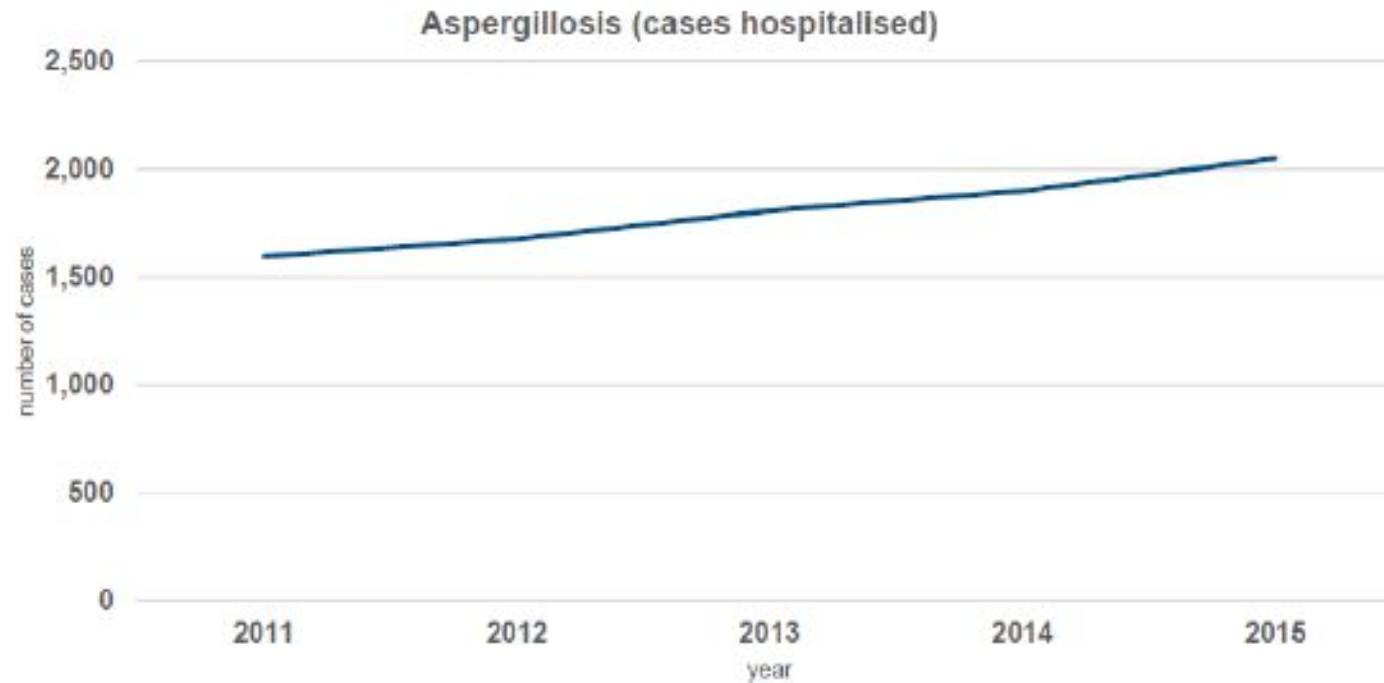
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1. Example on emerging issue: Azole resistance

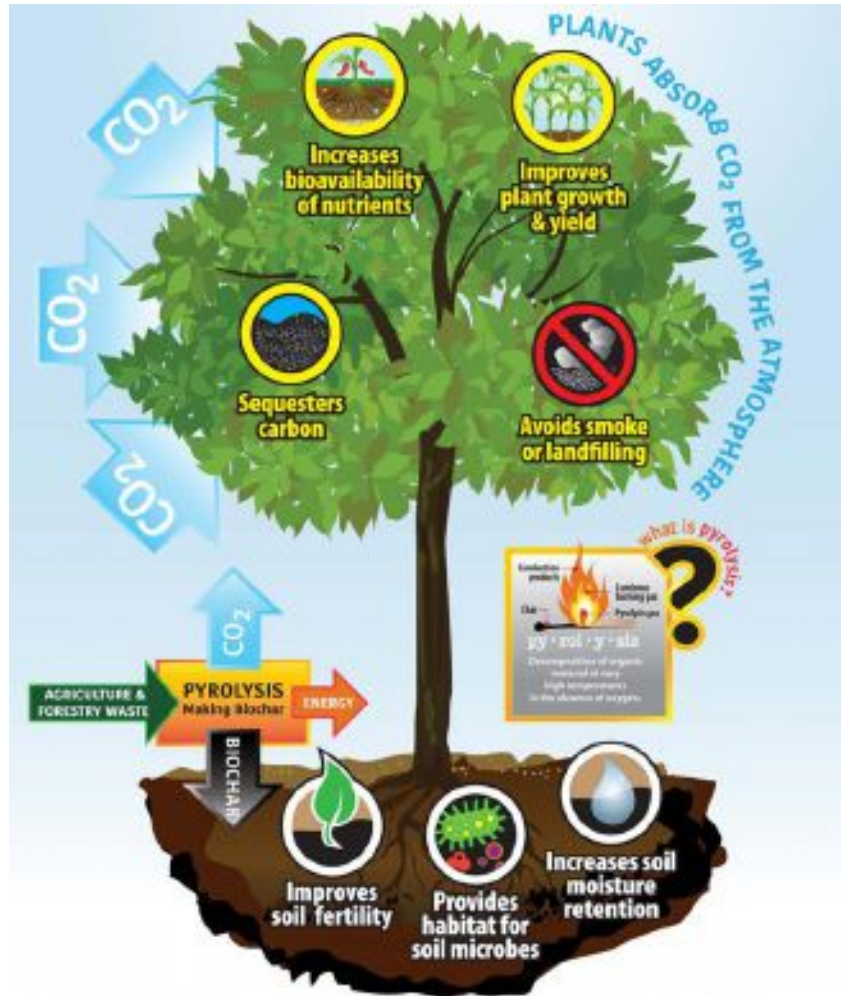
Human aspergillosis in Germany

Increasing number of cases with aspergillosis in German hospitals



Data: Information System of the Federal Health Monitoring www.gbe.bund.de

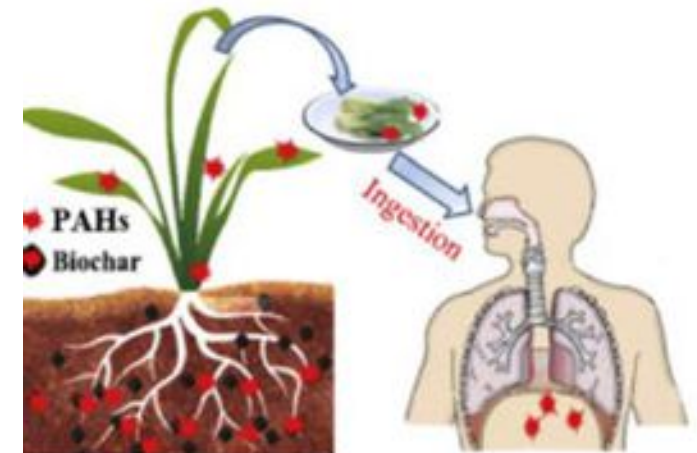
2. Example: Circular economy – pollution from waste to the food chain (ID352)



■ Reuse of waste as fertilizers

EXPOSURE OF POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

- Via skin contact
- Consumption of contaminated food

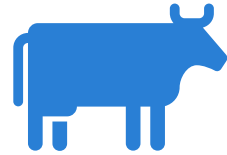


■ Human Health Risk

2. Example: Circular economy – Conclusions



Recycling of waste as fertiliser may lead to negative effects on the environment if contaminants are not controlled.



Adverse human and animal health effects may be caused by unknown mixtures of contaminants in drinking water, food and feed.



There is a need for occurrence data, research on plant uptake and environmental fate and methodology for risk assessment.



There is at present no harmonised regulation of the relevant substances in fertilisers in the EU.



What is the “**farm to fork**” pathway for the products?



What are known and **emerging hazards** that can be introduced?



What are the **key vulnerabilities** and where do they exist?



What type of **controls** (monitoring) are in place, are they effective?



What **drivers** (e.g. environment, governance, trade, prices, globalisation, etc.) act upon the supply chain and how do they influence the vulnerabilities and emerging risks?

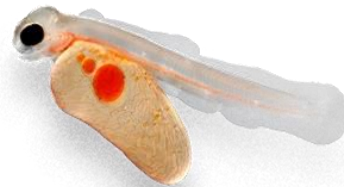
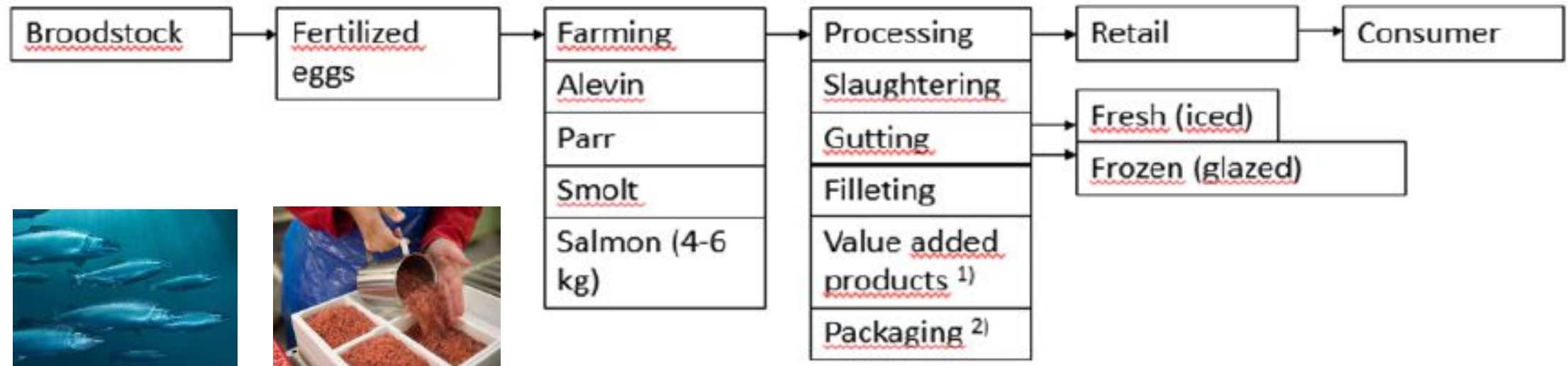


What type of data of drivers (and **indicators**) can be identified?



How to monitor these indicators?

Life-cycle of Atlantic salmon





- more than 140,000 chemicals estimated on the EU market
- 19,466 substances registered under REACH (source ECHA, 27/04/2018)
- The Toxic Substances Control Act (TSCA) in the USA lists ~85,000 chemicals
- ~700 new chemicals added to TSCA every year

To develop a procedure for the identification of emerging chemical risks in the food and feed chain

Step 1

2014 – 2016

Method development – piloting the process



Step 2:

2017-2019

Method application – identifying candidate emerging chemical risks

- (a) Substances selection
- (b) Substances evaluation

- releases to the **environment**
- **biodegradation**
- **bioaccumulation** in food/feed
- **Toxicity**

- (c) Substances prioritisation - potential emerging chemical risks in food

~ 20.000 REACH substances Registered



2.336 selected substances

Evaluated



212 prioritised substances



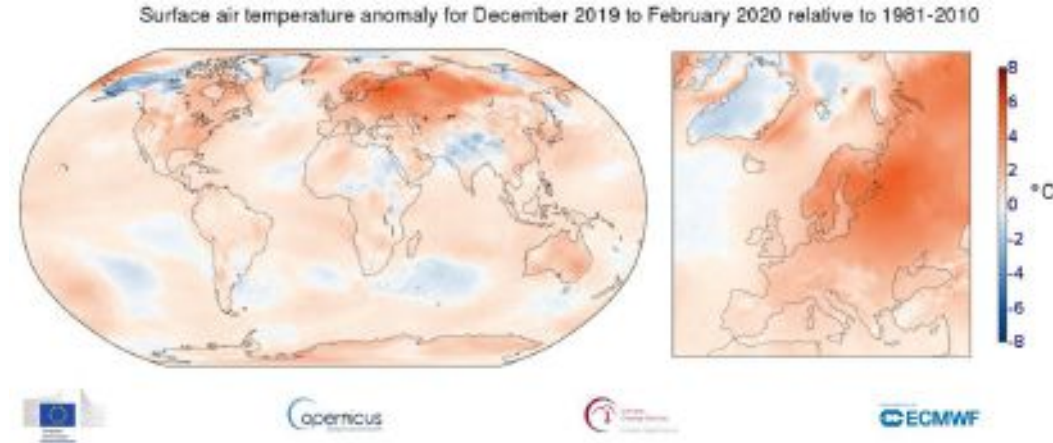
Step 3

2020 - 2022

Screening of prioritised substances

- Revisiting the ERI process:
The Climate Change project
(CLEFSA)

- Identification
- Characterisation
- Analysis



... by far the warmest winter on record for Europe (ECMWF, <https://climate.copernicus.eu/climate-bulletins>).

CLEFSA's features



Driver

- Long term
- Several emerging issues
- Scenarios



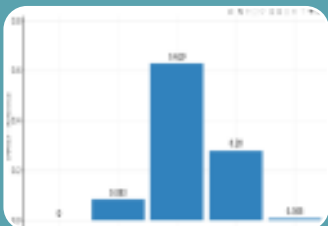
Horizon scanning for identification

- CLEFSA group
- Crowdsourcing
- Broad range of signals - Variety of information sources



Characterisation

- MCDA
- Participatory (expert knowledge + networking)



Analysis

- Impact-likelihood
- Indicator of effect of climate change
- Indicator for uncertainty



- Climate change and its implications for food safety demand complex scientific work, given the number and diversity of hazards to be considered, the large uncertainties involved and the **interconnections between the different areas**.
- The effects of climate change are characterised by a **multidisciplinary nature** (human-plant-animal health and environmental sciences) and go beyond the recognition of specific emerging risks

Green deal and farm to fork

Themes

- Sustainability and circular economy
- Chemical hazards identification - next steps
- Food fraud
- New food and feed technologies



Emerging risks

The successful identification of emerging risks is at the heart of protecting public health and the environment. By identifying emerging risks in the food chain early, EFSA supports risk managers in anticipating risks and taking effective and timely prevention measures to protect consumers. Identifying emerging risks also helps to improve EFSA's ability to meet future risk assessment challenges. EFSA defines an emerging risk as: "A risk resulting from a newly identified hazard to which a significant exposure may occur, or from an unexpected new or increased significant exposure and/or susceptibility to a known hazard."

Networks

Activity reports

Methodologies

Completed work

Emerging risk identification is a complex process requiring broad expertise and close cooperation with Member States, stakeholders, and EU and international agencies. Dedicated networks provide the structures needed to exchange experience, methods and data and to assess emerging issues.

- [Emerging Risks Exchange Network](#)
- [Discussion Group on Emerging Risks](#)

Discover All EFSA topics

Subject area

Cross-cutting science

Related News

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EFSA experts

- Emerging Risks Exchange Network
- Stakeholders discussion group
- JRC
- DG SANTE
- ECDC
- FAO
- WHO.....



THANK YOU