Circular Economy Foresight Event - 09 June 2022

Food and feed safety vulnerabilities in a circular economy

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KNOW - Knowledge, Innovation and Partnership management

ENREL - Engagement and External relations

NIF - Nutrition and Food innovation

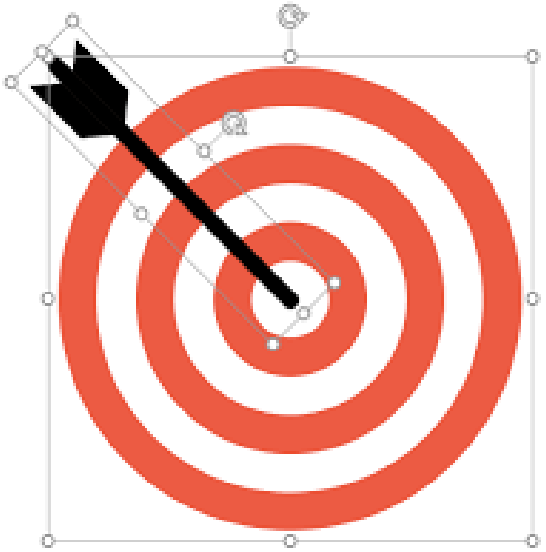
PLANTS- Plant Health & Pesticide Residues

Trusted science for safe food

efsa
European Food Safety Authority

Objectives of this presentation

- The project;
- Objectives of this event;
- What after this event?

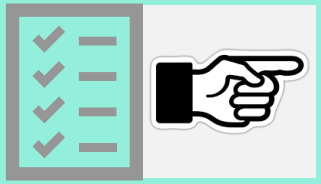


Why Circular Economy?

- Complexity, Uncertainty, Changes
- Preparedness to the **future -> identification emerging risks**
- **Drivers** for **Long-term** anticipation/prevention
- Circular economy as a driver of emerging risks

The circular economy project

Identification of vulnerabilities of circular economy for food/feed safety, plant and animal health and the environment



1st year: Extensive literature search (ELS)

2nd year: stakeholders

Status of uptake of CE in Europe

- Expert knowledge
- Literature search
- topic modelling
- On-going research projects

Emerging Risks Identification

- **Extensive literature search** (AI)
- on-going research projects

Emerging Risks Characterisation

- Papers and grey literature retrieved in objective 2

Feb 21 — May 21 — Oct 21 — End Jan 22

1st year

Circular economy in Europe

Waste reduction in:

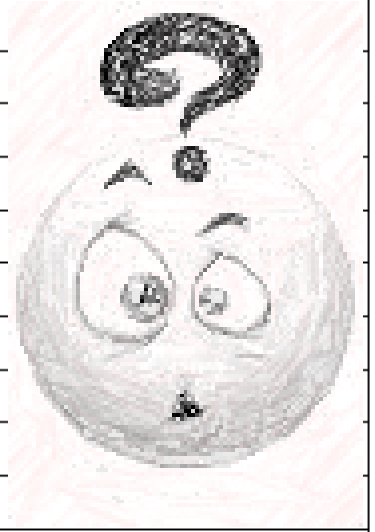
Primary **production** of food and feed

industrial/manufacturing/processing

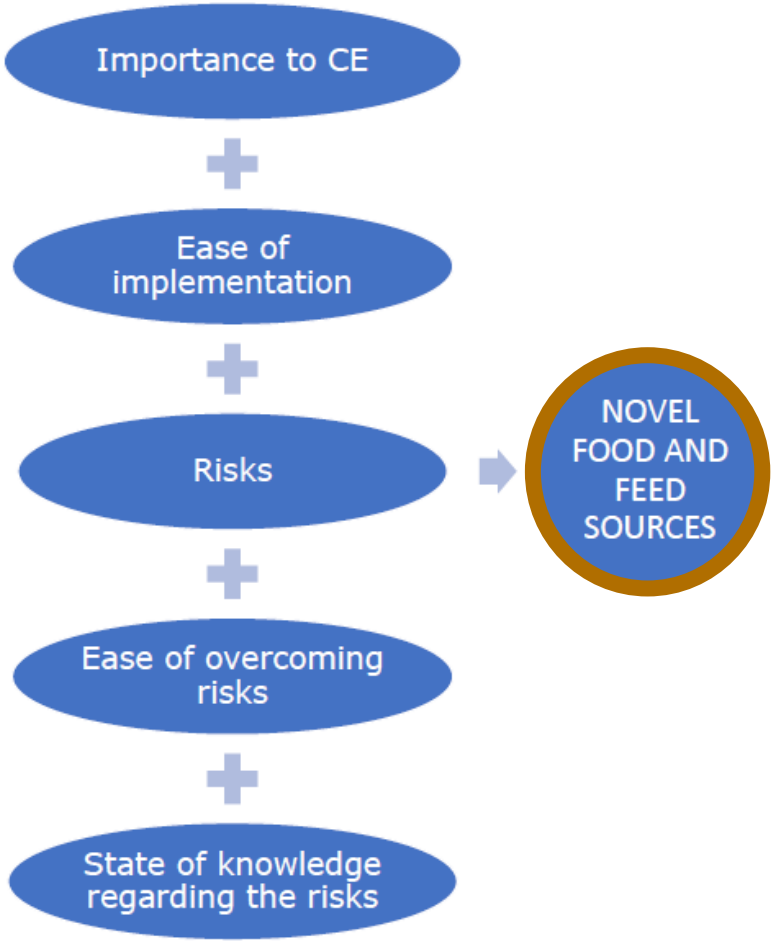
wholesale, food retail, catering and households

food and feed **packaging**

ID	CE Practice
1	**Use of organic waste streams**
2	**Novel sources of food & feed**
3	**Crop protection & breeding**
4	**Livestock health & breeding**
5	**Locally produced food & feed**
6	**Livestock waste**
7	**Food crop waste**
8	**Fish/Crustacea waste**
9	**Non-food crop waste**
10	**Energy Production**
11	**Date labels or selling beyond best before date**
12	**Food contact materials (FCM) to extend shelf life**
13	**Reducing food waste in supply chain**
14	**Redistribution of edible surplus food**
15	**Food waste for animal feed**
16	**Changing marketing and operations management**
17	**Repurposing surplus food for human consumption**
18	**Food waste for energy recovery**
19	**Nutrient recovery from food waste**
20	**Biorefinery of food waste**
21	**Knowledge transfer & training to reduce food waste**
22	**Development & recycling of biobased materials**
23	**Recycling of plastics & paper/card packaging**
24	**Source reduction**
25	**Reuse of packaging**
26	**Education**



Where do we start?



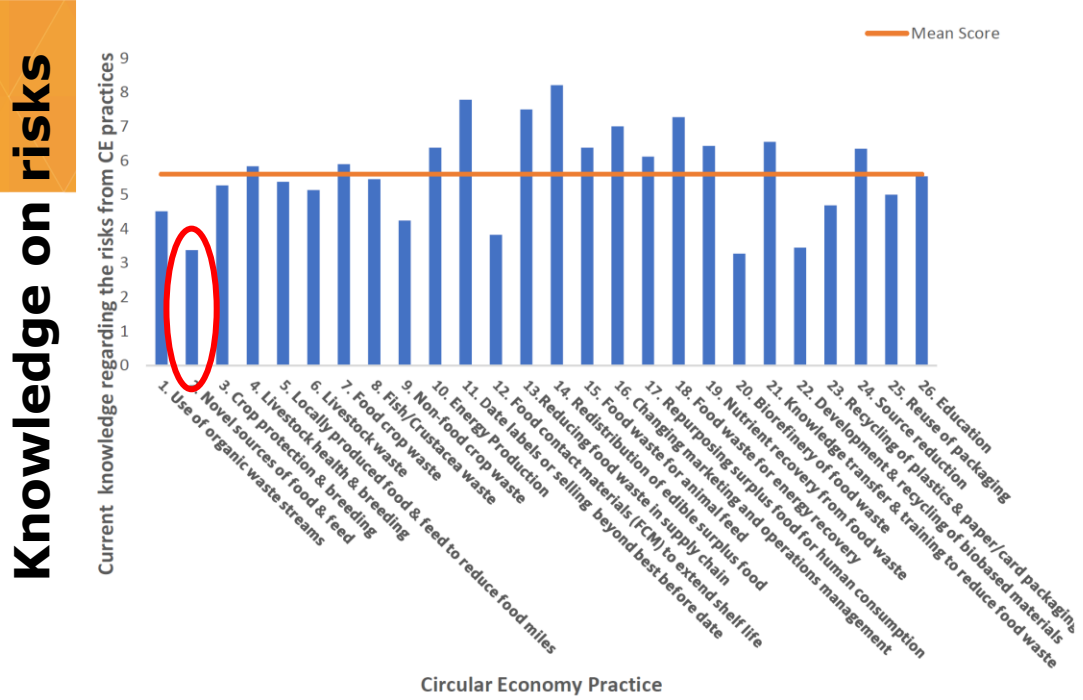
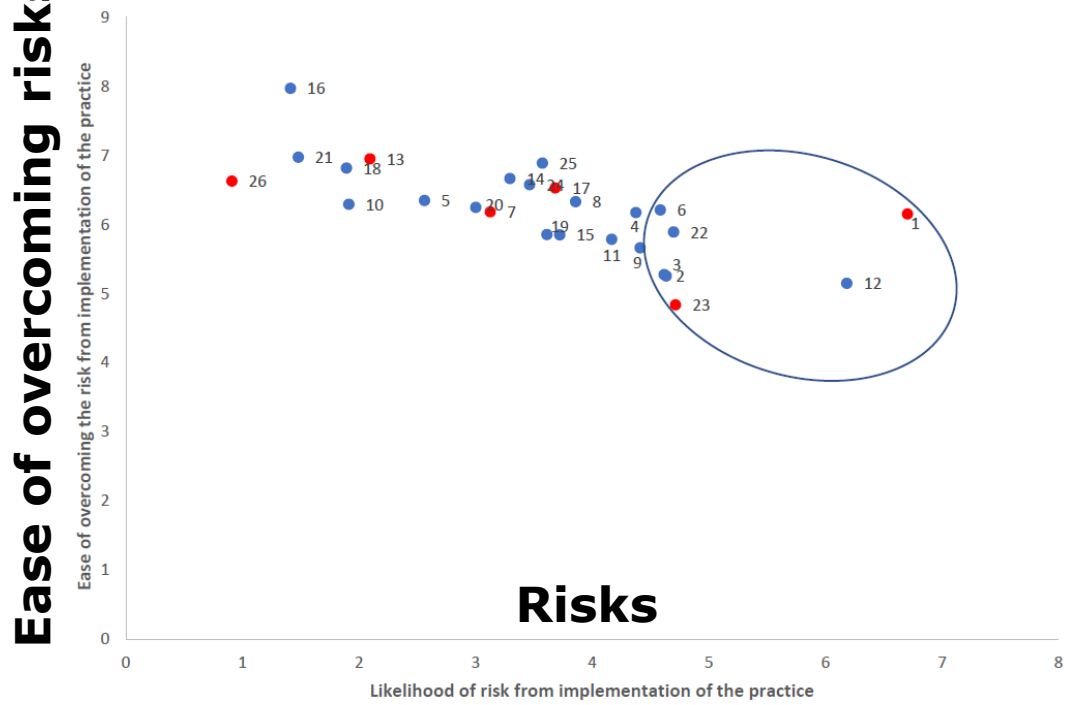


Figure 3: The current state of knowledge regarding the risks from these circular economy practices



Novel food and feed:
ELS for emerging risks

AI supported screening

Emerging risks in the primary question of the search (*inclusion criteria*)

Emerging Risks not extensively investigated (only 27 out of 51.235 articles). Many on animal production performance.

Nearly all these 27 articles investigated the rearing of **invertebrates** for food or feed on *substrates arising from waste, side-streams or FFP*

Emerging risks identification
resulting from ELS

Chrysomya spp	*Hermetia illuncens*	*Calliphora vomitoria*	*Eisenia fetida*	Generic animal feed	*Musca domestica*	*Fish*	*Alphitobius diaperinus*	Pig	*Tenebrio molitor*

Cereal by-product
Cereal flours (wheat, maize),
Coffee silverskin (roasting by-product)
Distillers' grain
Brewers grains
Brewery spent grain mixed with fish feed waste and yeast
Feather meal
Fish feed waste
Food waste
Fruit waste
Maize distiller
Manure - bovine
Manure - porcine
Manure - poultry
Manure – fermented poultry manure
Manure – poultry manure mixed with fish feed waste
Municipal organic waste
Olive-pomace
Pig offal

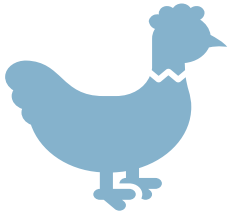
Potato starch
Potato processing product
Poultry by-product
Rapeseed meal
Soybean by-product
Sugar beet by-product
Sunflower meal
Unknown side stream
Vegetable waste
M. domestica larval meal fed on food waste
Wheat bran
Wheat flour
Wheat meal
Wheat middlings
Wheat processing product
Scallop by-product
Meat and vegetable former food product contaminated with paperboard carton or plastic

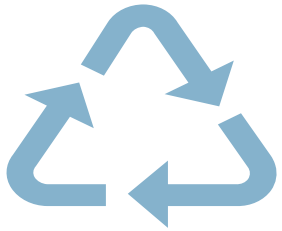
Next:

- Focus on *circular* ***novel food/feed <u>other than insects and worms</u>***

- Stakeholders'engagement *vs* ELS

Circular novel feeds/food other than insects/worms - **no risks** for food/feed safety in the ELS





Feed

Mammalian by-products
Former food products
Food waste
Food processing by-products
Invertebrates other than insects
Manure
Plant by-products
Poultry by-products
Fungi
Bio-diesel industrial side-streams

Food

Recycling plant waste/side-products
Microbial fermentation

multi-criteria based

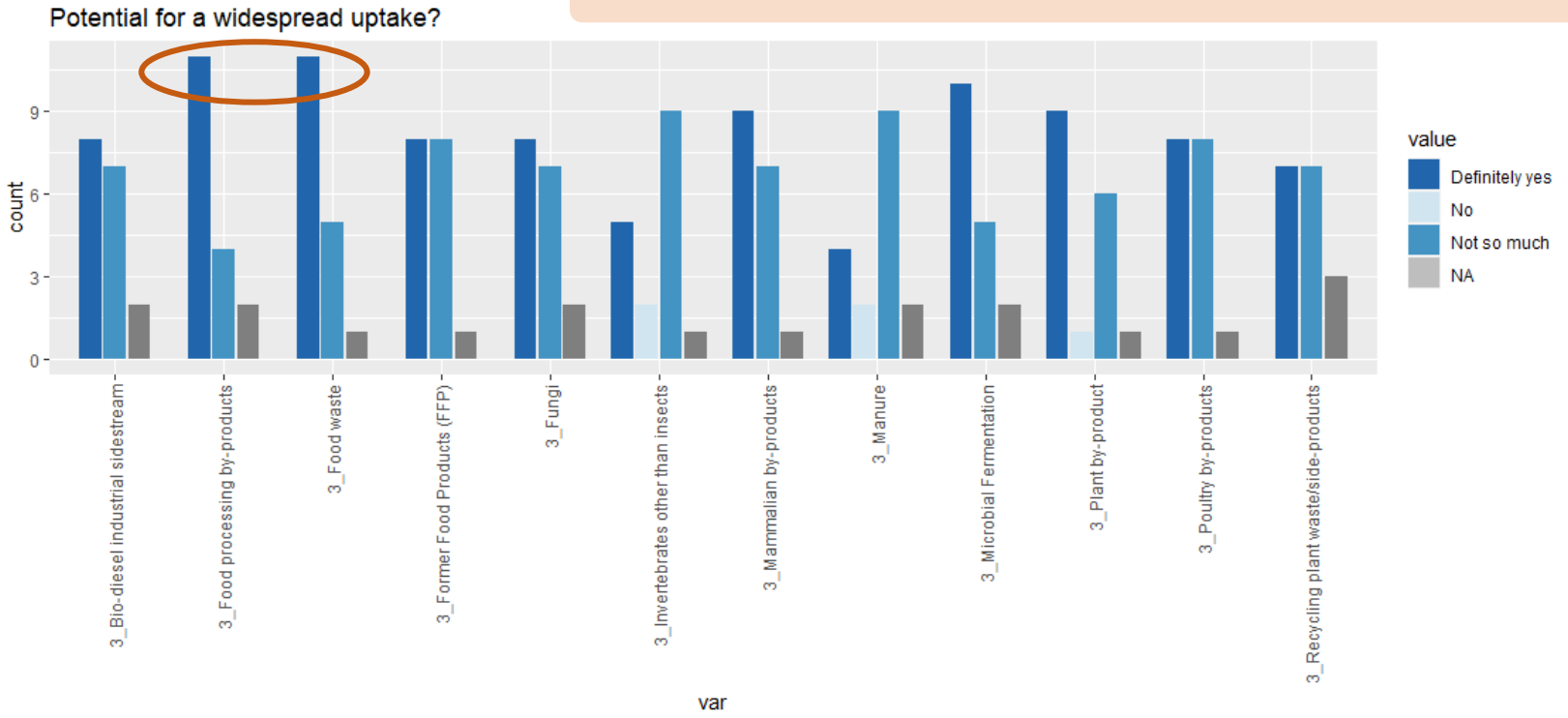
- Is there an enabling EU Policy? (for the EC)
- Is it covered by the EU legislation? (for the EC)
- Can it drive the emergence of risks in the future?
- Is it affected by significant knowledge gaps?
- Does it have a potential for a widespread uptake?

Selection of Top three

Selected areas: Novel Feed sources/technologies

Food → Feed

- Food waste
- Former Food Products
- Food processing by-products



Objectives of this event

Future trends, drivers, scenarios, inhibitors, and challenges

Specific new feed sources and technologies

Future vulnerabilities and emerging risks for feed safety (list of *short issues*)

Feed safety refers to biological, chemical or physical hazards potentially associated with additives, products or substances inherent to feed ingredients or intended for deliberate use in animal feed or resulting from contamination. It includes the safety for the target species (impact on animal health and welfare), for the consumer of products of animal origin (relevance for food safety), and for the environment.

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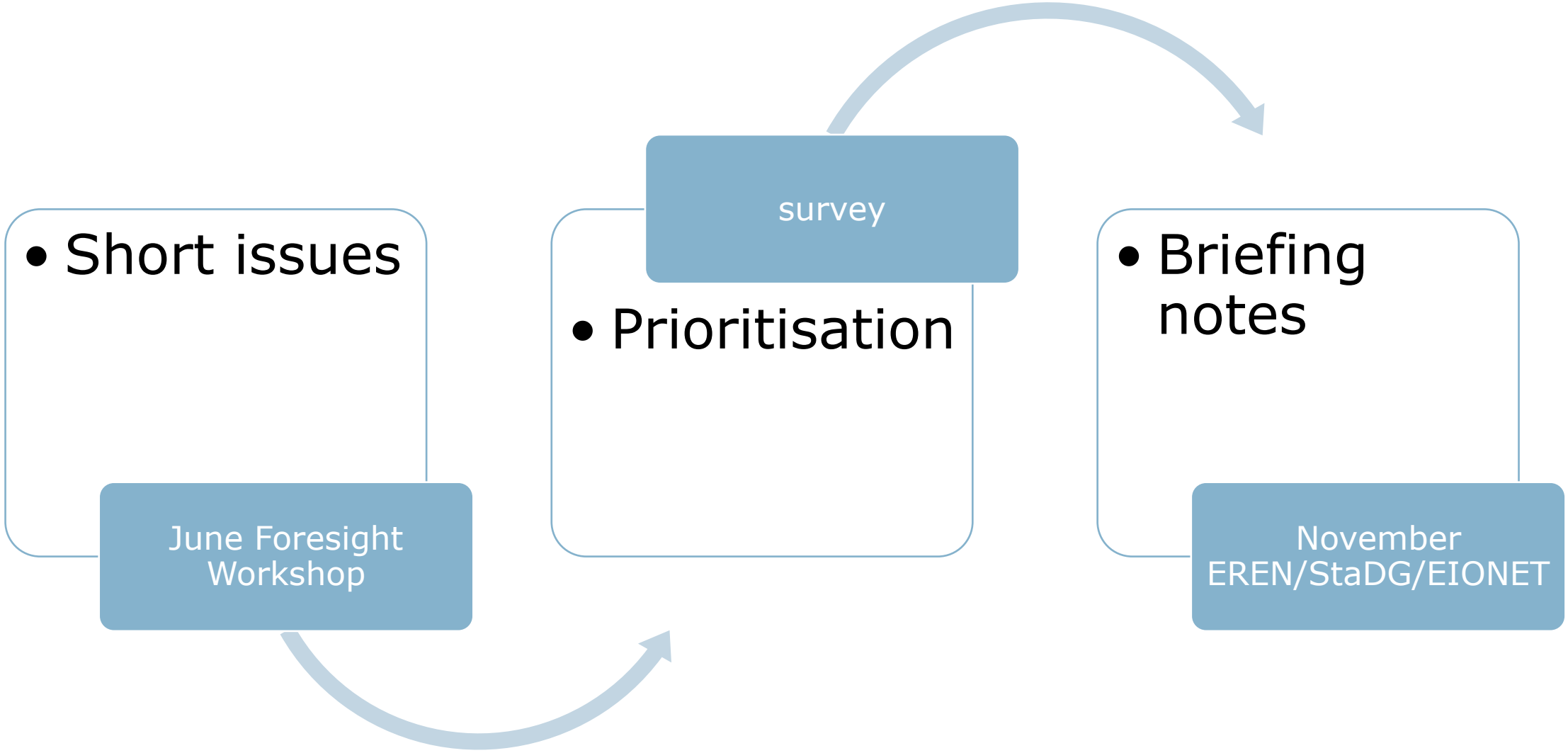
Next activities



Thank you for your attention.