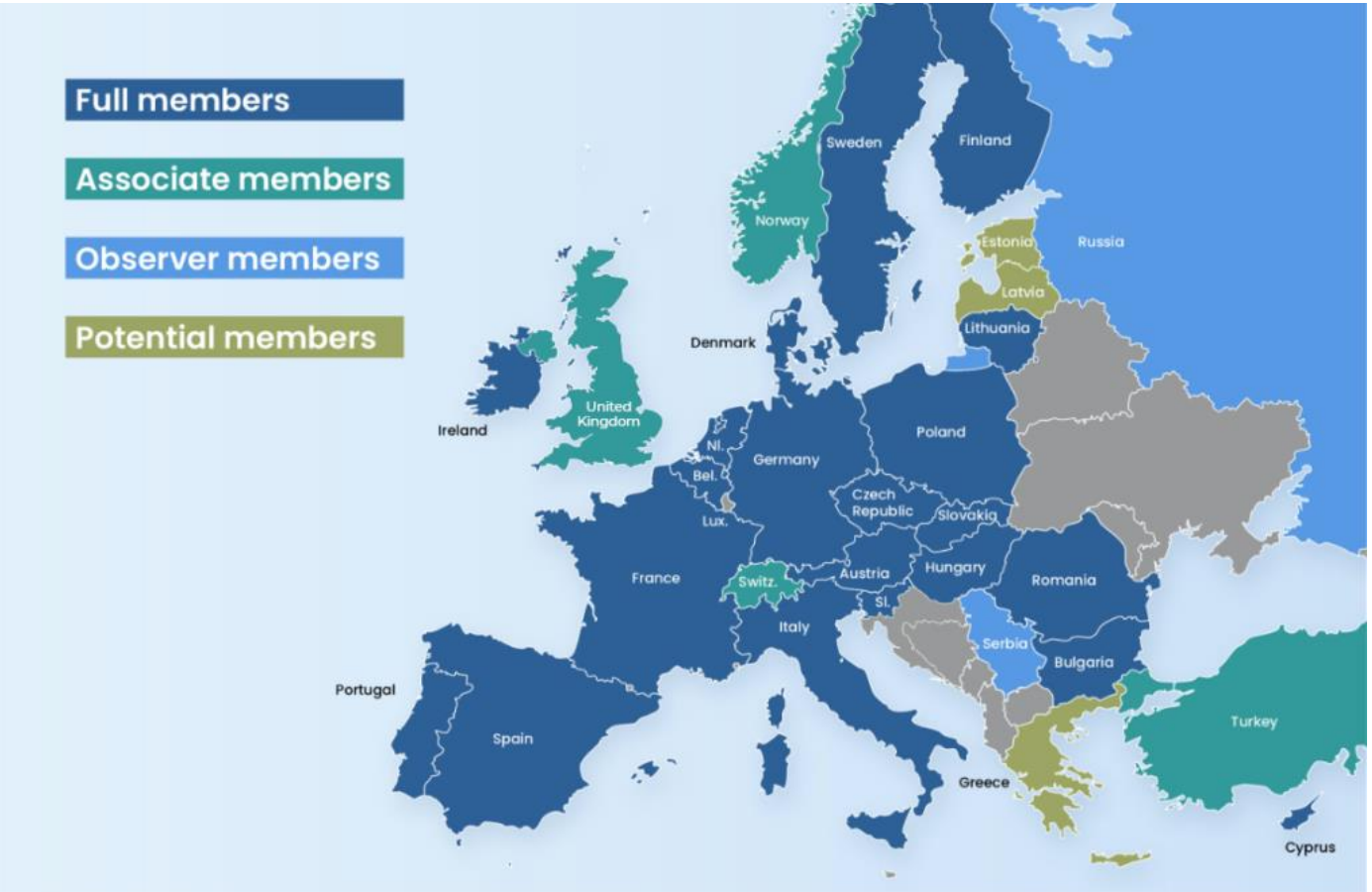
CIRCULARITY IN THE FEED CHAIN

LEA PALLARONI - VICE CHAIR OF FEFAC ANIMAL NUTRITION COMMITTEE

STA-DG ER 7-8 JUNE 2023

Who is FEFAC?

- European Association of Compound Feed Manufacturers
- Founded in 1959
- Represents 28 National Associations in 27 European countries
- The EU-27 compound feed production in 2022: 145.1 mt.



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ROLE OF THE LIVESTOCK SECTOR IN HARNASSING NUTRIENTS IN A CIRCULAR ECONOMY

(SOURCE ANIMAL TASK FORCE)

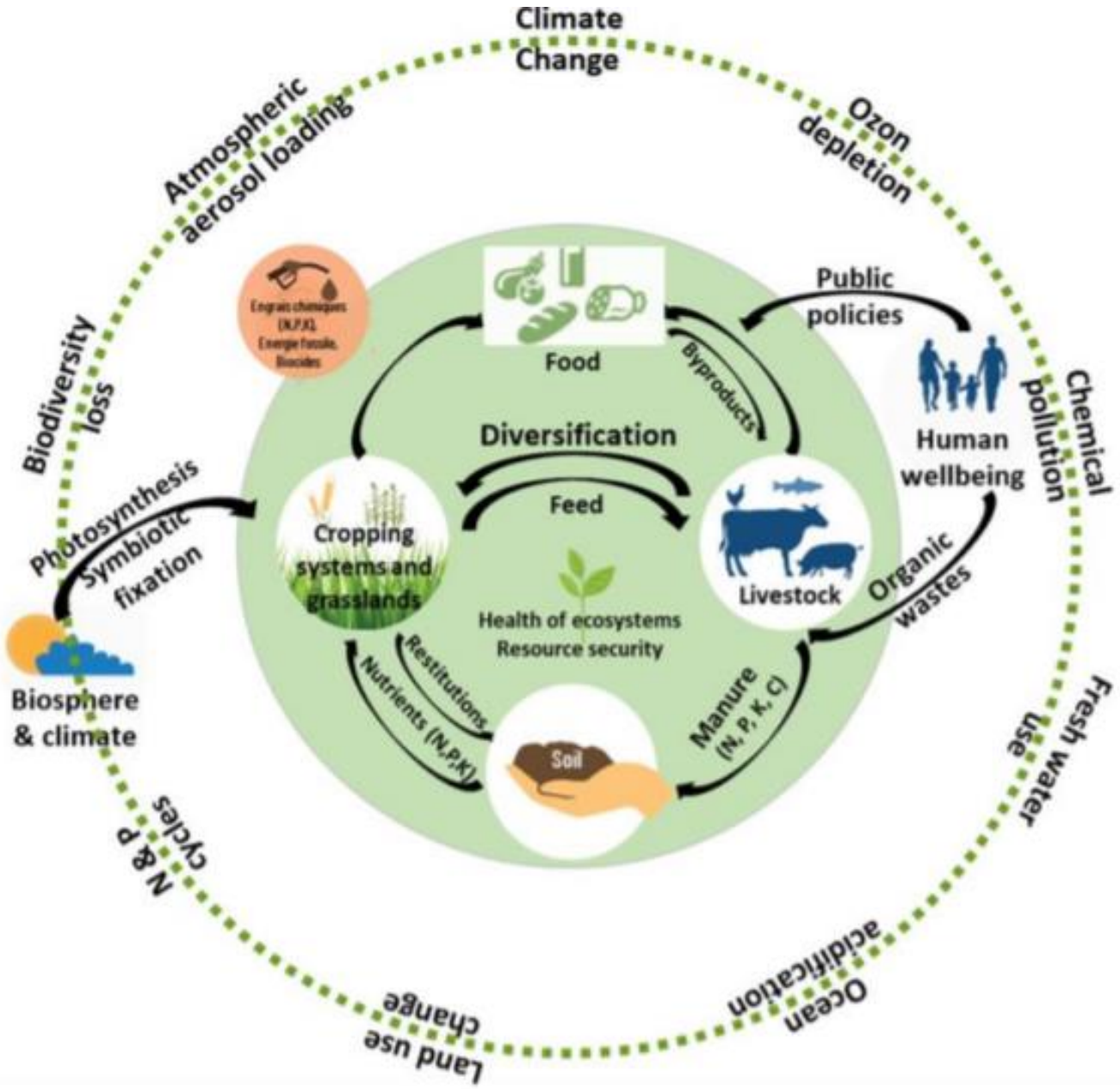

Figure 1. Role of livestock farming in sustainable agri-food systems

Harper Adams University

Current & envisaged circular economy practices within the food and feed production chain

Centre for Evidence Based Agriculture

- 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 to reduce food miles**
- 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**

POTENTIAL FEED SOURCES FROM THE CIRCULAR ECONOMY

Co-products from other industries

Food products no longer meant for food use (former foodstuffs)

Feed recovered from waste

Only first 2 potential resources are legally permitted today.

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RESOURCES AVAILABLE

CO-PRODUCTS / BY-PRODUCTS FROM FOOD / NON-FOOD PROCESSING INDUSTRY

The principle

Resource efficiency champions

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RESOURCES AVAILABLE

CO-PRODUCTS / BY-PRODUCTS FROM FOOD / NON-FOOD PROCESSING INDUSTRY

TRADITIONAL CO-PRODUCTS

SUNFLOWER OIL CAKE

CORN GLUTEN FEED

RICE BRAN

SOYBEAN MEAL

SUGAR BEET PULP

BLACKSTRAP MOLASSES

BREWERS' GRAINS

WHEY POWDER

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RESOURCES AVAILABLE

CO-PRODUCTS / BY-PRODUCTS FROM FOOD / NON-FOOD PROCESSING INDUSTRY

EMERGING CO-PRODUCTS

GRAPE POMACE

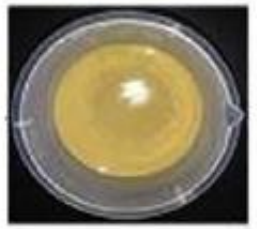
DRIED DESTONED VIRGIN OLIVE POMACE

CHICKEN FEATHER HYDROLYSATE

APPLE POMACE

CAMELINA MEAL

ANIMAL PLASMA



FISH PROTEIN HYDROLYSATE

TOMATO POMACE

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RESOURCES AVAILABLE
FORMER FOODSTUFFS

- **Former foodstuffs:** means foodstuffs, other than waste, which were manufactured for human consumption in full compliance with the food law but which are no longer intended for human consumption for practical or logistical reasons or due to problems of manufacturing or packaging defects or other defects and which do not present any health risks when used as feed.

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RESOURCES NOT AVAILABLE TODAY

NOT LEGALLY PERMITTED TODAY

- Recovery of nutrients via physical treatment :
  - **Sewage Sludge Incineration Ash**: phosphorus (precipitated calcium phosphate, phosphoric acid, dicalcium phosphate)
  - **Municipal solid waste incineration**: potassium salts
  - Sewage sludge: nitrogen recovery from ammonia stripping from digestates
  - **Printed circuit boards and batteries:** copper
- Recovery via anaerobic digestion
  - **Manure or sewage sludge**: **ammonia salts** from nitrogen recovery by stripping of ammonia gas from digestate after anaerobic digestion
- Recovery of nutrients via growing unicellular organisms (algae, bacteria, yeasts) or insects
  - **Food waste**: potential growing of insects for feed use
  - **Sewage sludge, manure**: algal biomass, duckweed lemnae, microbial biomass

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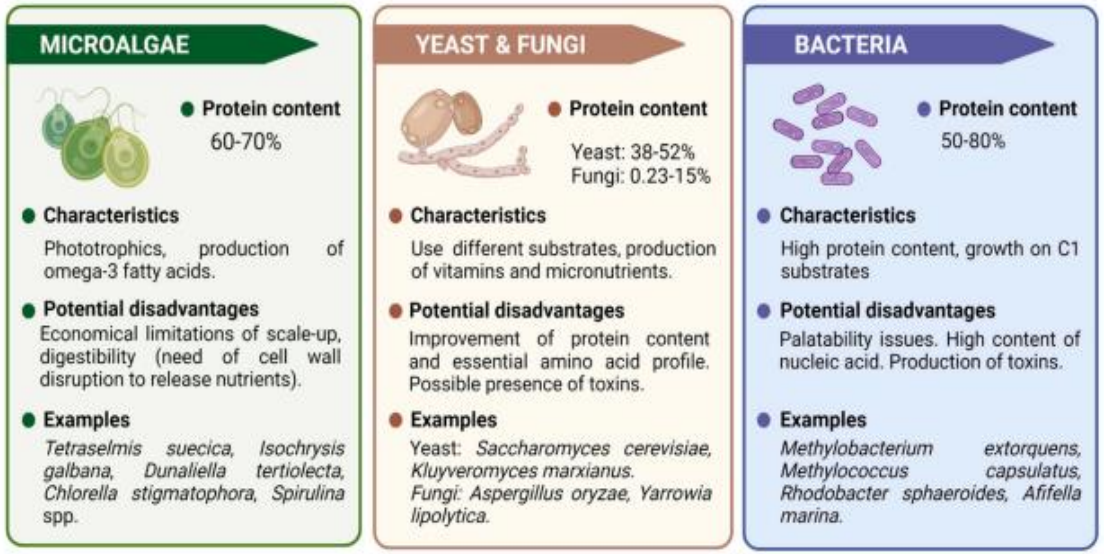
RESOURCES AVAILABLE

BIOLOGICAL UPCYCLING AND NUTRIENT RECOVERY

LAWFULLNESS AS FEED DEPENDS ON FEEDSTOCK

Review

Single-Cell Proteins Obtained by Circular Economy Intended as a Feed Ingredient in Aquaculture



Review

An inclusive approach for organic waste treatment and valorisation using Black Soldier Fly larvae: A review

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CIRCULAR FEED

PREREQUISITES FOR THE USE OF NEW FEED RESOURCES

- Safety Assurance: safety for feed means safety for all animal species, safety for consumer of animal products, safety for the environment, and also impact on animal's performance
- Responsibility: Suppliers of new feed resources shall apply feed hygiene principles (subject to authorization) and be placed under supervision of competent authorities
- Transparency: we are in the world of innovation and that means intellectual property / competition: safety should be the limiting factor to know how protection
- Social acceptance: intra-species recycling, religion, ethics

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SAFETY

- **Many feed safety crisis due to wrong waste processing practices**
  - Meat and Bone Meal (1990s)
  - Dioxin / PCBs in waste fat (1999)
  - MedroxyProgesterone Acetate in glucose syrup (1999)
  - Choline chloride (use of treated wood as carrier) (2000)
  - Bread meal (contamination with dioxin during drying process (2008)
  - Feed fats (mixture with “technical fats”) (2010/2011)

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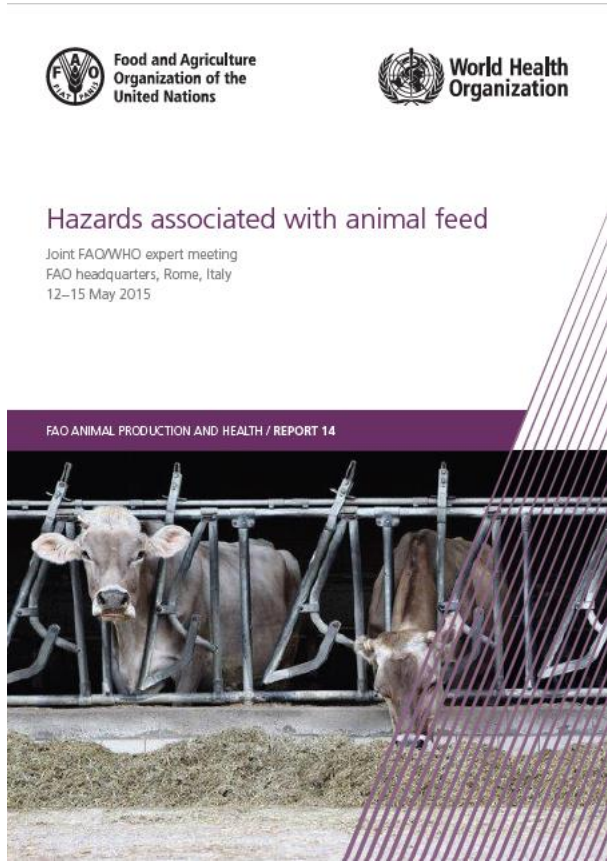
HAZARDS RELEVANT FOR FOOD SAFETY AND ANIMAL HEALTH

EXAMPLE OF FORMER FOODSTUFFS

- heavy metals
- pesticides
- dioxins, furans, dioxin-like polychlorinated biphenyls (PCBs)
- mycotoxins
- acrylamide and semicarbazide in (bakery surplus)
- residual processing aids
- packaging materials
- biological (microbial) hazards, which can increase particularly in high moisture former food
- hazards linked to presence of products of animal origin (FMD, PED, ASF, BSE, etc.)
- physical such as remnants of packaging materials, e.g. plastic, metal, aluminium and glass



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Thank you for your attention

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