



Food and Agriculture  
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# safety of alternative and innovative feed sources and technologies in the context of sustainable development

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ONE Conference- Daniela Battaglia, FAO



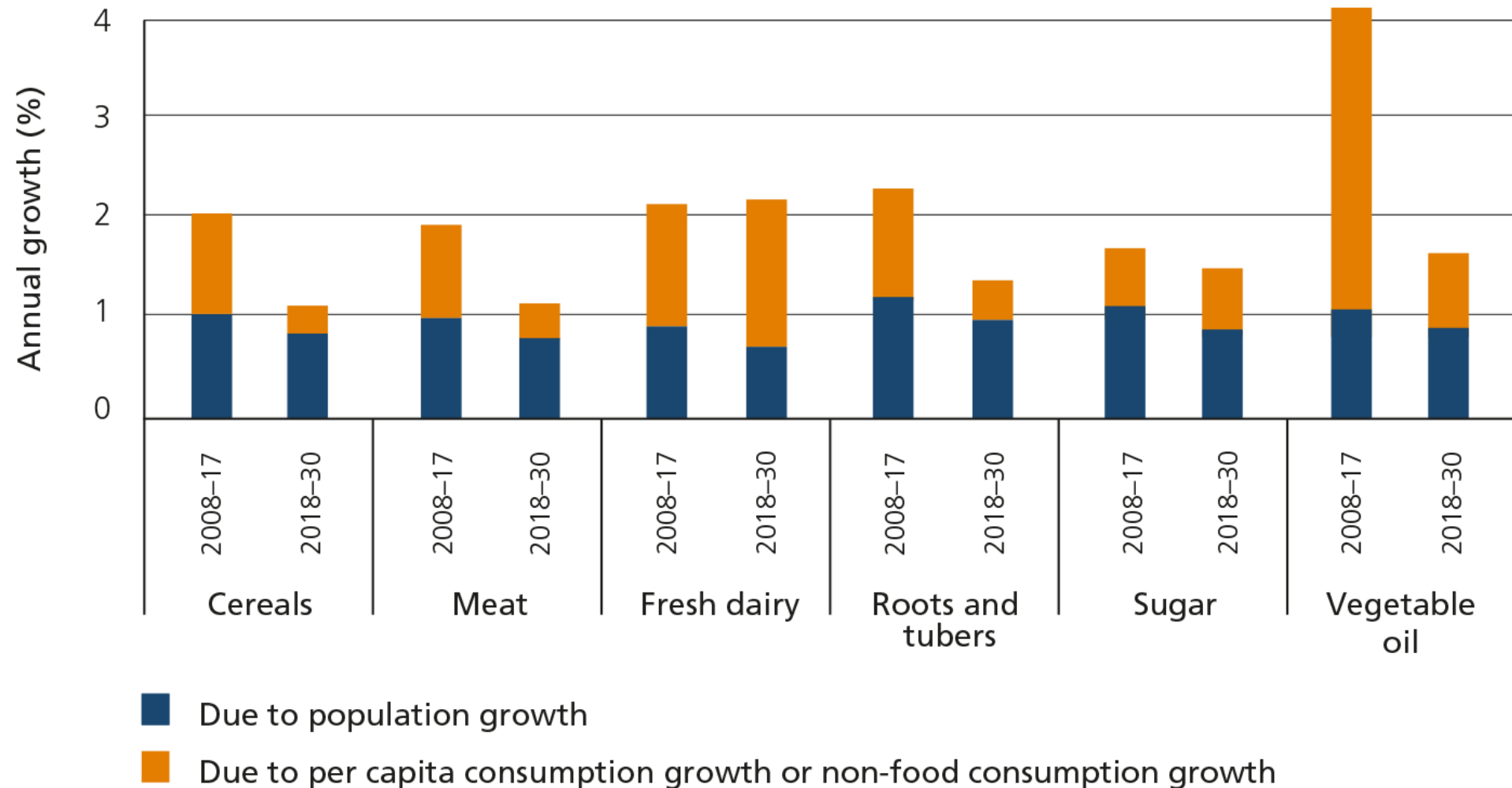






# livestock sector growth

demand for  
animal  
source  
foods is  
expected to  
increase by  
2030



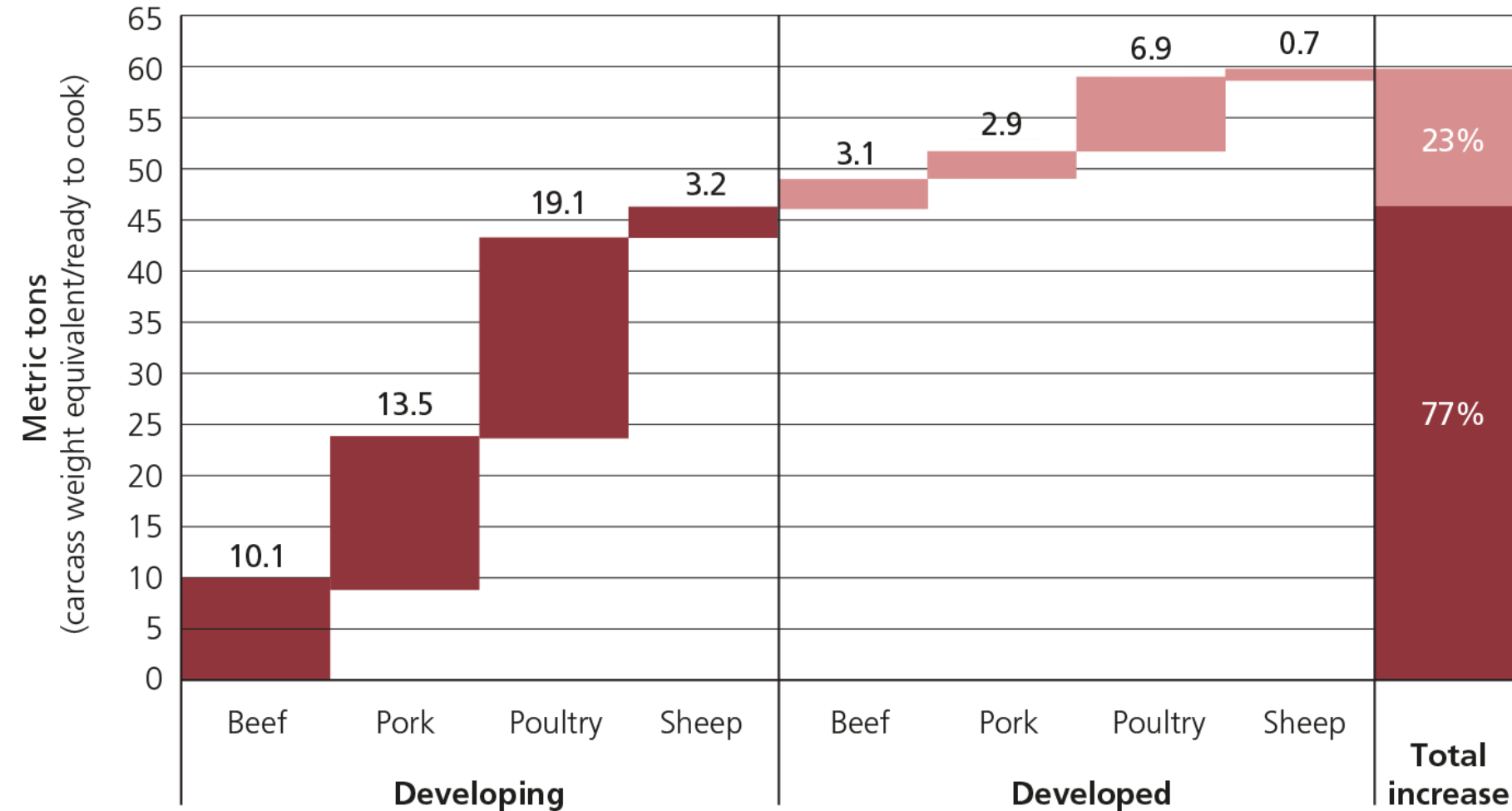








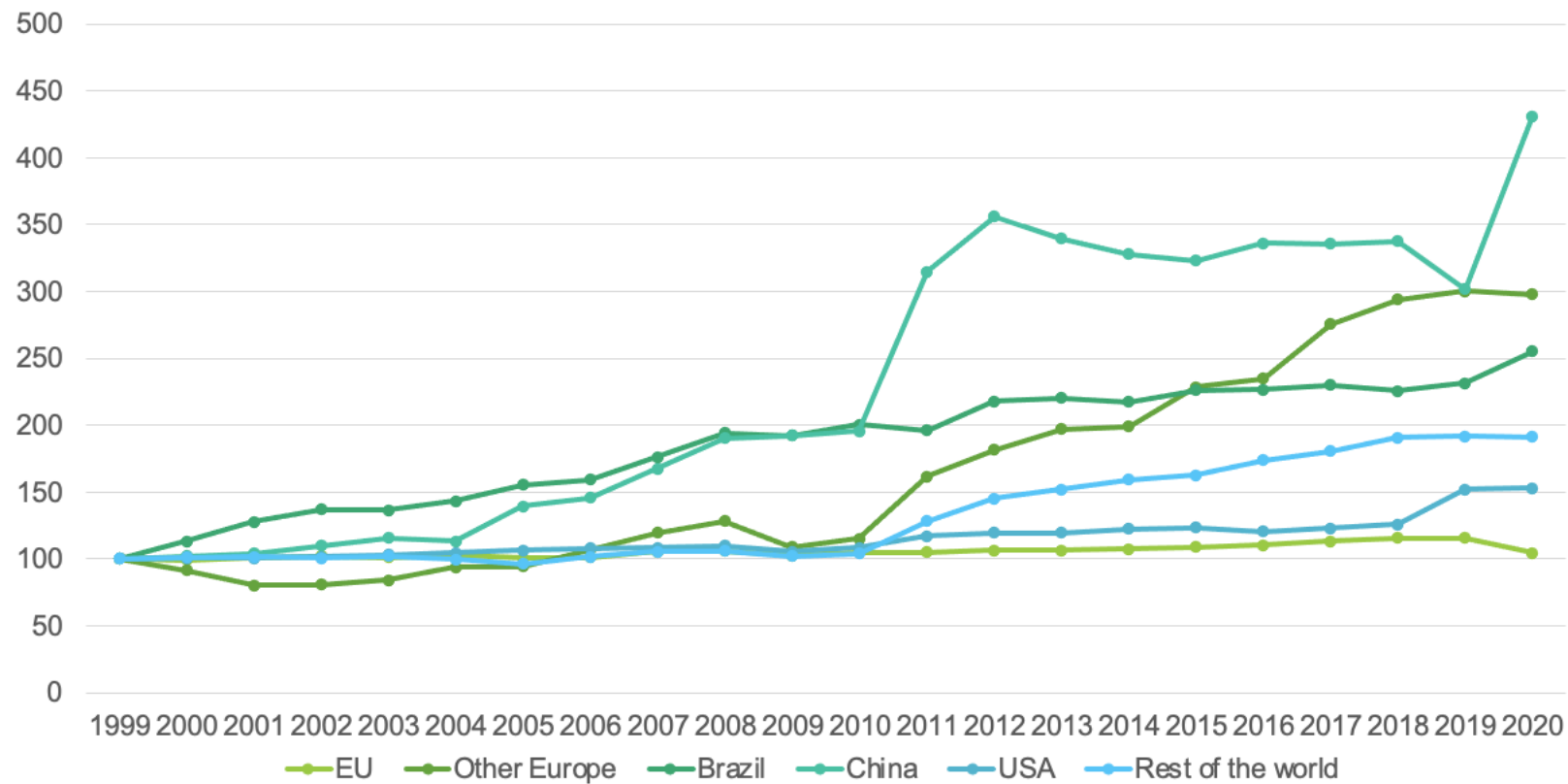
# growth in global meat production



poultry meat  
will remain the  
primary driver  
of growth in  
global meat  
production



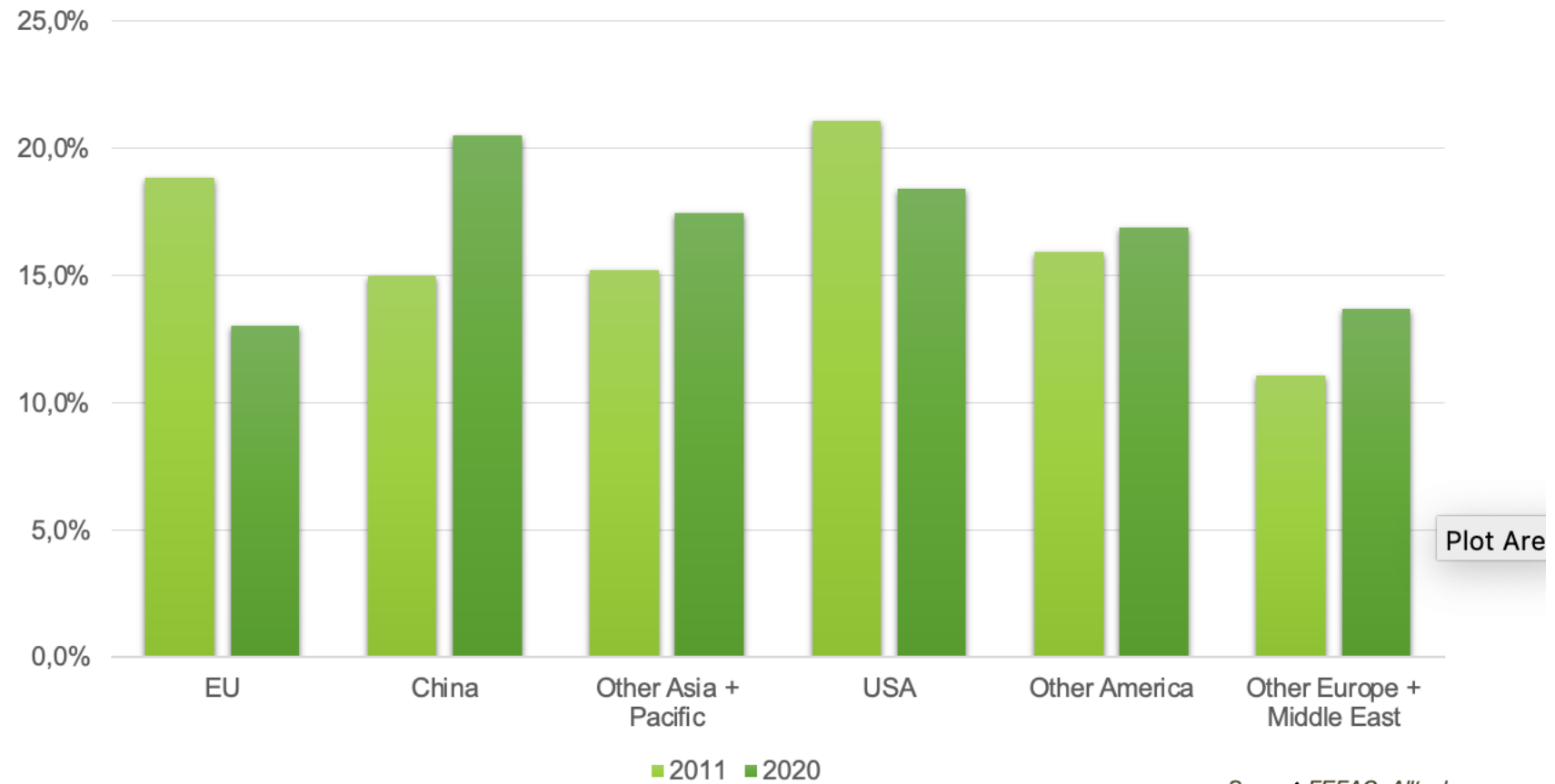
## Evolution of global compound feed production (Index 100 = 1999)



Source: FEFAC, Alltech, Feed International



## Market share change 2011/2020



\* the UK is not part of the EU

Source: FEFAC, Alltech



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SUSTAINABLE  
DEVELOPMENT  
GOALS

AN ESTIMATED  
**ONE THIRD**

OF THE WORLD'S  
CEREAL HARVEST  
IS FED TO FARMED  
ANIMALS.



That would be enough  
grain to feed about  
**3 billion people.**



**Animals  
Australia**  
the voice for animals





- **820 million people** continue to go **hungry** every day (slowly rising since 2014)
- **30% total global food production is lost and wasted**
- Those put **unnecessary pressure on the environment**, resulting in natural resource depletion and greenhouse gas emissions.
- **Urgency** to address sustainability, food/feed safety and quality with a **One Health approach**





- Growing demand for feed protein and energy sources drives the feed sector to look for new, alternative, more sustainable, and possibly locally available, sources of feed and for new technologies to produce and keep it safe
- Insects and their products, aquatic plants and other marine resources, former food products, agri-industrial by and co-products, and food waste can be converted into animal feed using proper risk-based measures and processing methods to ensure their safety and nutritional value for the needs of the animals (health and welfare) and their production
- Livestock as “up-cyclers” play a critical role to convert inedible products into high-quality meat, eggs, and milk, while addressing food/feed/fuel competition, waste management, food security, use of resource and environmental challenges





- Circularity in food systems offers ways to minimize the loss of resources and nutrients and increase the efficiency and sustainability of food and feed production.
- Japan, South Korea and other countries have developed tightly regulated systems and invested in substantial infrastructure to convert of 35–43 % of food waste into animal feed.
- Insects can also be used to recycle food waste to convert low-quality biomass into high-quality proteins and low requirements in terms of land, water and other resources.



- demand for insect products as animal feed and pet food ingredients, could reach half a million metric tons by 2030
- valuable feed ingredients with nutritional, functional and environmental benefits
- insects can be used to recycle food losses and waste to convert low-quality biomass into high-quality proteins with low requirements in terms of land, water and other resources
- major challenges : current limited scale, high production costs and prices, biosafety and legislative barriers
- need to establish guidance for the standardization of insect rearing, insect products processing practices and use





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# safety of alternative and innovative feed sources and technologies





- heavy metals (e.g. algae may concentrate toxic elements such as arsenic, chromium, cadmium, lead, or toxic at excess doses as iodine)
- pesticide and veterinary drug residues
- dioxins and furans
- mycotoxins
- toxins and bioactive compounds: e.g. Phytoestrogens, glucosinolates, alkaloids, cyanogenic glycosides, saponins
- residual processing aids
- endocrine disruptors
- chemical, from packaging materials, including plasticisers or dispersants, printing inks and certain raw materials for plastic production
- biological hazards (e.g. Food-and-mouth disease, African and Classical Swine fever)
- antinutritional factors
- physical, such as remnants of packaging materials, e.g. plastic, metal, aluminium and glass





hazard identification depends on:

- product type
- starting material
- processing steps to produce the feed
- processing steps to produce the original food item
- all handling, storage and transport steps
- re-introduction of any waste collecting processes, e.g. solids from wastewater treatments, filter cakes, cleaning materials, etc.



- need for clear identification and characterization of hazards that may be introduced through incoming materials that are used in the feed and food processing
- the evaluation of the feed source should consider the role of manufacturing processes to mitigate the risk of the hazards
- Some examples - risk assessment on presence of:
  - micro and nanoparticles
  - packaging materials and inks/dyes in former food products or food waste





- fluctuating cost of conventional feed sources vs costs of (safe) production from alternative sources
- changing environment (climate, farming practices, feed sources etc.): new hazards need constantly (on-going process) to be identified and addressed
- given the diversity of inputs, the range of hazards from these sources could be very broad
- security and ownership concerns regarding data sharing



# knowledge gaps

- inventories of the most prominent and relevant hazards
- insufficient knowledge on a number of hazards
- analytical methods: often not validated for all relevant feed and feed ingredients; no reliable methods for a number of the identified hazards
- data on the global, regional and national availability, utilization (types and volumes) of various new and alternative feed sources and technologies
- monitoring of chemical compounds, originating from packaging material such as phthalates, endocrine disruptors, colorants and printing inks
- occurrence, abundance and risks of remnants of packaging material need to be investigated (physical hazards are largely overlooked).



- use of validated predictive models
- Increased knowledge on animal microbiome
- technical innovations: use of smartphone apps, drones, satellite images, sensors, blockchain, A.I., big data, internet of things
- on-line and on-site analysis
- behaviour changes science – nudging
- precision farming
- feed forensic (authenticity and traceability)





- multi-stakeholder generation, collection and sharing data (role of the industry and competent authorities) – data governance
- harmonization of requirements and procedures (starting from definitions) – co-designing risk-assessments?
- collaborative (and global) foresighting and preparedness
- within a One Health approach, collaboration and communication among food and feed regulators, industries, academia, civil society and YOUTHS on the importance of the feed to food continuum and how to guarantee human, animal, plant, soils and environmental health and welfare



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## Invitation to the 16th International Feed Regulators Meeting (IFRM)

Dear Colleague,

We are pleased to invite you to the **16th International Feed Regulators Meeting (IFRM)**, organized jointly by the Food and Agriculture Organization of the United Nations (FAO) and the International Feed Industry Federation (IFIF).

The meeting will take place on Monday and Tuesday, 23-24 January 2023 in Atlanta, USA,



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look further

look global



A herd of white oxen with large, dark, curved horns is the central focus. One ox is in the immediate foreground, its head turned slightly. Behind it, several other oxen are resting on the dry, dusty ground. In the background, a person stands facing away from the camera, looking towards a hazy landscape with sparse, dry trees and distant hills. The air is thick with dust or mist, creating a soft, atmospheric effect. The lighting is warm, suggesting late afternoon or early morning.

thank you