



Food and Agriculture
Organization of the
United Nations

SUSTAINABLE
DEVELOPMENT
GOALS

Food Waste

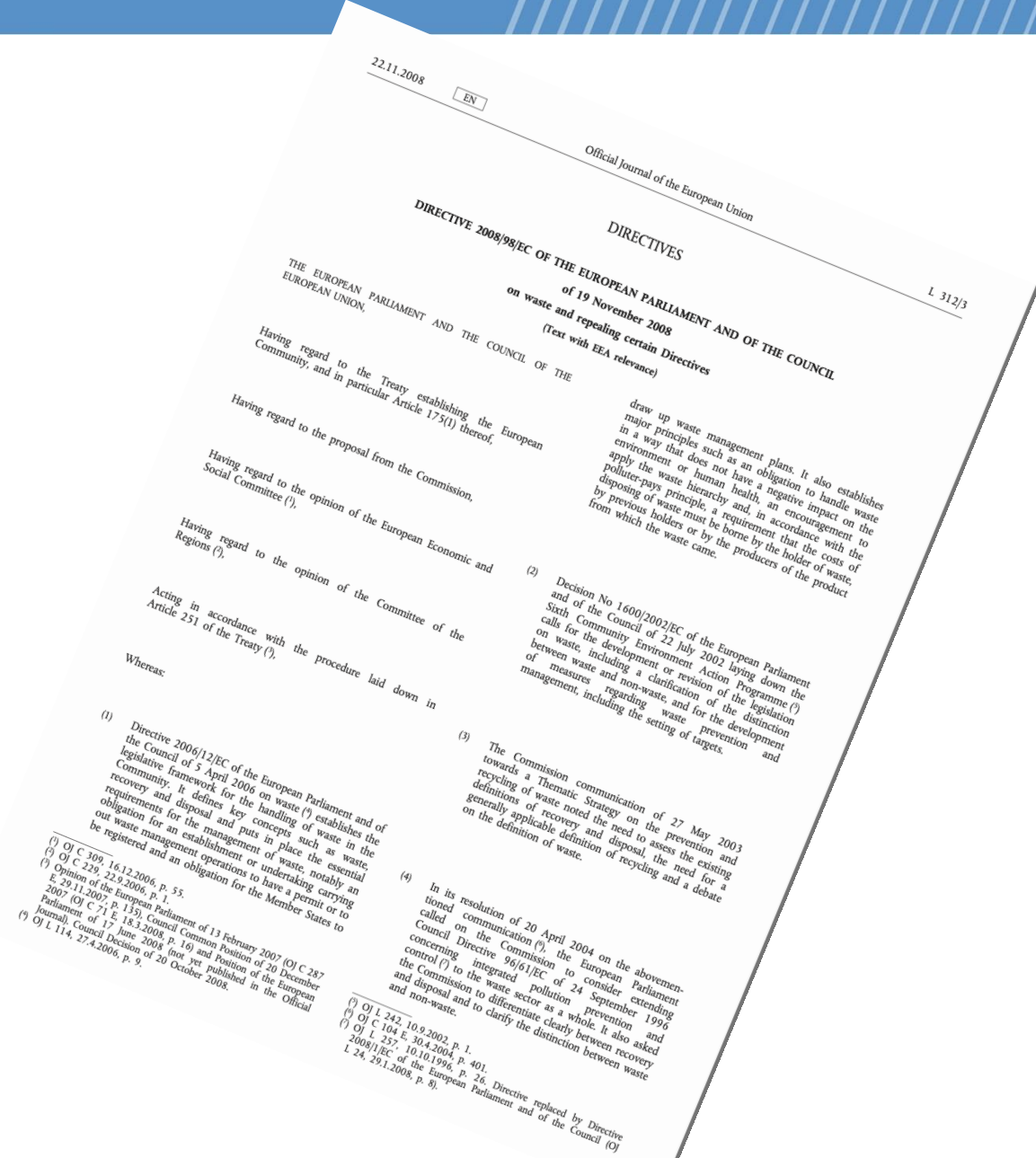
EFSA Circular Economy Foresight event - Daniela Battaglia



Waste: any substance or object which the holder discards or intends or is required to discard.

Food Waste can include materials that remain after, or are produced during, the processing, manufacture, preparation or sale of human food.

Bio-waste includes biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises and comparable waste from food processing plants.



(1) Directive 2006/12/EC of the European Parliament and of the Council of 5 April 2006 on waste (*) establishes the legislative framework for the handling of waste in the Community. It defines key concepts such as waste, recovery and disposal and puts in place the essential requirements for the management of waste, notably an obligation for the establishment or undertaking carrying out waste management operations to have a permit or to be registered and an obligation for the Member States to

(*) OJ C 309, 16.12.2006, p. 55.
(*) OJ C 229, 22.9.2006, p. 1.
(*) Opinion of the European Parliament of 20 December 2007 (OJ C 71 E, 18.3.2008, p. 16) and Position of the European Council of 17 June 2008 (not yet published in the Official Journal), Council Decision of 20 October 2008.
(*) OJ L 114, 27.4.2006, p. 9.

(*) OJ L 342, 10.9.2002, p. 1.
(*) OJ C 104 E, 30.4.2004, p. 401.
(*) OJ L 257, 10.10.1996, p. 24.
(*) OJ L 24, 29.1.2008, p. 8.

(4) In its resolution of 20 April 2004 on the abovementioned communication (*), the European Parliament called on the Commission to consider extending Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control (*) to the waste sector as a whole. It also asked the Commission to differentiate clearly between recovery and disposal and to clarify the distinction between waste and non-waste.

(3) The Commission communication of 27 May 2003 towards a Thematic Strategy on the prevention and recycling of waste noted the need to assess the existing definitions of recovery and disposal, the need for a generally applicable definition of recycling and a debate on the definition of waste.

(2) Decision No 1600/2002/EC of the European Parliament and of the Council of 22 July 2002 laying down the Sixth Community Environment Action Programme (*) calls for the development or revision of the legislation on waste, including a clarification of the distinction between waste and non-waste, and for the development of measures regarding waste prevention and management, including the setting of targets.

draw up waste management plans. It also establishes major principles such as an obligation to handle waste in a way that does not have a negative impact on the environment or human health, an encouragement to apply the waste hierarchy and, in accordance with the polluter-pays principle, a requirement that the costs of disposing of waste must be borne by the holder of waste, by previous holders or by the producers of the product from which the waste came.

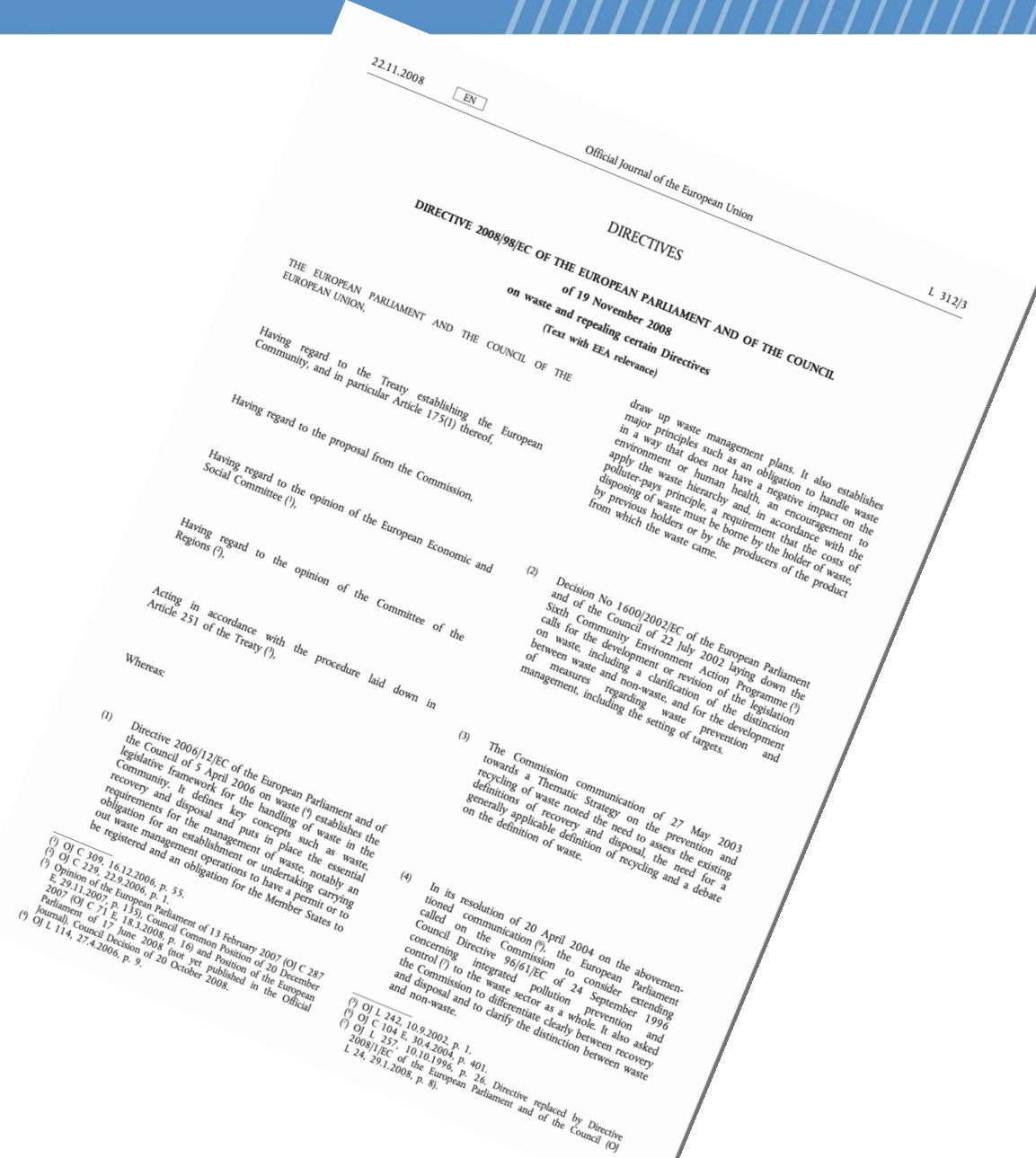


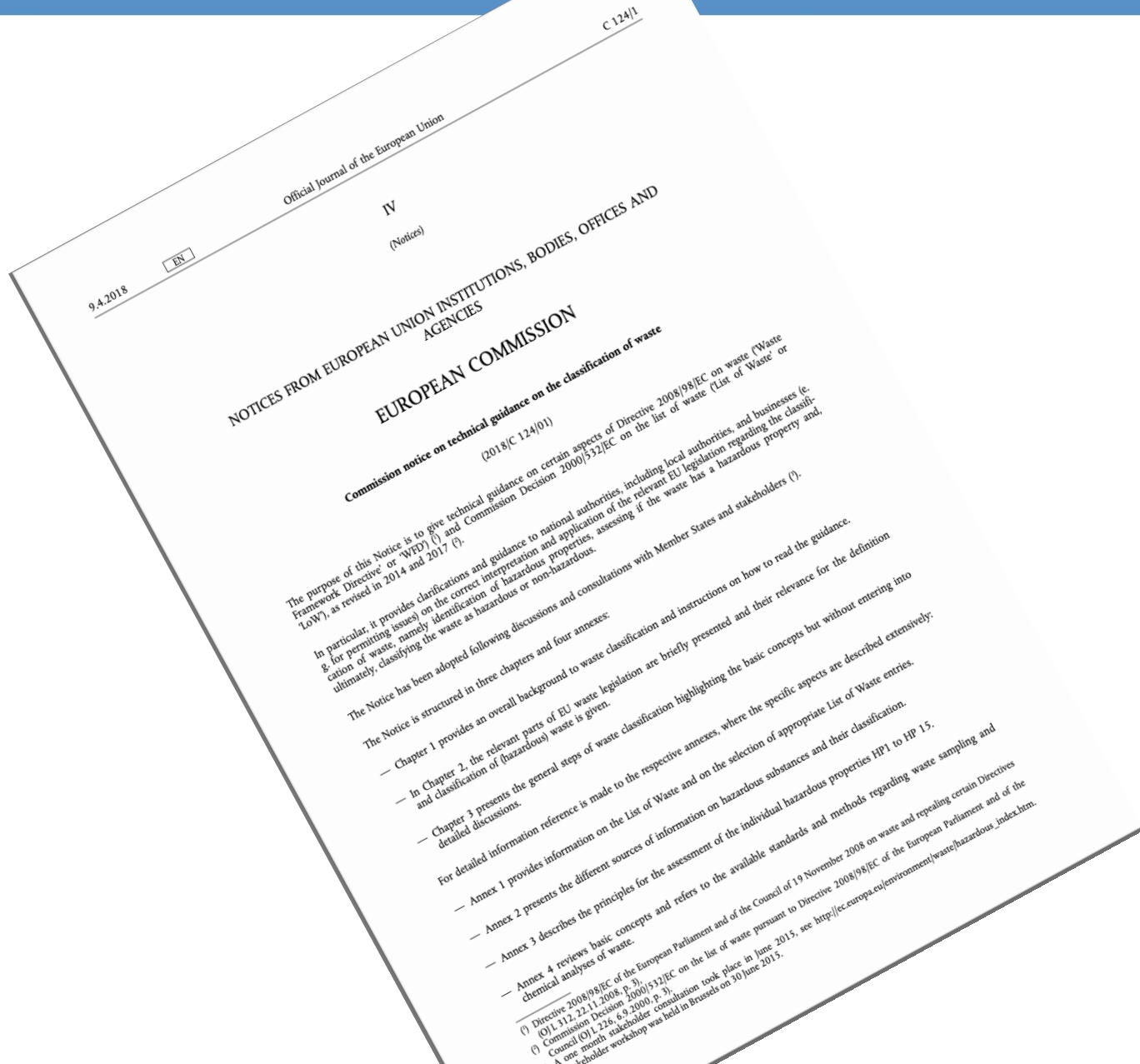
Definition(S)

Waste: any substance or object which the holder discards or intends or is required to discard.

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Food Waste: food and the associated inedible parts removed from the human food supply chain in the following sectors: Retail, Food service , Households

Inedible Parts: components associated with a food that are not intended to be consumed by humans (e.g. agro-industrial by/co products, bones, rinds and pits/stones).



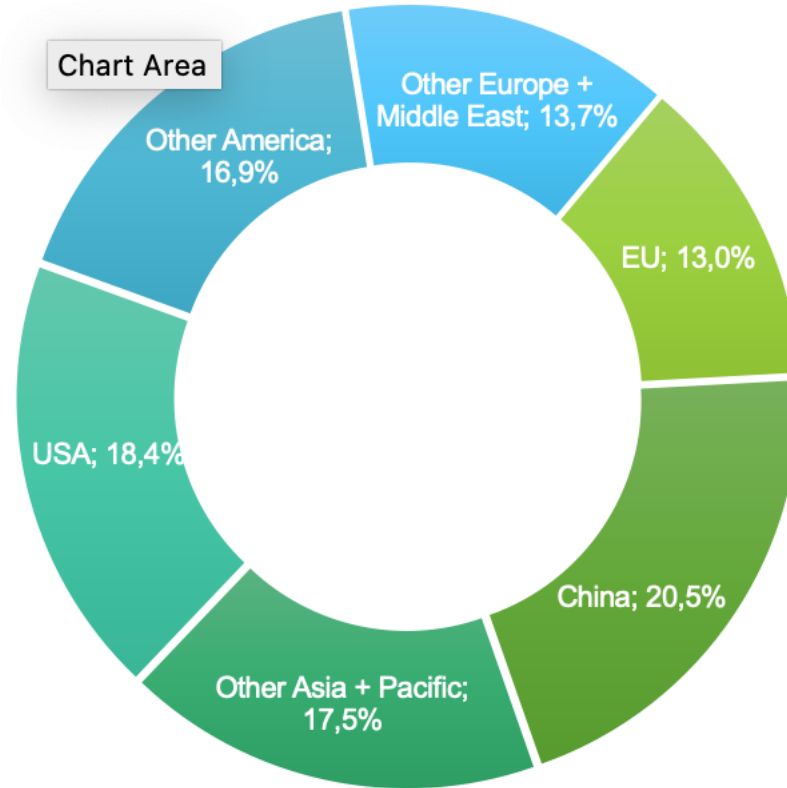


Food Waste: include materials that remain after, or are produced during, the processing, manufacture, preparation or sale of human food. This can include **Former Food Products**, such as edible material intended for human consumption, arising at any point in the food supply chain, such as that collected at restaurants, retail, or from household food scraps.

Food Processing By-products: include material that is recovered from food processing plants and may include some of the above listed material but also include production materials that are not intended as edible material.



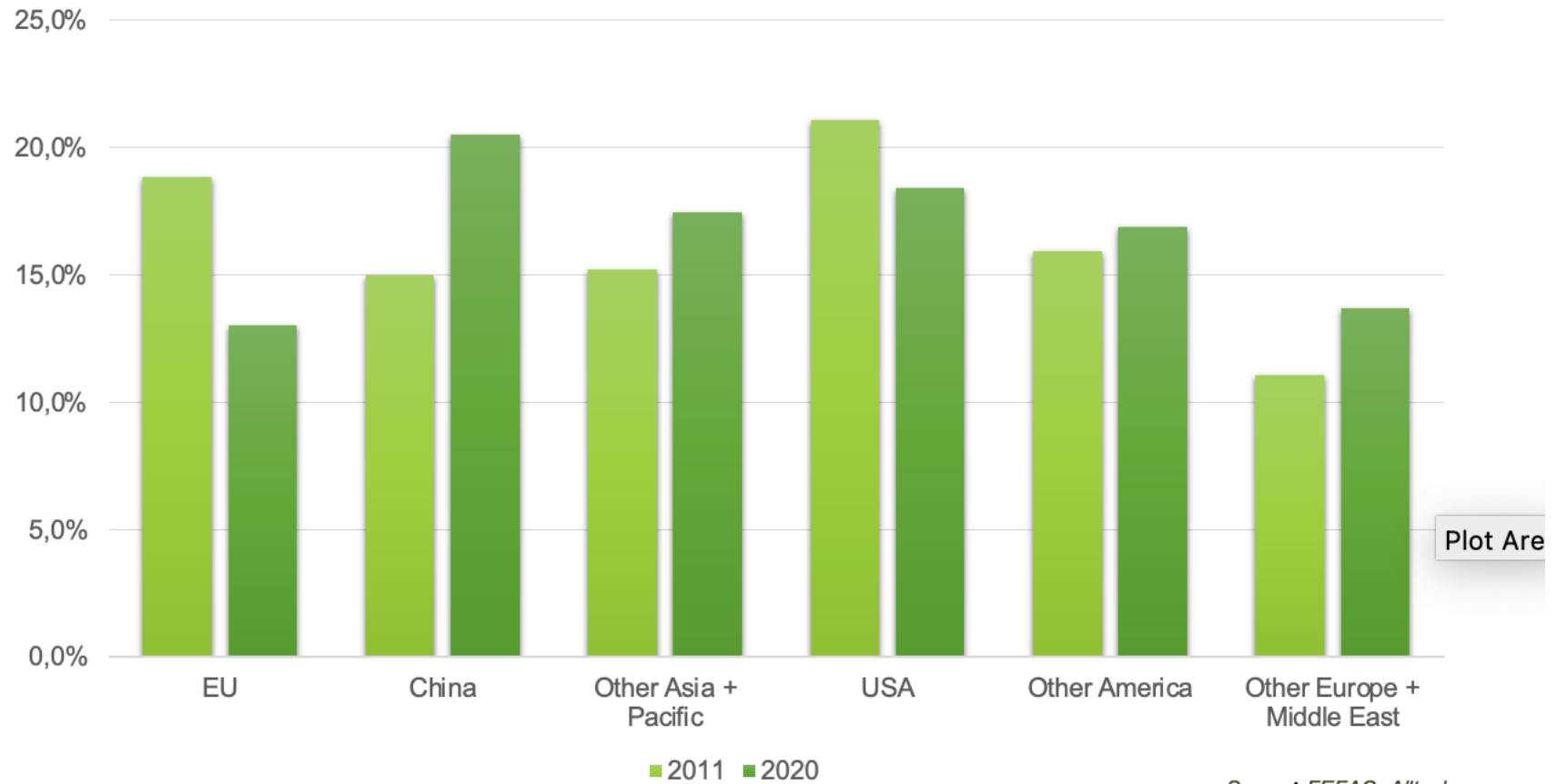
Market share 2020



Source: FEFAC, Alltech



Market share change 2011/2020



* the UK is not part of the EU

Source: FEFAC, Alltech



EU+UK balance sheet for protein feed materials in 2019/2020

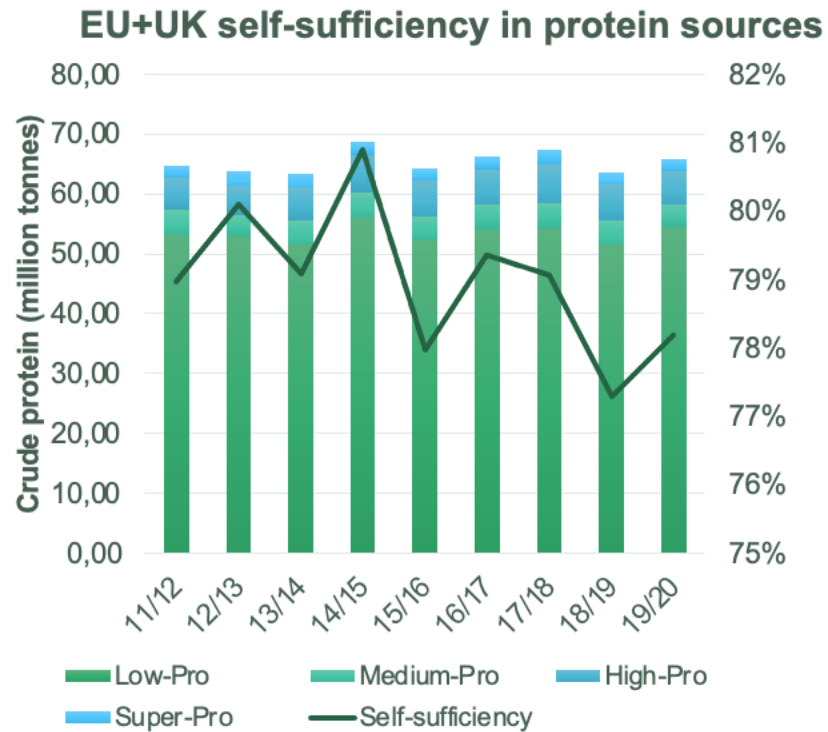
	EU total feed use (mio. t proteins)	EU total feed use of EU origin (mio. t proteins)	Self sufficiency
CROPS	18.36	16.55	90%
Thereof			
wheat	5.48	5.25	96%
barley	3.72	3.72	100%
maize	5.48	4.04	74%
oilseeds	0.46	0.46	100%
pulses	0.90	0.78	87%
CO-PRODUCTS (*)	20.52	4.91	24%
Thereof (**)			
Soybean meals	13.51	0.43	3%
Rapeseed meal	4.11	2.96	72%
Sunflower meal	2.90	1.51	52%
OTHER (*)	0.44	0.35	80%
Thereof			
Fishmeal	0.39	0.30	77%
Skimmed milk powder	0.05	0.05	100%
TOTAL	39.32	21.81	55%

(*) excluding on farm uses

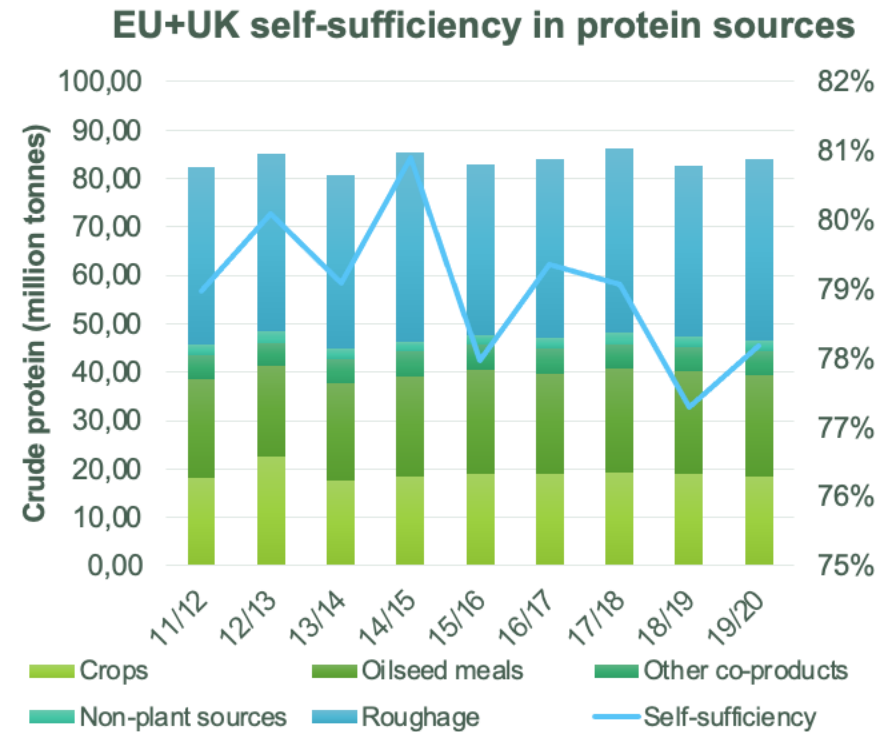
(**) including soy protein concentrate

Source: EU+UK Feed protein balance sheet

Development: EU self-sufficiency in feed



Source: EU+UK Feed protein balance sheet



Source: EU+UK Feed protein balance sheet



- Circularity in food systems (waste from one production process becomes a resource/input for another) offers ways to minimize the loss of resources and nutrients and increase the efficiency and sustainability of food production.
- Most food waste can be directly converted into animal feed using proper risk-based measures, technologies and processing methods to ensure their safety and nutritional value for the needs of the animals and their production
- Japan, South Korea and other countries have developed tightly regulated systems and invested in substantial infrastructure using adequate thermal processing to promote the conversion of 35–43 % of food waste into animal feed.



- Using food waste as direct and indirect sources of livestock feed can reduce feed-food-fuel competition and the sector's contribution to GHG emissions as well as alleviate pressure on the world's natural resources.
- However, it is critical from a safety perspective that the feed chain is not used to dispose of degraded or contaminated foodstuffs.
- Given the diversity of inputs, the range of hazards relevant to feed from these sources could be very broad
- Within a One Health approach, communication between food and feed regulators and industries on the importance of the feed to food continuum and how to guarantee human, animal and environmental health and welfare



- safety (or lack thereof), uneven nutritional composition, high production costs
- food waste is prone to decay during collection, transportation, and storage owing to its high-water content
- the quality of the animal feed produced from food waste is also more susceptible to deterioration
- business food waste (especially from food retailing and service) is not always available in constant quantities and the nutritional content is not always homogeneous



- thorough heat treatment to prevent the spread of diseases caused by food waste derived animal feed
- support to producers with government tax incentives and capital investment
- enhancement of production efficiency of the feeding process by increasing the production scale, but also by improving the technical efficiency and the quality of food waste
- optimization of food waste collection routes using information technology
- incentives for food waste generators to choose recycling rather than incineration or other uses



- heavy metals
- pesticides
- dioxins and furans
- mycotoxins
- acrylamide and semicarbazide in bakery waste
- residual processing aids
- packaging materials, including plasticisers or dispersants, printing inks and certain raw materials for plastic production which are classified as endocrine disruptors
- biological (microbial) hazards, which can increase particularly in high moisture former food (e.g. Food-and-mouth disease, African and Classical Swine fever)
- physical such as remnants of packaging materials in former food products, e.g. plastic, metal, aluminium and glass



hazard identification depends on:

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



- new challenges for risk assessment and management
- need for clear identification and characterization of hazards that may be introduced through incoming materials that are used in the processing
- the safety of the new sources of feed can be determined by a three-step approach: identifying all incoming material used to produce the novel feed and their potential hazards; understanding the manufacturing process while identifying potential hazards introduced via processing; and a risk characterization of the final product itself.
- the evaluation of the feed source should consider the role of manufacturing processes to mitigate the risk of the hazards.



- Specifically, all steps of the manufacture of food waste, by-products or new types of ingredients need to be considered including all processing aids used to treat or collect the material. For example, flocculants containing polyacrylamide polymers are some- times used to collect solids, and additional fat or protein, from waste water streams. These often are then added back to the material for inclusion into the final feed.
- risk assessment on the safe levels of packaging materials and inks/dyes contained in the food waste products
- inclusion of quality control plans in food processing plants needs to extend to the safety of any end materials which may be diverted to feed and training should be provided to waste haulers and livestock producers to discuss the implications of safe handling and use.



- data on the global, regional and national utilization (types and volumes) of various food waste
- inventories of the most prominent and relevant hazards
- impact of feed (swill, etc.) as transmission vector viral diseases
- monitoring of presence in feed and animal source food of chemical compounds, originating from packaging material, such as phthalates, endocrine disruptors, colorants and printing inks
- investigating occurrence, abundance and risks of remnants of packaging material need to be investigated (physical hazards are largely overlooked).



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- Communication between food and feed regulators and industries on the importance of the feed to food continuum and how guarantee human, animal and environmental health and welfare



- Thinking about the future of food safety - A foresight report (FAO, 2022)
- The State of Food and Agriculture 2019. Moving forward on food loss and waste reduction. (FAO, 2019)
- Feed and products of feed production technologies of increasing relevance: Insects, Former Food Products, and Food Processing by-products, Biofuel by-products. In: FAO and WHO. 2019. *Hazards associated with animal feed*. Report of the Joint FAO/WHO expert meeting
- Utilization of Food Loss and Waste as well as Non-Food Parts as Livestock Feed. (FAO 2017)
- Utilization of fruit and vegetable wastes as livestock feed and as substrates for generation of other value-added products. Food Waste Index Report 2021



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thank you
