LIFE Project Number
LIFE15 ENV/GR/000257

LIFE PROJECT NAME or Acronym
LIFE-F4F (Food for Feed)

Action:	**B7. Completing, Incorporating and Evaluating the F4F Process as Part of the EU's Wastes Strategy and other Union Policies**
Partner:	**Harokopio University of Athens (HUA)**
Deliverable:	**B7.2. The incorporation of the F4F process in the resource efficiency road map and relevant required improvements in the legislation**

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Table of Contents

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1 SUMMARY

Surplus food stock occurs for a variety of reasons such as trial runs, over-ordering and out of date stock, overcooking, packaging defects or the wrong size or weight of goods produced. A proportion of the finished product cannot be placed on the market for human consumption and is unsuitable for charity food banks. It is often destined for landfill.

The Waste and Resources Action Programme (WRAP) estimates that waste costs UK businesses in the food and drink supply chain £5 billion, annually. Much of this waste still ends up decomposing in a landfill, where it releases methane which has a damaging effect on the environment.

Former foodstuffs should be regarded as a resource, not a waste product. Diversion of food waste from disposal is becoming an increasing priority for governments of the Member States, which are promoting recycling and the development of markets for valuable products.

Many of these former foodstuffs, including bread, biscuits, breakfast cereal, crisps and confectionery have a high nutritional value - being a source of high-quality fats, sugar, and carbohydrates.

After checking their feed safety, traceability and therefore suitability, they can be converted into high-quality ingredients for use in animal feed, avoiding waste from food that is outside of specification for human consumption.

Present European and national legislation permits the utilisation of food waste as feed for fur animals and pets after undergoing an extremely demanding management procedure, which involves essentially sterilising them (Chapter 3, 2011 R0142, 23-02-2015). The rigor of this process, though it may not lead to the destruction of the protein that is implicated in encephalopathy (the great fear that overshadows any discussion of utilising animal by-products of any form), dramatically increases the cost and environmental footprint of the process, thereby reducing any benefit. At the same time, at the household level, the practice of utilising food residues in the feeding of domestic productive (and non-productive) animals, such as pigs and birds, continues to exist without any restrictions or limitations. On the other hand, food waste residues from the hospitality and foodservice industry (HFS), which apply extremely stringent HACCP rules (both for incoming raw materials and for their management), may not have the same outcome.

Approximately 88 million tonnes of food are wasted in the EU annually and the consequences seep far beyond homes, businesses, and landfill sites. It has been officially launched at European Union (EU) level[1], but also in other advanced countries, such as the USA[2], a debate on redefining the potential use of food waste as a feed and indeed, with more than one starting point. One is ethical and economical, and the amount of food waste dumped in the EU each year is estimated at 88 million tonnes, which is estimated at 143 billion euros. The other concerns the environmental footprint of the waste and the food production process as a whole, and in particular the process of producing animal protein. Lastly, the EU's (and not only) policy regarding the Circular Economy, the Road Map to Resource Efficient Europe, and the Waste Directive that they cannot ignore the fact that the food cycle does not seem to close.

According to the Food and Agriculture Organization of the United Nations (FAO), about one-third of all food produced worldwide is lost or wasted; the production of this amount of food generates about 8% of global greenhouse gas emissions. Food waste is a particularly important theme for the European Union's policies as it affects many different sectors from an environmental, ethical and economic point of view.

[1] EU Platform on Food Losses and Food Waste. https://ec.europa.eu/food/safety/food_waste/eu_actions/eu-platform_en

[2] EPA-US. Sustainable Management of Food - Reduce Wasted Food by Feeding Animals. https://www.epa.gov/sustainable-management-food/reduce-wasted-food-feeding-animals

Food waste is food that is lost or wasted along the entire food chain, and therefore involves farmers, the transport sector, food manufacturers and processors, operators in the hospitality sector, retailers, and consumers. Each sector interacts in many ways with other sectors that is why some food that cannot be used in one sector could be used in another one. In addition to the prevention of food waste, another especially important aspect is the quality of this kind of waste in terms of the degree of contamination by, e.g., packaging materials.

Organic waste management is a particularly important theme: poor quality collection leads to high management costs as well as higher environmental impacts. Composting plants only accept organic waste with a low percentage of impurities. A significant presence of the latter implies, therefore, the disposal of organic waste in other types of plants, such as waste-to-energy plants and landfills, and, consequently, a quantity of CO_2 emissions up to 10 times greater.

The idea that one man's trash is another's treasure has been thrown around for decades, but could taking it literally help to deal with food waste?

Along with associated economic losses, and the ethical matter of disposing food in a world where eleven percent of the population are undernourished, wasting food amounts to a huge squandering of natural resources.

Through committing to UN Sustainable Development Goal 12.3, the EU endeavours to halve food waste at consumer and retail level by 2030 and reduce food losses along production and supply chains. The establishment of the EU Platform on Food Losses and Food Waste bolstered this goal, but novel approaches are needed to support a growing population.

2 INTRODUCTION

2.1 DEFINITIONS

The most cited definitions of food waste and food loss come from various documents published by the United Nations (UN) Food and Agriculture Organization (FAO).

- Food loss: "Refers to a decrease in mass (dry matter) or nutritional value (quality) of food that was originally intended for human consumption. These losses are mainly caused by inefficiencies in the food supply chains, such as poor infrastructure and logistics, lack of technology, insufficient skills, knowledge and management capacity of supply chain actors, and lack of access to markets. In addition, natural disasters play a role." (Food Wastage Footprint, 2013)
- Food waste: "Refers to food appropriate for human consumption being discarded, whether or not after it is kept beyond its expiry date or left to spoil. Often this is because food has spoiled but it can be for other reasons such as oversupply due to markets, or individual consumer shopping/eating habits." (Food Wastage Footprint, 2013)
- Food wastage: "Refers to any food lost by deterioration or waste. Thus, the term "wastage" encompasses both food loss and food waste." (Food Wastage Footprint, 2013)

Also, in Directive 2008/98/EC,

Waste means any substance or object which the holder discards or intends or is required to discard (EU). and

Food waste means all food as defined in Article 2 of Regulation (EC) No 178/2002 of the European Parliament and of the Council that has become waste.

Food (or foodstuff) is defined as any substance or product, whether processed, partially processed or unprocessed, intended to be, or reasonably expected to be ingested by humans (Regulation (EC) No 178/2002).

Food includes drink, chewing gum and any substance, including water, intentionally incorporated into the food during its manufacture, preparation, or treatment. It includes water after the point of compliance as defined in Article 6 of Directive 98/83/EC and without prejudice to the requirements of Directives 80/778/EEC and 98/83/EC.

Some of the peripheral definitions that are also used to further define waste include:

- Food residues/food by-products: "a production residue that is not a waste," where a production residue is defined as "a material that is not deliberately produced in a production process but may or may not be a waste." (European Commission, 2007[3])
- Avoidable Food Waste: "Food and drink thrown away that was, at some point prior to disposal, edible (e.g., slice of bread, apples, meat)." (Quested and Johnson, 2009[4])
- Possibly Avoidable: "Food and drink that some people eat and others do not (e.g. bread crusts), or that can be eaten when a food is prepared in one way but not in another (e.g. potato skins)." (Quested and Johnson, 2009)

[3] Communication from the Commission to the Council and the European Parliament on the Interpretative Communication on Waste and By-products. Commission of the European Communities, COM/2007/059 final, Brussels, Belgium, 2007. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52007DC0059.
[4] Quested, T.; Johnson, H. Household food and drink waste in the UK: final report. Wastes & Resources Action Programme (WRAP), 2009.

- Unavoidable Food Waste: "Waste arising from food or drink preparation that is not, and has not been, edible under normal circumstances (e.g., meat bones, eggshells, pineapple skin, tea bags)." (Quested and Johnson, 2009)
- Former Foodstuffs: "means foodstuffs, other than catering reflux, which were manufactured for human consumption in full compliance with the EU 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." (Catalogue of Feed, 2013[5])

Most of the literature sources agree with the FAO definition of food waste, however, some reports and government regulations incorporate both edible and non-edible food losses. For example, BSR (2014) surveyed US food manufacturers, grocery retailers, and wholesalers about their waste streams and reported results for both edible and inedible food waste. Bond et al. (2013),[6] reported for the United Kingdom, including also both avoidable and unavoidable food losses. One advantage to this method is that it allows the country to properly account for all the "waste" material being generated. If management capacity, i.e., recycling and recovery plants, was solely set based on edible waste then the recovery infrastructure will be overcapacity from its inception. The inedible addition contributes roughly 10% to the total waste that must be managed in the UK (Downing et al., 2015)[7]. On the other hand, by identifying by-products as waste, materials with economic value may more likely be treated through waste management rather than as a secondary value stream.

In this report the EU definition of food waste is used.

2.2 BACKGROUND

Every year, about 4 billion tonnes of food are produced, but poor practice in harvesting, storage, and transport, along with market and consumer wastage, mean that about 40% of it (1.2-2 billion tonnes) is wasted. Feeding a projected population of 9.6 billion people by 2050 is going to be an unparallel challenge for humankind and may well require a multidimensional and integrated global strategy. Increasing food production is merely one of many ways to rise to this challenge. Researchers argue that one strategy to enhance food availability would simply be to lessen waste generation. This, in turn, could help moderate the requirement for increased food production to comply with growing food demand, which would alleviate the pressure on resources and help lower greenhouse gas emissions (which the EU has committed to cut back by 20% compared with 1990 levels by 2020).

Furthermore, the climate crisis is exacerbated by food losses and food waste. In the EU alone, 170 million tonnes of eCO_2 are emitted every year simply to produce and dispose of the 88 million tonnes of wasted food mentioned earlier. And then there's all the money spent on producing, processing, and transporting it, which amounted to some 143 billion euros in 2012 according to official estimates.

Regionally, about 56% of total food losses and food waste occur in the developed world- North America, Oceania, Europe, and the industrialized Asian nations of China, Japan & South Korea.

[5] Commission Regulation (EU) No 68/2013 of 16 January 2013 on the Catalogue of feed materials (Text with EEA relevance). OJ L 29, 30.1.2013,p. 1-64; https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32013R0068.
[6] Bond, M.; Meacham T.; Bhunnoo R.; Benton T.G. (2013). Food waste within global food systems, Global Food Security Programme, A Global Food Security report. Swindon, UK, 2013.
[7] Downing, E.; Priestley, S.; Carr, W. (2015). House of Commons Library. Food Waste; Briefing Paper Number CBP07045, 2 September 2015.

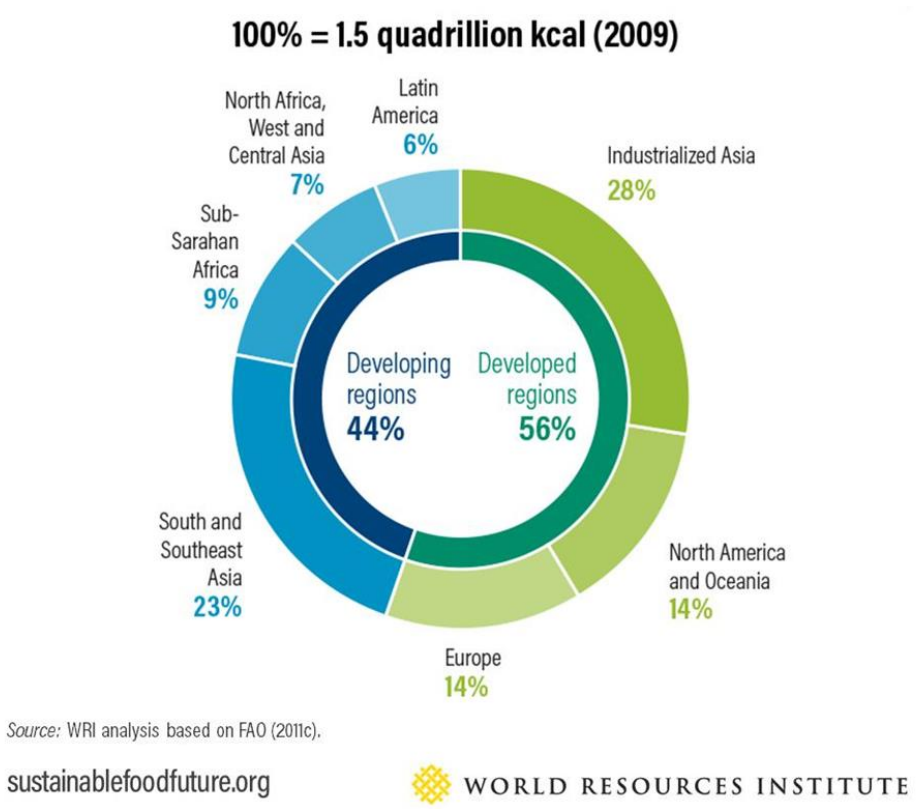


Figure 1. Regional distribution of total food losses and food waste (adapted from WRI)

An important part of the EU's action plan on the circular economy, it is aiming to give substance to a more efficient use of resources by reducing food waste and increasing food security.

Material resources are at the heart of modern economy, and they are consumed in large quantities. Material resources allow society to meet its basic human needs as well as generate economic growth and create social value. Our use of resources has become unsustainable however, which is causing harm to the natural environment and contributing to climate change. Economically, we are also at risk of fluctuating prices because of resource scarcity.

The solution to the problem, again according to the EU Roadmap to a resources efficient Europe, is to produce more value with fewer inputs, to lessen our impact on the environment, and to consume in a more intelligent fashion. We can use more efficient alternatives instead of many of the current resources, and we can boost recycling, for example. But if European society is to become more resource efficient, a mobilisation of millions of firms and consumers is needed. Environmental and social costs need to more accurately reflected on prices. This would improve the economic system, providing the right incentives and signals for producers and consumers. Most importantly, coherent public policies must be put in place to enable such a reform and push it forward.

There is more to do and that the waste we create, and the use of our resources is at the heart of public discussions about our relationship with the natural environment. The new Circular Economy Action Plan *For a cleaner and more competitive Europe*[8] emphasises that the EU cannot deliver alone the ambition of the European Green Deal[9] for a climate-neutral, resource-efficient, and circular economy. In the Action Plan is also confirmed that the EU will continue to lead the way to a circular economy at the global level and use its influence, expertise, and financial resources to implement the 2030 Agenda for Sustainable Development and its Sustainable Development Goals[10], in the EU and beyond.

[8] COM(2020) 98.

[9] COM(2019) 640.

[10] In particular SDG 8.4 on resource efficiency and decoupling; SDG 12.2 on sustainable management and efficient use of natural resources; SDG 15.3 on land-degradation neutrality; and SDG 15.5 on halting biodiversity loss.

2.3 FOOD WASTE IN THE EU

In the EU, food waste along the supply chain has been estimated at approximately 88 million tonnes, or 173 kg per capita annually, and is expected to rise to about 126 million tonnes a year by 2020 unless action is taken. Households generate the largest share of EU food waste (53%), followed by agriculture/food processing (19 %). These two sectors account for over two thirds (72%) of EU food waste. The rest is attributed to food services/catering (12%), primary production (11%) and retail/ wholesale (5%). The average per capita waste level conceals high variation between EU countries. According to a 2013 study, the highest food waste generators, expressed as kilograms per capita, are the Netherlands (541 kg), Belgium (345 kg), Cyprus (327 kg) and Estonia (265 kg). The lowest are Slovenia (72 kg), Malta and Romania (both 76 kg), followed by Greece (80 kg) and the Czech Republic (81 kg). Overall, the EU-15 countries tend to waste more food per capita than the EU-12 countries.

Animal feed plays an important part in the food chain and has implications for the composition and quality of the livestock products (milk, meat, and eggs) consumed by people.

The Food Standards Agency is responsible for drawing up the rules on the composition and marketing of animal feed. The Agency's main aims in this area are to help protect consumer and animal health. Another aim is to ensure that those buying the feed are provided with adequate and suitable information to allow them to make informed choices. Our focus is to recover as much surplus food safely and efficiently as we can and to do so inside a legislative framework that protects animals as well as the human food chain.

By recognising that former foodstuff not suitable for human consumption is a resource and not a waste product, industry could reduce the amount of waste sent to landfill every year, saving costs, and lessening environmental impact.

For example, grower pigs eat the equivalent of about 3 to 4% of their body weight and drink about 10% of their body weight daily. For each kilogramme of pork delivered to the customer at least 2.8 kgs of corn must be consumed and for each kilogramme of corn more than 1,600 litres of water must be used for irrigation. This is not a sustainable way of producing food, considering that it has not been introduced in this equation the fertilizer for the corn production, the fuel consumed for transporting fertilizer and corn, the environmental issues raised from the pesticides used for the corn production etc. These issues are related with the Resources Efficiency policy of the EU but also the Climate Action of the Union.

F4F is a process that aims in improving this equation, not just the wastes management equation and issue, but most important the food production equation. It is a process that can be introduced as an important pillar to the resource efficiency activities, among those characterised as: more efficient alternatives. This synergy between the waste management (environmental policy) and the resources efficiency (sustainability policy) is the issue that the F4F project mainly tackles.

Utilisation as pet food is probably the safest way of progressing for F4F realisation in full scale. Issues related to the mad cow disease or poultry fed with feed containing toxic substances (i.e., dioxins) in the past years, have created a considerably agony of consumers towards food safety. In that approach utilising the F4F product as pet food, seems a more realistic option than utilisation for poultry and pigs, irrelevant how old or safe this practice is.

Surplus food stock occurs for a variety of reasons such as trial runs, over-ordering and out of date stock, overcooking, packaging defects or the wrong size or weight of goods produced. A proportion of the finished product cannot be placed on the market for human consumption and is unsuitable for charity food banks. It is often destined for landfill.

Former foodstuffs should be regarded as a resource, not a waste product. Diversion of food waste from disposal is becoming an increasing priority for the government, which is promoting recycling and the development of markets for valuable products.

Many of these former foodstuffs, including bread, biscuits, breakfast cereal, crisps and confectionery have high nutritional value - being a source of high-quality fats, sugar, and carbohydrates.

After checking their feed safety, traceability and therefore suitability, they can be converted into high-quality ingredients for use in animal feed, avoiding waste from food that is outside of specification for human consumption.

Anything designated for feed use will ultimately be re-entering the food chain, so strict adherence to regulations is essential. When former foodstuffs are used to produce animal feed, certain legal obligations are placed on the factory of production. By law, the factory is deemed a 'Feed Business Operator' and must be compliant under the Feed Hygiene Regulation (EU) 183/2005.

Hygiene standards are particularly important in the disposal of surplus foodstuffs. Products no longer intended for human consumption, which may be destined for farm animal feeding, must be kept separate during transport, storage, and dispatch to and from a supermarket returns depot or food manufacturing plant.

Services should be fully accredited to the Feed Materials Assurance Scheme (FEMAS) standard ensuring that all feeds are fully traceable from source to supply, giving both quality-controlled service and products.

Critical control points for food safety must be implemented through Hazard Analysis Critical Control Point (HACCP) systems which prevent the mixture of any non-food waste and ensure feed materials are free from any chemical or microbiological impurities.

Where inedible products or products prohibited from inclusion in the feed (such as meat or fish) are stored or handled on the same site as surplus foods intended for feed use, there must be a physical separation between these products and the feed products.

This will ideally be full physical segregation of buildings and equipment. Detailed records of the disposal of non-feed products must be maintained.

Sealed containers with surplus food must be collected and returned using specialist vehicles. All containers should be clearly marked to avoid any chance of confusion between surplus food materials and waste.

The surplus food is then transported to purpose-built reprocessing centres where computer-generated formulations manufacture a feed material to exact customer specifications, producing a range of bakery, biscuit, and confectionery meals to suit feed compounders, blenders, and home mixers.

2.4 THE CIRCULAR ECONOMY AND ACTION TO REDUCE FOOD WASTE

It is increasingly recognised that the growing metabolism of society is approaching limitations both with respect to sources for resource inputs and sinks for waste and emission outflows. The circular economy (CE) is a simple, but convincing, strategy, which aims at reducing both input of virgin materials and output of waste by closing economic and ecological loops of resource flows.

This circular economy paradigm aims to reduce waste streams by reusing waste as a resource elsewhere. The EU aims to transition towards this in many areas and in their Action Plan for the Circular Economy, it is potential for food waste mitigation is recognised.

The circular economy model can apply to food waste, but it is not a one-size fits all solution. Determining the type of food waste involved is key to deciding the most appropriate way to deal with it. Residue is used to define unavoidable waste, such as fruit skins. They are a natural part of producing food.

The other is wasted food and that is very many leftovers; things that should and can be eaten but due to consumer behaviour, poor storage, and management practices, end up becoming waste. Unavoidable food waste can have high value secondary uses, the focus for tackling avoidable waste should first be on prevention. If the goal is just to utilise this wasted food elsewhere, there is no incentive to reduce it. Once this distinction is made, it is important to seek out the best possible new destination for a waste stream.

Unavoidable food waste must be valorised with the highest value possible. Value can be interpreted on many levels, but it basically involves keeping it as close to food as you can.

If not fit for human consumption, high value applications could include animal feed, biomaterials, and ingredients. While recognising the potential to convert food waste to bioenergy and compost, Bos-Brouwers says it should not be the first resort.

Prioritising high value applications forms the basis of the cascading principle—an idea that prioritises material uses for biomass before energy uses to prevent raw materials being lost.

For instance, potato peel can be burned and get a little bit of energy. Technically that is recycling. But there is a lot of value in that potato peel. The intent should be to take as much as you can from it and when everything is taken out, then it can be burn or composted.

The circular economy model aims to mitigate waste by creating closed loop systems, but how wide that loop is drawn varies. Internal loops may be preferable as they can ensure resources are conserved with given product lifecycles.

Food waste occurs at production, retail and consumer levels and the circular economy approach can be integrated at all stages. Innovations also happen where supply chain partners meet up.

Households generate over half of the EU's food waste and while its inconsistent nature make it difficult to find high value applications.

The recently revised EU Waste Framework Directive now includes a definition for food waste, but a level of ambiguity remains.

In the definition, when something becomes waste, it is with the intention or the action to discard. Yet, if some entrepreneurs want to collaborate using the side flow of one company as a resource of the other, they could run into permit problems trying to transport the side flow as they are not a waste management company.

Introducing standards for material "identifications" would help to instil trust within producers and consumers, who may be uncertain how a material created from biomaterials compares to its traditional counterpart.

2.4.1 The Circular Economy Package

In 2015, the European Commission adopted an ambitious Circular Economy Package to help European businesses and consumers to make the transition to a stronger and more circular economy where resources are used in a more sustainable way.

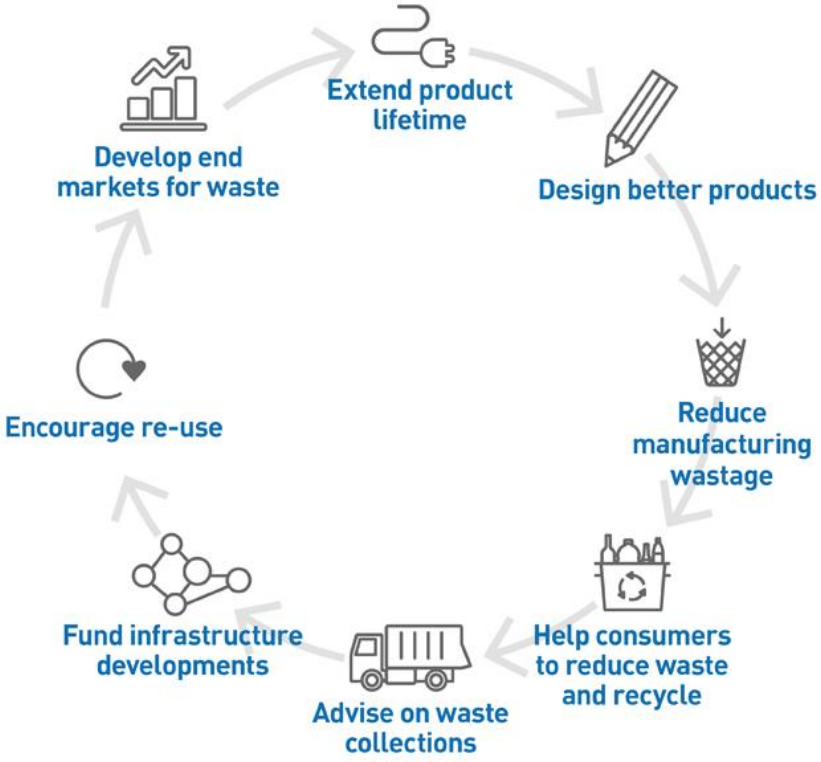


Figure 2. The Circular Economy paradigm.

The planned action will contribute to "closing the loop" of product lifecycles through greater recycling and re-use and bring benefits for both the environment and the economy. The plans will extract the maximum value and use from all raw materials, products, and waste, fostering energy savings and reducing Green House Gas emissions.

The action plan also covers the full lifecycle of products: from production and consumption to waste management and the market for secondary raw materials. This transition will be supported financially by the European Structural & Investment Funds (ESIF), which include €5.5 billion for waste management. In addition, support will be provided by €650 million under Horizon 2020 (the EU funding programme for research and innovation) and investments in the circular economy at national level.

2.4.2 Farm to Fork Strategy

The **European Green Deal** sets out how to make Europe the first climate-neutral continent by 2050. It maps a new, sustainable, and inclusive growth strategy to boost the economy, improve people's health and quality of life, care for nature, and leave no one behind.

*Figure 3. The Circular Economy paradigm for food according to the **Farm to Fork** strategy.*

The Farm to Fork Strategy is at the heart of the Green Deal. It addresses comprehensively the challenges of sustainable food systems and recognises the inextricable links between healthy people, healthy societies, and a healthy planet. The strategy is also central to the Commission's agenda to achieve the United Nations' Sustainable Development Goals (SDGs). All citizens and operators across value chains, in the EU and elsewhere, should benefit from a **just transition**, especially in the aftermath of the COVID-19 pandemic and the economic downturn**.** A shift to a sustainable food system can bring environmental, health and social benefits, offer economic gains and ensure that the recovery from the crisis puts us onto a sustainable path[11]. Ensuring a sustainable livelihood for primary producers, who still lag in terms of income[12], is essential for the success of the recovery and the transition.

The COVID-19 pandemic (coronavirus SARS-CoV-2) has underlined the importance of a **robust and resilient food system** that functions in all circumstances and can ensure access to a sufficient supply of affordable food for citizens. It has also made us acutely aware of the interrelations between our health, ecosystems, supply chains, consumption patterns and planetary boundaries. Clearly, much more is needed to be done to keep individuals and the planet healthy. The current pandemic is just one example. The increasing recurrence of droughts, floods, forest fires and new pests are a constant reminder that our food system is under threat and must become more sustainable and resilient.

The Farm to Fork Strategy is a new comprehensive approach to how EU **values** food sustainability. It is an opportunity to improve lifestyles, health, and the environment. The creation of a favourable food environment that makes it easier to choose healthy and sustainable diets will benefit consumers' health and quality of life and reduce health-related costs for society. People pay increasing attention to environmental, health, social and ethical issues[13] and they seek value in food more than ever before. Even as societies become more urbanised, they want to feel closer to their food. They want food that is fresh, less processed, and sustainably sourced. And the calls for shorter supply chains have intensified

[11] At global level, it is estimated that food and agriculture systems in line with the SDGs would deliver nutritious and affordable food for a growing world population, help restore vital ecosystems and could create new economic value of over EUR 1.8 trillion by 2030. Source: Business & Sustainable Development Commission (2017), *Better business, better world*.

[12] For example, the average EU farmer currently earns around half of the average worker in the economy as a whole. Source: CAP Context indicator C.26 on Agricultural entrepreneurial income (https://agridata.ec.europa.eu/Qlik_Downloads/Jobs-Growth-sources.htm).

[13] Europeans have a high level of awareness of food safety topics. Most frequently reported concerns relate to antibiotics, hormones and steroids in meat, pesticides, environmental pollutants, and food additives. Source: Special Eurobarometer (April 2019), *Food safety in the EU*.

during the current outbreak. Consumers should be empowered to choose sustainable food and all actors in the food chain should see this as their responsibility and opportunity.

Tackling food loss and waste is key to achieving sustainability[14]. Reducing food waste brings savings for consumers and operators, and the recovery and redistribution of surplus food that would otherwise be wasted has an important social dimension. It also ties in with policies on the recovery of nutrients and secondary raw materials, the production of feed, food safety, biodiversity, bioeconomy, waste management and renewable energy.

The European Commission is committed to halving *per capita* food waste at retail and consumer levels by 2030 (SDG Target 12.3). Using the new methodology for measuring food waste[15] and the data expected from Member States in 2022, it will set a baseline and propose legally binding **targets** to reduce food waste across the EU. In addition to quantifying food waste levels, the Commission will investigate food losses at the production stage and explore ways of preventing them. **Coordinating action** at EU level will reinforce action at national level, and the recommendations of the EU Platform on Food Losses and Food Waste[16] will help show the way forward for all actors.

[14] At EU level, food waste (all steps of the lifecycle) accounts for at least 227 million tonnes CO_2 eq. a year, i.e. about 6% of total EU emissions in 2012 (EU FUSIONS (2016). *Estimates of European food waste levels*.

[15] Commission Delegated Decision (EU) 2019/1597 of 3 May 2019 supplementing Directive 2008/98/EC of the European Parliament and of the Council as regards a common methodology and minimum quality requirements for the uniform measurement of levels of food waste (OJ L 248, 27.9.2019, p. 77).

[16] https://ec.europa.eu/food/sites/food/files/safety/docs/fs_eu-actions_action_implementation_platform_key_recommendations.pdf

2.4.3 Revised Waste Framework Directive

On 14 June 2018, the revised Waste Framework Directive (2018/851) was published in the Official Journal of the European Union. The new waste legislation includes an exclusion for substances destined for use as feed materials (Article 2(2,e)). Also, Recital 8 confirms that when former foodstuffs are placed on the market as safe feed materials, they cannot be downgraded to waste based on interpretation of the by-products criteria by competent environmental control authorities. This is because these materials are already covered by feed legislation.

The amendment is also relevant in the light of the new definition of "food waste" (Article 3(4,a) – food waste is food that has become waste), as food is prevented from becoming a waste when it is used in feed.

The F4F project contributes to the implementation of the following EU directives.

- Waste Framework Directive (2008/98/EC) that requires promotion of source separation, recycling, and efficient energy recovery, while waste prevention is ranked as the highest priority (see relevant wastes management priorities pyramid). F4F tackles all these issues, since:
  - Support existing source separation systems that can be found in hotels and restaurants.
  - Further promoting source separation, since will be providing an optimum and economically viable recycling process.
  - Will increase wastes prevention values, since though its circular economy approach will: a) consider food waste collected separately as a raw material, and b) prevent the wastes produced though the existing feed production system.
- The EU Landfill Directive (1999/31/EC) sets as target the progressive reduction of biodegradable municipal waste going to landfill, to 35% of the 1995 disposal level by 2020 for Greece. Without successful long term waste prevention activities, achieving notable behaviour change in the way people dispose food wastes, the treatment capacity required to handle food waste will need to increase by more than a factor of two as waste volumes continue to grow. Similar problems are facing all EU states, especially in the southern Europe that waste facilities operate in an uneven way all through the year, due to the massive number of visitors during summer. The F4F process contributes to the
  - prevention of food waste ending up in landfills, the most common wastes management and final disposal method still in Greece, as well as other Mediterranean countries.
  - reduction of the volume of waste that under development waste management facilities (e.g. MBT) allowing them to handle other organic wastes more efficiently found in the mixed wastes.
  - reduction of GHG emissions since does not allow the decomposition of organic carbon but the evaporation of water and its direct reuse in heterotrophic organisms, like pigs, poultry, and pets.

2.4.4 The Food Waste Challenge

While food loss is a global issue, the problem scale and waste sources vary according to regional customs, season, and economic development status. For example, in Japan, there is a significant problem with table waste because it is a part of the culture to have large, plentiful meals with only the freshest ingredients. Much of this food ends up going to waste (Parry et al., 2015)[17]. According to Girotto et al. (2015)[18] at the global level, 32% of edible food produced is wasted. This equates to 61 million tonnes per year in the United States, 6.24 million tonnes per year in Korea, 92.4 million tonnes per year in China, 21 million tonnes per year in Japan, and 90 million tonnes per year in the European Union (Girotto et al., 2015). Developing and developed nations have different issues driving food loss; in the developed world, 40% of waste is generated at the retail and consumer stages whereas developing nations lose 40% of food in post-harvest (Girotto et al., 2015). For developing nations, some of the causes for food loss include improper storage, handling, and refrigeration, whereas developed nations face losses due to overconsumption and high expectations of quality (Lipinski et al., 2013)[19]. The disparity in food loss by product stage between developed and developing nations is represented below, in Figure 4 (Lipinski et al., 2013). North America and Oceania have similar waste generation characteristics to both Industrialised Asia and Europe. The main difference with Industrialised Asia is that the second largest waste source comes from handling and storage and North America and Oceania has the highest consumption losses at 61% (Lipinski et al., 2013).

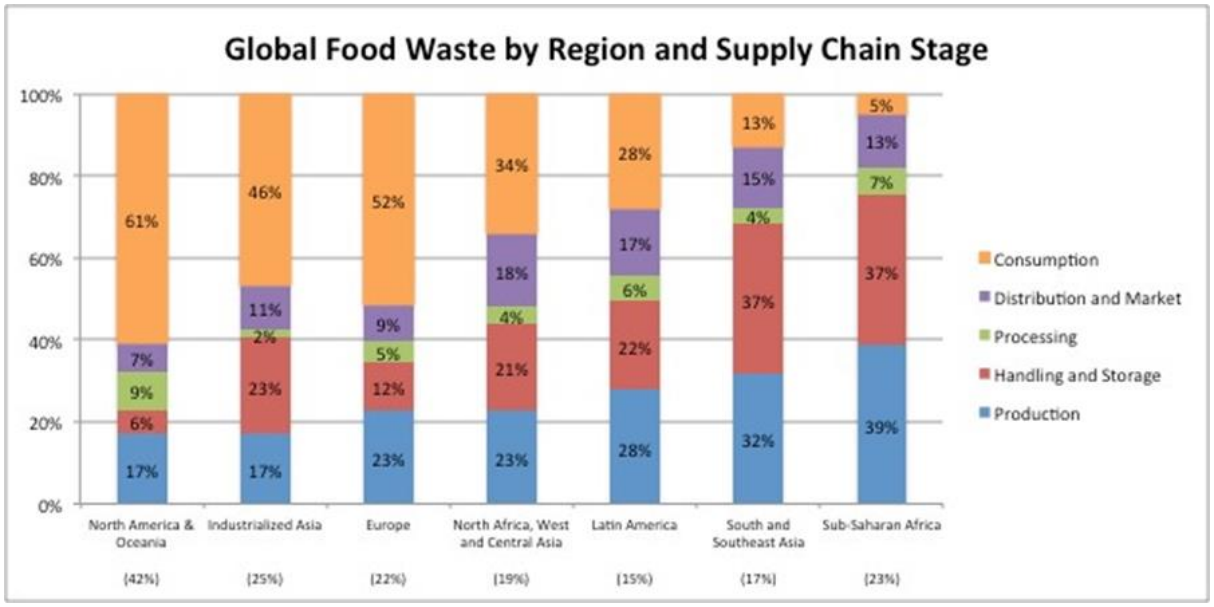


Figure 4. Global food waste by region and supply chain stage, (Lipinski et al., 2013)

The implications of waste occurring at later stages in the food chain for developed nations are that recovery options for the losses become more limited and costly. Steinfeld et al. (2006)[20] noted "Food waste from marketing and retailing are much less recycled as feed… because their content and quality vary greatly and their geographical spread increases collection costs. The safety of food wastes is also questionable." Packaging, volume, quality, and consistency play roles in the ability to recover foods for certain types of recycling. Griffin et al. (2009)[21] quantified recovery by each stage of the food chain using

[17] Parry, A., P. Bleazard and K. Okawa (2015), "Preventing Food Waste: Case Studies of Japan and the United Kingdom", OECD Food, Agriculture and Fisheries Papers, No. 76, OECD Publishing. http://dx.doi.org/10.1718/5js4w29cf0f7-en

[18] Girotto, F.; Alibardi, L.; Cossu, R. Food waste generation and industrial uses: a review. Waste Management. 2015, 45, 32-41; doi: 10.1016/j.wasman.2015.06.008.

[19] Lipinski, B.; Hanson, C.; Lomax, J.; Kitinoja, L.; Waite, R.; Searchinger, T. Reducing food loss and waste; World Resources Institute Working Paper, 2013.

[20] Steinfeld, H.; Gerber, P.; Wassenaar, T.; Castel, V.; Rosales, M.; Haan, C. D. Livestock's long shadow: environmental issues and options. Food and Agriculture Organization of the United Nations: Rome, Italy, 2006.

[21] Griffin, M.; Sobal, J.; Lyson, T. A. An analysis of a community food waste stream. Agriculture and Human Values. 2009, 26(1-2), 67-81; doi: 10.1007/s10460-008-9178-1

data from a roughly 100,000-person community in Upstate New York. The waste data included both edible and inedible components of food. As shown in Table 1, recovery was significantly higher at the production and processing stages than at the distribution or consumption levels. According to the authors' study, all the food waste at the production stage was assumed to have gone to composting and processing waste was recovered primarily through donation and animal feed (Griffin et al., 2009).

Table 1. Community Food Waste Audit (adapted from Griffin et al., 2009)

Stage	Generation	Recovery	% Recovery	% Generation of Total
Production/ Agricultural Waste	4,108,287	3,911,274	95.2%	20.13%
Processing Food Waste (Bakeries, wineries, etc.)	258,415	229,661	88.9%	1.27%
Distribution/Retail (Restaurants and supermarkets)	3,750,340	679,360	18.1%	18.38%
Consumption* (Households and institutions)	12,292,845	893,400	7.3%	60.23%
Total	20,409,887	5,713,695	28.0%	100.00%

* Includes edible and inedible portions.

The food waste generated at each stage varies by food type as well. Lipinski et al. (2013) presented the global loss by weight and kilocalorie (kcal) for the major food groups (

Figure 5). By weight the largest loss, by almost double, comes from fruits and vegetables; by kcal, cereal losses represent over half of all the waste around the world. Product specific losses for cereals, fruits and vegetables, and roots and tubers, by country region and supply chain stage s described by Gustavsson et al. (2011). For the most part, Europe and North America and Oceania align on loss rates for each of the food categories. For cereals, most of the food waste comes from the consumption stage whereas with fruits, vegetables, roots, and tubers the biggest losses happen during the agricultural stage.

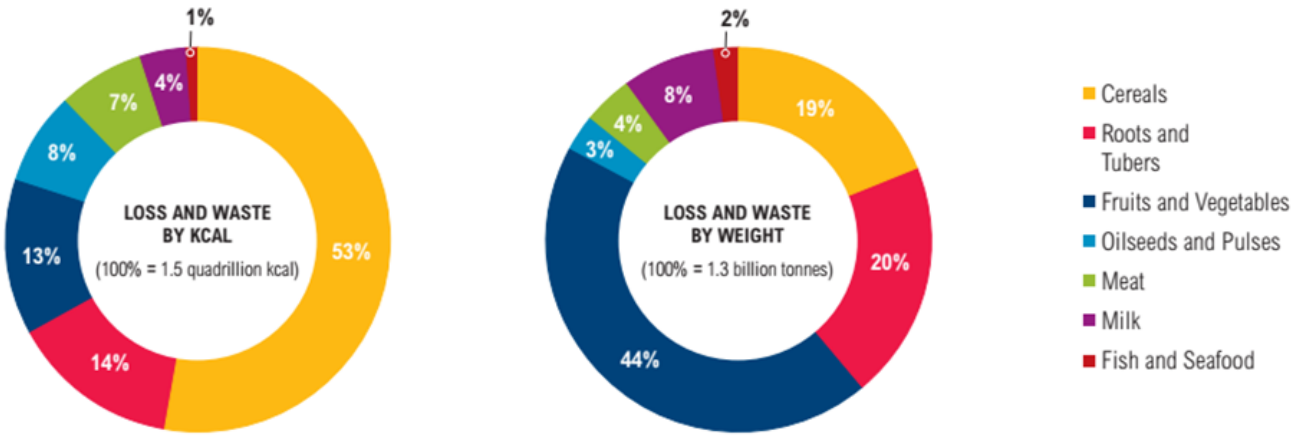


Figure 5. Global food waste by food type (Reproduction of figure by Lipinski et al., 2013)

The economic impact of global food loss was estimated in 2007 to be roughly $750 billion (Papargyropoulou et al., 2014[22]). The FAO, in "Food Wastage Footprint Full-cost Accounting" (2014)[23], calculated the cost to be close to $2.6 trillion. In the FAO's analysis, the authors included losses such as value of lost subsidies, water scarcity, and health damages. The largest contributing factors were the value of products lost and wasted ($936 billion), the risk of conflict ($396 billion), the livelihood loss ($333 billion), and thew greenhouse gas emissions ($305 billion). A full list of the costs included by the FAO are shown in Table 2.

Table 2. FAO food waste footprint costs (Food Wastage Footprint Full-cost Accounting, 2014).

Type	Cost Category	Cost (billion USD, 2012)
Economic	Value of products lost and wasted	936
Social	Risk of conflict	396
Social	Livelihood loss	333
Environmental	GHG emissions	305
Environmental	Water scarcity	164
Social	Health damages (well-being loss)	145
Economic	Subsidies	119
Environmental	GHG from deforestation	72
Environmental	Erosion (water)	35
Environmental	Erosion (wind, very uncertain)	35
Environmental	GHG from managed organic soils	17
Environmental	Pollution impacts of P eutrophication	17
Environmental	Pollinator losses	15
Environmental	Fisheries overexploitation	10
Environmental	Water use (irrigation water)	8
Social	Acute health effects of pesticides	8
Environmental	Pesticides in sources of drinking water	3
Environmental	Pollution impacts of N eutrophication	3
Environmental	Land occupation (deforestation)	3
Environmental	Biodiversity impacts of nitrate eutrophication	3
Environmental	Biodiversity impacts of phosphorus eutrophication	3
Environmental	Ammonia emissions	1
Environmental	Nitrate in sources of drinking water	1
Environmental	Biodiversity impacts of pesticide use	1
Sub-total Environmental		**696**
Sub-total Social		**882**
Sub-total Economic		**1,055**
Total Costs		**2,625**

[22] Papargyropoulou, E.; Lozano, R.; Steinberger, J. K.; Wright, N.; bin Ujang, Z. (2014). The food waste hierarchy as a framework for the management of food surplus and food waste. Journal of Cleaner Production, 76, 106-115; doi: 10.1016/j.jclepro.2014.04.020.

[23] Food Wastage Footprint Full-Cost Accounting: Final Report; Food and Agriculture Organization of the United Nations, 2014.
Food Wastage Footprint: Impacts on Natural Resources: Summary Report; Food and Agriculture Organization of the United Nations (FAO), 2013

In the United States alone, the cost of food loss has been reported to be between $165 billion and $198 billion and accounts for roughly 13 million metric tonnes per year of $CO_{2\text{-eq}}$ GHG emissions (Venkat, 2012[24]; Papargyropoulou et al., 2014; Bond et al., 2013). From an environmental point of view, food waste generates emissions at each stage of the supply chain where material is lost; from the resources used to produce the food as well as the methane gas released as it decomposes in a landfill. One tonne of food waste equates to six tonnes of $CO_{2\text{-eq}}$ when decomposed in a landfill and most of the degradation occurs before 100 days (Beyond Waste, 2010). According to the EPA Waste Reduction Model (WARM)[25], the net landfill emissions for food waste is 0.78 metric tonnes $CO_{2\text{-eq.}}$ per metric tonne of food waste. Additionally, Cuéllar and Webber (2010)[26] estimated the embodied energy of wasted food in the United States based on energy invested to produce the lost resource. In 2007, they estimated the embodied energy to be 2030 ± 160 trillion BTU, equivalent to 550,000 to 650,000 GWh, sufficient to power between 50 and 60 million homes for one year (Cuéllar and Webber, 2010). A 2005 report by the FAO quantified the relative global greenhouse gas impact of food waste as compared to what nations emit on a yearly basis. Food wastage, with just over 3 Gt $CO_{2\text{-eq}}$, produces more than eight of the top ten GHG emitting countries, after China and the United States, both of which are around 7 Gt $CO_{2\text{-eq}}$ (Global Initiative, 2014[27]). The next largest emitters are the Russian Federation and India at roughly 2 Gt $CO_{2\text{-eq}}$ a piece (Global Initiative, 2014).

Many nations are attempting to mitigate food waste and its damages through various programs and regulations. Recovery methodology and success rate vary significantly by country. For example, in 2006 Korea recycled 94.6% of its food waste (Kim et al., 2011[28]), whereas as of 2010, the United States only reported recovering 2.8% of its 34.8 million tonnes of food waste (Solid Waste, 2011[29]). It is important to note that how countries define food waste also impacts the resulting recovery rate figures. As stated before, while the United States includes only *edible food* waste in its calculation, many of this country's counterparts include both edible and inedible waste.

While strategies for encouraging, enforcing, and engaging stakeholders in food waste recovery differ by nation, many agree in the general management hierarchy. Table 3 shows the food waste hierarchies for select European countries and the United States (Eriksson et al., 2015). The South Korean waste management hierarchy, beyond just food waste, is shown also in Table 3; the section of reduction includes reuse of materials including animal feed (Seo, 2013). Interestingly, the South Korean strategy incorporates several different landfill scenarios. The only listed country that has a differing set of priorities is Japan. The country has given top diversion priority to fertilizer and animal feed due to targets to reduce national dependence on imports.

[24] Venkat, K. (2012). The climate change and economic impacts of food waste in the United States. International Journal on Food System Dynamics, 2(4), 431-446.
[25] Environmental Protection Agency, Food Waste, 2015, http://www3.epa.gov/epawaste/conserve/warm/pdfs/Food_Waste.pdf
[26] Cuéllar, A. & Webber, M. (2010). Wasted Food, Wasted Energy: The Embedded Energy in Food Waste in the United States. Environmental Science & Technology. 44. 6464-9. DOI: 10.1021/es100310d.
[27] Global Initiative on Food Loss and Waste Reduction; Food and Agricultural Organization of the United Nations, 2014.
[28] Kim, M. H.; Song, Y. E.; Song, H. B.; Kim, J. W.; Hwang, S. J. (2011). Evaluation of food waste disposal options by LCC analysis from the perspective of global warming: Jungnang case, South Korea. Waste management, 31(9), 2112-2120; doi: 10.1016/j.wasman.2011.04.019.
[29] Solid Waste and Emergency Response. Municipal Solid Waste Generation, Recycling and Disposal in the United States: Facts and Figures 2010; 2011.

Table 3. Food waste diversion hierarchies from select countries

EU[30]	UK[19]	USA[19]	The Netherlands [19]	Sweden [19]	Korea[31]
Prevention	Reduce	Source reduction	Prevention	Donation	Waste reduction
Re-use and preparation for reuse	Feed people in need	Feed hungry people	Use for human food		Recycling
			Conversion to human food		
Recycle	Animal Feed	Animal Feed	Animal Feed	Animal Feed	
Recovery	Composting and 100% renewable energy	Industrial use	Raw materials for industry	Biogas	Anaerobic digestion
			Processing to make fertiliser for co-fermentation	Composting	Composting
			Processing to make fertiliser through composting		Waste to Energy
			Use for sustainable energy		Modern landfill recovering and using CH_4
		Composting	Burn as waste	Incineration	Modern landfill recovering and flaring CH_4
					Landfills that do not capture CH_4
Disposal	Disposal	Disposal	Dumping	Landfill	Unsanitary landfills and open burning

[30] Eriksson, M.; Strid, I.; Hansson, P. A. 2015). Carbon footprint of food waste management options in the waste hierarchy–a Swedish case study. Journal of Cleaner Production. 93, 115-125; doi: 10.1016/j.jclepro.2015.01.026.
[31] Seo, Yoonjung (2103). Current MSW Management and Waste-to-Energy Status in the Republic of Korea. M.S. Thesis, Columbia University, New York, NY.

3 FOOD WASTE TO ANIMAL FEED PROCESSING

3.1 INTRODUCTION

Globally, the demand for livestock products, i.e., dairy, eggs, and meat, is increasing. According to Coughenour and Makkar (2012), this increase in consumption is related to income. In places with significant economic growth, such as Brazil, China, and India, meat production is also rising quickly (Steinfeld et al., 2006). The demand for both meat and milk are expected to nearly double by 2050 using data from 1999 to 2001 as a baseline, resulting in increases of 229 million tons to 465 million tons and 580 million tons to 1,043 million tons, respectively (McMichael et al., 2007). According to Steinfeld et al. (2006), while industrialized nations and Sub-Saharan Africa are expected to experience moderate increases, the rest of the areas identified, transitioning countries, Latin America and the Caribbean, East Asia, Near East and North Africa, and South Asia, show more significant increases between 2006 and 2050 (Steinfeld et al., 2006).

Currently, much of the global feed produced comes from cereals or grains. This began in the United States in the 1940s when corn was introduced to livestock diets in larger portions than previously. Around this time, researchers demonstrated that concentrated feeds, such as corn, were a cost-effective means, over grass fed, to mature livestock in less time (Corah, 2008). According to Capper and Bauman (2013), "Over the past century, the US dairy industry has shifted from extensive production systems based entirely on forage to intensive systems with diets still founded on forage but formulated with feed components to optimize rumen fermentation and meet the dairy cow's nutrient requirements."

Despite the increases in efficiency from concentrated feeds, a reliance on specialty blends of these ingredients can leave the livestock industry vulnerable to the fluctuations of commodity feed pricing. Historically, cereal or grain prices were on a steady decline, which was one of the reasons that made them so attractive around the world (Steinfeld et al., 2006). For example, in Japan, the use of food waste and food by-products as feed was declining recently due to how inexpensive concentrated feed had become. Currently, however, feed pricing has been more volatile, which represents a significant risk for farmers; for example, between roughly 2007 and 2009, soybean prices climbed from around $150 per metric ton to over $250 per metric ton and back down again to $150 (Gardebroek et al., 2014). In the European Union, in 2012, animal feed was close to 50% the cost of pig production and roughly 15% for cattle (FEFAC Congress, 2013).

Practices related to concentrated feed-based farming has significantly increased the environmental impact of animal production (Steinfeld et al., 2006). Feed manufacturing accounts for close to half of the GHGs of animal production for milk and beef industry (Sonesson et al. 2009). Blonk and Ponsioen (2009) documented the main sources of GHG emissions from animal feed including: crop growing, feed processing, and transportation. The largest contributor on the list is from the growing of the feed crops; fertilizers and other agricultural sources of nitrous oxide emissions contribute 298 times more GHG emissions than CO_2.

Conventional animal feed processing, as discussed above, has a few inherent challenges, i.e. volatile crop pricing and GHG emissions from fertilizer use. However, these benefits are not necessarily the main driver for diverting food waste to feeding animals. The primary focus should be on keeping food waste out of landfills and utilising it as a resource. Animal feed is one of many value-added outlets, along with feeding people, composting, anaerobic digestion, and thermochemical conversion, that should be evaluated on a case-by-case basis depending on the characteristics of a given food waste stream.

Food waste diversion and feeding animals are two processes that historically have been paired together, providing a more effective outlet for food waste, garbage, and food by-products as input to animal feed production. This pairing is also positioned highly on most food waste recovery hierarchies across the globe. However, current data does not suggest that a significant amount of food waste is being recovered and diverted to feed. As will be discussed in subsequent Chapters, most feed diversion is from the by-

products of food production, not from waste. Feed safety laws and disease incidences have also discouraged the continual growth in this area. However, there is current interest in increasing food waste diversion to animal feed by multiple government agencies, including the European Union and the New York State Department of Environmental Conservation (DEC). In a recent report by the DEC, they outlined their efforts to "Maximize the diversion of food scraps to feed animals," (Beyond Waste, 2010). With only 2.8% of food waste being recovered in the United States, there is a significant opportunity to increase food waste diversion towards the DEC's goal (Solid Waste, 2011).

If this is a food waste diversion option the State is promoting, it is important to understand the environmental impacts associated with that option, but there is not sufficient data in literature to conduct a comprehensive analysis. As stated above, most life cycle assessments compare anaerobic digestion and composting to landfilling. The remainder of this thesis is intended to report additional research that enables better comparison of all diversion pathways, including animal feed. Additionally, this thesis provides insight into the opportunities within New York State for food scraps to be recovered for animal feed.

For the remainder of this document, the phrases "feeding animals food waste" or "food waste diversion to animal feed" will generally be identified under the acronym FFP or **feed from food products**. As will be discussed later, several countries have deviated from using the phrase feed from food waste due to the negative connotation, and some cases legal stipulations, associated with the term "waste". There are some countries where waste is being diverted to feed, such as Korea, which recycles some of its municipal solid waste as feed. For those instances, the term waste is included in the phrasing to describe food products being diverted to feed. Facilities that process FFP will also be known as processors.

3.2 A BRIEF HISTORY

There has been a long history of feeding food products to livestock both in the United States as well as around the world. According to Westendorf (2000), "Garbage and food waste have been used as livestock feed for centuries". In the recent past, however, several health outbreaks have led to regulatory changes and market shrinkage. The major health concerns from feed contamination with swine include foot-and-mouth disease (FMD), African swine fever (ASF), hog cholera, and vesicular exanthema of swine (VES); these diseases are spread from swine consumption of "partially-cooked infected tissues" (Westendorf, 2000). In recent history within the United States, there have been nine cases of FMD between 1870 and 1930; across the outbreaks, 300,000 swine, cattle, goats, and sheep were slaughtered to stop the spread of disease (Westendorf, 2000). A case of VES occurred in California between 1935 and 1944 in which 430,000 swine were slaughtered (Westendorf, 2000). The most recent incidences of hog cholera have been more recent than some of the above-mentioned diseases. The United States was not free of the disease until 1978 (Westendorf, 2000).

Shortly after the last of the hog cholera cases, the federal government signed the Swine Health Protection Act of 1980 (SHPA). This law made it illegal to feed swine untreated garbage; treated garbage must be heated to 212 °F for 30 minutes (Swine Health Protection Act, 1980). Despite the intention of this regulation to increase feed safety, many states outlaw feeding garbage to swine, treated or untreated, including New York State. Even after the Swine Health Protection Act of 1980, states that allow garbage feeding are still doing so in high numbers, as of a report from 1995, 90.6% of swine feed in Texas, 92.0% in Florida, and 81.5% in Hawaii came from plate waste (Westendorf, 2000).

The more recent disease outbreak impacting global regulation for animal feed was Bovine Spongiform Encephalopathy (BSE), also known as "mad cow disease", which had the first reported cases in the UK in 1986 (Jin et al., 2004). According to Sugiura et al. (2009a), cattle contract BSE from consuming contaminated meat-and-meal bone. What makes containment an issue for BSE is that it could be up to four to six years before the cattle show signs of the fatal infection. From the initial incident all the way to the year 2000, the disease had spread to over 180,000 cases across many countries including Ireland, Portugal, France, and Switzerland (Jin et al., 2004). As of 2000, the UK had slaughtered roughly 4.4 million cattle as a safety measure and had spent roughly $7.4 billion (Brown, 2000). According to Jin et al. (2004), the UK announced in 1996 that human consumption of contaminated meat may be tied to the contraction of Creutzfeldt-Jacob disease (vCJD) (Jin et al., 2004). As of 2011, there have been 176 cases of vCJD, all resulting in death (Andrews, 2012). Additionally, the United States introduced a Mammalian Protein-Ruminant Feed Ban in 1997; Canada introduced a similar measure in the same year (Jin et al., 2004). Despite the introduction of safety measures around the world, there are still a few reported cases of BSE each year, even as recent as 2015; Canada, Norway, and Slovenia each self-reported one infection. The United Kingdom reported two cases in 2015.

3.3 ANIMAL FEEDS EXPLAINED

Kellems and Church (2002) identified eight ways to provide nutrition to livestock: dry roughages, pasture and range grasses, ensiled roughages, high energy concentrates, protein sources, minerals, vitamins, and additives. According to Westendorf (2000), food waste falls under the additive's category. A feed is considered high moisture if the moisture content is greater than 20% (Westendorf, 2000). Feeding animals wet feed, has the advantage of requiring minimal preparation before feeding. The application, however, is somewhat limited because the shelf life is short, one to two days without refrigeration. Moreover, such material has a lower consumption rate at over 40% moisture and is more expensive to transport than dry feed (Westendorf, 2000). For example, in a food waste recovery analysis performed in Korea by Kim and Kim (2010)[32], they assumed that the wet food waste generated, which was 70% to

[32] Kim, M. H.; Kim, J. W. (2010). Comparison through a LCA evaluation analysis of food waste disposal options from the perspective of global warming and resource recovery. Science of the total environment. 408(19), 3998-4006.

80% moisture, was fed to animals at the same location as where it was generated because it is rarely transported any distance.

For this thesis, the primary focus will be on dried food products that are transformed into an animal feed at FFP processing plants. The process begins with material recovered from the food product generator and delivered to an FFP processor where it is shredded and dried. From there, the feed can either be sent directly to a farmer or to a feed mill where it is blended into a larger mix of ingredients. For this analysis, it is assumed that all feed processed from food products is sent to a mill to be mixed according to a predetermined recipe. Larger farms use commodity ingredients that are mixed to a custom blend. Additionally, based on direct input from a FFP provider, product is primarily sold to feed mills and added into a mix of ingredients. When FFP is in this dry form, it can be purchased and substituted for concentrated feeds such as corn and soybean meal.

The basic animal feed processing steps are illustrated below in Figure 6 - Figure 8. Figure 6 documents the principal method for feeding livestock: growing and processing crops specifically for animal consumption. As discussed above, this process generates GHG emissions from fertiliser use during agricultural production. After crops are grown, they are transported to a series of facilities where they are processed (i.e. milled, dried, and mixed to a recipe) then delivered to farms. Figure 7 shows the simplified version of feeding wet food products to animals; the key point is that the food goes through minimal processing before being fed to animals. Figure 8 documents the most relevant process wherein food products are collected from various sources, delivered to a processor where it is milled and dried, then sent to a second milling factory where the feed is incorporated into a larger recipe with other ingredients and finally delivered to farms. Other feed ingredients mixed in more than likely come from the traditional animal feed processing shown in Figure 8. FFP is not produced at a scale large enough to completely substitute existing practices.

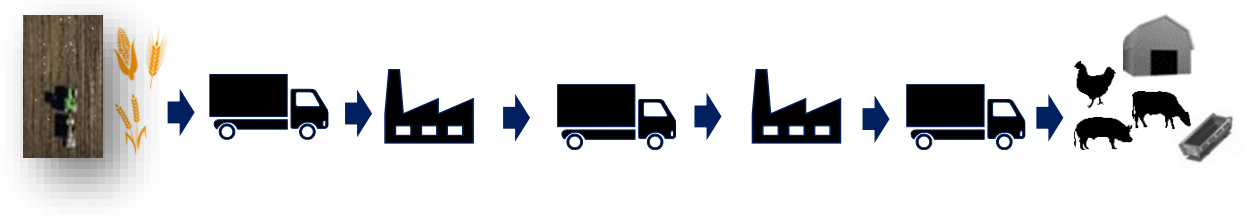


Figure 6. Traditional feed manufacturing from dedicated agriculture production

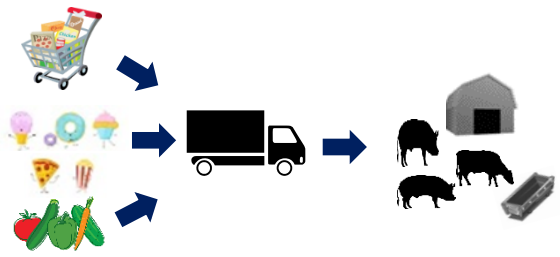


Figure 7. Food residues delivered directly to farms as a Wet Feed.

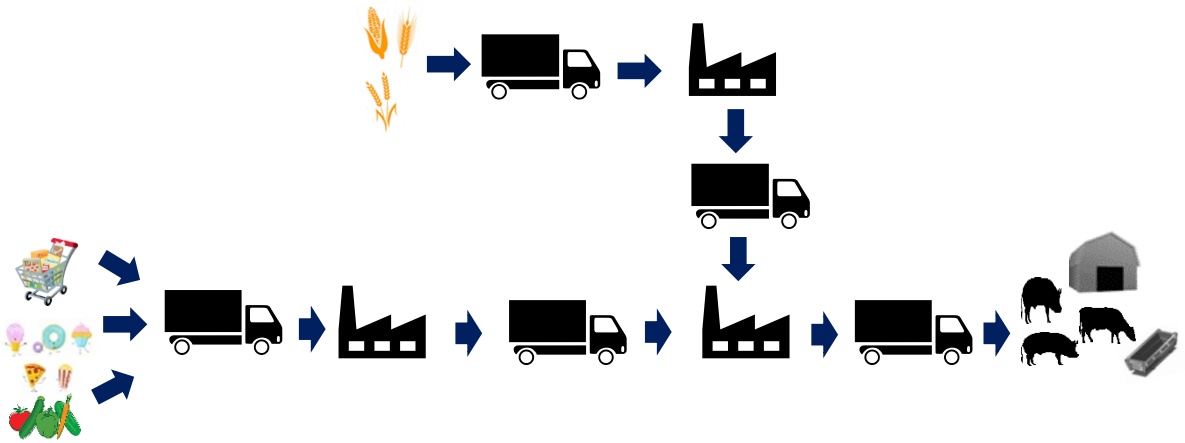


Figure 8. Food residues processed into Dry Feed substitute then delivered to farms.

Some of the most highly utilised by-products for animal feed are described below.

- Distillers' Grains: During ethanol production, 70% by weight of the corn kernel is converted into ethanol and CO_2, and the remaining 30% is called distillers grains and soluble; one or both of these by-products can be fed to livestock in wet or dry form (Wisner, 2010).
- Wheat Middlings: This product includes many of the wheat components leftover from the milling process to make flour including bran, germ, and shorts.
- Bakery Waste, Bakery Meal, or Bakery By-products: This food waste product is a conglomeration of many different food inputs classified under bakery goods. Ingredients can include bread, crackers, candy, and cookies, etc. (Harris and Staples, 1991). Since the ingredients vary from batch to batch, so does the nutrition content of the composite feed, as shown in the tables below.
- Beet Pulp: This feed ingredient is the by-product of sugar production from sugar beets. According to Harris and Staples (1991), beet pulp has roughly 85% the energy value of corn.

According to Ferguson (n.d.), 26% of the total feed produced in the United States in 2012 came from by-products including oilseed meals, animal proteins, and mill products. The remaining 74% was made up of concentrated feeds, predominately corn. The totals are shown in *Table 3-1* below. A recent report by Beef Magazine contains average nutritional information, e.g., energy, protein, and fibre content, for various by-product or food product-based feeds that have been quantified in industry. The listing includes materials such as beet pulp, dried bakery product, brewer grains, and tomato pomace, among many others.

Table 3-1. Total Feed Produced in the United States (Reproduction of table by Ferguson, n.d.)

Category	Type	Amount (short tons)	% Total Feed
Oilseed Meals	Soybean Meal	30,300,000	16.16%
	Cotton seed Meal	2,525,000	1.35%
	Linseed Meal	197,000	0.11%
	Peanut Meal	95,000	0.05%
	Sunflower Meal	360,000	0.19%
Animal Products	Tankage and Meat Meal	2,350,000	1.25%
	Fish Meal	200,000	0.11%

Category	Type	Amount (short tons)	% Total Feed
	Dried Milk	250,000	0.13%
Mill Products	Wheat Mill Feeds	6,400,000	3.41%
	Gluten Feeds and Meal	5,075,000	2.71%
	Rice Mill Feeds	575,000	0.31%
	Total By-Products	**48,327,000**	**25.77%**
Cereals	Corn	128,800,000	68.68%
	Sorghum	1,500,000	0.80%
	Oats and Barley	2,900,000	1.55%
	Wheat	5,900,000	3.15%
	Rye	100,000	0.05%
	Total Feed	**187,527,000**	**100.00%**

Note: 1 short tonne = 0.90718474 metric tonnes.

There is extensive literature incorporating the feeds described above along with many others described as "unusual feedstuffs" by various authors. Several have researched the use of distiller's grains in livestock diets (e.g., Firkins et al. (1985); Anderson et al. (2006)). The use of distiller's grains in livestock feed has grown rapidly due to the market expansion of ethanol in the United States. According to Wisner (2010), distillers grains production in the United States has grown from roughly zero in 1980, to about five million metric tons in 2000 and close 40 million metric tons by 2010. Froetschel et al. (2014) reviewed feeding livestock ensiled grocery food products in Atlanta, Georgia that included waste bakery items, fruits, and vegetables. Angulo et al. (2012), in Columbia, researched the use of fruit and vegetable products as feed and Bampidis and Robinson (2006), in the United States, tested the use of citrus by-products in livestock diets. Several authors have conducted reviews of various by-products incorporated in animal feeds such as almond hulls, beet pulp, citrus pulp, bakery waste, and brewers' grains, including Grasser et al. (1995), Arosemena et al., 1995), and Fadel (1999). Given the extensive research presented, the limiting factors for increasing FFP is not the nutrition content. While there are certain foodstuffs that are inadequate feed supplements due to low nutrient density, there are ample ingredients that have been proven to meet livestock needs. More attention should be put on the other relevant variables such as lowering costs, improving efficiency, and educating stakeholders on this pathway.

3.4 Food Waste to Feed Growth

The principal challenges associated with processing mixed food waste into feed ingredients are the high moisture, the compositional variability, and the potential presence of animal and human pathogens. The methods used for processing food waste must be designed to obtain a product that is stable and free from pathogens and contaminants. In addition, from the feed industry perspective, comprehensive analysis of the nutritional profile and digestibility of the product will be required as well as consistency of quality and supply. Figure 9 summarises the general steps and issues involved in producing animal feed from food waste.

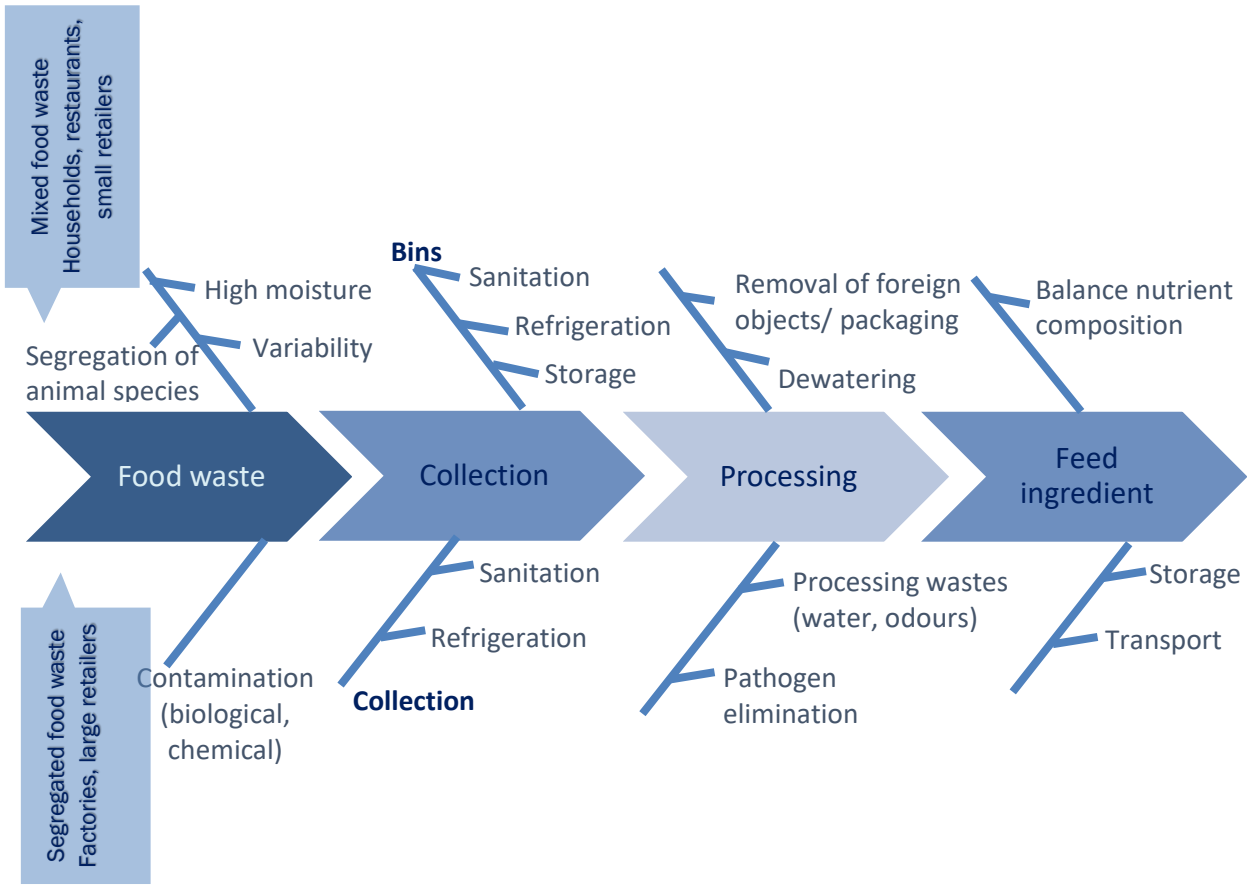


Figure 9. Principal issues to consider when converting food waste into animal feed ingredients.

Many different methods can be used for processing food waste. In many cases, the nature of the food and even the species for which the ingredient is intended will determine the method that can be used. Currently, the range of food waste materials that may be processed into animal feed is severely restricted in the EU. Former foodstuffs that can be recycled for use in farm animal feed (from premises such as bakers, supermarkets, retail stores, crisp manufacturers, and confectioners, but not from kitchens and restaurants) include baked goods, milk and milk products, eggs, and egg products. Procedures required by Defra include heat treatment of milk and ensuring milk comes from FMD free areas. Baked goods must be free of meat and not been in contact with meat; eggshells must be rendered and powdered before use. Other materials currently allowed in animal feed (with exceptions and conditions) include used cooking oil (but not from catering sources and only of non-animal origin), fishmeal and fish oils. A wide range of safety requirements are in place to ensure that the waste does not contain restricted products and that food waste is treated to prevent pathogens growing or to reduce the pathogen load to acceptable levels, e.g., by heating the product.

Despite recent health outbreaks caused by improper handling of certain feeds, specific countries are actively promoting increased use of FFP. One reason is that countries such as Japan and Korea want to

decrease their dependence on imported feed for their livestock. According to Ha et al. (1996), before 1996, Korea was importing roughly 15 million metric tons of animal feed from Southeast Asia and the United States. One of the purposes of their study was to evaluate the incorporation of food by-products into feed to lower the rate of imports. In Japan, Sugiura et al. (2009b) highlighted the importance of their feed independence. As of 2007, roughly 75% of their total digestive nutrition for feeds was imported, as shown in Figure 10 (Sugiura et al., 2009b). Forages included hay, ensiled grass, corn, rice, and rice straw. The compound feed ingredients included grains such as corn, rice, sorghum, rice bran, soybean oil residue, beet pulp, beer residue, and bean curd residue.

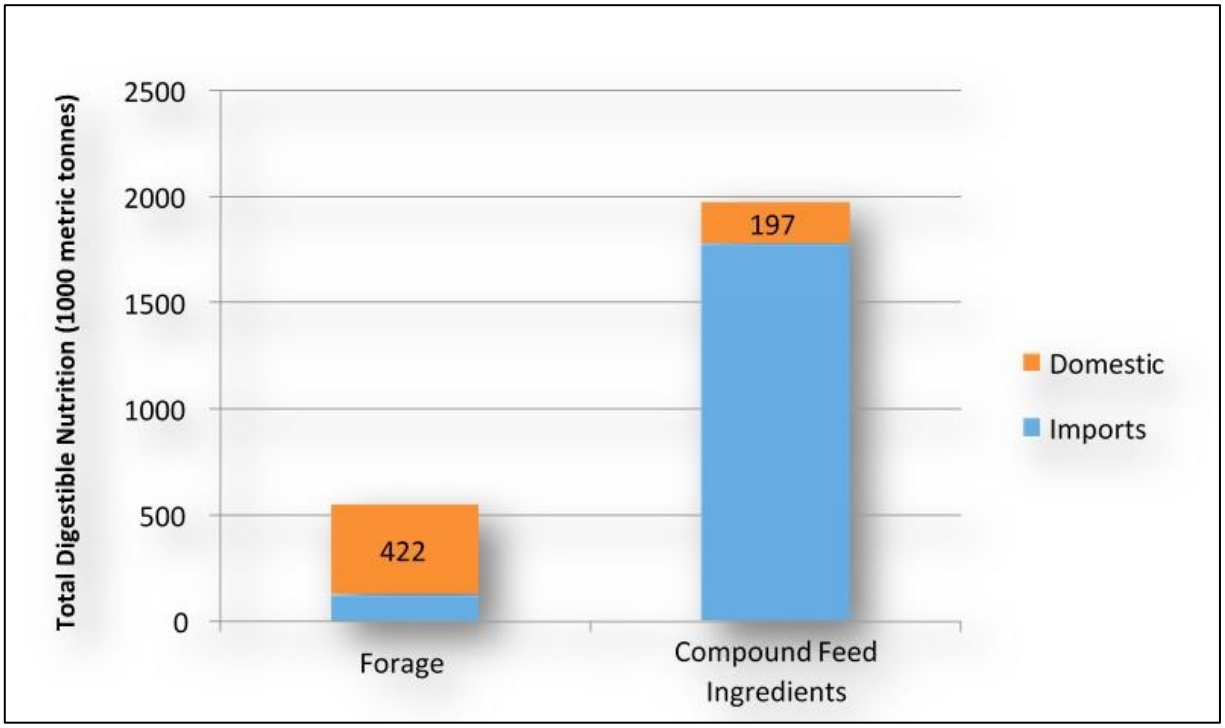


Figure 10. Japan 2007 Animal Feed Sourcing in Total Digestive Nutrition (Sugiura et al., 2009b).

Although the diversion of food waste to feed still has a lot of room to grow, there is already significant research and industry around incorporating co- and by-product foods into livestock feed. According to a food waste survey conducted in 2013 (BSR, 2014), 81% of all food products and by-products generated by U.S. food processors were diverted to animal feed. The amount diverted to animal feed decreased drastically at each new stage in the supply chain. This study included both edible and inedible food products, e.g., vegetable peelings, and not just what the EPA defines as waste. Results from the survey are shown below in Table 2.

Table 2. Edible/ Inedible food waste recovery survey results by supply chain stage and recovery method (Reproduction of table by BSR, 2014).

Supply Chain Stage	# of Respondents	Total Waste Generated (X10^9 lbs)	% Donated	% Recycled	Recycling methods (% of Total)		
					% Animal Feed	% Composting	% Biogas (AD, biofuel, etc.)
Manufacturing	15	7.1	1.5%	93.4%	81.1%	1.87%	2.62%
Retail and Wholesale	10	1.4	13.2%	29.2%	7.65%	7.18%	5.43%
Restaurants	NA*	2.1	1.40%	14.3%	0.01%	2.77%	0%

**Not reported.*

There is ample opportunity to utilise the food products that are no longer suitable for human consumption and divert those to animal feed as well. Based on available research, the best opportunities for recovery are from large volume generators producing materials that already have low moisture content. Sugiura et al. (2009b) explained the main hurdles for a particular food waste stream to be fed to animals as high moisture content, short shelf life, variation in availability, and inconsistent nutrition levels.

Variability in the dry matter, protein, fat, energy, and fibre content of food waste can limit its incorporation as a feed additive into livestock and companion animal feeds. Processing (grinding, drying, blending, etc.) of food waste improves marketability. To ensure economical processing costs, economy of scale becomes increasingly important. The greater the volume of product processed daily through one manufacturing plant; the more competitively priced food waste becomes as a feed additive.

Large volume generation ensures a more consistent and reliable product resource worth developing into animal feed. Figures from the United Kingdom also indicate that low moisture feed inputs are what are primarily recovered for animal feed; a recent study of former foodstuff sources within the UK is shown below in Table 3; the list includes mostly cereals, breads, and crackers (Bouxin, 2012). Additionally, a few references in the environmental literature focused on FFP primarily utilizing bread as a feedstock. Takata et al. (2012) researched a feed mixture that was composed of 80% bread. Vandermeersch et al. (2014) also studied the diversion of bread waste to animal feed. After articulating the results of their analysis, the authors note that the outcomes achieved may not be representative of all food products since bread has low moisture content relative to most other foods (Vandermeersch et al., 2014).

Table 3. UK former foodstuffs by source (Reproduction of table by Bouxin, 2012).

Source	*Amount (metric tonnes)*
Bread and Bakeries	177,000
Cake	30,000
Breakfast Cereal	21,000
Biscuit/Cracker Bread	23,000
Crisps/Snacks	14,000
Dough	3,500
Flour/Breadcrumbs	10,000
Chocolate/Confectionary	18,500
Dairy Products	8,000
Uncharacterised	150,000

Drier food products that are generated in higher volumes are a top priority for recovery.

4 STATE OF THE FOOD WASTE TO ANIMAL FEED INDUSTRY

4.1 INTRODUCTION

The purpose of this section is to present the current practices and policies that affect the feed from food products (FFP) industry. The term "food products" is used in place of food waste to describe edible foods which are lost from the human food supply chain. Inedible food waste, also known as by- or co-products, include items such as potato peelings or vegetable seeds; these food losses are not considered food waste. While lost food products and food waste can be used interchangeably in this context, one of the intentions of this report is to deliberately remove the term waste from the discussion about animal feed. As will be covered below, several countries have already done this: coming up with their own FFP-like names such as Ecofeed and former foodstuffs.

This section will document some of the domestic and international facilities that are transforming wet food products into dry animal feed. There are a variety of processing methods and raw material inputs being turned into feed all over the world. The policy review will shed light onto what some nations are doing to divert food products (in general and specific to animal feed) as well as what animal feed regulations are in place to prohibit contamination and the spread of disease. As discussed in the Brief History (paragraph 3.2), many of today's animal feed laws were put into place in response to several disease outbreaks. The animal feed restrictions are critical to understand because they determine the amount and types of food waste that can be sent to this recovery method. For example, in Japan, diversion rates to animal feed are significantly higher than they are in Europe because there are less stringent regulations on sourcing. Instead of restricting inputs, Japan requires all food materials to be tested before they can be transformed into feed (Takata et al., 2012). On the contrary, in Europe, in order to maintain high levels of food safety, the types of food material eligible for animal feed are highly regulated. New York State animal feed policies (as well as those throughout most of the United States) are much more closely aligned with Europe, so it is important to consider this when determining a path forward for the State.

A few of the global leaders in FFP are described at length in the following sections. There may be others doing similar work, but these countries are generally at the forefront of activity and offer unique insights into strategies for both food waste recovery and diversion to animal feed. Following these sections is a summary table outlining all the relevant policies for both topic areas. In addition to the policy analysis there is a review of several business leaders around the world that are transforming food products into feed.

4.2 JAPAN STRATEGY

According to Bagherzadeh et al. (2014), most nations have policies on food waste or food product recovery as a subset of larger waste reduction strategies. Examples given include Finland's Waste Act, Korea's Waste Control Act, and New Zealand's Waste Minimization Act. Japan, on the other hand, has a specific policy created for food waste management; it is called the Food Waste Recycling Law, but is officially known as the Law for the Promotion of Recycling and Related Activities for the Treatment of Cyclical Food Resources. The law was originally put into place in 2001 and revised in 2007. This law is very comprehensive; it incorporates recycling volume targets as well as reporting requirements for various generators across the supply chain, it documents the government's role to oversee, provide guidance, funding, and public relations for recycling, and outlines the legal requirements for recycling businesses to operate[33].

The Food Recycling Law is a subset of a larger framework, which was instituted in 1991 called the Act on the Promotion of Effective Utilization of Resources. This waste strategy was the second policy attempt to

[33] Global Environment Centre Foundation, Law for Promotion to Recover and Utilize Recyclable Food Resources (Food Recycling Law), 2011, http://nett21.gec.jp/Ecotowns/data/et_c-08.html

reduce and better handle waste around the country. The first attempt was called the Waste Management Act of 1970. The act was put into place as Japan was going through significant economic growth that resulted in increased waste generation (Waste Management in Japan, 2014). The country was running out of landfill space and, just as was the case in Korea, communities did not want new landfills built near them (Waste Management in Japan, 2014). Unfortunately, this initial framework incentivized the wrong behaviour, which led to illegal dumping by waste management businesses. Under the law, waste producers became responsible for handling their own waste. According to Waste Management in Japan (2014), companies generally subcontracted this activity to the lowest bidding waste management facility. Those facilities which often won the bid undercut competition by not properly disposing of the waste and recouping most of the profit. By 1991, public trust in waste management was lost and Japan incurred significant cost in environmental damages caused by the illegal dumping (Waste Management in Japan, 2014). The Act on the Promotion of Effective Utilization of Resources attempted to curb this behaviour and restructure how waste is managed by striving for a material cycling society. The Food Recycling Law is one of several focus areas under the larger framework including: containers and packaging, home appliances, construction, automobiles, and small home appliances. For all of these target areas the government is responsible for supporting materials cycling through education and technology support as well as funding. One example is for grants-in-aid for businesses and municipalities to reduce the entry cost into waste recycling (Waste Management in Japan, 2014).

Under the Food Recycling Law starting in 2008, food manufacturers, food retailers, food wholesalers, and catering and restaurants were required to adhere to recycling rates by sector, 85%, 45%, 70%, and 40% respectively.[14] To achieve these targets, each individual generator has required recycling rates, which increase each year. If a business's recycling rate is between 20% and 50%, they must increase their recovery rate by 2% each year. Between 50% and 80% the rate is cut in half to 1%, and above 80% food waste generators are only required to maintain but can improve as desired. In the case where businesses recover less than 20% per year, their recovery requirement calculation uses a base of 20%. For example, if a generator's recycling rate is 15%, for 2009, the year after this was put into law, this business would be required to recycle 20% plus 2% or 22% of their waste generated.[14] In general, no matter the business size, or how much they currently recover, each firm is required to attempt to decrease their food waste even further. Additionally, the generators making more than 100 tons per year of waste must report to the government their food waste data and recycling strategy once per year.

Also, under the Food Recycling Law, the government provides funding and recommendations to businesses or sectors and has the right to mandate action with a company that is underperforming recycling levels.[14] To be certified as an Ecofeed producer, the feed must include at least 20% food waste with 5% comprised of promoted or priority food products (Ermgassen et al., 2016). According to Ermgassen et al. (2016), ordinary food products include: distillery waste, beet pulp, rice bran, wheat bran, and domestically produced soybean dregs, whereas promoted food waste includes: plate scraps, noodle debris, breadcrumbs, cooking waste, coffee waste, waste box lunches, squeezed fruit waste, dairy plant waste, and many others. Ermgassen et al. (2016) also state that the Ecofeed industry receives incentives through two different programs: $194 million for "Grant to Create a Strong Agricultural Industry", and $750,000 for "Urgent Plan to Increase Ecofeed Production". Japan primarily encourages the production of FFP and fertilizer from food waste, "The [Food Recycling Law's] guidelines state: 'since it is the most effective way to utilize the nutrition or calorific value of the recycled food, besides contributing to [Japan's] self-sufficiency ratio for feed, it is important to make processing feed [from food waste] a priority."[5] Animal feed made from food waste is certified and labeled as 'Ecofeed;' prior to this label, pigs fed food by-products or food waste were known as garbage-fed pork (Sugiura et al., 2009b; Sasaki et al., 2011).

Figure 11, adapted from Ermgassen et al. (2016) shows the combined recycling rates (animal feed, composting, and anaerobic digestion) over time across manufacturing, retail, and catering and food service. As shown in

Table 4, most of the waste recycled from the food processing and from the wholesale and retail industries was recovered as fertiliser and animal feed. Of all the recycled food waste, 72% went towards feed and 19% went towards manure.[34] The fact that the top diversion methods are for feed and fertilizer are not surprising; as stated above, they are the primary recovery outlets promoted by Japan. As of 2006, 52.5% of food waste was diverted to animal feed (Ermgassen et al., 2016). To put the diversion rate of 52.5% into perspective, in 2006, Ecofeed made up roughly 4% of the animal feed market; the number is closer to 6% as of 2013 (Ermgassen et al., 2016).

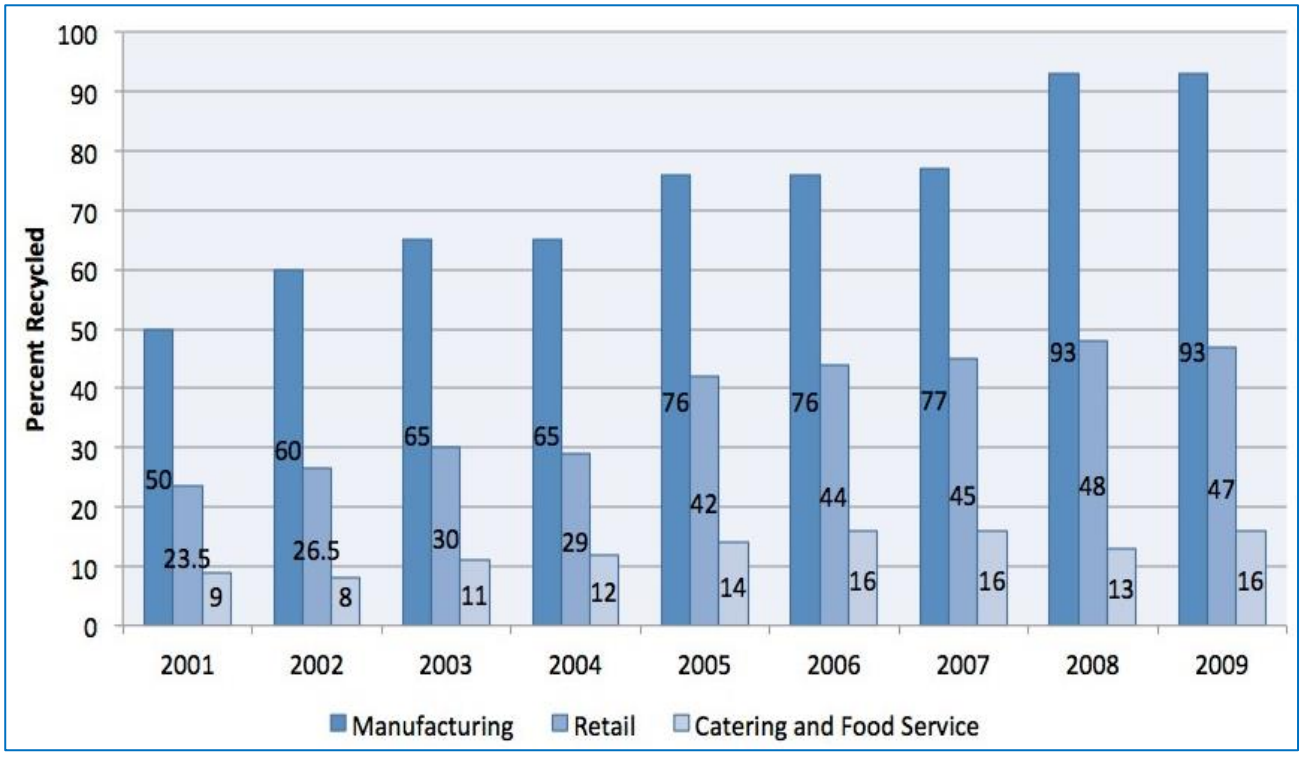


Figure 11. *Japan food waste recycling rate by year and source (Ermgassen et al., 2016).*

[34] Ministry of Agriculture, Forestry and Fisheries (MAFF), The 89th Statistical Yearbook of Ministry of Agriculture, Forestry and Fisheries (2013～2014), http://www.maff.go.jp/e/tokei/kikaku/nenji_e/89nenji/index.html

Table 4. Japan food waste recovery by industry in 2012 (in thousands of tonnes)[15]

2012 Japan Food Waste Recycling	Manure	Feed	Methane	Oils and fats, and oil and fat products	Carbonized fuels and reducing agents	Ethanol	Recovered Total	Disposed Total	Recycling Rate
Food industry total	**2,536**	**9,578**	**540**	**526**	**39**	**6**	**13,225**	**2,833**	**85%**
Food manufacturers	**2,186**	**9,227**	**518**	**320**	**33**	**5**	**12,289**	**474**	**95%**
Livestock products	321	892	5	156	5	-	1,379		
Marine products	114	345	0	15	0	0	474		
Canned vegetables and fruits, and preserved farm products	121	123	3	-	-	-	247		
Seasonings	90	144	3	3	1	-	241		
Sugars and saccharide	86	541	-	16	1	3	647		
Polished grains and flours	35	1,710	0	25	-	-	1,770		
Breads and confectionery	57	325	8	4	2	0	396		
Animal, vegetable oils and fats	177	2,946	0	70	0	-	3,193		
Other food products	530	1,292	32	29	5	1	1,889		
Soft drinks	491	81	44	0	17	-	633		
Alcoholic beverages	148	828	423	1	1	0	1,401		
Tea and coffee (Except for soft drink)	15	1	-	-	-	-	16		
Food wholesalers	**52**	**34**	**3**	**24**	**0**	**0**	**113**	**89**	**58%**
Farm, livestock, and marine products	41	18	0	23	0	0	82		
Foods and beverages	11	16	2	1	0	-	30		
Food retailers	**160**	**202**	**12**	**68**	**4**	**0**	**446**	**760**	**45%**
Various food retailers	123	141	10	33	3	0	310		
Vegetable/fruit retailers	2	2	-	0	-	-	4		
Meat retailers	2	1	-	4	0	-	7		
Fresh fish retailers	9	10	-	1	-	-	20		
Breads and confectionery retailers	0	3	0	1	-	-	4		
Other food retailers	25	45	2	29	1	-	102		
Food services business	**138**	**114**	**7**	**114**	**2**	**1**	**376**	**89**	**24%**
Lodging industry	23	12	0	2	1	0	38		
Eating and drinking industry	81	93	6	106	2	1	289		
Takeaway・eating and drinking services delivery	30	9	0	6	0	0	45		
Wedding hall industry	4	1	0	1	-	0	6		

As of 2007, according to Sugiura et al. (2009b) there were 171 registered FFP plants producing Ecofeed. The chart below, Figure 12, depicts the types of food products recovered by facility. For example, in 2007 there were 55 facilities that processed food dregs or food residues from food processing plants. Additionally, 30 plants took in expired foods from grocery and convenient stores.

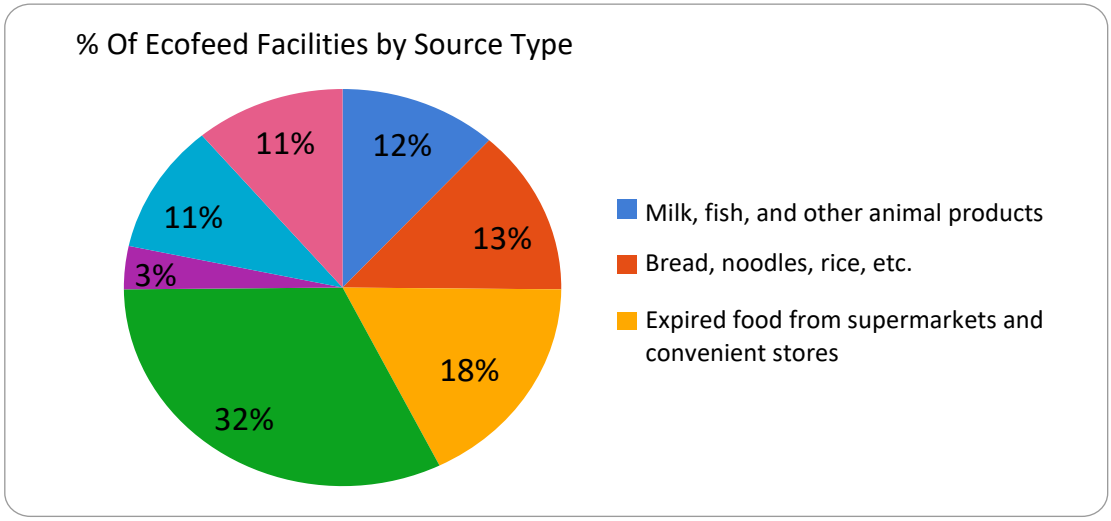


Figure 12. 2007 Japanese Ecofeed processing facilities, grouped by waste sources (Reproduction of figure by Sugiura et al., 2009b)

Japan, according to Sugiura et al. (2009a), has taken several recent measures to ensure feed safety and mitigate the risks of bovine spongiform encephalopathy. Multiple importation bans of meat-and-bone meal (MBM) from BSE infected states, i.e., the United Kingdom and subsequently all the European Union, Switzerland, and Liechtenstein, were instituted unless the MBM was cooked at 133 °C, three bar pressure for 20 minutes (Sugiura et al., 2009a). Feed manufacturers were encouraged, but not enforced, to end MBM feeding to ruminants in 1996; this changed to a requirement in 2001 after the first BSE case was found (Sugiura et al., 2009a). Neither swine nor poultry have the same restrictions as ruminants; they can be fed meat from swine or poultry (Sugiura et al., 2009a).

To ensure compliance, the Japanese Food and Agricultural Materials Inspection Centre performs audits at each part of the feed production supply chain (Sugiura et al., 2009a). Additionally, according to Takata et al. (2012), "Recycling food waste into animal feed is tightly restricted in Europe due to the infectious diseases of animals (Garcia et al., 2005). However, in Japan, the safety and quality of food waste are strictly tested before entering recycling facilities. Therefore, animal disease related to feed has not occurred.". It is legal to send food products to animal feed from manufacturing, retail, and catering or foodservice, but household waste cannot be diverted due to the likelihood of contamination (Ermgassen et al., 2016).

4.3 South Korean Strategy

According to Research Office (2013), Korea began to put effort into waste management in the 1990s due to vast economic growth; waste generation outpaced their ability to treat the waste. Food waste management strategies come from the Wastes Control Act of 1986 and the Act on Promotion of Saving and Recycling of Resources of 1992; both were amended in 2007 and 2008, respectively. The Food Waste Reduction Master Plan, established in 1996, required that commercial food waste generators recycle their food wastes, and households were responsible for separating their food wastes for collection. In 2005, food waste was banned from landfills and in 2010 Korea started to introduce volume-based Food Waste Fee Systems, which had been in place for general MSW for households and small businesses since the mid-1990s. To support these food waste recycling requirements, the Korean government has increased capacity at the public recycling facilities around the country by building both biogas and sewage treatment plants.

South Korea's recent recycling rates are reflective of the effort invested in diverting food waste from landfills. According to Kim et al. (2011), as of 2006, only one year after the landfill ban was enacted, 94% of food waste was being recycled in some form, up almost 40% from five years earlier. The majority of waste was recovered for animal feed and composting, 45.2% and 44.9% respectively; this includes food waste from households (Kim et al., 2011). In Korea it is legal to divert plate and table wastes to animal feed. After animal feed and compost, the remaining 9.8% was recycled through multiple sources including anaerobic digestion and co-digestion with sewage sludge (Kim et al., 2011). The breakdown by Kim et al. (2011) of recent recovery outlets is shown in Table 5 below. The majority of meat consumed in Korea is pork; the country used to be the largest global importer of beef but that declined significantly after BSE outbreaks.[35] To reduce the risk of animal borne diseases, the Korean government introduced livestock disease control measures in 2011 that included farm registration, increased training, and standard operating procedures for food-and-mouth disease.[16] According to Ermgassen et al. (2016), feed produced from food wastes can only occur at registered facilities that heat-treat for sterilization.

[35] United States Department of Agriculture Economic Research Services, South Korea Animal Product Markets, http://www.ers.usda.gov/topics/international-markets-trade/countries-regions/south-korea/animal-productmarkets.aspx

Table 5. Korean food waste recovery in tons per day in 2006 (Reproduction of table by Kim et al., 2011)

Year	2001		2002		2003		2004		2005		2006	
Treatment Type	Amt	%	Amt	%	Amt	%	Amt	%	Amt	%	Amt	%
Animal Feed	3523	31%	3526	31%	3832	34%	4434	39%	5110	39%	5703	43%
Compost	2598	23%	3259	29%	3391	30%	3955	34%	5759	44%	5660	42%
Others	256	2%	345	3%	495	4%	927	8%	1235	10%	1240	9%
Recycling Sum	6378	57%	7130	63%	7718	68%	9316	81%	12104	93%	12603	94%
Incineration	3856	34%	922	8%	2836	25%	1607	14%	356	3%	261	2%
Landfilling	1003	9%	3345	29%	844	7%	541	5%	516	4%	509	4%
Total	11237	100%	11397	100%	11398	100%	11464	100%	12976	100%	13372	100%
Others include: AD and co-digestion with sewage sludge												

4.4 United States Strategy

The United States does not have a comprehensive policy for food waste management at the federal level. According to Sakai et al. (2011), municipal solid waste is handled by state and local agencies. However, the federal government has set forth several recovery and reduction targets and challenges as well as an overall waste reduction target as recently as the fall of 2015. The two main agencies involved in food waste activities are the Environmental Protection Agency (EPA) and the United States Department of Agriculture (USDA). The EPA's food waste hierarchy is shown Figure 13. This priority diversion strategy was published as early as Waste Not, Want Not: Feeding the Hungry and Reducing Solid Waste through Food Recovery in 1999 (Waste Not, 1999).

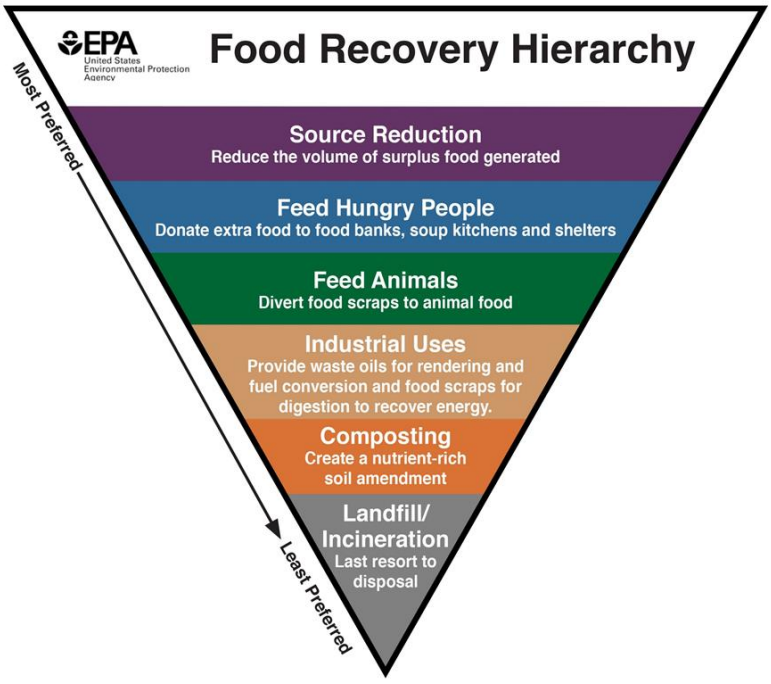


Figure 13. Food Recovery Hierarchy (EPA US)[36].

In 2010, the Food Recovery Challenge was introduced by the EPA's Sustainable Materials Management Program. As a part of the voluntary program, businesses and organizations must practice and promote

[36] EPA US (2016). Sustainable Management of Food - Food Recovery Hierarchy (website). Available at: https://www.epa.gov/sustainable-management-food/food-recovery-hierarchy. Accessed, 16.09.2020.

sustainable food waste management practices as well as follow the food waste hierarchy[37]. The benefits to participating include free technical resources through webinars, databases, etc., free climate change report, and public recognition from the EPA[23]. According to the EPA's website, there were 800 participating members during 2014, and just over 600,000 tons were diverted from landfills. Of the total, 36% went to compost, 26% went to animal feed, 15% was donated, 14% was prevented, and 4% went to anaerobic digestion.[38] The USDA and EPA started the U.S. Food Waste Challenge in 2013. This program is also volunteer based for all members of the food supply chain. Unlike the previous challenge, the focus of the Food Waste Challenge is for businesses to generate a commitment for food waste reduction, recovery, or recycling. The EPA and USDA in return for the business's commitments will share best practices[39].

According to Moriarty (2013), as of 2012, there were thirteen active anaerobic digesters in the United States that were either food waste-based AD facilities or co-digesters with wastewater. The facilities identified are shown below in Table 6. This dataset, however, is limited and does not capture all active locations. For example, CH_4 Biogas has two facilities which co-digest food waste with manure. Synergy Biogas is a co-digestion facility based in Wyoming, New York with an electricity production capacity of 1.4 MW.[40] Napoleon Biogas is located in Harrison Township, Ohio and has a capacity of 2.8 MWh of electricity from food processing and dairy farm waste[27].

Table 6. Listing of food waste based anaerobic digestion facilities (Reproduction of table by Moriarty,2013).

Anaerobic Digester Owner	Location	Feedstock
Gills Onions AD Project	Oxnard, CA	Pre-consumer food waste
San Jose Zero Waste (construction)	San Jose, CA	Food waste, green waste
Orange County Food Waste Pilot Plant	Orange, CA	Post-consumer food waste
Monterey Zero Waste AD Pilot Plant	Monterey, CA	Post-consumer food waste, green waste
Inland Empire-Environ AD Project	OshKosh, WI	Food waste, green waste
City of Toronto	Toronto, Canada	Food waste
Gloversville and Johnston	Johnston, NY	Wastewater, yogurt factory waste
Cottonwood Dairy	Cottonwood, CA	Manure, cheese waste
East Bay Municipality	Oakland, CA	Wastewater, food waste
Sacramento County Co. Regional WWTP	Sacramento, CA	Wastewater, food waste
Central Marin Station	Marin, CA	Wastewater, food waste
Humboldt County Waste Authority	Eureka, CA	Wastewater, food waste
City of Riverside	Riverside, CA	Wastewater, food waste

According to Levis et al. (2010) there are 273 food waste based composting facilities in the United States including 57 handling more than 5000 metric tons of organic waste per year. The breakdown by region and size are shown below, in Table 7. This dataset or scope may be limited, however, according to the Organic Resource Locator (ORL), generated by the New York State Pollution Prevention Institute (P2I),

[37] United States Environmental Protection Agency (EPA), Food Recovery Challenge, http://www.epa.gov/sustainable-management-food/food-recovery-challenge-frc.

[38] United States Environmental Protection Agency (EPA), Food Recovery Challenge Results and Award Winners, http://www.epa.gov/sustainable-management-food/food-recovery-challenge-results-and-award-winners#2015

[39] United States Department of Agriculture Office of the Chief Economist, Frequently Asked Questions, http://www.usda.gov/oce/foodwaste/faqs.htm

[40] Waste Management World, New York's Largest Farm & Food Waste Biogas Facility Opened, 2012, http://wastemanagement-world.com/a/new-yorks-largest-farm-food-waste-biogas-facility-opened [27] CH4 Biogas, Napoleon Biogas, http://ch4biogas.com/projects/napoleon-biogas/

there are over 60 composting locations in New York alone which have food waste as a primary feedstock whereas Levis et al. (2010) only accounts for 51 sites in all New England.[41]

Table 7. Food Waste based composting facilities in the United States (Reproduction of table by Levis et.al., 2010).

Region	Total	Greater than 5000 mt/y	Greater than 50,000 mt/y	Commercial or municipal composters	Accept residential waste
New England	51	9	2	16	8
Atlantic	48	6	3	15	3
Southeast	18	4	2	11	3
Upper Midwest	48	13	3	17	10
Mountain	36	6	5	27	13
West	72	19	9	45	34
Entire US	273	57	24	131	71

Animal feed in the United States is regulated by a few different agencies. The Food and Drug Administration (FDA) enforces the Federal Food, Drug, and Cosmetic Act (FFDCA); all food products are covered by this act, which includes animal feed. The FFDCA determines food requirements, i.e., sanitation and labeling.[29] Any new substance that will be included in animal feed must receive approval by the FFDCA before being added unless it is generally recognized as safe (GRAS).[29] The USDA, through the Food Safety Inspection Service (FSIS) and the Animal and Plant Health Inspection Service (APHIS), oversees the animal product end, for both domestic production and imports (Lefferts et al., 2006). The EPA also plays a role by controlling pesticide use as well as crops that are genetically modified (Lefferts et al., 2006). States have the ability to regulate beyond what has been mandated federally. For example, New York is one of 20 states that prohibit feeding garbage to swine. The other nineteen states include: Alabama, Delaware, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Mississippi, Nebraska, North Dakota, Oregon, South Carolina, South Dakota, Tennessee, Virginia, and Wisconsin[30].

In addition to the relatively recent feed safety regulations described earlier in response to BSE, is the Food Safety Modernization Act (FSMA) of 2011 generated by the USDA. FSMA encompasses both human and animal food produced domestically as well as internationally that are imported to the United States.[42] Compliance for the animal feed portion will be integrated over time based on business size, starting in September of 2016[43]. This law is, "the most sweeping reform of our food safety laws in more than 70 years"[31]. The portion of the regulation specific to animal feed, called the Preventative Controls for Animal Feed, covers both businesses that divert their wastes to farms or feed mills as well as the facilities that process food waste into animal feed[32]. There are several main components of a part of the law that will impact the FFP industry. Feed mills that are onsite and directly tied to one farm are not responsible for following all of the requirements identified below so long as all feed is utilized onsite. The relevant changes are identified below:

- Current Good Manufacturing Practices (CGMPs) created for animal food processing. The standards are intended to be flexible to account for the variation in feed components and

[41] New York State Pollution Prevention Institute, Organic Resource Locator, https://www.rit.edu/affiliate/nysp2i/OrganicResourceLocator/ [29] United States Food and Drug Administration, Product Regulation, http://www.fda.gov/AnimalVeterinary/Products/AnimalFoodFeeds/ucm050223.htm [30] United States Food and Drug Administration, Animal and Plant Health Inspection Service, https://www.gpo.gov/fdsys/pkg/CFR-2010-title9-vol1/pdf/CFR-2010-title9-vol1-sec166-15.pdf

[42] United States Food and Drug Administration, FDA Food Safety Modernization Act (FSMA), http://www.fda.gov/Food/GuidanceRegulation/FSMA/

[43] United States Food and Drug Administration, Key Requirements: Final Rule on Preventative Controls for Animal Food, 2015, http://www.fda.gov/downloads/Food/GuidanceRegulation/FSMA/UCM461884.pdf

processing techniques. Businesses that already comply with the human based CGMPs do not have to also follow the animal food based CGMPs.

- Applicable facilities are required to maintain a prevention-based food safety plan. The document must include a hazard analysis, preventative controls, a recall plan, as well as an extensive oversight strategy, i.e., monitoring, verification, and corrective action.
- The animal food-based supply chains must be flexible and accountable during times of hazard recovery. All parties involved are responsible for ensuring what moves through facilities is safe and sourced by approved suppliers.

The original FSMA regulation was revised in September 2014 after public feedback.[44] The updates incorporated more flexibility and practicality based on the state of the animal feed industry in the United States.

4.5 EUROPEAN STRATEGY

Analogous to many other nations and regions, food waste policy is a subset of a single or set of waste policies. Most recent regulations started with the Directive on the Landfill of Waste from 1999. The landfill regulation stated that recovery and recycling of materials should be performed where possible, however there was no specific mention of food or organic matter in this regulation. The Waste Framework Directive of 2008 was the basis for most modern regulations regarding waste within the EU. The Directive also included targets for reuse and recycling targets for residential municipal solid waste (MSW) i.e., plastic, paper, glass, metal, etc., to be 50% by 2020 (Directive 2008, 2008) It gave guidelines for the recovery and recycling hierarchy for all wastes as prevention, re-use, recycling, recovery, and disposal. The document also directed member states to create their own strategies for waste management. Biowaste is specifically mentioned to be collected and handled separately in order to reduce greenhouse gas emissions.

After 2008, strategic projects around food waste started to take shape. In 2011, the Roadmap to a Resource Efficient Europe identified food and food waste as key areas of concern. Since then, numerous research programs have been launched to reduce food waste, and increase diversion to various technologies, including animal feed. Some of those programs include FUSIONS from 2012-2016, NOSHAN from 2012 to 2015, and REFRESH from 2015 to 2019. FUSIONS, which stands for Food Use for Social Innovation by Optimising Waste Prevention Strategies, is meant to generate an agreed upon framework for food waste reduction and recovery. NOSHAN was specifically set up to look at how to produce low-cost animal feed from food products. REFRESH is another food waste reduction project, which just started in July 2015. The results from NOSHAN, as of December 2015 have not been published. When the project's outcomes are disseminated, they will provide valuable insight into the FFP industry. The project's technological objectives are to:

- "Create a broad portfolio of valorised wastes for feed production according to their potential nutritional properties, quantities produced, seasonality, possibility of stabilization, safety and regulatory issues, cost and logistics.
- Characterise at a molecular level the different waste streams to provide the best technology for the best raw material to obtain the desired nutritional/functional properties.
- Develop high-advanced technologies for conditioning, stabilising seasonal wastes by physiochemical and biological strategies, extracting high-added value compounds and feed production.
- Integrate the developed technologies in an innovative low-cost and low energy tailor made procedure for valorising food waste for production of safety and compound functional feed."[45]

[44] The United States Food and Drug Administration, FSMA Final Rule for Preventive Controls for Animal Food, http://www.fda.gov/Food/GuidanceRegulation/FSMA/ucm366510.htm

[45] NOSHAN, Project Objectives, http://www.noshan.eu/index.php/en/project/#project-objectives

The first two objectives target the important concept that not all food products are created equal. The output of these items helps to overcome many of the barriers for FFP identified by Sugiura et al. (2009b). Beyond the key issue of nutrition value, this project will give insight into the costs and logistical concerns for FFP, which are two very real challenges. Additionally, depending on the moisture content and other factors, the technology required to prepare FFP may change. Having detail into the various options will help to lower the cost and improve efficiency of making feed from food products. The final two technological objectives build upon the first two by introducing recommendations for actual systems that can be employed to achieve the low cost, efficient production of feed.

In 2015, the European Commission proposed to amend the 2008 directive; this new revision incorporated many more specifics on food waste management. Firstly, it clarified that, "Plant based substances from the agri-food industry and food of non-animal origin no longer intended for human consumption, which are destined to be used as feed are subject to Regulation (EC) No 767/200915 and are not regarded as waste for the purposes of that Regulation. Directive 2008/98/EC should therefore not apply to those products and substances when used for feed, and the scope of that Directive needs to be clarified accordingly" (Proposal for a Directive, 2015).

This language is significant because according to European law, food waste cannot be fed to animals, "Catering and household waste are foodstuff residues resulting from human consumption at catering facilities or people's homes. The use of this food waste in animal feed for food producing animals, also known as swill feeding, is prohibited in the EU… In addition, the use of catering waste in animal feed can impossibly comply with the General Food Law's traceability requirements and would conflict with the EU ban on intra-species recycling"[46].

The terminology in the European Commission statement improves the confidence and standing of food by-products and former foodstuffs as animal feed. The proposal also stated that EU members should strive for food waste reduction across the entire food supply chain as well as work toward the target of reducing food waste by half by 2030 (Proposal for a Directive, 2015). Member States are to be required to report their food waste levels biannually. Additionally, the document recommends that best practices should be established and shared throughout the European Union. Also, in 2015, the European Commission introduced "Closing the Loop - An EU Action Plan for the Circular Economy." As a part of the 2030 target on food waste reduction, the Commission is committing to, "facilitate food donation and the use of former foodstuff and by-products from the food chain in feed production without compromising food and feed safety"[47].

Within Europe there also are non-profit organisations encouraging diversion of food products to animal feed. One example is an organization called the Pig Idea, which is aiming to change European law to allow catering wastes to be fed to pigs. This practice was outlawed after an infection of Foot in Mouth Disease was discovered.[20] According to the Pig Idea organization, this ban should be removed, "Pathogens such as Foot and Mouth Disease and Classical Swine Fever are effectively eliminated by heat treatment," therefore, with the proper regulations in place Europe can safely send catering waste to pigs and chickens.[20] Another organization, called the European Former Foodstuff Processors Association (EFFPA), acts as the main voice for the former foodstuffs to animal feed industry in Europe. There are sister organizations in several EU member states including Germany, The Netherlands, France, and the UK. Industrial companies participate in the non-profit either at the EU level or within their respective countries. Some examples of the industry members include the Promic Group from Spain, Trotec from Belgium, and Dalma Mangimi Spa from Italy. This organization plays an active role in legitimizing the diversion of former foodstuffs to animals by working closely with the European Feed Manufacturers' Federation (FEFAC) to ensure consistency of message and to separate former foodstuffs from a waste status.

[46] European Former Foodstuff Processors Association, Reducing Food Waste, http://www.effpa.eu/reducing-foodwaste/

[47] European Commission, EU Actions Against Food Waste, http://ec.europa.eu/food/safety/food_waste/eu_actions/index_en.htm

[20] The Pig Idea, The Solution, http://thepigidea.org/the-solution.html#facts

The non-profit also had some reinforcing feedback to the European Commission statement quoted above. According to the president of the EFFPA, Paul Featherstone, "A clear non-waste legal status for former foodstuffs is very much needed, as former foodstuff processors occasionally find their operations interrupted by environmental control authorities who incorrectly interpret former foodstuffs as a 'waste'. The circular economy package once and for all confirms our operations have nothing to do with waste processing or food waste recycling"[48, 49].

The comments by Featherstone as well as the statement by the European Commission are particularly important for the food to feed industry. This pathway sets Europe apart from the rest of the world in terms of separating food recovery for feed from waste recycling. The next few years will tell if the language clarification and the removal of the negative connotation of waste help the growth of the industry. As stated above, Japan recently changed the labelling on the pork fed food waste to Ecofeed pork rather than garbage-fed pork (Sasaki et al., 2011).

Examples of former foodstuffs given by the EFFPA's website include biscuits, bread, pasta, savoury snacks, chocolate bars, etc. that are not consumed due to errors in production, seasonal or event over production, expired product, and more. Additionally, livestock cannot be fed any gelatine that is of ruminant origin, which also limits scope of acceptable foodstuffs for feed.[50].

According to Bouxin (2012), approximately 90 million tons of co-products from food and biofuels are utilised as animal feed each year. Additionally, 3 million tons of feed is former foodstuffs. The breakdown of EU Member State contribution to the 3 million total is shown below in Table 3.3. There are at least ten different countries in Europe with former foodstuff processors and four with more than ten processing facilities (Bouxin, 2012).

4.5.1 Policy measures connected to animal by-products and feedingstuffs.

Within the policy and legislative areas, certain topics and policy measures regarding food waste and specifically animal by-products and feedingstuffs have been identified. The relevant EU legislation is listed below.

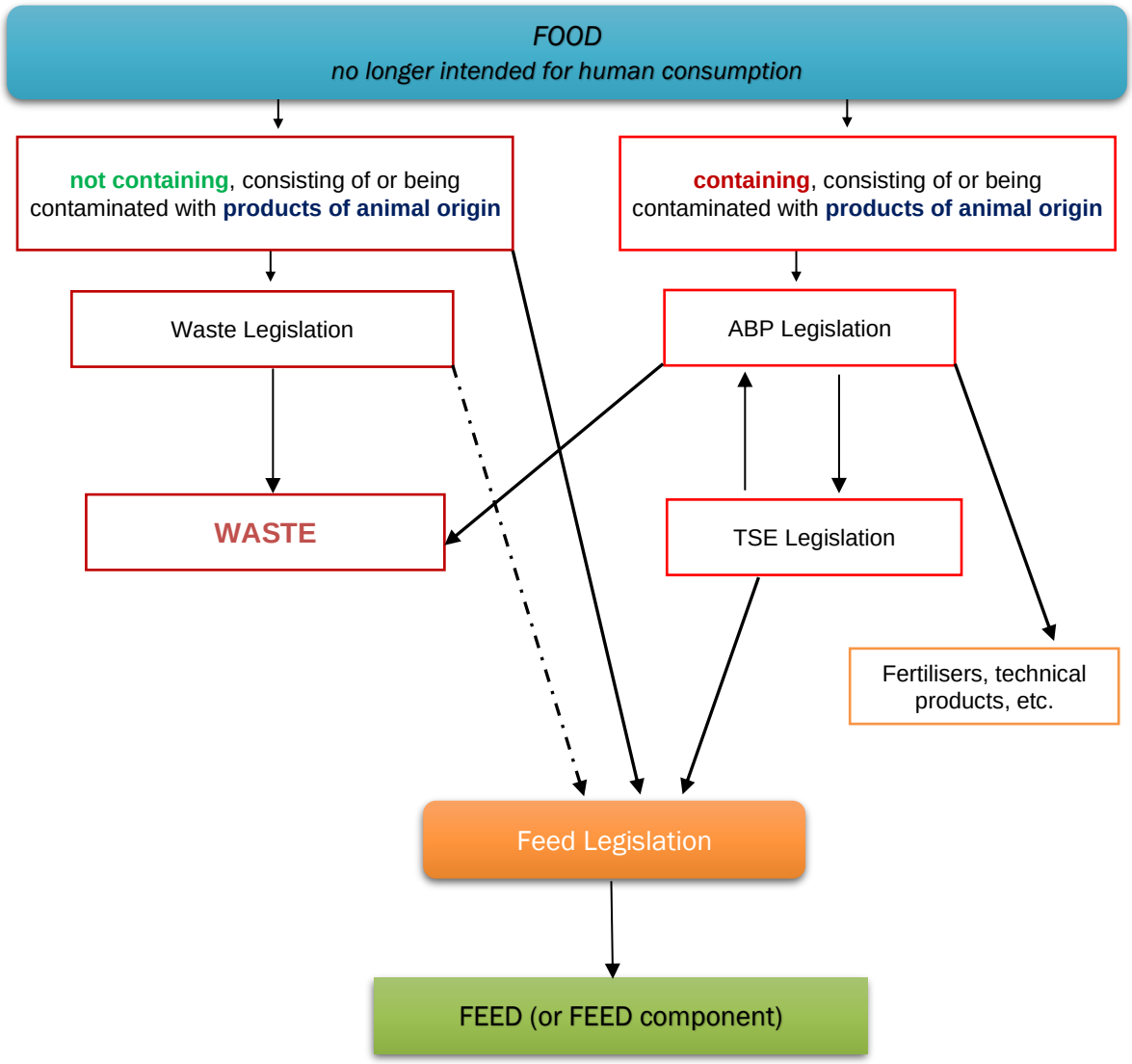
1. Regulation (EC) No 1069/2009 of the European Parliament and of the Council of 21 October 2009 laying down health rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (Animal by-products Regulation). OJ L 300, 14.11.2009, p. 1–33
2. Commission Regulation (EU) No 142/2011 of 25 February 2011 implementing Regulation (EC) No 1069/2009 of the European Parliament and of the Council laying down health rules as regards animal by-products and derived products not intended for human consumption and implementing Council Directive 97/78/EC as regards certain samples and items exempt from veterinary checks at the border under that Directive (Text with EEA relevance). OJ L 54, 26.2.2011, p. 1–254.
3. Commission Regulation (EU) 2017/1017 of 15 June 2017 amending Regulation (EU) No 68/2013 on the Catalogue of feed materials (Text with EEA relevance). OJ L 159, 21.6.2017, p. 48–119.
4. Regulation (EC) 2017/625 of the European Parliament and of the Council of 15 March 2017 on official controls and other official activities performed to ensure the application of food and feed law, rules on animal health and welfare, plant health and plant protection products, amending Regulations (EC) No 999/2001, (EC) No 396/2005, (EC) No 1069/2009, (EC) No 1107/2009, (EU) No 1151/2012, (EU) No 652/2014, (EU) 2016/429 and (EU) 2016/2031 of the European Parliament and of the Council, Council Regulations (EC) No 1/2005 and (EC) No 1099/2009 and Council Directives 98/58/EC, 1999/74/EC, 2007/43/EC, 2008/119/EC and 2008/120/EC, and repealing Regulations (EC) No 854/2004 and (EC) No 882/2004 of the European Parliament and of

[48] European Former Foodstuff Processors Association (EFFPA), EFFPA Welcomes Circular Economy Package,
[49] , http://www.effpa.eu/wp-content/uploads/2015/12/15_EFFPA_PR_2_EFFPA-Welcomes-Circular-EconomyCommunication.pdf
[50] Featherstone, Paul, European Former Foodstuff Processors Association (EFFPA), Keeping Food Losses in the Food Chain, http://ec.europa.eu/dgs/health_food-safety/dgs_consultations/docs/summary_20140508_co09_en.pdf

the Council, Council Directives 89/608/EEC, 89/662/EEC, 90/425/EEC, 91/496/EEC, 96/23/EC, 96/93/EC and 97/78/EC and Council Decision 92/438/EEC (Official Controls Regulation) (Text with EEA relevance). OJ L 095 7.4.2017, p.1.

5. Commission Delegated Regulation (EU) 2019/625 of 4 March 2019 supplementing Regulation (EU) 2017/625 of the European Parliament and of the Council with regard to requirements for the entry into the Union of consignments of certain animals and goods intended for human consumption (Text with EEA relevance.). OJ L 131, 17.5.2019, p. 18-30.
6. Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (Text with EEA relevance). OJ L 312, 22.11.2008, p. 3–30
7. Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste (Text with EEA relevance). OJ L 150, 14.6.2018, p. 109–140.

If the food consists of, contains, or is contaminated with products of animal origin, it is directly subject to the rules set out in the animal by-products Regulation. Therefore, food of animal origin which is no longer intended for human consumption becomes first an animal by-product and, subject to the rules laid down in the animal by-product Regulation and in the transmissible spongiform encephalopathies Regulation (Regulation (EC) No 999/2001 of the European Parliament and of the Council (2)), can become feed; this procedure is illustrated below in Figure 14.



Legend
⇢: special conditions
ABP: Animal by Products
TSE: Transmissible Spongiform Encephalopathy

Figure 14. Flow chart from food to feed

Under the Commission Regulation (EU) No 56/2013, however, the use of PAPs from nonruminant animals (e.g., pigs and poultry) in aqua feed has been allowed. Other restrictions on the use of animal by-products may be removed or loosened.

The use of PAPs has been considered a positive measure potentially reducing food waste. Obviously, the production of PAPs must meet legal requirements. According to legislation, PAPs must be derived only from "Category 3", which includes animal by-products classed as low risk (e.g., carcasses or body parts identified at a slaughterhouse as fit for humans to eat; products or foods of animal origin originally meant for human consumption but withdrawn, not because they are unfit to eat, but for commercial reasons; eggs and egg by-products; and hides and skins from slaughterhouses).

Another potentially positive effect could be a reduction in the use of agricultural commodities (maize, soy) as feed. This could lead to increased availability of these products for human consumption and to reduced environmental pressure resulting from these intensive production systems. However, any further loosening of restrictions should be supported by appropriate studies and scientific tests since the protection of human and animal health must always be the primary goal.

Table 8. European former foodstuffs processing by country (Bouxin, 2012)

Country	# of FFP Facilities	Volume Processed (1000 t)
Germany	11	800
United Kingdom	20	500
The Netherlands	10	300
Spain	9	300
Italy	10	200
France	4	200
Belgium	1	125
Denmark	3	95
Portugal	2	30
Ireland	2	20
Other	20-30	450-950
Total	90-100	3,000 – 3,500

In addition to diverting roughly 93 million tonnes of former foodstuffs and food by-products to animal feed, Europe also has a mature anaerobic digestion industry. According to Moriarty (2013), in 2006, 126 AD facilities that accepted food waste combined had a capacity of 4.6 million tonnes. Anaerobic digestion and other biofuels gained legislative momentum through the EU's Renewable Energy Directive of 2009, which requires 20% of energy to be sourced by renewables by 2020 within the member states (Directive 2009/28/EC, 2009). According to the document, "The use of agricultural material such as manure, slurry and other animal and organic waste for biogas production has, in view of the high greenhouse gas emission saving potential, significant environmental advantages in terms of heat and power production and its use as biofuel," (Directive 2009/28/EC, 2009).

5 EU POLICY FOR FOOD WASTE TO ANIMAL FEED

Figure 15 outlines the main results regarding the applicability of the F4F process. Concerning the legal framework on food waste and feed production currently in force, the analysis has proven not to be fully suitable for implementation in the EU due to two main drawbacks: The nature of the raw material used as input for the food waste transformation process (catering waste) and, secondly, the destination of the final product.

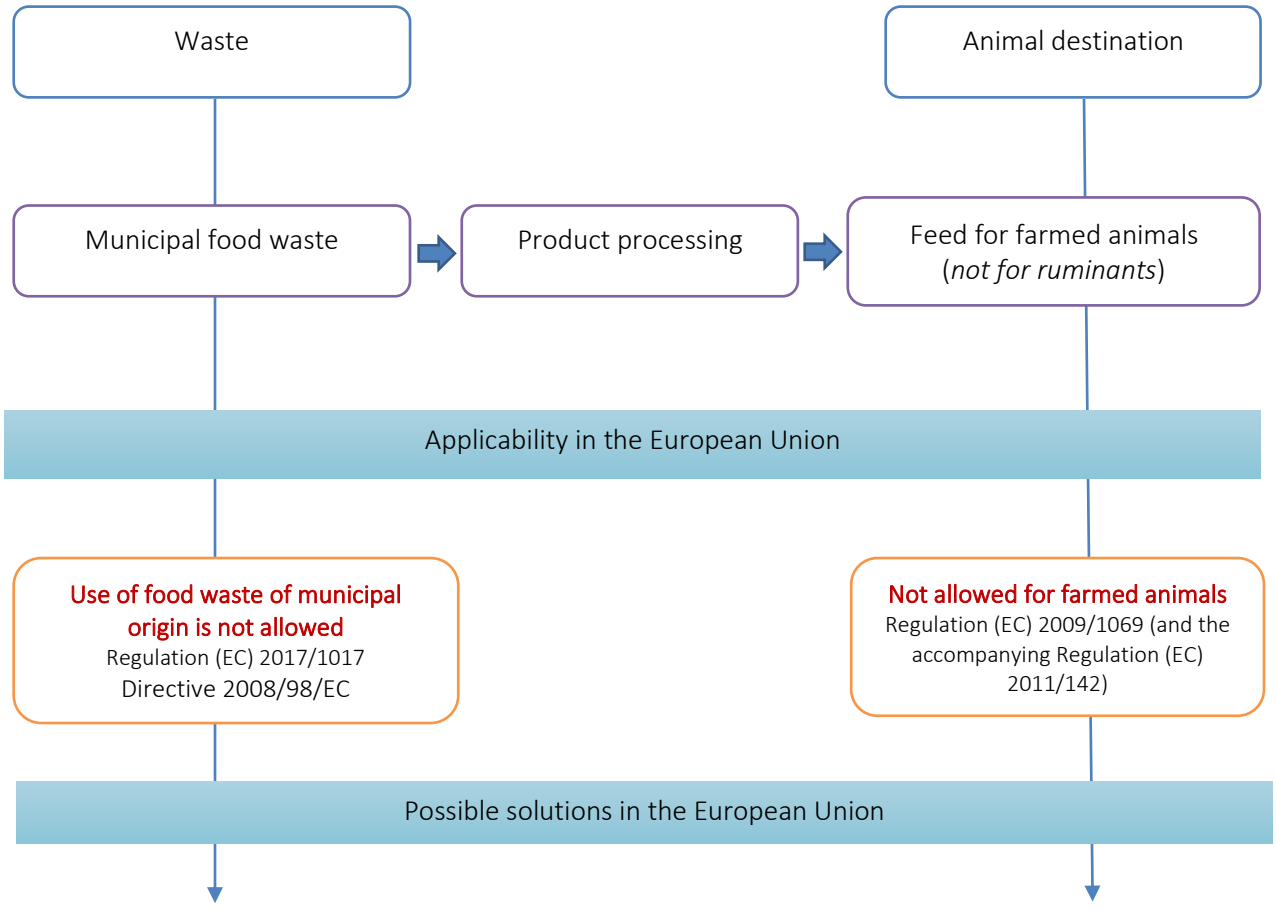
The processed municipal food waste is not allowed in the EU following Directive 2008/98/EC which considers food and kitchen waste from households, restaurants, caterers, and retail premises as biological waste for incineration, landfilling, or use in either a composting, or anaerobic digestion plant. Even when the final product analysed can show its compliance with safety requirements and a good nutritional profile, the European approach, which does not permit municipal waste to be used as raw material for the food chain, can be considered as the best solution for public health protection.

However, a large proportion of food waste that could be legally recycled under the current legislation already exists, as provisioned by the Commission Regulation No. 1017/2017 in the catalogue of feed materials. More specifically, the Regulation includes former foodstuffs (Figure 15, source 1), defined as food products manufactured for human consumption in full compliance with the EU food law but which are no longer intended for human consumption for practical or logistical reasons. The second type of source is fruit and vegetable surplus, which is composed of surplus derived from the industrial processing of raw fruit and vegetables, such as fruit pulp.

The third type of food surplus identified is catering residues, defined by Regulation (EU) 2017/1017 as all waste food containing material of animal origin originating in restaurants, catering facilities and kitchens, including central kitchens and household kitchens. The food material comprised in this category can be considered as one of the most interesting sources for animal feed production and derives from three main origins: Sludge due to kitchen procedures, the food surplus generated by unconsumed food portions (which can also be redistributed for human consumption) and plate leftovers, under specific safety conditions determined by HACCP procedures.

Source 4, namely the fish and meat surplus, is composed of animal products or by-products with or without treatment, such as fresh, frozen, and dried food products.

The second critical point relates to the destination of the product, namely the type of animals that can be fed with the product originating from the food waste treatment. EU legislation Reg. No. 1069/2009 specifies the health rules regarding animal by-products and derived products not intended for human consumption. However, it does not permit the feeding of farmed animals with processed animal proteins. This measure derives from past crises related to outbreaks of foot-and-mouth disease, the spread of transmissible spongiform encephalopathies such as bovine spongiform encephalopathy (BSE), and the occurrence of dioxins in feedstuff.



Former food	Reg. (EC) 2017/1017	Farmed animals, aquarium fish and pets
1. Fruit and vegetable surplus	Reg. (EC) 2017/1017	Farmed animals, aquarium fish and pets
2. Fish and meat surplus	Reg. (EC) 2017/1017 Reg. (EC) 2009/1069 (and the accompanying Regulation (EC)2011/142)	Aquarium fish, pets, and fur animals
3. Catering residues	Reg. (EC) 2017/1017, Part C (list of feed materials, number 9.9.1 Reg. (EC) 2009/1069 (and the accompanying Regulation (EC) 2011/142)	Aquarium fish, pets, and fur animals

Figure 15. Applicability analysis of food residues transformation to animal feed for the EU.

Markedly, sources 1 and 2 (former food and fruit and vegetable surplus) can be used for farmed animals since the absence of animal proteins makes them suitable for transformation into livestock feed within the EU safety requirements.

Furthermore, all the sources listed in Figure 15 can be used for the production of pet food including catering reflux, under specific conditions. Protein is the most expensive macronutrient in ecological and economic terms, and therefore the one requiring the most attention for sustainability[51]. The animal protein content significantly determines the environmental impact of dog and cat food recipes, and there is an increasing demand for culturally acceptable products for pet owners, while still being nutritious and

[51] McCusker, S.; Buff, P.R.; Yu, Z.; Fascetti, A.J. Amino acid content of selected plant, algae and insect species: A search for alternative protein sources for use in pet foods. J. Nutr. Sci. 2014, 3, p39.

palatable to the pets[52]. Eco-alert owners of pets wish to balance their dietary needs with the protection of the planet. Thus, the development of controlled measures for collecting, transporting, and storing raw materials is the principal condition for the safe use of the raw materials identified as livestock feed or pet food.

The continued use of food wastes is permitted only where it can be demonstrated that there is no risk of contamination with meat, fish, or other animal products. This requires either that a facility handle no animal products, or they establish separate handling streams for animal and non-animal products, along with Hazard Analysis and Critical Control Point (HACCP) procedures.

Table 9 summarises the food waste laws described above, i.e., landfilling bans, reduction targets, and incentives are described for Japan, Korea, the United States, and Europe. As discussed earlier, nations have developed varying strategies for tackling food waste challenges, some of which are based on regional or societal pressures. Both Korea and Japan have heavy governmental involvement in collection and food waste management, whereas in Europe and the United States, there is more of a focus on research and innovation with less hands-on regulatory direction.

South Korea is the only nation represented below that has enacted a food waste landfill ban starting in 2005. Several European nations not mentioned below have put into place landfill bans on biodegradable waste or organic waste within the last ten years or so including Sweden, Norway, and Austria. Sweden has enacted two significant landfill bans which has allowed them to reduce the amount of MSW landfilled to roughly 1% as of 2010 (Milios, 2013). In 2002, the country banned sorted combustible waste from landfills and in 2005 they banned organic waste in landfills. Norway attributes their success in reducing waste in landfills to the introduction of a landfill tax in 1999, as well as a ban on all biodegradable waste with total organic carbon (TOC) greater than 10% or organic matter greater than 20% (Kjær, 2013). As of 2010, Austria had the highest rate of recycling MSW in all of Europe at 63% (Herczeg, 2013). In addition to a landfill ban on biodegradable waste with TOC levels greater than 5% since 2004, the country has had separate collection for paper and bio-waste since 1995 (Herczeg, 2013).

[52] Carter, R.A.; Bauer, J.E.; Kersey, J.H.; Buff, P.R. Awareness and evaluation of natural pet food products in the United States. J. Am. Vet. Med. Assoc. 2014, 245, 1241–1248.
Swanson, K.S.; Carter, R.A.; Yount, T.P.; Aretz, J.; Buff, P.R. Nutritional sustainability of pet foods. Adv. Nutr. 2013, 4, 141–150.

Table 9. Food waste policy matrix

Location	Food Waste Law(s)	Food Waste Laws Description
Japan	A. Law for Promotion to Recover and Utilize Recyclable Food Resources (2001 and 2007)	A. Purpose: Promote/ facilitate food businesses to recycle food waste -components: (1) recycling volume targets by source (2) government funding for collection, sorting, use information, and conducting public relations for promoting recycling. (3) require food businesses to work on recycling and provide annual reports. (4) provide guidance and instruction to businesses. (5) require recyclers to register, must go through approval process to be registered
South Korea	A. Wastes Control Act (1986 and 2007) B. Act on Promotion of Saving and Recycling of Resources (1992 and 2008) C. Volume-based Waste Fee System (1995) D. Food Waste Reduction Master Plan (1996) E. Comprehensive Measures for Food Waste Reduction (2001) F. Direct Landfilling Ban (2005)	A. Purpose to collect data on waste generation to create other policies for management. B. Includes a material reuse plan, a fee system for waste treatment, etc. C. Consumer law based on the producer pays principle, started in 1995, still being rolled out across different waste types D. Required collection of residential and commercial food waste. Commercial establishments are responsible for recycling their own and residential households' separate food waste so that it can be collected by a government agency. E. Public campaigns to promote food waste reduction including educational information in videos and posters
US	A. Food Waste Reduction Goal (2015) B. U.S. Food Waste Challenge (2013) C. USDA ongoing efforts D. Food: Too Good to Waste (2012) E. Food Recovery Challenge (2010) F. Bill Emerson Good Samaritan Act (1996) G. Federal tax deductions for food donation (multiple)	A. 50% by 2030 B. USDA and US EPA are working together to research and share best practices on food waste reduction, recovery, and recycling. Generators can participate and have their progress posted on the USDA website Challenge which enables them to receive funding for their efforts. C. Consumer education, Farm Storage Facility Loan, stimulate research, etc. D. Community development toolkit from the EPA E. Businesses can receive technical assistance and management software to reduce their waste. F. Donator cannot be subject to civil or criminal liability for donating food in good faith. G. Tax deductions for C corporations is equal to 1/2 the donated food's basic cost. There are also food tax laws for non-C corporations
Europe	A. Directive on the Landfill of Waste (1999) B. Waste Framework Directive (2008) B. additional activities including Roadmap to a Resource Efficient Europe (2014)	A. Member states should attempt to recover or recycle wastes where possible. B. Guidelines for all waste regulations in member states including waste recovery hierarchy. C. Roadmap: by 2020, have a 20% reduction in food chain's resource inputs and disposal of edible food waste cut in half. This initiative has promoted other activities and put a focus on food waste in the EU. Additionally, EU is working on a new proposal based on the circular economy that includes food waste.

Table *10* incorporates many of the feed laws discussed in the previous sections. Many of the policies in place today have been shaped by health and safety concerns over the last 100 years. European nations were most visibly impacted by the disease crisis and therefore have the strictest regulations on food products diverted to animals among the regions reviewed. Korea produces and consumes more pork than

beef, which is reflected in their livestock safety regulations that focus more on food-and-mouth disease rather than BSE. Japan has federal targets to increase feed independence, which may be why the country chose to continually test food waste destined for feed instead of applying a blanket ban on certain ingredients.

Table 10. Animal feed policy matrix

Location	Animal Feed Laws	Animal Feed Laws Description
Japan	(1) Feed Safety Law - high level legislation (2) Voluntary feed ban of MBM (1996) (3) Guidelines for the Prevention of Cross-contamination of Feed for Ruminants with Ruminant Proteins (2001) (4) Feed ban of MBM (2001, 2005) (G) General	(1) MBM not to be used in ruminant feeding. (2) Rules to reduce opportunity of contamination. (3) MBM feed ban for all livestock. Feed ban altered in 2005 to allow swine and poultry feeding to swine and poultry but not ruminants. (G) Required audits under the Food and Agricultural Materials Inspection Centre. Gelatine and collagen of mammalian origin, milk and dairy products, and eggs are approved to be consumed by ruminants and pigs.
Korea	(1) Detailed Measures for Improvement of Livestock Disease Control and Advanced Livestock Industry (2011)	(1) Measures for increasing safety for livestock: facility registration, introduction to standard operating procedures, and increased training
US	(1) Food Safety Modernization Act (2011) - Preventative Controls for Animal Food (Sept. 2016) (2) CFR: 589.2001 (2008) (3) CFR: 589:2000 (1997)	(1) Processing of food by-products for animal feed must comply with the CGMPs (Current Good Manufacturing Practices), animal food processing facilities must perform a hazards analysis, implement preventative controls (with monitoring and verification), and have a recall plan if an issue arises. (2) Prohibitions of cattle materials in animal feed Goal is to prevent transmission of BSE. This is an update from 589.2000. (3) This version of the cattle material ban only concerned feeding cattle to ruminants.
Europe	(1) EU No 68/2013 – Catalogue of Feed Materials (2) EC No 183/2005- Requirements for Feed Hygiene (2005) (3) EC No 999/2001 - Processed animal protein feed ban for all farm animals (2001) (4) Processed animal protein feed ban for cattle, sheep, and goats (1994).	(1) Most recent update of catalogue defining all potential feed materials. (2) Concerns feed hygiene, feed traceability, and feed facility registration across the supply chain including imports and exports. (3) Processed animal protein feed ban for all farm animals. (4) Processed animal protein feed ban for cattle, sheep, and goats.

Over the last roughly 30 years, many nations have shifted their focus from treating food waste to utilising it as a resource. The strategies that have taken shape vary by region and are at different stages of maturity. Korea has had a landfill ban on organic wastes for ten years and puts the cost burden on food waste generators to promote waste reduction and efficient recovery. As of 2006, Korea was recycling over 90% of its food wastes (Kim et al., 2011).

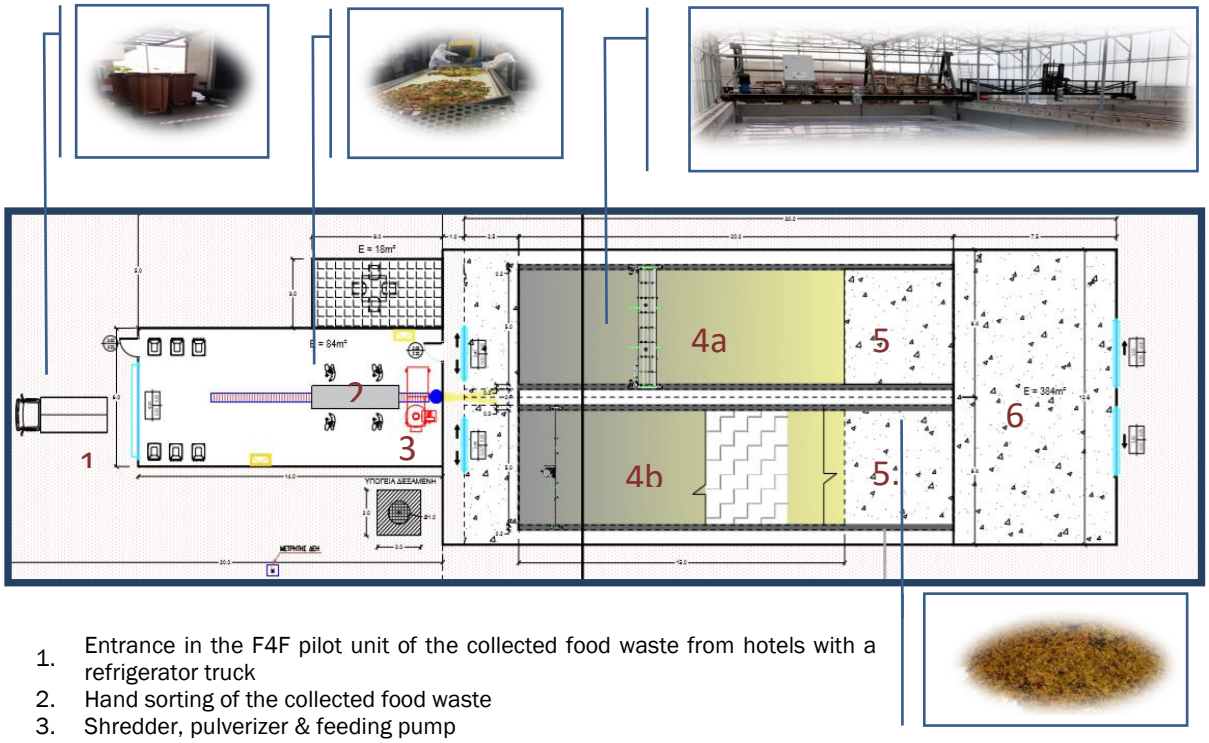
Food product recovery for animal feed also differs by nation. As stated previously, the disease outbreaks changed the way society felt about feeding waste and food products to livestock. In Europe, regulations are still stringent, but confidence is building through EU funded research projects, public promotion, and non-profit trade organisations. Japan has given animal feed, primarily to swine, the top priority for recovery to reduce feed import dependence. Both regions, are utilising different methods to safely recover lost food products for animal feed; many lessons can be learned from the efforts in these locations.

The policy analysis above highlights that there is no single driver for achieving a high food waste diversion rate to animal feed. The policies that were put into place in regions such as Japan, Korea, and Europe were culturally relevant to those areas and align with a larger framework of policy initiatives. None of the locations mentioned above had a food waste ban or organics diversion target that stood by itself legislatively or as a regulatory policy. By having the support of other policies, the concept of diverting food waste to animal feed becomes less foreign or daunting. This policy reinforcement, whether it was through MSW reduction targets, government sponsored research, or public funding, allowed these countries to maintain high food waste diversion rates to animal feed. Another factor that stood out that was similar across all regions was that both concepts, food waste diversion and recovery for animal feed, appeared to be well documented in the public domain, enhancing confidence in FFP and awareness of utilising food waste as a resource.

6 THE F4F PRODUCTION PROCESS

The F4F pilot unit consists of a prefabricated building (14m x 6m) where food waste pre-treatment takes place and a solar drying unit (30m x 12.8m). A series of air-conditions and air extraction and recirculation units (for health and safety issues) have been installed into the prefabricated building.

The solar drying unit is essentially a greenhouse, covered by polycarbonate, windows are covered with insects' net and there is a concrete floor for pest control. Roof based fans are used to extract moisture from the sun drying hall, connected with the operation of the turners. It consists of two drying halls, covered by stainless steel. Each drying hall (20m long and 5m wide, with 0.80m high reinforced concrete side walls), is covered with an extensive network of pipelines connected with solar thermal collectors and a heat pump in order hot water to accelerate the drying rate. On the top of the pipelines, a high-quality stainless still cover is covering the drying hall surface, where the food waste is in contact with. Each corridor floor has a different type of drying turner (a horizontal and a vertical turner are being used). The turners are a prototype system custom-made for the process. They have several motors and sensors for a variety of moves: a) moving in the drying hall corridor using wheels rolling on the sidewalls, in various speeds and both directions, b) increasing and decreasing the height of the turner's drum, c) turning the drum both directions and in various and control speeds, e) estimating its position from the ends of the corridor at all times, and f) including a series of safety operation mechanisms (e.g. emergency stop).



1. Entrance in the F4F pilot unit of the collected food waste from hotels with a refrigerator truck
2. Hand sorting of the collected food waste
3. Shredder, pulverizer & feeding pump
4. 4a. Solar drying tank with a horizontal drying turner
   4b. Solar drying tank with a vertical drying turner
5. Free space for emptying the drying cells after the completion of the drying process. The final product is placed in big bags.
6. Temporary storage of the final product

Figure 16. The F4F production process

The food waste is collected on-site in specific inox containers and transported with a refrigerator truck that keeps the waste residues separate from the general environment, accordingly, keeping odours to a minimum, minimising the attraction of insects, rodents, and other vectors, and also to reduce the contamination of the food residues during transport. The plant treats about 150 tonnes of food waste in each operational period (1.0- 1.5 t daily) of source-separated food waste from hospitality units (mainly

from 5-star hotels) and generates 275 kg of dried feed per tonne of food waste of an average starting moisture of 75%.

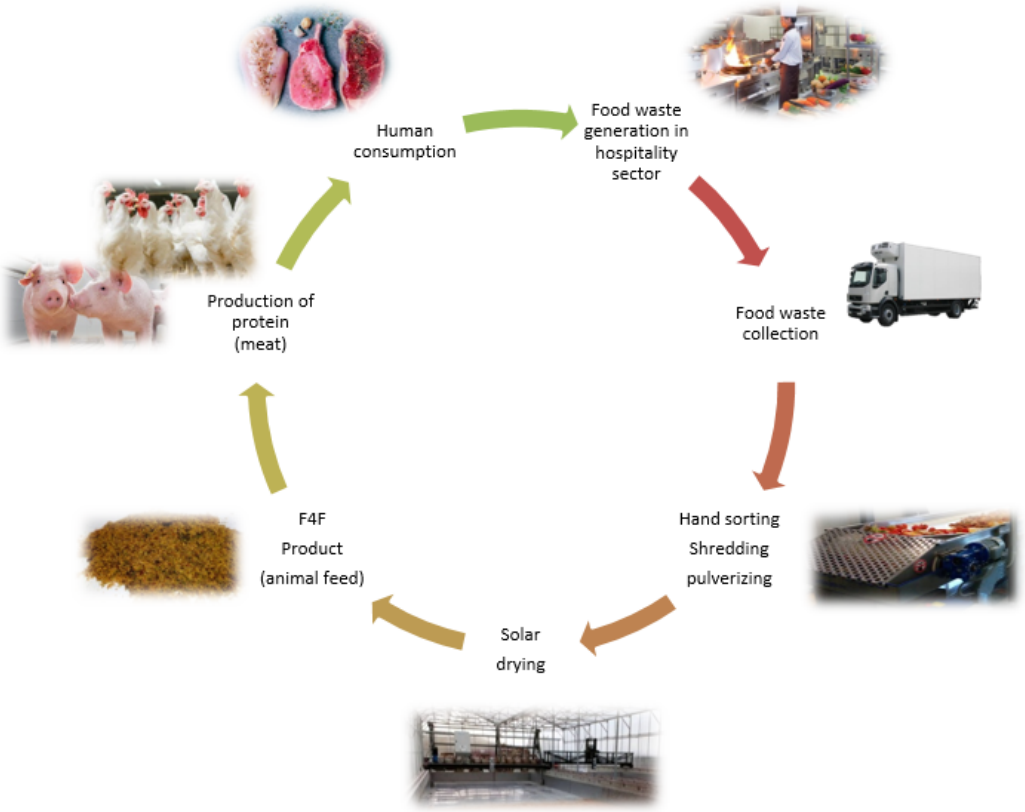


Figure 17. The F4F food waste management system.

The first stage of the food waste management takes place into the prefabricated building and concerns hand sorting of the food waste to remove unwanted materials (paper, plastic, metal etc.). At the end of the hand sorting belt, the food waste is forward into a shredder and then into a pulveriser. With a screw and then with a high-power pump the pulverised food waste is introduced into the solar drying tanks of the solar drying unit. Each drying hall is fed with the pulverised waste until to a specific level inside the hall (about 15cm height) and then operates in a closed loop until the moisture content is reduced from the 75% of the original material to 12% or lower.

The F4F process can only operate locally as it is not economically wise to transfer organic wastes of high moisture with refrigeration trucks for long distances, especially when you do not compress them. Facilities must be developed near the areas with the touristic development and operate as what they are, feed producing units and not waste management units. Each facility must be able to manage up to 10,000 tonne of food wastes and produce 2,500 tonnes of feed, employing in a full-time bases 10 to 15 people, from the local communities.

- In all the above we must add the real environmental benefit of the process. Food wastes, especially the quality that is unavoidable ends up with mixed wastes. This leads to the following final disposal options:
- Low quality compost from MBT units that will probably end up as landfills cover, resulting in small utilisation of organic matter.
- Landfilling, treated, partially treated or most often untreated, producing methane and leachate.
- Incinerated together with other mixed wastes, destroying valuable organic matter.

The F4F process will provide a significant boosting in the local efforts to achieve the targets of the EU policy on organic/ mixed wastes. In a touristic community about 50% of the overall food waste are generated by tourists, which are responsible for more than 85% of this waste category during the summer period. If a quarter of these wastes can be removed from the mixed waste stream and handled separately, automatically this helps the community to achieve the required targets. And this takes place at no extra cost and no extra effort to develop source separation, since many hotels and restaurants do have a separate food wastes disposal scheme applied.

One should take under consideration the environmental footprint of hotels. Especially four- and five-star hotels, operating under the pressure of continuing provision of high-quality service, have a significant impact. Regarding water, a customer in such a hotel consumes 3 to 4 times more water per day than in his/her house. With food is a similar situation with people relaxing from their tight daily schedule, consuming (mostly tasting) and throwing far larger quantities of food than usual. As a result, these hotels are a constant "black hole" of resources, most of the times competing with other local activities, and returning just a small percentage of profit to the community. This process however might actually overturn this allowing a more sustainable operation. Something like that could even be a promotion tool for the hotels and the evaluation of F4F as such will be part of the project proposed here.

7 OUTLOOK AND PROSPECTS

More than 150 million people each year choose the Mediterranean Europe, meaning Portugal, Spain, France (South), Italy (South), Malta, Greece, and Cyprus to spend their summer vacations. The great majority selects an organised hotel for accommodation and dines, daily, in all kinds of restaurants. It is estimated that each, in the average 10 days of vacations in the region, produce about 10,0 kg of food wastes (both avoidable and unavoidable), that could be collected separately.

Respectively 1,500,000 tonnes of food wastes could be collected and managed separately under the strong Mediterranean sun in Europe alone. More than 375,000 tonnes of animal feed could be produced as a result, the wholesale value of which should be estimated in about 75,000,000 € and the retail value of more than 225,000,000 €. And that regards tourists alone in the EU states. In the 300,000,000 people of the Mediterranean region and the 250,000,000 tourists, the economical scale becomes even more attractive.

In addition, however to the feed value, one must add the value of the services provided, meaning collection and management. In the Mediterranean EU the average collection cost for each tonne of mixed/ organic wastes should be estimated around 75€. This means that the actual value of the provided service for the original 1,5 million tonnes of wastes is an additional 115,000,000 €.

Regarding the average treating cost, this varies considerably, especially since landfilling is still the most common management/ disposal solution in the area. If, however, the estimated mixed wastes management cost included in the Regional Strategy for Wastes Management of Crete, is used, that of 65€/t, then the value of managing/ treating these wastes is an additional 100,000,000 €.

In simple terms the industry that could be developed around F4F process, if proven to be economically viable, is estimated in about 300 to 400 million Euros in the Southern Europe, without considering the costs of the relevant needed investments (well above 1,0 billion Euros). This is becoming even more interesting if the "local" character of the process is taken under consideration (please see further down this section), that would result in developing local jobs. Even though specific estimation will be made during the F4F project, is safe to say that about 20 full time positions will be developed for each million turnovers, resulting in about 6,000 to 8,000 new jobs in the region, one among those regions with the highest unemployment rates in the EU.

Food waste is targeted and influenced by various fields including environment, agriculture, health, and economics. Anything designated for feed use will ultimately be re-entering the food chain, so strict adherence to regulations is essential. When former foodstuffs are used to produce animal feed, certain legal obligations are placed on the factory of production. By law, the factory is deemed a 'Feed Business Operator' and must be compliant under the Feed Hygiene Regulations (EU) 183/2005.

The reintroduction of feeding food waste, for any kind of former foodstuffs which have been in contact with animal materials or catering waste, to animals will require some modification of the legislation at EU level as well as at national (Greece) level, especially to the EU Animal By-Products Regulation (EC) 1069/2009 and TSE Regulation 999/2001[53]. The most likely modification would be, to permit, apart for furry animals, for the recycling of such waste to pets, but not to ruminants because of concerns about TSE. The industry and the public are likely to be cautious about this. Therefore, before taking these steps it would be informative to carry out social studies to determine the level of and reasons for resistance to changes. It is also particularly important to collect all the scientific evidence required to demonstrate that the procedures introduced would be safe.

[53] The TSE Regulation 999/2001 has changed: Consolidated text: Regulation (EC) No 999/2001 of the European Parliament and of the Council of 22 May 2001 laying down rules for the prevention, control and eradication of certain transmissible spongiform encephalopathies. OJ L 147 31.5.2001, p. 1

Global and Greek assessments of food loss and waste as a percentage of food grown are substantial, but there is no standardisation as to how these assessments should be conducted. This hampers progress in our collective battle against food loss and waste by delaying public policy change and the creation of accountability metrics that can be applied across the food supply chain. Nonetheless, it is evident that redirection of food waste from landfills is necessary to improve global food security and resource sustainability issues. It is also logical that livestock, with their capacity to "up-cycle" relatively low-quality feedstuffs into high-quality protein, are an essential element of this solution. Greek livestock producers are recognized globally for the animal care standards, milk, meat and egg quality and efficiency of production. Furthermore, Greek farmers have demonstrated interest, ingenuity, and investment to replace traditional feeds with by-products and even food waste.

Despite the abundance of by-products and food waste available, there are several challenges regarding their use as feed component.

Today's diversity of by-products and urban setting for much of our food waste requires a diversity of solutions. Disincentives to waste food will be influenced by food prices and costs for food disposal. Producer and processor incentives to recover more food and to redirect by-products away from landfill and non-food recycling efforts will require investment to improve infrastructure, creating market opportunities. Furthermore, revised policy and regulation are essential to fully implement the spectrum of solutions. Research to facilitate safe incorporation of by-products and food waste in animal feed is a critical step toward changes in policy and regulation.

Greece has some unique challenges. The large geographic area, with much of food processing and food waste occurring in large urban centres means that by-product and food waste sources are often large distances from the livestock and poultry farms. As a major food commodity exporter, Greece's food supply chain is heavily intertwined with multinational food processors and retailers affecting transportation costs. These companies will need incentives or regulation to shift current practices at the local or national level. As one of the world's most northerly food producers, Greece may have an advantage by using cold weather to reduce spoilage of by-products or food waste in storage for a part of the year to reduce storage and processing costs. Furthermore, comprehensive LCA-type assessments to examine environmental benefits of treatment options including replacement of feed grains with by-products or food waste will provide much-needed information regarding the impact on the environment including GHG and ammonia emissions as well as land and water. Finally, a coordinated approach requiring input from producers, feed suppliers, researchers, policy makers, and retailers is critical for the development of successful strategies for inclusion of food loss and waste in livestock diets.

The reintroduction of feeding food waste, for any kind of former foodstuffs which have been in contact with animal materials or catering waste, to animals will require some modification of the legislation at EU level as well as at national (Greece) level, especially to the EU Animal By-Products Regulation (EC) 1069/2009 and TSE Regulation 999/2001[54]. The most likely modification would be to permit the recycling of such waste to pets but not to ruminants because of concerns about TSE. The industry and the public are likely to be cautious about this, considering the history of the practice in the UK. Therefore, before taking these steps it would be informative to carry out social studies to determine the level of and reasons for resistance to changes. It is also particularly important to collect all the scientific evidence required to demonstrate that the procedures introduced would be safe.

By recognising that former foodstuff not suitable for human consumption is a resource and not a waste product, the feed industry is reducing the amount of waste sent to landfill every year, saving costs, and lessening environmental damage.

[54] The TSE Regulation 999/2001 has changed: Consolidated text: Regulation (EC) No 999/2001 of the European Parliament and of the Council of 22 May 2001 laying down rules for the prevention, control and eradication of certain transmissible spongiform encephalopathies. OJ L 147 31.5.2001, p. 1

It is apparent, from the analysis in the previous sections that the F4F process (and similar processes reusing food waste as feed) that have currently three alternative pathways to take.

1. Utilising only waste of vegetal origin as the source of producing feed, with the significant drawback that the substantial quantity of catering waste cannot be exploited.
2. Production of feed only for furry animals and pets. However for the latter changes are required in the ABR regulation (**details in chapter 8**)).
3. Adding enough data of the effects of reusing catering waste for production of animal feed to follow the procedure for the authorisation of alternative methods of use or disposal of animal by-products or derived products as laid down in the Regulation (EC) No 1069/2009, as described below.

7.1 AUTHORISATION OF ALTERNATIVE METHODS OF USE OR DISPOSAL OF ANIMAL BY-PRODUCTS: OVERVIEW AND PROCEDURE

Regulation (EC) No 1069/2009 has introduced a procedure for the authorisation of alternative methods of use or disposal of animal by-products or derived products. Such methods may be authorised by the Commission following receipt of an opinion from the European Food Safety Authority (EFSA). In order to facilitate the evaluation of applications by EFSA, a standard format should be laid down which illustrates to applicants the nature of the evidence to be submitted. In accordance with the Treaties, it should be possible to submit applications for alternative methods in the official languages of the Union, as laid down in EEC Council Regulation No 1 determining the languages to the used by the European Economic Community (OJ 17, 6.10.1958, p. 385/58.).

Applications for authorisation of an alternative method of use or disposal of animal by-products or derived products as referred to in Article 20 of Regulation (EC) No 1069/2009 (applications) shall be submitted in one of the official languages of the European Union as referred to in Article 1 of Regulation No 1 of 1958. Interested parties that submit such applications in a language other than English shall validate the official translation of their application, which EFSA shall provide, prior to the assessment. The period referred to in Article 20(5) of Regulation (EC) No 1069/2009 shall only start once the interested party has validated the official translation of the application.

Animal by-products (ABPs) are entire bodies or parts of animals, products of animal origin or other products obtained from animals, which are not intended for human consumption. Some of them are authorised to be processed to produce industrial products.

Applications on ABPs should be submitted to the national competent authority of a Member State, according to the legislation. Application dossiers are then forwarded to EFSA by the competent authority.

Annex VII of Commission Regulation (EU) 142/2011 includes provisions on the format, language, and content of the application.

The procedure for authorisation of an alternative method of use or disposal of animal by-products or derived products may be initiated either by the Commission or, following an application, by a Member State or by an interested party, which may represent several interested parties.

Interested parties shall send their applications to the competent authority of the Member State where they intend to use the alternative method.

The competent authority shall evaluate, within a period of two months following receipt of a complete application, whether the application complies with the standard format for applications referred to in paragraph 10.

1. The competent authority shall communicate the applications of the Member States and interested parties, together with a report on its evaluation to the European Food Safety Authority (EFSA) and inform the Commission thereof.

2. When the Commission initiates the procedure for authorisation, it shall send a report on its evaluation to EFSA.
3. EFSA shall assess, within six months following receipt of a complete application, whether the method submitted ensures that risks to public or animal health are:
   (a) controlled in a manner which prevents their proliferation before disposal in accordance with this Regulation or the implementing measures thereof; or
   (b) reduced to a degree which is at least equivalent, for the relevant category of animal by-products, to the processing methods laid down pursuant to point (b) of the first subparagraph of Article 15(1).

EFSA shall issue an opinion on the application submitted.

4. In duly justified cases where EFSA requests additional information from applicants, the period provided for in paragraph 5 may be extended.

After consulting the Commission or the applicant, EFSA shall decide on a period within which that information shall be provided to it and inform the Commission and the applicant as appropriate of the additional period needed.

5. Where applicants wish to submit additional information on their own initiative, they shall send it directly to EFSA.

In that case the period provided for in paragraph 5 shall not be extended by an additional period.

6. EFSA shall forward its opinion to the Commission, the applicant and the competent authority of the Member State concerned.
7. Within three months following receipt of the opinion of EFSA and taking account of that opinion, the Commission shall inform the applicant of the proposed measure to be adopted in accordance with paragraph 11.
8. A standard format for applications for alternative methods shall be adopted in accordance with the advisory procedure referred to in Article 52(2).
9. Following receipt of the opinion of EFSA, the following shall be adopted:
   (a) either a measure authorising an alternative method of use or disposal of animal by-products or derived products; or
   (b) a measure rejecting the authorisation of such an alternative method.

Those measures, designed to amend non-essential elements of this Regulation by supplementing it, shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 52(4).

The procedure of applications for authorisation of an alternative method of use or disposal of animal by-products or derived products as referred to in Article 20 of Regulation (EC) No 1069/2009 (applications) is illustrated below in Diagram 1.

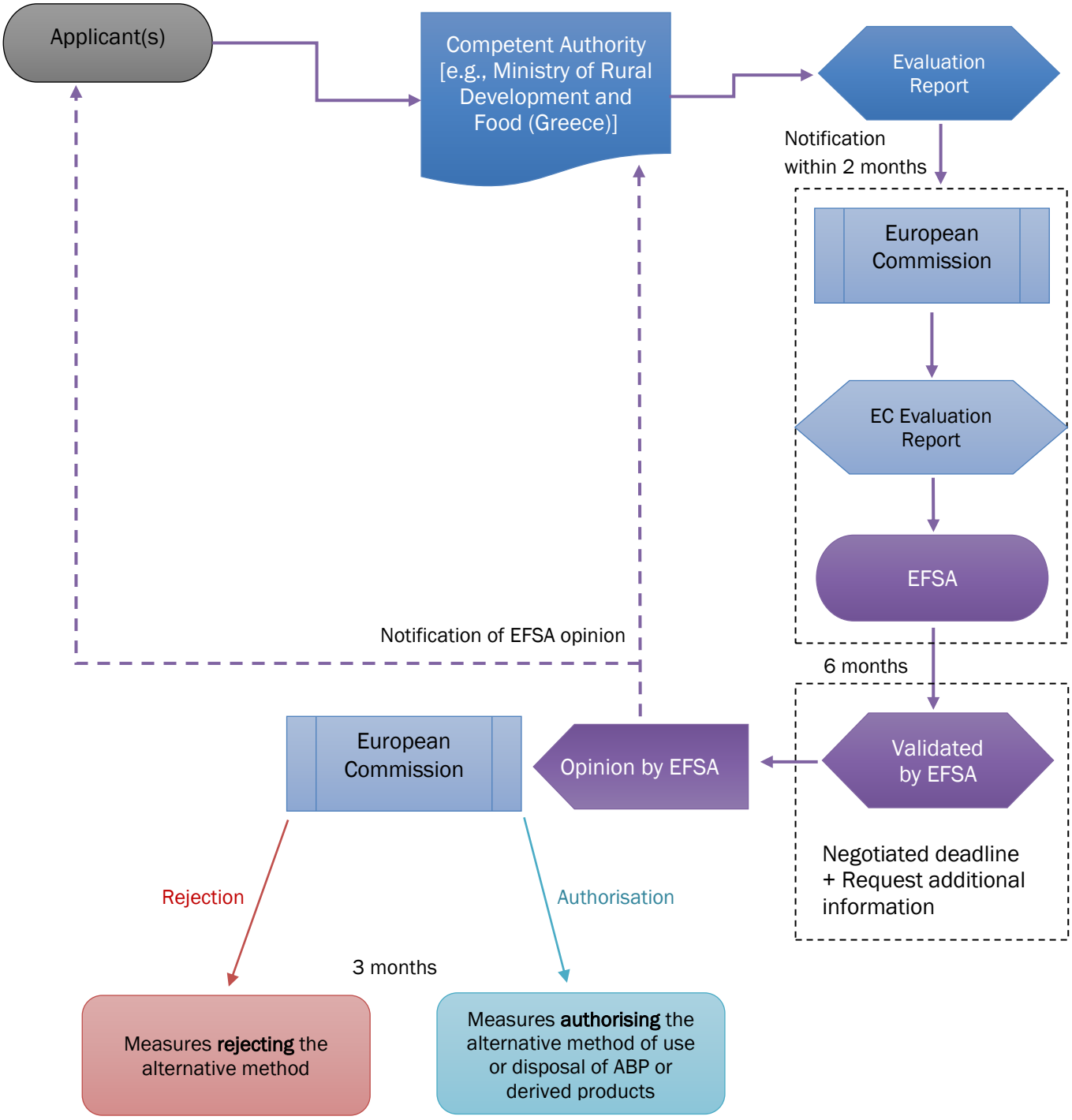


Diagram 1. Procedure for authorisation of an alternative method (e.g., F4F) of use or disposal of animal by-products or derived products.

The contents of the application for authorisation of an alternative method of use or disposal of animal by-products or derived products are presented in Chapter II, ANNEX VII, Regulation (EC) 142/2011).

8 PROPOSED CHANGES TO REGULATION (EC) 1069/2009 AND REGULATION (EC) 142/2011

Special section: Legal text: information considering the waste management pyramid and how it imposes prioritisation of actions at management level.

[Νομικό κείμενο: πληροφορίες λαμβάνοντας υπόψη την πυραμίδα διαχείρισης των αποβλήτων και πως αυτή επιβάλει προτεραιοποίηση δράσεων σε διαχειριστικό επίπεδο]

ΩΣ ΠΡΟΣ ΤΟΝ ΚΑΝΟΝΙΣΜΟ (ΕΚ) αριθ. 1069/2009 ΤΟΥ ΕΥΡΩΠΑΪΚΟΥ ΚΟΙΝΟΒΟΥΛΙΟΥ ΚΑΙ ΤΟΥ ΣΥΜΒΟΥΛΙΟΥ της 21ης Οκτωβρίου 2009, ΤΟΝ ΚΑΝΟΝΙΣΜΟ (ΕΕ) αριθ. 142/2011 ΤΗΣ ΕΠΙΤΡΟΠΗΣ της 25ης Φεβρουαρίου 2011 ΚΑΙ ΤΑ «ΖΩΑ ΣΥΝΤΡΟΦΙΑΣ».

I. ΕΙΣΑΓΩΓΗ – ΙΣΤΟΡΙΚΟ ΚΑΙ ΝΟΜΙΚΟ ΥΠΟΒΑΘΡΟ - ΠΕΡΙΛΗΨΗ ΤΡΟΠΟΠΟΙΗΣΕΩΝ & ΑΛΛΑΓΩΝ- ΣΚΟΠΙΜΟΤΗΤΑ.

Κατ' αρχάς, ο ΚΑΝΟΝΙΣΜΟΣ (ΕΚ) αριθ. **1069/2009** ΤΟΥ ΕΥΡΩΠΑΪΚΟΥ ΚΟΙΝΟΒΟΥΛΙΟΥ ΚΑΙ ΤΟΥ ΣΥΜΒΟΥΛΙΟΥ της 21ης Οκτωβρίου 2009 **δεν εφαρμόζεται** στα υπολείμματα τροφίμων, **εκτός εάν, μεταξύ άλλων,** προορίζονται για ζωοτροφή.

Ωστόσο:

1. (α) Με την «*Οδηγία πλαίσιο 2008/98/ΕΚ για τα απόβλητα*», η Ευρωπαϊκή Επιτροπή είχε θεσπίσει μέτρα για την προστασία του περιβάλλοντος και της ανθρώπινης υγείας εμποδίζοντας ή μειώνοντας τις αρνητικές επιπτώσεις της παραγωγής και της διαχείρισης αποβλήτων και περιορίζοντας τον συνολικό αντίκτυπο της χρήσης των πόρων και βελτιώνοντας την αποδοτικότητά της. Στόχος της ήταν η αποσαφήνιση των εννοιών, όπως απόβλητο, διάθεση, αξιοποίηση, στην προώθηση της πρόληψης για την παραγωγή απορριμμάτων, στην εισαγωγή της έννοια του κύκλου ζωής στη λήψη αποφάσεων για τη διαχείρισή τους και στην περαιτέρω προώθηση της ανάκτησης υλικών και ενέργειας.

(β) Η άνω Οδηγία 2008/98/ΕΚ, όπως τροποποιήθηκε, εν συνεχεία, με την Οδηγία (ΕΕ) 2018/851, εισήχθη και ενσωματώθηκε στο εθνικό ελληνικό Δίκαιο με τον προσφάτως εκδοθέντα Ν. 4819/2021 «*Ολοκληρωμένο πλαίσιο για τη διαχείριση αποβλήτων - Ενσωμάτωση Οδηγιών ΕΚ, ανακύκλωση, πλαστικά κλπ*» (ΦΕΚ τ. Α' αρ. φύλλου 129/23.7.2021).

Κατά το άρθρο 4 «***Ιεράρχηση*** *των αποβλήτων*» παρ. 1 του εν λόγω Ν. 4819/2021 [Άρθρο 4 της Οδηγίας 2008/98/ΕΚ, όπως τροποποιήθηκε με την παρ. 4 του άρθρου 1 της Οδηγίας (ΕΕ) 2018/851],

«*Στη νομοθεσία και την πολιτική για την πρόληψη και τη διαχείριση των αποβλήτων ισχύει κατά προτεραιότητα η ακόλουθη* ***ιεράρχηση*** *όσον αφορά στα απόβλητα:*

α) πρόληψη*, β) προετοιμασία για επαναχρησιμοποίηση, γ) ανακύκλωση, δ) άλλου είδους ανάκτηση, όπως ανάκτηση ενέργειας, και ε) διάθεση*....».

Αλλά και σύμφωνα με τη σχετική πυραμίδα διαχείρισης της Ευρωπαϊκής Ένωσης (Ιεράρχηση Υλικών από Τρόφιμα και Ποτά) της EFFPA **(ΠΑΡΑΡΤΗΜΑ Α')**, η πρόληψη θεωρείται ως η πιο αποδεκτή επιλογή σε σχέση με τις ενέργειες ανακύκλωσης και απόθεσης αποβλήτων. Στην πυραμίδα αυτή **(ΠΑΡΑΡΤΗΜΑ Α')** η σκοπούμενη πρόληψη μπορεί να επιτευχθεί, μεταξύ άλλων, και με τη διάθεση Υλικών από Τρόφιμα για Ζωοτροφές

2. Περαιτέρω, κατόπιν μεταγενεστέρων ερευνών που ακολούθησαν και με βάση τις πρόσφατες επιστημονικές αντιλήψεις που φαίνεται να έχουν επικρατήσει και να έχουν εδραιωθεί, θεωρείται πλέον ασφαλής και η σίτιση ζώων συντροφιάς με υπολείμματα τροφίμων ή ζωοτροφές που περιέχουν ή προέρχονται από υπολείμματα τροφίμων.

Ενδεικτικά, και προκειμένου να ενισχύσουμε την άνω άποψη, αναφερόμαστε στον προσφάτως εκδοθέντα Κανονισμό (ΕΕ) 2021/1372 της Ευρωπαϊκής Επιτροπής της 17/08/2021, τον οποίο παραθέτουμε αναλυτικώς κατωτέρω ως **ΠΑΡΑΡΤΗΜΑ Β'** του παρόντος.

Συνοπτικά, στον εν λόγω Κανονισμό αναφέρεται ότι όλα αυτά τα χρόνια που μεσολάβησαν ο οδικός χάρτης ΜΣΕ 2 εξέταζε και εξέτασε την αναθεώρηση των ισχυουσών διατάξεων απαγόρευσης ζωοτροφών για μη μηρυκαστικά ζώα που προβλέπονται στη Νομοθεσία της Ένωσης, καταλήγοντας στο συμπέρασμα ότι θα μπορούσε να εξεταστεί η άρση της απαγόρευσης όσον αφορά τη χρήση μεταποιημένων ζωικών πρωτεϊνών από μη μηρυκαστικά σε ζωοτροφές μη μηρυκαστικών, με παράλληλη τήρηση της υφιστάμενης απαγόρευσης της ανακύκλωσης εντός του ίδιου ζωικού είδους, και ότι θα πρέπει να εγκριθεί εκ νέου η χρήση μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από χοιροειδή σε ζωοτροφές για πουλερικά και μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από πουλερικά σε ζωοτροφές για χοιροειδή.

3. Ως προς τον ΚΑΝΟΝΙΣΜΟ (ΕΚ) αριθ. 1069/2009 ΤΟΥ ΕΥΡΩΠΑΪΚΟΥ ΚΟΙΝΟΒΟΥΛΙΟΥ ΚΑΙ ΤΟΥ ΣΥΜΒΟΥΛΙΟΥ της 21ης Οκτωβρίου 2009 και τα Ζώα Συντροφιάς:

(i) Το **άρθρο 11** «*Περιορισμοί χρήσης»* του εν λόγω Κανονισμού, ως έχει, **απαγορεύει** τη σίτιση χερσαίων ζώων δεδομένου είδους, πλην των γουνοφόρων ζώων, με μεταποιημένη ζωική πρωτεΐνη που προέρχεται από πτώματα ή μέρη πτωμάτων ζώων του ίδιου είδους (ανακύκλωση εντός του ίδιου ζωικού είδους), με υπολείμματα τροφίμων ή ζωοτροφές που περιέχουν ή προέρχονται από υπολείμματα τροφίμων.

Για το λόγο αυτό **προτείνουμε** την τροποποίησή του με την **προσθήκη** πρόβλεψης για επέκταση της σίτισης με υπολείμματα τροφίμων ή με ζωοτροφές και των ζώων συντροφιάς, πέραν των γουνοφόρων ζώων.

(ii) Το **άρθρο 31** «*Διάθεση στην αγορά*» και το **άρθρο 35** «*Διάθεση ζωοτροφής για ζώα συντροφιάς στην αγορά*» του εν λόγω Κανονισμού, ως έχουν, δεν επιτρέπουν τη διάθεση ζωοτροφής για ζώα συντροφιάς με προϊόντα που προέρχονται από υπολείμματα τροφίμων (άρθρο 10 στοιχείο ιστ).

Για το λόγο αυτό **προτείνουμε** την τροποποίησή τους με την παράλληλη **απαλοιφή** του στοιχείου (ιστ) περί υπολειμμάτων τροφίμων.

(iii) Παράλληλα, την ίδια ακριβώς **απαλοιφή προτείνουμε** και στο στοιχείο α' της παραγράφου 2 του Κεφαλαίου ΙΙ «*Ειδικές απαιτήσεις σχετικά με τις τροφές για ζώα συντροφιάς συμπεριλαμβανομένων των δερμάτινων κοκάλων για σκύλους*» του Παραρτήματος XIII «*Τροφές για ζώα συντροφιάς και ορισμένα άλλα παράγωγα προϊόντα*» του ΚΑΝΟΝΙΣΜΟΥ (ΕΕ) αριθ. **142/2011** ΤΗΣ ΕΠΙΤΡΟΠΗΣ της 25ης Φεβρουαρίου 2011 για την εφαρμογή του κανονισμού (ΕΚ) αριθ. 1069/2009 του Ευρωπαϊκού Κοινοβουλίου και του Συμβουλίου που αφορά την παρασκευή μεταποιημένων τροφών για ζώα συντροφιάς.

(iv) Σύμφωνα με το **άρθρο 18** «*Ειδικοί Σκοποί Σίτισης*» παράγραφος 1 του εν λόγω Κανονισμού, η αρμόδια Αρχή μπορεί να εγκρίνει, υπό όρους, τη συλλογή και τη χρήση υλικών της κατηγορίας 3, στην οποία ανήκουν και τα υπολείμματα τροφίμων (άρθρο 10 στοιχείο ιστ), για τη σίτιση: α) ζώων ζωολογικών κήπων, β) ζώων τσίρκων, γ) ερπετών και αρπακτικών πτηνών, εκτός από τα ζώα ζωολογικών κήπων ή τσίρκων, δ) γουνοφόρων ζώων, ε) αγρίων ζώων, στ) σκύλων από αναγνωρισμένα κυνοτροφεία ή αγελών κυνηγόσκυλων, ζ) σκύλων και γατών σε καταφύγια, η) σκωλήκων σκωληκοκαλλιέργειας και γαιοσκωλήκων για δολώματα αλιείας.

Για το λόγο αυτό **προτείνουμε** την τροποποίησή του με την **προσθήκη** και των ζώων συντροφιάς.

II. ΠΡΟΤΑΣΗ – ΕΙΣΗΓΗΣΗ ΓΙΑ ΖΩΙΚΑ ΥΠΟΠΡΟΪΟΝΤΑ (ΖΥΠ), τα οποία προέρχονται από Σ/Μ και από χώρους μαζικής εστίασης.

Α. ΝΑ ΤΡΟΠΟΠΟΙΗΘΕΙ Ο "ΚΑΝΟΝΙΣΜΟΣ (ΕΚ) αριθ. **1069/2009** ΤΟΥ ΕΥΡΩΠΑΪΚΟΥ ΚΟΙΝΟΒΟΥΛΙΟΥ ΚΑΙ ΤΟΥ ΣΥΜΒΟΥΛΙΟΥ της 21ης Οκτωβρίου 2009 περί υγειονομικών κανόνων για ζωικά υποπροϊόντα και παράγωγα προϊόντα που δεν προορίζονται για κατανάλωση από τον άνθρωπο και για την κατάργηση του κανονισμού (ΕΚ) αριθ. 1774/2002 (κανονισμός για τα ζωικά υποπροϊόντα) **ΣΤΑ ΕΞΗΣ ΣΗΜΕΙΑ:**

1. Να τροποποιηθεί το Άρθρο 11 «*Περιορισμοί χρήσης*» **παρ. 1 περ. β' ως εξής:**

«*1. Απαγορεύονται οι ακόλουθες χρήσεις ζωικών υποπροϊόντων και παράγωγων προϊόντων:*

β) η σίτιση εκτρεφόμενων ειδών, εκτός των γουνοφόρων ζώων ***και εκτός των ζώων συντροφιάς****, με υπολείμματα τροφίμων ή ζωοτροφές που περιέχουν ή προέρχονται από υπολείμματα τροφίμων·*».

2. Να προστεθεί στοιχείο θ' στην παράγραφο 1 του Άρθρου 18 «Ειδικοί Σκοποί Σίτισης» **ως εξής:**

«*θ) ζώων συντροφιάς*».

3. Να προστεθεί στοιχείο (δ) στην παράγραφο 1 του Άρθρου 31 «*Διάθεση στην αγορά*» **ως εξής:**

«*δ) Τα ζωικά υποπροϊόντα και τα παράγωγα προϊόντα που προορίζονται για ζωοτροφή ζώων συντροφιάς μπορούν να διατίθενται στην αγορά, υπό τα ανωτέρω β) και γ) στοιχεία της παρούσας παραγράφου, μόνο εάν είναι ή προέρχονται από υλικά της κατηγορίας 3 εκτός των υλικών που αναφέρονται στο άρθρο 10 στοιχεία ιδ) και ιε)*».

4. Να τροποποιηθεί η υποπερίπτωση (i) του στοιχείου α' του Άρθρο 35 «*Διάθεση ζωοτροφής για ζώα συντροφιάς στην αγορά*» **ως εξής:**

«*Οι υπεύθυνοι επιχειρήσεων μπορούν να διαθέτουν ζωοτροφή για ζώα συντροφιάς στην αγορά, υπό τον όρο ότι:*

α) τα προϊόντα παράγονται από:

i) υλικό της κατηγορίας 3 πλην του υλικού που αναφέρεται στο άρθρο 10 στοιχεία ιδ) και ιε)».

Β. ΝΑ ΤΡΟΠΟΠΟΙΗΘΕΙ Ο "ΚΑΝΟΝΙΣΜΟΣ (ΕΕ) αριθ. **142/2011** ΤΗΣ ΕΠΙΤΡΟΠΗΣ της 25ης Φεβρουαρίου 2011 για την εφαρμογή του κανονισμού (ΕΚ) αριθ. 1069/2009 του Ευρωπαϊκού Κοινοβουλίου και του Συμβουλίου περί υγειονομικών κανόνων για ζωικά υποπροϊόντα και παράγωγα προϊόντα που δεν προορίζονται για κατανάλωση από τον άνθρωπο και για την εφαρμογή της οδηγίας 97/78/ΕΚ του Συμβουλίου όσον αφορά ορισμένα δείγματα και τεμάχια που εξαιρούνται από κτηνιατρικούς ελέγχους στα σύνορα οι οποίοι αναφέρονται στην εν λόγω οδηγία **ΣΤΑ ΕΞΗΣ ΣΗΜΕΙΑ:**

Να τροποποιηθεί το στοιχείο α' της παραγράφου 2 του Κεφαλαίου ΙΙ «*Ειδικές απαιτήσεις σχετικά με τις τροφές για ζώα συντροφιάς συμπεριλαμβανομένων των δερμάτινων κοκάλων για σκύλους*» **του Παραρτήματος XIII** «*Τροφές για ζώα συντροφιάς και ορισμένα άλλα παράγωγα προϊόντα*» **ως εξής:**

«*2. Πρώτες ύλες μεταποιημένων τροφών για ζώα συντροφιάς και δερμάτινων κοκάλων για σκύλους.*

Οι υπεύθυνοι επιχειρήσεων μπορούν να παρασκευάζουν μεταποιημένες τροφές για ζώα συντροφιάς και δερμάτινα κόκαλα για σκύλους μόνο από:

α) υλικό της κατηγορίας 3, πλην του υλικού που αναφέρεται στο άρθρο 10 στοιχεία ιδ) και ιε) του κανονισμού (ΕΚ) αριθ. 1069/2009….».

ΙΙΙ. ΑΙΤΙΟΛΟΓΗΣΗ ΠΡΟΤΕΙΝΟΜΕΝΩΝ ΤΡΟΠΟΠΟΙΗΣΕΩΝ ΚΑΙ ΔΙΑΤΑΞΕΩΝ.

Με τις άνω προτεινόμενες τροποποιήσεις σκοπείται πλέον η σίτιση με υπολείμματα τροφίμων ή ζωοτροφές που περιέχουν ή προέρχονται από υπολείμματα τροφίμων, και των ζώων συντροφιάς, πέραν των εκτρεφομένων γουνοφόρων ζώων, για τα οποία υφίστατο ήδη πρόβλεψη.

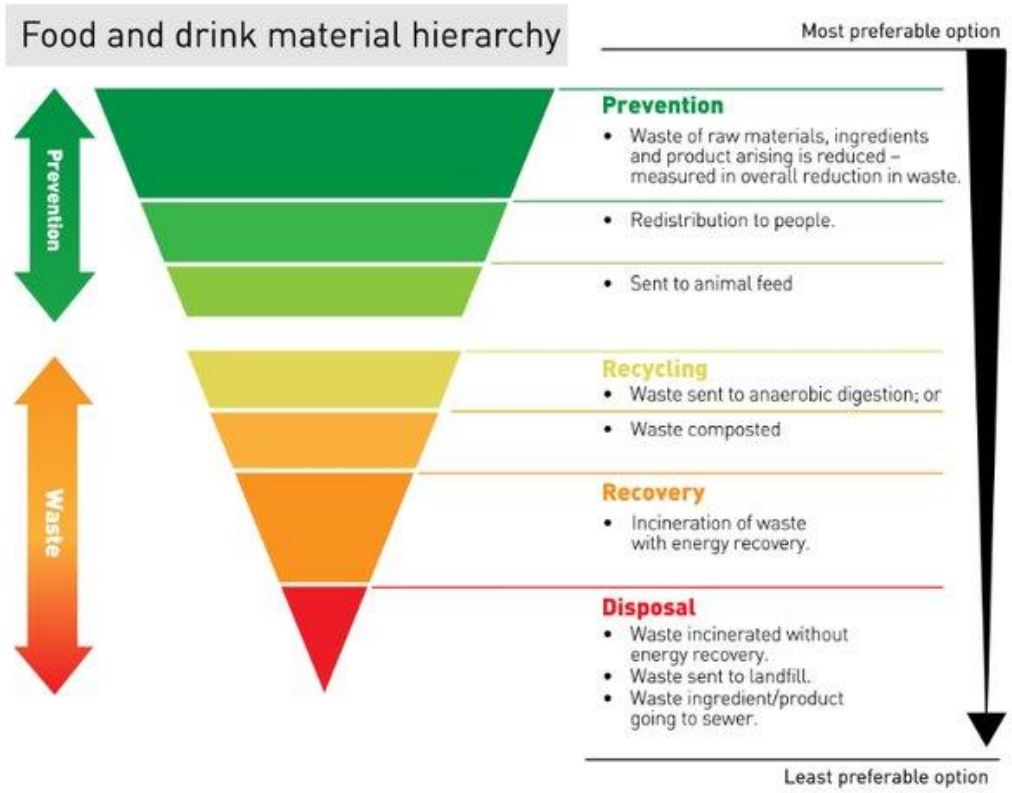
Για τα ζώα συντροφιάς προβλέπονται συγκεκριμένες προϋποθέσεις και διαδικασίες, και συγκεκριμένα: (α) Να έχουν συλλεχθεί ή μεταποιηθεί, κατά περίπτωση, σύμφωνα με τους όρους για την αποστείρωση υπό πίεση ή άλλους όρους για την αποτροπή των κινδύνων που παρουσιάζονται για τη δημόσια υγεία ή για την υγεία των ζώων σύμφωνα με τα μέτρα που θεσπίζονται κατά το άρθρο 15 του Κανονισμού 1069/2009 και με τα τυχόν μέτρα που έχουν καθορισθεί σύμφωνα με την παράγραφο 2 του άρθρου 31 του Κανονισμού 1069/2009 και (β) να προέρχονται από εγκεκριμένες ή καταχωρισμένες σε μητρώο εγκαταστάσεις ή μονάδες, ανάλογα με το σχετικό ζωικό υποπροϊόν ή το παράγωγο προϊόν.

Η επέκταση της προβλέψεως σίτισης και των ζώων συντροφιάς με υπολείμματα τροφίμων ή ζωοτροφές που περιέχουν ή προέρχονται από υπολείμματα τροφίμων είναι απολύτως εύλογη και απολύτως ασφαλής για τη δημόσια υγεία, ανθρώπων, αλλά και ζώων, με δεδομένο ότι τα ζώα συντροφιάς δεν καταναλώνονται από τον άνθρωπο ή από άλλα ζώα για τροφή, δηλαδή ό,τι ακριβώς συμβαίνει και με τα γουνοφόρα ζώα, για τα οποία ήδη ισχύει η πρόβλεψη αυτή και τα οποία εκτρέφονται από τον άνθρωπο με αποκλειστικό σκοπό τη χρήση της γούνας τους και όχι την κατανάλωση αυτών ή μέρους αυτών ως τροφή.

Σε κάθε δε περίπτωση, η σίτιση με υλικά της κατηγορίας 3 προβλέπεται και στο άρθρο 18 του Κανονισμού 1069/2009 , υπό συγκεκριμένες προϋποθέσεις, και για ζώα ζωολογικών κήπων, ζώα τσίρκων, ερπετά και αρπακτικά πτηνά, εκτός από τα ζώα ζωολογικών κήπων ή τσίρκων, γουνοφόρα ζώα, άγρια ζώα, σκύλους από αναγνωρισμένα κυνοτροφεία ή αγέλες κυνηγόσκυλων, σκύλους και γάτες σε καταφύγια, δηλαδή για κατηγορίες ζώων που δεν καταναλώνονται από τον άνθρωπο ή από άλλα ζώα για τροφή, όπως ακριβώς και τα ζώα συντροφιάς, για τα οποία προτείνεται η επέκταση της πρόβλεψης.

IV. ΠΑΡΑΡΤΗΜΑΤΑ.

Α. ΠΑΡΑΡΤΗΜΑ Α': Ιεράρχηση Υλικών από Τρόφιμα και Ποτά της EFFPA.



Β. ΠΑΡΑΡΤΗΜΑ Β': Ο προσφάτως εκδοθείς ΚΑΝΟΝΙΣΜΟΣ (ΕΕ) 2021/1372 ΤΗΣ ΕΠΙΤΡΟΠΗΣ της 17ης Αυγούστου 2021 για την τροποποίηση του Παραρτήματος IV του Κανονισμού (ΕΚ) αριθμ. 999/2001 του Ευρωπαϊκού Κοινοβουλίου και του Συμβουλίου όσον αφορά την απαγόρευση χορήγησης πρωτεϊνών ζωικής προέλευσης ως ζωοτροφών σε εκτρεφόμενα μη μηρυκαστικά ζώα, πλην των γουνοφόρων ζώων:

Άρση Περιορισμών της Χρήσης Υπολειμμάτων, η οποία δεν επιτρεπόταν μέχρι πρότινος για τη σίτιση παραγωγικών ζώων.

Με τον Κανονισμό (ΕΕ) 2021/1372 της Ευρωπαϊκής Επιτροπής της 17/08/2021 τροποποιήθηκε προσφάτως το Παράρτημα IV του Κανονισμού (ΕΚ) αριθμ. 999/2001 του Ευρωπαϊκού Κοινοβουλίου και του Συμβουλίου της 22ας Μαΐου 2001, ο οποιος θέσπιζε κανόνες πρόληψης, καταπολέμησης και εξάλειψης ορισμένων μεταδοτικών σπογγωδών εγκεφαλοπαθειών (ΜΣΕ). Ο εν λόγω Κανονισμός εφαρμοζόταν στην παραγωγή και τη διάθεση στην αγορά ζώντων ζώων και προϊόντων ζωικής προέλευσης και, σε ορισμένες συγκεκριμένες περιπτώσεις, στις εξαγωγές τους.

1. Ιστορικό, Επιστημονικό και Νομικό Πλαίσιο.

(α) Κατ' αρχάς, το άρθρο 7 παράγραφος 1 του Κανονισμού (ΕΚ) αριθμ. 999/2001 απαγορεύει τη χορήγηση μεταποιημένων πρωτεϊνών ζωικής προέλευσης στη διατροφή των μηρυκαστικών. Το άρθρο 7

παράγραφος 2 του εν λόγω Κανονισμού επεκτείνει την απαγόρευση σε ζώα, εκτός των μηρυκαστικών, όπως προβλέπεται στο παράρτημα IV κεφάλαιο I, ενώ στα κεφάλαια II έως V καθορίζονται και περιγράφονται λεπτομερώς **ορισμένες παρεκκλίσεις** από τις απαγορεύσεις που προβλέπονται στο κεφάλαιο I υπό ειδικούς όρους.

(β) Ωστόσο, όλα αυτά τα χρόνια που μεσολάβησαν ο οδικός χάρτης ΜΣΕ 2 εξέταζε και εξέτασε την αναθεώρηση των ισχυουσών διατάξεων απαγόρευσης ζωοτροφών για μη μηρυκαστικά ζώα που προβλέπονται στη Νομοθεσία της Ένωσης.

(γ) Ας σημειωθεί ότι το άρθρο 11 του Κανονισμού (ΕΚ) αριθμ. 1069/2009 του Ευρωπαϊκού Κοινοβουλίου και του Συμβουλίου **απαγορεύει** τη σίτιση χερσαίων ζώων δεδομένου είδους, πλην των γουνοφόρων ζώων, με μεταποιημένη ζωική πρωτεΐνη που προέρχεται από πτώματα ή μέρη πτωμάτων ζώων του ίδιου είδους (ανακύκλωση εντός του ίδιου ζωικού είδους).

(δ) Εν συνεχεία, μετά και τη διατύπωση σχετικών επιστημονικών γνωμών της Ευρωπαϊκής Αρχής για την Ασφάλεια των Τροφίμων, ο οδικός χάρτης ΜΣΕ 2 αναγνώρισε ότι δεν είχε εντοπιστεί εκδήλωση μεταδοτικών σπογγωδών εγκεφαλοπαθειών (ΜΣΕ) σε εκτρεφόμενα μη μηρυκαστικά ζώα υπό φυσικές συνθήκες και για το λόγο αυτό η Επιτροπή της 17ης Αυγούστου 2021 θεώρησε, μεταξύ άλλων, ότι θα πρέπει να καταργηθεί η απαγόρευση της χορήγησης κολλαγόνου και ζελατίνης που προέρχονται από μηρυκαστικά σε εκτρεφόμενα μη μηρυκάστικα.

(ε) Μάλιστα, ο οδικός χάρτης ΜΣΕ 2 αναγνώρισε, επίσης, ότι ο κίνδυνος μετάδοσης της σπογγώδους εγκεφαλοπάθειας των βοδινών (ΣΕΒ) από μη μηρυκαστικά σε μη μηρυκαστικά **είναι αμελητέος**, εφ' όσον αποφεύγεται η ανακύκλωση εντός του ίδιου ζωικού είδους. Κατά συνέπεια, κατέληξε στο συμπέρασμα ότι θα μπορούσε να εξεταστεί η άρση της απαγόρευσης όσον αφορά τη χρήση μεταποιημένων ζωικών πρωτεϊνών από μη μηρυκαστικά σε ζωοτροφές μη μηρυκαστικών, με παράλληλη τήρηση της υφιστάμενης απαγόρευσης της ανακύκλωσης εντός του ίδιου ζωικού είδους.

(στ) Σε σχετική έκθεση της Επιτροπής προς Συμβούλιο και το Ευρωπαϊκό Κοινοβούλιο για την ανάπτυξη των φυτικών πρωτεϊνών στην Ευρωπαϊκή Ένωση, η οποία δημοσιεύτηκε στις 22 Νοεμβρίου 2018, επισημαίνεται η ανάγκη να μειωθεί η εξάρτηση της Ένωσης από τρίτες χώρες για τον εφοδιασμό της με πρωτεΐνες. Από διατροφική άποψη, οι μεταποιημένες ζωικές πρωτεΐνες αποτελούν εξαιρετική πρώτη ύλη ζωοτροφών, με υψηλή συγκέντρωση ιδιαιτέρως εύπεπτων θρεπτικών συστατικών, όπως είναι τα αμινοξέα και ο φωσφόρος, και υψηλή περιεκτικότητα σε βιταμίνες. Με την εκ νέου έγκριση της χορήγησης μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από μη μηρυκαστικά στις ζωοτροφές για μη μηρυκαστικά, θα μειωνόταν αυτή η εξάρτηση από πρωτεΐνες από τρίτες χώρες.

(ζ) Κατά την άποψη της Επιτροπής, θα πρέπει να εγκριθεί εκ νέου η χρήση μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από χοιροειδή σε ζωοτροφές για πουλερικά και μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από πουλερικά σε ζωοτροφές για χοιροειδή, μέσω, όμως, υποχρεωτικώς της εφαρμογής αυστηρών απαιτήσεων κατά τη συλλογή, τη μεταφορά και τη μεταποίηση αυτών των προϊόντων και της διενέργειας τακτικής δειγματοληψίας και ανάλυσης, ώστε να αποφεύγεται οποιοσδήποτε κίνδυνος και να διευκολύνεται η επαλήθευση της απουσίας διασταυρούμενης μόλυνσης με απαγορευμένες πρωτεΐνες μηρυκαστικών καθώς και της απουσίας ανακύκλωσης εντός του ίδιου ζωικού είδους.

2. <u>Ενδεικτικές</u> Τροποποιήσεις που επέφερε ο Κανονισμός (ΕΕ) 2021/1372 της Ευρωπαϊκής Επιτροπής της 17/08/2021.

Σε συνέχεια των άνω επιστημονικών συμπερασμάτων εξεδόθη ο Κανονισμός (ΕΕ) 2021/1372 της Ευρωπαϊκής Επιτροπής της 17/08/2021, ο οποίος επέφερε ενδεικτικά τις εξής, μεταξύ άλλων, τροποποιήσεις (**οι τροποποιήσεις** επί του κειμένου του προγενέστερου Κανονισμού (ΕΚ) αριθμ. 999/2001, καθώς και οι **αντικαταστάσεις** διατάξεων **φέρουν υπογράμμιση**):

(α) <u>Καταργείται</u> πλέον η απαγόρευση χορήγησης κολλαγόνου και ζελατίνης που προέρχονται από μηρυκαστικά σε εκτρεφόμενα μη μηρυκάστικα ζώα, εκτός γουνοφόρων.

(β) Οι μεταποιημένες πρωτεΐνες ζωικής προελεύσεως, οι οποίες απαγορεύονταν στη διατροφή των μηρυκαστικών με το άρθρο 7 παρ. 1 του Κανονισμού (ΕΚ) αριθμ. 999/2001, δεν απαγορεύονται ΟΤΑΝ χορηγούνται **ΚΑΙ**:

(i) σε πουλερικά, οι ακόλουθες πρώτες ύλες ζωοτροφών και σύνθετες ζωοτροφές: i) μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από χοιροειδή και σύνθετες ζωοτροφές που περιέχουν τέτοιες μεταποιημένες ζωικές πρωτεΐνες, οι οποίες παράγονται, διατίθενται στην αγορά και χρησιμοποιούνται σύμφωνα με τους γενικούς όρους που καθορίζονται στο κεφάλαιο III, καθώς και τους ειδικούς όρους που καθορίζονται στο κεφάλαιο IV τμήμα Ζ, ii) μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από εκτρεφόμενα έντομα και σύνθετες ζωοτροφές που περιέχουν τέτοιες μεταποιημένες ζωικές πρωτεΐνες, οι οποίες παράγονται, διατίθενται στην αγορά και χρησιμοποιούνται σύμφωνα με τους γενικούς όρους που καθορίζονται στο κεφάλαιο III, καθώς και τους ειδικούς όρους που καθορίζονται στο κεφάλαιο IV τμήμα ΣΤ, και

(ii) σε χοιροειδή, οι ακόλουθες πρώτες ύλες ζωοτροφών και σύνθετες ζωοτροφές: i) μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από πουλερικά και σύνθετες ζωοτροφές που περιέχουν τέτοιες μεταποιημένες ζωικές πρωτεΐνες, οι οποίες παράγονται, διατίθενται στην αγορά και χρησιμοποιούνται σύμφωνα με τους γενικούς όρους που καθορίζονται στο κεφάλαιο III, καθώς και τους ειδικούς όρους που καθορίζονται στο κεφάλαιο IV τμήμα Η, ii) μεταποιημένες ζωικές πρωτεΐνες που

προέρχονται από εκτρεφόμενα έντομα και σύνθετες ζωοτροφές που περιέχουν τέτοιες μεταποιημένες ζωικές πρωτεΐνες, οι οποίες παράγονται, διατίθενται στην αγορά και χρησιμοποιούνται σύμφωνα με τους γενικούς όρους που καθορίζονται στο κεφάλαιο III, καθώς και τους ειδικούς όρους που καθορίζονται στο κεφάλαιο IV τμήμα ΣΤ.

(γ) Το σημείο 1 στοιχεία α) του Τμήματος Α «**Μεταφορά** πρώτων υλών ζωοτροφών και σύνθετων ζωοτροφών που προορίζονται να χρησιμοποιηθούν για τη διατροφή εκτρεφόμενων μη μηρυκαστικών ζώων» του Κεφαλαίου III, το οποίο είχε: «*1. Τα ακόλουθα προϊόντα που προορίζονται να χρησιμοποιηθούν για τη διατροφή εκτρεφόμενων μη μηρυκαστικών ζώων μεταφέρονται σε οχήματα και περιέκτες που δεν χρησιμοποιούνται για τη μεταφορά ζωοτροφών που προορίζονται για μηρυκαστικά: α) ασυσκεύαστες μεταποιημένες ζωικές πρωτεΐνες, συμπεριλαμβανομένων των ιχθυαλεύρων, που προέρχονται από μη μηρυκαστικά* …», **αλλάζει ως εξής**: «*α) ασυσκεύαστες μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από μη μηρυκαστικά, συμπεριλαμβανομένων των ιχθυαλεύρων, μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από εκτρεφόμενα έντομα, μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από χοιροειδή και μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από πουλερικά*».

(δ) Στο ΤΜΗΜΑ Β «*Παραγωγή σύνθετων ζωοτροφών που προορίζονται να χρησιμοποιηθούν για τη διατροφή εκτρεφόμενων μη μηρυκαστικών ζώων*» **προστέθηκαν** τα κατωτέρω υπογραμμισμένα:

«*1. Οι σύνθετες ζωοτροφές που προορίζονται να χρησιμοποιηθούν για τη διατροφή εκτρεφόμενων μη μηρυκαστικών ζώων και οι οποίες περιέχουν τις ακόλουθες πρώτες ύλες ζωοτροφών παράγονται μόνο σε εγκαταστάσεις που δεν παράγουν σύνθετες ζωοτροφές για μηρυκαστικά και έχουν εγκριθεί από την αρμόδια αρχή:*

α) ιχθυάλευρα·

β) όξινο φωσφορικό ασβέστιο και φωσφορικό ασβέστιο ζωικής προέλευσης·

γ) προϊόντα αίματος που προέρχονται από μη μηρυκαστικά

«*δ) μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από εκτρεφόμενα έντομα*

ε) μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από χοιροειδή

στ) μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από πουλερικά».

(ε) Κατά παρέκκλιση από το σημείο 1, δεν απαιτείται ειδική άδεια για την παραγωγή πλήρων ζωοτροφών από σύνθετες ζωοτροφές που περιέχουν τα προϊόντα τα οποία απαριθμούνται στο εν λόγω σημείο για τους κατ' οίκον παρασκευαστές, εφ' όσον συμμορφώνονται προς τους ακόλουθους όρους **ΜΕΤΑΞΥ ΑΛΛΩΝ** «*β) πρέπει να εκτρέφουν μόνο μη μηρυκαστικά ζώα και: i) όταν εκτρέφουν πουλερικά, δεν παράγουν πλήρεις ζωοτροφές από σύνθετες ζωοτροφές που περιέχουν μεταποιημένες ζωικές πρωτεΐνες*

προερχόμενες από πουλερικά· 18.8.2021 EL Επίσημη Εφημερίδα της Ευρωπαϊκής Ένωσης L 295/5 ii) όταν εκτρέφουν χοιροειδή, δεν παράγουν πλήρεις ζωοτροφες από σύνθετες ζωοτροφές που περιέχουν μεταποιημένες ζωικές πρωτεΐνες προερχόμενες από χοιροειδή».

(στ) Πριν από τη θέση σε ελεύθερη κυκλοφορία στην Ένωση, οι εισαγωγείς διασφαλίζουν ότι κάθε αποστολή των ακόλουθων πρώτων υλών ζωοτροφών και σύνθετων ζωοτροφών που προορίζονται για τη διατροφή εκτρεφόμενων μη μηρυκαστικών ζώων, πλην των γουνοφόρων ζώων, αναλύεται σύμφωνα με τις μεθόδους ανάλυσης για τον προσδιορισμό των συστατικών ζωικής προέλευσης για τον έλεγχο των εισαγωγών ζωοτροφών που αναφέρονται στο παράρτημα VI του κανονισμού (ΕΚ) αριθ. 152/2009, προκειμένου να επαληθεύεται η απουσία μη εγκεκριμένων συστατικών ζωικής προέλευσης:

«*α) μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από μη μηρυκαστικά, συμπεριλαμβανομένων των ιχθυαλεύρων, μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από εκτρεφόμενα έντομα, μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από χοιροειδή και μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από πουλερικά·»·*

β) προϊόντων αίματος που προέρχονται από μη μηρυκαστικά·

γ) σύνθετων ζωοτροφών οι οποίες περιέχουν τις πρώτες ύλες ζωοτροφών που απαριθμούνται στα στοιχεία α) και β)».

(ζ) Η χρήση και η αποθήκευση των ακόλουθων ζωοτροφών απαγορεύεται στις εκμεταλλεύσεις, όπου εκτρέφονται ζωικά είδη, για τα οποία δεν προορίζονται οι εν λόγω ζωοτροφές:

«*α) μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από μη μηρυκαστικά, συμπεριλαμβανομένων των ιχθυαλεύρων, μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από εκτρεφόμενα έντομα, μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από χοιροειδή και μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από πουλερικά·»*

β) όξινο φωσφορικό ασβέστιο και φωσφορικό ασβέστιο ζωικής προέλευσης·

γ) προϊόντα αίματος που προέρχονται από μη μηρυκαστικά

δ) σύνθετες ζωοτροφές οι οποίες περιέχουν τις πρώτες ύλες ζωοτροφών που απαριθμούνται στα στοιχεία α) έως γ)».

(η) Το κεφάλαιο IV τροποποιείται ως εξής: α) στο τμήμα Δ, το στοιχείο α) **αντικαθίσταται πλήρως** από το ακόλουθο κείμενο: «*α) Τα ζωικά υποπροϊόντα που προορίζονται να χρησιμοποιηθούν για την παραγωγή των μεταποιημένων ζωικών πρωτεϊνών που αναφέρονται στο παρόν τμήμα προέρχονται από ένα ή περισσότερα από τα ακόλουθα: i) σφαγεία εγκεκριμένα σύμφωνα με το άρθρο 4 του κανονισμού (ΕΚ) αριθ. 853/2004, στα οποία δεν σφάζονται μηρυκαστικά και τα οποία έχουν καταχωριστεί από την αρμόδια*

αρχή ως σφαγεία όπου δεν σφάζονται μηρυκαστικά· ii) εργαστήρια τεμαχισμού εγκεκριμένα σύμφωνα με το άρθρο 4 του κανονισμού (ΕΚ) αριθ. 853/2004, στα οποία δεν αποστεώνεται ούτε τεμαχίζεται κρέας μηρυκαστικών και τα οποία έχουν καταχωριστεί από την αρμόδια αρχή ως εργαστήρια όπου δεν αποστεώνεται ούτε τεμαχίζεται κρέας μηρυκαστικών· iii) άλλες εγκαταστάσεις εκτός από αυτές που αναφέρονται στο σημείο i) ή ii), καταχωρισμένες ή εγκεκριμένες σύμφωνα με το άρθρο 4 του κανονισμού (ΕΚ) αριθ. 853/2004, στις οποίες δεν γίνεται χειρισμός προϊόντων μηρυκαστικών και οι οποίες έχουν καταχωριστεί από την αρμόδια αρχή ως εγκαταστάσεις στις οποίες δεν γίνεται χειρισμός προϊόντων μηρυκαστικών· iv) εγκεκριμένες εγκαταστάσεις που αναφέρονται στο άρθρο 24 παράγραφος 1 στοιχεία η) και θ) του κανονισμού (ΕΚ) αριθ. 1069/2009, οι οποίες έχουν καταχωριστεί από την αρμόδια αρχή ως εγκαταστάσεις στις οποίες γίνεται μόνο χειρισμός ή αποθήκευση ζωικών υποπροϊόντων μη μηρυκαστικών που προέρχονται από εγκαταστάσεις που αναφέρονται στα σημεία i), ii) και iii). Κατά παρέκκλιση από τα σημεία i), ii) και iii) του πρώτου εδαφίου, η αρμόδια αρχή μπορεί να επιτρέψει τη σφαγή μηρυκαστικών και τον χειρισμό προϊόντων μηρυκαστικών στις εγκαταστάσεις που αναφέρονται στα σημεία i), ii) και iii) του πρώτου εδαφίου, οι οποίες παράγουν ζωικά υποπροϊόντα μη μηρυκαστικών που προορίζονται για την παραγωγή των μεταποιημένων ζωικών πρωτεϊνών που αναφέρονται στο παρόν τμήμα. Η εν λόγω άδεια μπορεί να χορηγηθεί μόνον εφόσον η αρμόδια αρχή έχει πεισθεί, ύστερα από τη διενέργεια επιτόπιας επιθεώρησης, για την αποτελεσματικότητα των μέτρων που αποσκοπούν στην πρόληψη της διασταυρούμενης μόλυνσης μεταξύ των υποπροϊόντων μηρυκαστικών και μη μηρυκαστικών. Τα μέτρα αυτά περιλαμβάνουν τις ακόλουθες ελάχιστες απαιτήσεις: 1) η σφαγή των μη μηρυκαστικών πρέπει να πραγματοποιείται σε γραμμές που διαχωρίζονται φυσικά από τις γραμμές που χρησιμοποιούνται για τη σφαγή των μηρυκαστικών· 2) ο χειρισμός των προϊόντων μη μηρυκαστικών πρέπει να πραγματοποιείται σε γραμμές παραγωγής που διαχωρίζονται φυσικά από τις γραμμές που χρησιμοποιούνται για τον χειρισμό των προϊόντων μηρυκαστικών· 3) οι εγκαταστάσεις συλλογής, αποθήκευσης, μεταφοράς και συσκευασίας των ζωικών υποπροϊόντων που προέρχονται από μη μηρυκαστικά πρέπει να είναι χωριστές από εκείνες που χρησιμοποιούνται για τα ζωικά υποπροϊόντα που προέρχονται από μηρυκαστικά· 4) πρέπει να διενεργείται τακτική δειγματοληψία και ανάλυση των ζωικών υποπροϊόντων που προέρχονται από μη μηρυκαστικά για την ανίχνευση της παρουσίας πρωτεϊνών μηρυκαστικών. Η μέθοδος ανάλυσης που χρησιμοποιείται πρέπει να είναι επιστημονικά επικυρωμένη για τον σκοπό αυτό. Η συχνότητα της δειγματοληψίας και της ανάλυσης καθορίζεται βάσει εκτίμησης κινδύνου που πραγματοποιείται από τον υπεύθυνο της επιχείρησης ως μέρος των διαδικασιών που αυτός εφαρμόζει με βάση τις αρχές HACCP».

(θ) Το τμήμα ΣΤ **αντικαθίσταται πλήρως** από τα εξής **ως προς τα πιθανολογούμενα σημεία ενδιαφέροντός σας**: «*ΤΜΗΜΑ ΣΤ Ειδικοί όροι που ισχύουν για την παραγωγή και τη χρήση μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από εκτρεφόμενα έντομα και σύνθετων ζωοτροφών που περιέχουν τέτοιες πρωτεΐνες, οι οποίες προορίζονται να χρησιμοποιηθούν για τη διατροφή ζώων υδατοκαλλιέργειας,*

πουλερικών και χοιροειδών. Οι ακόλουθοι ειδικοί όροι ισχύουν για την παραγωγή και τη χρήση μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από εκτρεφόμενα έντομα και σύνθετων ζωοτροφών που περιέχουν τέτοιες μεταποιημένες ζωικές πρωτεΐνες, οι οποίες προορίζονται να χρησιμοποιηθούν για τη διατροφή ζώων υδατοκαλλιέργειας, πουλερικών και χοιροειδών: α) οι μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από εκτρεφόμενα έντομα πρέπει να παράγονται:…….. . β) Οι σύνθετες ζωοτροφές που περιέχουν μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από εκτρεφόμενα έντομα παράγονται σε εγκαταστάσεις οι οποίες: i) έχουν εγκριθεί για τον σκοπό αυτό από την αρμόδια αρχή· ii) ασχολούνται αποκλειστικά με την παρασκευή ζωοτροφών για ζώα υδατοκαλλιέργειας, πουλερικά ή χοιροειδή. 18.8.2021 EL Επίσημη Εφημερίδα της Ευρωπαϊκής Ένωσης L 295/7 Κατά παρέκκλιση από το σημείο i) του πρώτου εδαφίου, δεν απαιτείται ειδική άδεια για την παραγωγή πλήρων ζωοτροφών από σύνθετες ζωοτροφές που περιέχουν μεταποιημένες ζωικές πρωτεΐνες προερχόμενες από εκτρεφόμενα έντομα για τους κατ' οίκον παρασκευαστές που πληρούν τις ακόλουθες προϋποθέσεις: — έχουν καταχωριστεί από την αρμόδια αρχή ως παραγωγοί πλήρων ζωοτροφών από σύνθετες ζωοτροφές που περιέχουν μεταποιημένες ζωικές πρωτεΐνες προερχόμενες από εκτρεφόμενα έντομα, — δεν διατηρούν εκτρεφόμενα ζώα όπως ορίζονται στο άρθρο 3 σημείο 6 στοιχείο α) του κανονισμού (ΕΚ) αριθ. 1069/2009, εκτός των ζώων υδατοκαλλιέργειας, των πουλερικών, των χοιροειδών ή των γουνοφόρων ζώων, — οι σύνθετες ζωοτροφές οι οποίες περιέχουν μεταποιημένες ζωικές πρωτεΐνες προερχόμενες από εκτρεφόμενα έντομα, οι οποίες χρησιμοποιούνται στην παραγωγή τους, περιέχουν ακατέργαστες πρωτεΐνες σε ποσοστό μικρότερο του 50 %. Κατά παρέκκλιση από το σημείο ii) του πρώτου εδαφίου, η παραγωγή σύνθετων ζωοτροφών που περιέχουν μεταποιημένες ζωικές πρωτεΐνες από εκτρεφόμενα έντομα και προορίζονται για ζώα υδατοκαλλιέργειας, πουλερικά ή χοιροειδή, σε εγκαταστάσεις που παράγουν επίσης σύνθετες ζωοτροφές που προορίζονται για άλλα εκτρεφόμενα ζώα, εκτός των γουνοφόρων ζώων, μπορεί να επιτραπεί από την αρμόδια αρχή κατόπιν επιτόπου επιθεώρησης, υπό την προϋπόθεση ότι τηρούνται οι ακόλουθοι όροι: — οι σύνθετες ζωοτροφές που προορίζονται για μηρυκαστικά πρέπει να παρασκευάζονται και να φυλάσσονται, κατά την αποθήκευση, τη μεταφορά και τη συσκευασία, σε εγκαταστάσεις που διαχωρίζονται φυσικά από τις εγκαταστάσεις στις οποίες παρασκευάζονται και φυλάσσονται σύνθετες ζωοτροφές για μη μηρυκαστικά, — οι σύνθετες ζωοτροφές που προορίζονται για ζώα υδατοκαλλιέργειας, πουλερικά ή χοιροειδή πρέπει να παρασκευάζονται και να φυλάσσονται, κατά την αποθήκευση, τη μεταφορά και τη συσκευασία, σε εγκαταστάσεις που διαχωρίζονται φυσικά από τις εγκαταστάσεις στις οποίες παρασκευάζονται και φυλάσσονται σύνθετες ζωοτροφές για άλλα μη μηρυκαστικά ζώα, — τα αρχεία που καταγράφουν λεπτομερώς τις αγορές και τις χρήσεις των μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από εκτρεφόμενα έντομα και τις πωλήσεις σύνθετων ζωοτροφών που περιέχουν τέτοιες πρωτεΐνες πρέπει να διατηρούνται στη διάθεση της αρμόδιας αρχής για τουλάχιστον πέντε έτη, — πρέπει να διενεργείται τακτική δειγματοληψία και ανάλυση των σύνθετων ζωοτροφών που προορίζονται για εκτρεφόμενα ζώα εκτός των ζώων υδατοκαλλιέργειας, των πουλερικών και των χοιροειδών, προκειμένου να επαληθεύεται η απουσία μη εγκεκριμένων συστατικών ζωικής

προέλευσης, με τη χρήση των μεθόδων ανάλυσης για τον προσδιορισμό των συστατικών ζωικής προέλευσης για τον έλεγχο των ζωοτροφών που προβλέπονται στο παράρτημα VI του κανονισμού (ΕΚ) αριθ. 152/2009· η συχνότητα της εν λόγω δειγματοληψίας και ανάλυσης καθορίζεται βάσει εκτίμησης κινδύνου που πραγματοποιείται από τον υπεύθυνο της επιχείρησης ως μέρος των διαδικασιών που εφαρμόζει με βάση τις αρχές HACCP· τα αποτελέσματα πρέπει να διατηρούνται στη διάθεση της αρμόδιας αρχής για τουλάχιστον πέντε έτη. γ) το εμπορικό έγγραφο ή, κατά περίπτωση, το υγειονομικό πιστοποιητικό που συνοδεύει τις μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από εκτρεφόμενα έντομα σύμφωνα με το άρθρο 21 παράγραφος 2 του κανονισμού (ΕΚ) αριθ. 1069/2009, η ετικέτα αυτών των μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από εκτρεφόμενα έντομα και η ετικέτα των σύνθετων ζωοτροφών που περιέχουν μεταποιημένες ζωικές πρωτεΐνες προερχόμενες από εκτρεφόμενα έντομα φέρουν ευκρινή ένδειξη σύμφωνα με το κεφάλαιο V τμήμα Ζ του παρόντος παραρτήματος.» ·

(ι) <u>Προστίθενται</u> τα ακόλουθα τμήματα:

«***ΤΜΗΜΑ Ζ Ειδικοί όροι που ισχύουν για την παραγωγή και τη χρήση μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από χοιροειδή και σύνθετων ζωοτροφών που περιέχουν τέτοιες πρωτεΐνες, οι οποίες προορίζονται να χρησιμοποιηθούν για τη διατροφή πουλερικών***.*

Οι ακόλουθοι ειδικοί όροι ισχύουν για την παραγωγή και τη χρήση μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από χοιροειδή και σύνθετων ζωοτροφών που περιέχουν τέτοιες πρωτεΐνες, οι οποίες προορίζονται να χρησιμοποιηθούν για τη διατροφή πουλερικών ("μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από χοιροειδή"): α) Τα ζωικά υποπροϊόντα που προορίζονται να χρησιμοποιηθούν για την παραγωγή μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από χοιροειδή προέρχονται από ένα ή περισσότερα από τα ακόλουθα: L 295/8 EL Επίσημη Εφημερίδα της Ευρωπαϊκής Ένωσης 18.8.2021 i) σφαγεία εγκεκριμένα σύμφωνα με το άρθρο 4 του κανονισμού (ΕΚ) αριθ. 853/2004, στα οποία δεν σφάζονται μηρυκαστικά και πουλερικά και τα οποία έχουν καταχωριστεί από την αρμόδια αρχή ως σφαγεία όπου δεν σφάζονται μηρυκαστικά και πουλερικά· ii) εργαστήρια τεμαχισμού εγκεκριμένα σύμφωνα με το άρθρο 4 του κανονισμού (ΕΚ) αριθ. 853/2004, στα οποία δεν αποστεώνεται ούτε τεμαχίζεται κρέας μηρυκαστικών και πουλερικών και τα οποία έχουν καταχωριστεί από την αρμόδια αρχή ως εργαστήρια όπου δεν αποστεώνεται ούτε τεμαχίζεται κρέας μηρυκαστικών και πουλερικών· iii) άλλες εγκαταστάσεις εκτός από αυτές που αναφέρονται στο σημείο i) ή ii), καταχωρισμένες ή εγκεκριμένες σύμφωνα με το άρθρο 4 του κανονισμού (ΕΚ) αριθ. 853/2004, στις οποίες δεν γίνεται χειρισμός προϊόντων μηρυκαστικών και πουλερικών και οι οποίες έχουν καταχωριστεί από την αρμόδια αρχή ως εγκαταστάσεις στις οποίες δεν γίνεται χειρισμός προϊόντων μηρυκαστικών και πουλερικών· iv) εγκεκριμένες εγκαταστάσεις που αναφέρονται στο άρθρο 24 παράγραφος 1 στοιχεία η) και θ) του κανονισμού (ΕΚ) αριθ. 1069/2009, οι οποίες έχουν καταχωριστεί από την αρμόδια αρχή ως εγκαταστάσεις στις οποίες γίνεται μόνο χειρισμός ή αποθήκευση ζωικών υποπροϊόντων μη μηρυκαστικών που προέρχονται από εγκαταστάσεις που

αναφέρονται στα σημεία i), ii) και iii). Κατά παρέκκλιση από τα σημεία i), ii) και iii) του πρώτου εδαφίου, η αρμόδια αρχή μπορεί να επιτρέψει τη σφαγή μηρυκαστικών ή πουλερικών και τον χειρισμό προϊόντων μηρυκαστικών ή πουλερικών στις εγκαταστάσεις που αναφέρονται στα σημεία i), ii) και iii) του πρώτου εδαφίου, οι οποίες παράγουν ζωικά υποπροϊόντα χοιροειδών που προορίζονται για την παραγωγή μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από χοιροειδή. Η εν λόγω άδεια μπορεί να χορηγηθεί μόνον εφόσον η αρμόδια αρχή έχει πεισθεί, ύστερα από τη διενέργεια επιτόπιας επιθεώρησης, για την αποτελεσματικότητα των μέτρων που αποσκοπούν στην πρόληψη της διασταυρούμενης μόλυνσης μεταξύ των υποπροϊόντων μηρυκαστικών ή πουλερικών και χοιροειδών. Τα μέτρα αυτά περιλαμβάνουν τις ακόλουθες ελάχιστες απαιτήσεις: 1) η σφαγή των χοιροειδών πρέπει να πραγματοποιείται σε γραμμές που διαχωρίζονται φυσικά από τις γραμμές που χρησιμοποιούνται για τη σφαγή των μηρυκαστικών ή πουλερικών· 2) ο χειρισμός των προϊόντων χοιροειδών πρέπει να πραγματοποιείται σε γραμμές παραγωγής που διαχωρίζονται φυσικά από τις γραμμές που χρησιμοποιούνται για τον χειρισμό των προϊόντων μηρυκαστικών ή πουλερικών· 3) οι εγκαταστάσεις συλλογής, αποθήκευσης, μεταφοράς και συσκευασίας των ζωικών υποπροϊόντων που προέρχονται από χοιροειδή πρέπει να είναι χωριστές από εκείνες που χρησιμοποιούνται για τα ζωικά υποπροϊόντα που προέρχονται από μηρυκαστικά ή πουλερικά· 4) πρέπει να διενεργείται τακτική δειγματοληψία και ανάλυση των ζωικών υποπροϊόντων που προέρχονται από χοιροειδή για την ανίχνευση της παρουσίας πρωτεϊνών μηρυκαστικών ή πουλερικών. Η μέθοδος ανάλυσης που χρησιμοποιείται πρέπει να είναι επιστημονικά επικυρωμένη για τον σκοπό αυτό. Η συχνότητα της δειγματοληψίας και της ανάλυσης καθορίζεται βάσει εκτίμησης κινδύνου που πραγματοποιείται από τον υπεύθυνο της επιχείρησης ως μέρος των διαδικασιών που αυτός εφαρμόζει με βάση τις αρχές HACCP. β) Τα ζωικά υποπροϊόντα που προέρχονται από χοιροειδή, που προορίζονται να χρησιμοποιηθούν για την παραγωγή των μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από χοιροειδή, μεταφέρονται σε μονάδα μεταποίησης με οχήματα και περιέκτες που δεν χρησιμοποιούνται για τη μεταφορά ζωικών υποπροϊόντων που προέρχονται από μηρυκαστικά ή πουλερικά. Κατά παρέκκλιση από το πρώτο εδάφιο, μπορούν να μεταφέρονται σε οχήματα και περιέκτες που έχουν χρησιμοποιηθεί προηγουμένως για τη μεταφορά ζωικών υποπροϊόντων που προέρχονται από μηρυκαστικά ή πουλερικά, υπό τον όρο ότι τα εν λόγω οχήματα και περιέκτες έχουν καθαριστεί διεξοδικά προηγουμένως ώστε να αποφεύγεται η διασταυρούμενη μόλυνση, σύμφωνα με μια τεκμηριωμένη διαδικασία που έχει λάβει προηγούμενη έγκριση από την αρμόδια αρχή. Όποτε χρησιμοποιείται τέτοια διαδικασία, τεκμηριωμένα ίχνη της εν λόγω χρήσης διατηρούνται στη διάθεση της αρμόδιας αρχής για τουλάχιστον δύο έτη. γ) Οι μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από χοιροειδή παράγονται σε μονάδες μεταποίησης οι οποίες: i) ασχολούνται με τη μεταποίηση υποπροϊόντων που λαμβάνονται από τα σφαγεία, τα εργαστήρια τεμαχισμού ή τις άλλες εγκαταστάσεις που αναφέρονται στο στοιχείο α)· ii) έχουν καταχωριστεί από την αρμόδια αρχή ως μονάδες οι οποίες δεν μεταποιούν ζωικά υποπροϊόντα μηρυκαστικών ή πουλερικών. 18.8.2021 EL Επίσημη Εφημερίδα της Ευρωπαϊκής Ένωσης L 295/9 Κατά παρέκκλιση από το σημείο ii) του πρώτου εδαφίου, η

αρμόδια αρχή μπορεί να επιτρέψει την παραγωγή μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από χοιροειδή σε μονάδες μεταποίησης που μεταποιούν ζωικά υποπροϊόντα μηρυκαστικών ή πουλερικών. Η εν λόγω άδεια μπορεί να χορηγηθεί μόνον εφόσον η αρμόδια αρχή έχει πεισθεί, ύστερα από τη διενέργεια επιθεώρησης, για την αποτελεσματικότητα των μέτρων που αποσκοπούν στην αποτροπή διασταυρούμενης μόλυνσης μεταξύ των μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από μηρυκαστικά ή πουλερικά και των μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από χοιροειδή. Τα προληπτικά αυτά μέτρα περιλαμβάνουν τις ακόλουθες ελάχιστες απαιτήσεις: 1) η παραγωγή μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από μηρυκαστικά ή πουλερικά πρέπει να διεξάγεται σε κλειστό σύστημα που διαχωρίζεται φυσικά από εκείνο που χρησιμοποιείται για την παραγωγή των μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από χοιροειδή· 2) τα ζωικά υποπροϊόντα που προέρχονται από μηρυκαστικά και πουλερικά πρέπει να διατηρούνται κατά την αποθήκευση και τη μεταφορά σε εγκαταστάσεις που διαχωρίζονται φυσικά από εκείνες που χρησιμοποιούνται για τα ζωικά υποπροϊόντα που προέρχονται από μη χοιροειδή· 3) οι μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από μηρυκαστικά ή πουλερικά πρέπει να διατηρούνται κατά την αποθήκευση και τη συσκευασία σε εγκαταστάσεις που διαχωρίζονται φυσικά από εκείνες που χρησιμοποιούνται για τα τελικά προϊόντα που προέρχονται από χοιροειδή· 4) πρέπει να διενεργείται τακτική δειγματοληψία και ανάλυση των μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από χοιροειδή προκειμένου να επαληθεύεται η απουσία διασταυρούμενης μόλυνσης με μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από μηρυκαστικά ή πουλερικά, με τη χρήση των μεθόδων ανάλυσης για τον προσδιορισμό των συστατικών ζωικής προέλευσης για τον έλεγχο των ζωοτροφών, που προβλέπονται στο παράρτημα VI του κανονισμού (ΕΚ) αριθ. 152/2009· η συχνότητα δειγματοληψίας και ανάλυσης καθορίζεται βάσει εκτίμησης κινδύνου που πραγματοποιείται από τον επιχειρηματία ως μέρος των διαδικασιών που εφαρμόζει βάσει των αρχών HACCP· τα αποτελέσματα της σχετικής δειγματοληψίας και ανάλυσης διατηρούνται στη διάθεση της αρμόδιας αρχής για τουλάχιστον πέντε έτη. δ) Οι σύνθετες ζωοτροφές που περιέχουν μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από χοιροειδή παράγονται σε εγκαταστάσεις οι οποίες: i) έχουν εγκριθεί για τον σκοπό αυτό από την αρμόδια αρχή· ii) ασχολούνται αποκλειστικά με την παραγωγή ζωοτροφών για πουλερικά, ζώα υδατοκαλλιέργειας ή γουνοφόρα ζώα. Κατά παρέκκλιση από το σημείο i) του πρώτου εδαφίου, δεν απαιτείται ειδική άδεια για την παραγωγή πλήρων ζωοτροφών από σύνθετες ζωοτροφές που περιέχουν μεταποιημένες ζωικές πρωτεΐνες προερχόμενες από χοιροειδή για τους κατ' οίκον παρασκευαστές που πληρούν τις ακόλουθες προϋποθέσεις: — έχουν καταχωριστεί από την αρμόδια αρχή ως παραγωγοί πλήρων ζωοτροφών από σύνθετες ζωοτροφές που περιέχουν μεταποιημένες ζωικές πρωτεΐνες προερχόμενες από χοιροειδή, — δεν διατηρούν εκτρεφόμενα ζώα όπως ορίζονται στο άρθρο 3 σημείο 6 στοιχείο α) του κανονισμού (ΕΚ) αριθ. 1069/2009, εκτός των πουλερικών, των ζώων υδατοκαλλιέργειας ή των γουνοφόρων ζώων, — οι σύνθετες ζωοτροφές οι οποίες περιέχουν μεταποιημένες ζωικές πρωτεΐνες προερχόμενες από χοιροειδή οι οποίες χρησιμοποιούνται στην παραγωγή τους περιέχουν ακατέργαστες πρωτεΐνες σε ποσοστό μικρότερο του 50 %. Κατά παρέκκλιση από

το σημείο ii) του πρώτου εδαφίου, η παραγωγή σύνθετων ζωοτροφών για πουλερικά, που περιέχουν μεταποιημένες ζωικές πρωτεΐνες προερχόμενες από χοιροειδή, σε εγκαταστάσεις που παράγουν επίσης σύνθετες ζωοτροφές που προορίζονται για εκτρεφόμενα ζώα εκτός των ζώων υδατοκαλλιέργειας και των γουνοφόρων ζώων, μπορεί να επιτραπεί από την αρμόδια αρχή κατόπιν επιτόπου επιθεώρησης, υπό την προϋπόθεση ότι τηρούνται οι ακόλουθοι όροι: — οι σύνθετες ζωοτροφές που προορίζονται για μηρυκαστικά πρέπει να παρασκευάζονται και να φυλάσσονται, κατά την αποθήκευση, τη μεταφορά και τη συσκευασία, σε εγκαταστάσεις που διαχωρίζονται φυσικά από τις εγκαταστάσεις στις οποίες παρασκευάζονται και φυλάσσονται σύνθετες ζωοτροφές για μη μηρυκαστικά, — οι σύνθετες ζωοτροφές που προορίζονται για χοιροειδή πρέπει να παρασκευάζονται και να φυλάσσονται, κατά την αποθήκευση, τη μεταφορά και τη συσκευασία, σε εγκαταστάσεις που διαχωρίζονται φυσικά από τις εγκαταστάσεις στις οποίες παρασκευάζονται και φυλάσσονται σύνθετες ζωοτροφές για άλλα μη μηρυκαστικά ζώα, L 295/10 EL Επίσημη Εφημερίδα της Ευρωπαϊκής Ένωσης 18.8.2021 — τα αρχεία που καταγράφουν λεπτομερώς τις αγορές και τις χρήσεις των μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από χοιροειδή και τις πωλήσεις σύνθετων ζωοτροφών που περιέχουν τέτοιες πρωτεΐνες πρέπει να διατηρούνται στη διάθεση της αρμόδιας αρχής για τουλάχιστον πέντε έτη, — πρέπει να διενεργείται τακτική δειγματοληψία και ανάλυση των σύνθετων ζωοτροφών που προορίζονται για εκτρεφόμενα ζώα εκτός των πουλερικών, των ζώων υδατοκαλλιέργειας και των γουνοφόρων ζώων, προκειμένου να επαληθεύεται η απουσία μη εγκεκριμένων συστατικών ζωικής προέλευσης, με τη χρήση των μεθόδων ανάλυσης για τον προσδιορισμό των συστατικών ζωικής προέλευσης για τον έλεγχο των ζωοτροφών που προβλέπονται στο παράρτημα VI του κανονισμού (ΕΚ) αριθ. 152/2009· η συχνότητα της εν λόγω δειγματοληψίας και ανάλυσης καθορίζεται βάσει εκτίμησης κινδύνου που πραγματοποιείται από τον υπεύθυνο της επιχείρησης ως μέρος των διαδικασιών που εφαρμόζει με βάση τις αρχές HACCP· τα αποτελέσματα πρέπει να διατηρούνται στη διάθεση της αρμόδιας αρχής για τουλάχιστον πέντε έτη. ε) Το εμπορικό έγγραφο ή, κατά περίπτωση, το υγειονομικό πιστοποιητικό που συνοδεύει τις μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από χοιροειδή σύμφωνα με το άρθρο 21 παράγραφος 2 του κανονισμού (ΕΚ) αριθ. 1069/ 2009, η ετικέτα αυτών των μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από χοιροειδή και η ετικέτα των σύνθετων ζωοτροφών που περιέχουν μεταποιημένες ζωικές πρωτεΐνες προερχόμενες από χοιροειδή φέρουν ευκρινή ένδειξη σύμφωνα με το κεφάλαιο V τμήμα Z του παρόντος παραρτήματος.

ΤΜΗΜΑ Η Ειδικοί όροι που ισχύουν για την παραγωγή και τη χρήση μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από πουλερικά και σύνθετων ζωοτροφών που περιέχουν τέτοιες πρωτεΐνες, οι οποίες προορίζονται να χρησιμοποιηθούν για τη διατροφή χοιροειδών.

Οι ακόλουθοι ειδικοί όροι ισχύουν για την παραγωγή και τη χρήση μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από πουλερικά και σύνθετων ζωοτροφών που περιέχουν τέτοιες πρωτεΐνες, οι οποίες προορίζονται να χρησιμοποιηθούν για τη διατροφή χοιροειδών ("μεταποιημένες ζωικές πρωτεΐνες που

προέρχονται από πουλερικά"): α) Τα ζωικά υποπροϊόντα που προορίζονται να χρησιμοποιηθούν για την παραγωγή μεταποιημένων ζωικών πρωτεϊνών από πουλερικά προέρχονται από ένα ή περισσότερα από τα ακόλουθα: i) σφαγεία εγκεκριμένα σύμφωνα με το άρθρο 4 του κανονισμού (ΕΚ) αριθ. 853/2004, στα οποία δεν σφάζονται μηρυκαστικά και χοιροειδή και τα οποία έχουν καταχωριστεί από την αρμόδια αρχή ως σφαγεία όπου δεν σφάζονται μηρυκαστικά και χοιροειδή· ii) εργαστήρια τεμαχισμού εγκεκριμένα σύμφωνα με το άρθρο 4 του κανονισμού (ΕΚ) αριθ. 853/2004, στα οποία δεν αποστεώνεται ούτε τεμαχίζεται κρέας μηρυκαστικών και χοιροειδών και τα οποία έχουν καταχωριστεί από την αρμόδια αρχή ως εργαστήρια όπου δεν αποστεώνεται ούτε τεμαχίζεται κρέας μηρυκαστικών και χοιροειδών· iii) άλλες εγκαταστάσεις εκτός από αυτές που αναφέρονται στο σημείο i) ή ii), καταχωρισμένες ή εγκεκριμένες σύμφωνα με το άρθρο 4 του κανονισμού (ΕΚ) αριθ. 853/2004, στις οποίες δεν γίνεται χειρισμός προϊόντων μηρυκαστικών και χοιροειδών και οι οποίες έχουν καταχωριστεί από την αρμόδια αρχή ως εγκαταστάσεις στις οποίες δεν γίνεται χειρισμός προϊόντων μηρυκαστικών και χοιροειδών· iv) εγκεκριμένες εγκαταστάσεις που αναφέρονται στο άρθρο 24 παράγραφος 1 στοιχεία η) και θ) του κανονισμού (ΕΚ) αριθ. 1069/2009, οι οποίες έχουν καταχωριστεί από την αρμόδια αρχή ως εγκαταστάσεις στις οποίες γίνεται μόνο χειρισμός ή αποθήκευση ζωικών υποπροϊόντων μη μηρυκαστικών που προέρχονται από εγκαταστάσεις που αναφέρονται στα σημεία i), ii) και iii). Κατά παρέκκλιση από τα σημεία i), ii) και iii) του πρώτου εδαφίου, η αρμόδια αρχή μπορεί να επιτρέψει τη σφαγή μηρυκαστικών ή χοιροειδών και τον χειρισμό προϊόντων μηρυκαστικών ή χοιροειδών στις εγκαταστάσεις που αναφέρονται στα σημεία i), ii) και iii) του πρώτου εδαφίου, οι οποίες παράγουν ζωικά υποπροϊόντα πουλερικών που προορίζονται για την παραγωγή μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από πουλερικά. Η εν λόγω άδεια μπορεί να χορηγηθεί μόνον εφόσον η αρμόδια αρχή έχει πεισθεί, ύστερα από τη διενέργεια επιτόπιας επιθεώρησης, για την αποτελεσματικότητα των μέτρων που αποσκοπούν στην πρόληψη της διασταυρούμενης μόλυνσης μεταξύ των υποπροϊόντων μηρυκαστικών ή χοιροειδών και πουλερικών. 18.8.2021 EL Επίσημη Εφημερίδα της Ευρωπαϊκής Ένωσης L 295/11 Τα μέτρα αυτά περιλαμβάνουν τις ακόλουθες ελάχιστες απαιτήσεις: 1) η σφαγή των πουλερικών πρέπει να πραγματοποιείται σε γραμμές που διαχωρίζονται φυσικά από τις γραμμές που χρησιμοποιούνται για τη σφαγή των μηρυκαστικών ή χοιροειδών· 2) ο χειρισμός των προϊόντων πουλερικών πρέπει να πραγματοποιείται σε γραμμές παραγωγής που διαχωρίζονται φυσικά από τις γραμμές που χρησιμοποιούνται για τον χειρισμό των προϊόντων μηρυκαστικών ή χοιροειδών· 3) οι εγκαταστάσεις συλλογής, αποθήκευσης, μεταφοράς και συσκευασίας των ζωικών υποπροϊόντων που προέρχονται από πουλερικά πρέπει να είναι χωριστές από εκείνες που χρησιμοποιούνται για τα ζωικά υποπροϊόντα που προέρχονται από μηρυκαστικά ή χοιροειδή· 4) πρέπει να διενεργείται τακτική δειγματοληψία και ανάλυση των ζωικών υποπροϊόντων που προέρχονται από πουλερικά για την ανίχνευση της παρουσίας πρωτεϊνών μηρυκαστικών ή χοιροειδών. Η μέθοδος ανάλυσης που χρησιμοποιείται πρέπει να είναι επιστημονικά επικυρωμένη για τον σκοπό αυτό. Η συχνότητα της δειγματοληψίας και της ανάλυσης καθορίζεται βάσει εκτίμησης κινδύνου που πραγματοποιείται από τον υπεύθυνο της επιχείρησης ως μέρος των διαδικασιών

που αυτός εφαρμόζει με βάση τις αρχές HACCP. β) Τα ζωικά υποπροϊόντα που προέρχονται από πουλερικά, που προορίζονται να χρησιμοποιηθούν για την παραγωγή των μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από πουλερικά, μεταφέρονται σε μονάδα μεταποίησης με οχήματα και περιέκτες που δεν χρησιμοποιούνται για τη μεταφορά ζωικών υποπροϊόντων που προέρχονται από μηρυκαστικά ή χοιροειδή. Κατά παρέκκλιση από το πρώτο εδάφιο, μπορούν να μεταφέρονται σε οχήματα και περιέκτες που έχουν χρησιμοποιηθεί προηγουμένως για τη μεταφορά ζωικών υποπροϊόντων που προέρχονται από μηρυκαστικά ή χοιροειδή, υπό τον όρο ότι τα εν λόγω οχήματα και περιέκτες έχουν καθαριστεί διεξοδικά προηγουμένως ώστε να αποφεύγεται η διασταυρούμενη μόλυνση, σύμφωνα με μια τεκμηριωμένη διαδικασία που έχει λάβει προηγούμενη έγκριση από την αρμόδια αρχή. Όποτε χρησιμοποιείται τέτοια διαδικασία, τεκμηριωμένα ίχνη της εν λόγω χρήσης διατηρούνται στη διάθεση της αρμόδιας αρχής για τουλάχιστον δύο έτη. γ) Οι μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από πουλερικά παράγονται σε μονάδες μεταποίησης οι οποίες: i) ασχολούνται με τη μεταποίηση ζωικών υποπροϊόντων που λαμβάνονται από τα σφαγεία, τα εργαστήρια τεμαχισμού ή τις άλλες εγκαταστάσεις που αναφέρονται στο στοιχείο α)· ii) έχουν καταχωριστεί από την αρμόδια αρχή ως μονάδες οι οποίες δεν μεταποιούν ζωικά υποπροϊόντα μηρυκαστικών ή χοιροειδών. Κατά παρέκκλιση από το σημείο ii) του πρώτου εδαφίου, η αρμόδια αρχή μπορεί να επιτρέψει την παραγωγή μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από πουλερικά σε μονάδες μεταποίησης που μεταποιούν ζωικά υποπροϊόντα μηρυκαστικών ή χοιροειδών. Η εν λόγω άδεια μπορεί να χορηγηθεί μόνον εφόσον η αρμόδια αρχή έχει πεισθεί, ύστερα από τη διενέργεια επιθεώρησης, για την αποτελεσματικότητα των μέτρων που αποσκοπούν στην αποτροπή διασταυρούμενης μόλυνσης μεταξύ των μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από μηρυκαστικά ή χοιροειδή και των μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από πουλερικά. Τα προληπτικά αυτά μέτρα περιλαμβάνουν τις ακόλουθες ελάχιστες απαιτήσεις: 1) η παραγωγή μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από μηρυκαστικά ή χοιροειδή πρέπει να διεξάγεται σε κλειστό σύστημα που διαχωρίζεται φυσικά από εκείνο που χρησιμοποιείται για την παραγωγή των μεταποιημένων ζωικών πρωτεϊνών προερχόμενων από πουλερικά· 2) τα ζωικά υποπροϊόντα που προέρχονται από μηρυκαστικά ή χοιροειδή πρέπει να διατηρούνται κατά την αποθήκευση και τη μεταφορά σε εγκαταστάσεις που διαχωρίζονται φυσικά από εκείνες που χρησιμοποιούνται για τα ζωικά υποπροϊόντα που προέρχονται από πουλερικά· 3) οι μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από μηρυκαστικά ή χοιροειδή πρέπει να διατηρούνται κατά την αποθήκευση και τη συσκευασία σε εγκαταστάσεις που διαχωρίζονται φυσικά από εκείνες που χρησιμοποιούνται για τα τελικά προϊόντα που προέρχονται από πουλερικά· 4) πρέπει να διενεργείται τακτική δειγματοληψία και ανάλυση των μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από πουλερικά προκειμένου να επαληθεύεται η απουσία διασταυρούμενης μόλυνσης με μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από μηρυκαστικά ή χοιροειδή, με τη χρήση των μεθόδων ανάλυσης για τον προσδιορισμό των συστατικών ζωικής προέλευσης για τον έλεγχο των ζωοτροφών, που προβλέπονται στο L 295/12 EL Επίσημη Εφημερίδα της Ευρωπαϊκής Ένωσης 18.8.2021 παράρτημα VI του κανονισμού (ΕΚ) αριθ.

152/2009· η συχνότητα δειγματοληψίας και ανάλυσης καθορίζεται βάσει εκτίμησης κινδύνου που πραγματοποιείται από τον επιχειρηματία ως μέρος των διαδικασιών που εφαρμόζει βάσει των αρχών HACCP· τα αποτελέσματα της σχετικής δειγματοληψίας και ανάλυσης διατηρούνται στη διάθεση της αρμόδιας αρχής για τουλάχιστον πέντε έτη. δ) Οι σύνθετες ζωοτροφές που περιέχουν μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από πουλερικά παράγονται σε εγκαταστάσεις οι οποίες: i) έχουν εγκριθεί για τον σκοπό αυτό από την αρμόδια αρχή· ii) ασχολούνται αποκλειστικά με την παραγωγή ζωοτροφών για χοιροειδή, ζώα υδατοκαλλιέργειας ή γουνοφόρα ζώα. Κατά παρέκκλιση από το σημείο i) του πρώτου εδαφίου, δεν απαιτείται ειδική άδεια για την παραγωγή πλήρων ζωοτροφών από σύνθετες ζωοτροφές που περιέχουν μεταποιημένες ζωικές πρωτεΐνες προερχόμενες από πουλερικά για τους κατ' οίκον παρασκευαστές που πληρούν τις ακόλουθες προϋποθέσεις: — έχουν καταχωριστεί από την αρμόδια αρχή ως παραγωγοί πλήρων ζωοτροφών από σύνθετες ζωοτροφές που περιέχουν μεταποιημένες ζωικές πρωτεΐνες προερχόμενες από πουλερικά, — δεν διατηρούν εκτρεφόμενα ζώα όπως ορίζονται στο άρθρο 3 σημείο 6 στοιχείο α) του κανονισμού (ΕΚ) αριθ. 1069/2009, εκτός των χοιροειδών, των ζώων υδατοκαλλιέργειας ή των γουνοφόρων ζώων, — οι σύνθετες ζωοτροφές οι οποίες περιέχουν μεταποιημένες ζωικές πρωτεΐνες προερχόμενες από πουλερικά οι οποίες χρησιμοποιούνται στην παραγωγή τους περιέχουν ακατέργαστες πρωτεΐνες σε ποσοστό μικρότερο του 50 %. Κατά παρέκκλιση από το σημείο ii) του πρώτου εδαφίου, η παραγωγή σύνθετων ζωοτροφών για χοιροειδή, που περιέχουν μεταποιημένες ζωικές πρωτεΐνες προερχόμενες από πουλερικά, σε εγκαταστάσεις που παράγουν επίσης σύνθετες ζωοτροφές που προορίζονται για εκτρεφόμενα ζώα εκτός των ζώων υδατοκαλλιέργειας και των γουνοφόρων ζώων, μπορεί να επιτραπεί από την αρμόδια αρχή κατόπιν επιτόπου επιθεώρησης, υπό την προϋπόθεση ότι τηρούνται οι ακόλουθοι όροι: — οι σύνθετες ζωοτροφές που προορίζονται για μηρυκαστικά πρέπει να παρασκευάζονται και να φυλάσσονται, κατά την αποθήκευση, τη μεταφορά και τη συσκευασία, σε εγκαταστάσεις που διαχωρίζονται φυσικά από τις εγκαταστάσεις στις οποίες παρασκευάζονται και φυλάσσονται σύνθετες ζωοτροφές για μη μηρυκαστικά, — οι σύνθετες ζωοτροφές που προορίζονται για πουλερικά πρέπει να παρασκευάζονται και να φυλάσσονται, κατά την αποθήκευση, τη μεταφορά και τη συσκευασία, σε εγκαταστάσεις που διαχωρίζονται φυσικά από τις εγκαταστάσεις στις οποίες παρασκευάζονται και φυλάσσονται σύνθετες ζωοτροφές για άλλα μη μηρυκαστικά ζώα, — τα αρχεία που καταγράφουν λεπτομερώς τις αγορές και τις χρήσεις των μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από πουλερικά και τις πωλήσεις σύνθετων ζωοτροφών που περιέχουν τέτοιες πρωτεΐνες πρέπει να διατηρούνται στη διάθεση της αρμόδιας αρχής για τουλάχιστον πέντε έτη, — πρέπει να διενεργείται τακτική δειγματοληψία και ανάλυση των σύνθετων ζωοτροφών που προορίζονται για εκτρεφόμενα ζώα εκτός των πουλερικών, των ζώων υδατοκαλλιέργειας και των γουνοφόρων ζώων, προκειμένου να επαληθεύεται η απουσία μη εγκεκριμένων συστατικών ζωικής προέλευσης, με τη χρήση των μεθόδων ανάλυσης για τον προσδιορισμό των συστατικών ζωικής προέλευσης για τον έλεγχο των ζωοτροφών που προβλέπονται στο παράρτημα VI του κανονισμού (ΕΚ) αριθ. 152/2009· η συχνότητα της εν λόγω δειγματοληψίας και ανάλυσης

καθορίζεται βάσει εκτίμησης κινδύνου που πραγματοποιείται από τον υπεύθυνο της επιχείρησης ως μέρος των διαδικασιών που εφαρμόζει με βάση τις αρχές HACCP· τα αποτελέσματα πρέπει να διατηρούνται στη διάθεση της αρμόδιας αρχής για τουλάχιστον πέντε έτη· ε) Το εμπορικό έγγραφο ή, κατά περίπτωση, το υγειονομικό πιστοποιητικό που συνοδεύει τις μεταποιημένες ζωικές πρωτεΐνες που προέρχονται από πουλερικά σύμφωνα με το άρθρο 21 παράγραφος 2 του κανονισμού (ΕΚ) αριθ. 1069/ 2009, η ετικέτα αυτών των μεταποιημένων ζωικών πρωτεϊνών που προέρχονται από πουλερικά και η ετικέτα των σύνθετων ζωοτροφών που περιέχουν μεταποιημένες ζωικές πρωτεΐνες προερχόμενες από πουλερικά φέρουν ευκρινή ένδειξη σύμφωνα με το κεφάλαιο V τμήμα Ζ του παρόντος παραρτήματος».

(ιβ) Οι υπολειπόμενες διατάξεις του Κανονισμού αφορούν διαδικαστικά θέματα, τα οποία θεωρούμε **ότι δεν εμπίπτουν στα πιθανολογούμενα σημεία ενδιαφέροντός σας**.

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