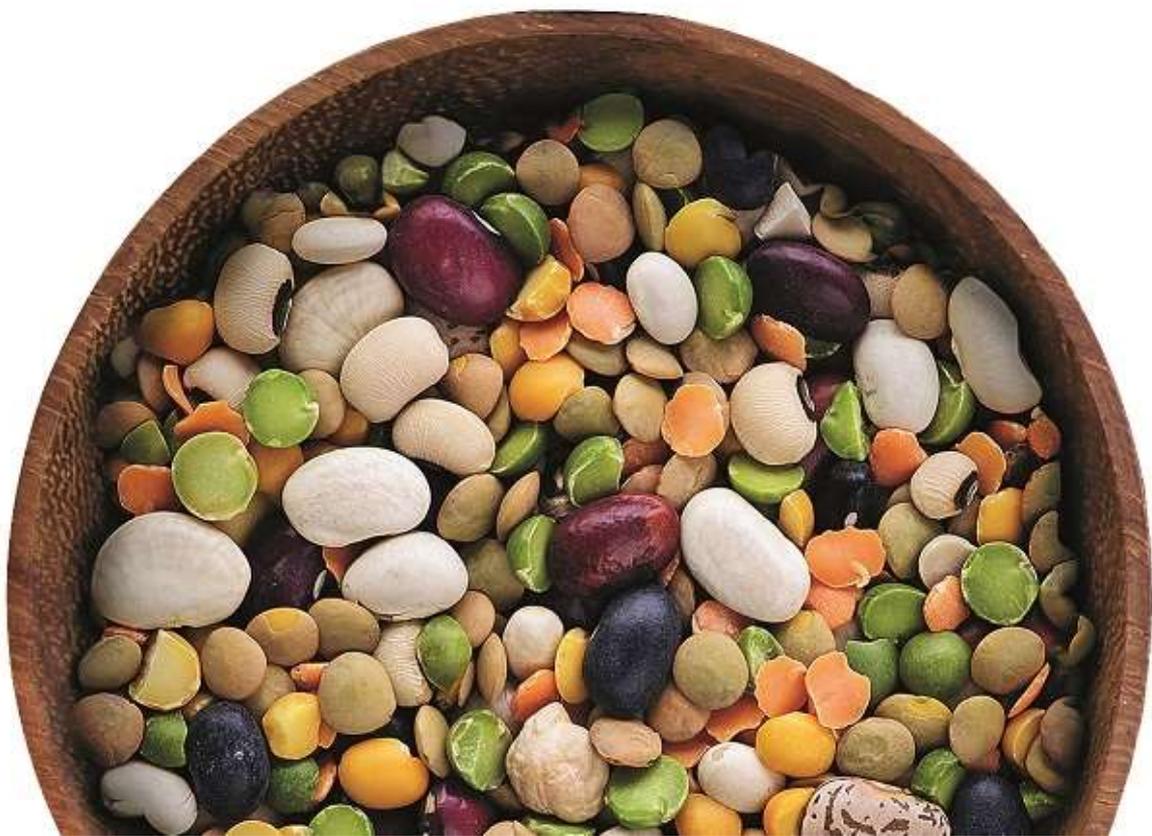




Public and Private Procurement

Deliverable 4.4 (D26)

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- Deliverable description: Food service markets will be investigated to explore the role of public institutions and chain actors in the private sector. Key supply chains for legume-based organic and conventional products will be identified to highlight major access points for routes into the food service market. This work is based on literature, interviews, Case Studies and Regional Cluster based workshops/interviews. The range of legume-based products applied in professional kitchens will be listed and demands for new products identified through at least 30 structured interviews with large public institutions and private chain actors in five partner countries. Interviews will also provide information on barriers and opportunities for having legumes included in a policy brief targeted to Green Public Procurement Criteria for food and catering services (D4.4), co-ordinated with WP7. Special attention will be given to how a European food service operator can impact the public and private food service market with the aim of introducing legumes on to the menu.
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Foreword

This report covers the potential for legumes and legume-based products in the food service market. It analyses market structures, supply chains, purchasing patterns of food service professionals and trends with the overarching aim of identifying opportunities and barriers to introducing more grain legumes and legume-based products into food service markets. Throughout the report, specific examples are used to illustrate the findings and their relevance to legumes, legume-based products and legume-supported agri-food systems. The report finally identifies transition paths to achieve the full market potential of legumes and legume-based products and especially for the professional Business-to-Business market

The findings described in this report are elaborated for legumes produced from conventional and organic cropping systems, and processed products made from legumes, as clarified below.

- **Legumes:** defines that plant family (Fabaceae) that encompasses species which require no, or very little, synthetic nitrogenous fertiliser since they can fix atmospheric nitrogen *via* specific biological capacities located within root nodules. In this report, legumes studied as example or model species include: pea (*Vicia sativum* L.), field bean (*Vicia faba* L. minor), chickpeas (*Cicer arietinum* L.), lentils (*Lens culinaris* Medik.), and lupin (*Lupinus* spp.). Also, these species are reported only in relation to their potential in the food chain. Feed chain focused considerations will be reported in a later TRUE-WP4 Deliverable.
- Fresh and frozen green peas and beans are considered as **vegetables**.
- **Pulses** are the dried grains from grain legumes such as lentil, pea and chickpea. Their grains are *not* oleaginous, and these **pulse grains' main nutritional components comprise both starch and protein**. Pulses may be stored dried and for prolonged periods.
- **Soybean** (*Glycine max* (L.) Merr.), **lupin** and **peanut** (*Arachis hypogaea* L.) are examples of legumes yielding grains which are, to a greater or lesser extent, oleaginous. Soybean is a widely used ingredient for making plant protein-based processed foods, such as tofu. In this treatise, the legume-based products considered also include processed food products, such as those made from soybeans, or isolated soy protein.

This report is based on data gathered from desk-top based research, interviews and stakeholder consultations as detailed in Annex 1 (Methodology). The findings of this report are intended to support subsequent research activities in the TRUE project regarding market policies, green public procurement and pathways towards a more sustainable food systems where legumes play a more profound role. The report provides suggestions for further research and especially in the relation of “sustainability” within food services contexts - which is a society challenge generally.

The main structures and trends described in the report are valid across the EU with respect to local market differences and cultural preferences. The report can therefore be used as a guidance document for understanding patterns and opportunities for legume and legume-based products in the food service sector, including purchasing behaviour of food service actors. It is the vision of the report to inspire present and future supply chain actors to engage with the opportunities presented by legumes and legume-based products for the food service market.



Glossary

Business to Business (B2B): trading operations between two professional parties

Business to Consumer (B2C): retailing to consumers

Category: the hierarchy of organising food groups. A category would include product groups, sub-groups, the products, and the brands and private labels

Cash & Carry (C&C): large wholesale stores, where professionals can buy food and non-food items from

Certification schemes: approve a specific standard *e.g.* related to food safety, production method or product provenance (see Annex 2, Certification Schemes)

Chains or chained: entities of a similar type and organised within the same company. Examples of chained restaurants are *McDonalds, Subway* and *Starbucks*

Concept: the using selling point or ethos of the outlet. The concept includes the business model (*e.g.* franchised, self-service restaurant), the menu, production method (*e.g.* heat and serve *vs.* home-cooked), location and themed interior of the outlet

Consolidation: structural development process in an industry that is aimed to result in fewer and larger companies

Consumer: person buying food from an outlet such as a restaurant or canteen, or receiving a meal in a public food service environment of which a hospital or government institution can be examples

Delivered wholesales: delivery of goods (food and non-food) from a wholesaler to a food service outlet

Distributor: company in wholesale trade, *i.e.* delivered wholesales, and Cash & Carry

Entity: outlet or business

Food service sector: whole public and private food service operations (as opposed to the retail sector, the food manufacturing sector and, the agricultural sector)

Food service segment: part of the food service sector

Gatekeeper: entity holding power to decide whether a supplier has access to a supply chain, *e.g.* a wholesaler demanding large volumes of commodity or product, that small suppliers would struggle to deliver, thus restricting the entry of small suppliers into that supply chain



Green Public Procurement (GPP): EU initiative that shapes public procurement towards buying more environmentally friendly goods and services

Greening menus (or greener menus): reducing the share of meat and increasing the share of vegetables and pulses in the dish, salad bar or menus served in public and private food service entities

Guest: person paying for a meal in a private-outlet such as a restaurant or bar

In-store catering: provision of catering services (food and/or drinks) in non-food stores such as furniture stores or book stores

Listing: an agreement formed between a supplier and a distributor (wholesaler) to include the **suppliers' products into the distributor's portfolio**. Listing is a pre-requisite for trading through wholesalers

Outlet: place where the meal sold to the consumer, *e.g.* the restaurant, the hospital, the kindergarten, the snack bar or the sandwich bar

Private sector: food service operations managed by private companies for profit (restaurants, canteens, fast food, travel, in-store, bars)

Procurement: process of finding goods, agreeing on terms and acquiring goods from an external source, often through tenders and contracts

Producer: farmers, growers and or processors delivering commodities or products to a supplier (or directly to the food service market)

Production system: the system by which meals are produced (*e.g.* central kitchens at the entity, central kitchen and distribution of meals, or provision of industrially produced meals that are heated before being served)

Professional: skilled person working in the kitchens of food service outlets

Public sector: food service operations funded by government money and provided for people in public care (hospitals, army, prisons, schools, kindergartens, government buildings)

Stand-alone-unit: a food service entity not belonging to a chain, and is relevant only for the private sector

Supplier: entity that supplies (aggregated) food, or food-products to the wholesaler

Wholesaler: Business entity trading business-to-business. In food service, wholesalers operate as Cash & Carry or delivered wholesales



Executive Summary

Legume crops are an important constituent of fully-sustainable agri-food systems in many regions of the world as they yield grains of high nutritional quality and are commonly consumed with cereals to provide balanced staple diets. **Legumes are also characterised by their capacity to ‘fix’** atmospheric di-nitrogen gas into biologically useful (proteinaceous) forms stored within vegetative material and seeds. Thus, legumes need no or very little synthetic nitrogenous fertiliser to support their own growth and yield, and that of non-legume crops in the same cropping system. This capacity of legumes to reduce synthetic nitrogen fertiliser dependency and encourage natural chemical (nitrogen) cycling presents a major contribution to help address major societal challenges such as: reducing agricultural Green House Gas (GHG) emissions and eutrophication; and, to safeguard soil qualities and the diversity and function of above- and below-ground farmland food webs. Despite this, European cropping systems encompass levels of legumes which are very low and range from less than one to four percent of the cultivated land.

The food service market offers consumers a means to help realise personal- and environmental-health benefits *via* greater consumption of legumes or legume-based products. This transition reflects an increasing awareness and demand among consumers for alternatives to meat- and dairy-based products in favour of vegetable-protein based products such as those provided by legumes. Catering for this consumption transition can also offer higher gross margins to supply chain actors compared to legumes grown for animal feed. Consequently, private and public food service markets are increasingly profitable sectors of the economy, and this is especially true for the more-nutritious and -environmentally friendly or ‘green’ legume-based options.

The food market constitutes 25 % of the food consumed in the EU, and one quarter of that market is accounted by public food services, that are well-positioned to lead by example on the transition to ‘sustainable consumption’ of **homegrown local legume-based** options. This is because food procurement by public food service is subject to ethical compliance criteria as specified by the EU’s ‘green public procurement framework’. However, the role of wholesalers (or ‘gatekeepers’) largely determines such potential as their organisational structures regulate which food products enter the market and the extent to which such products are visible to purchasers. Therefore, new or improved operational and cooperative structures are required for wholesalers to ensure legume products have high visibility. It is also important that more opportunities are provided for small scale legume producers and or processors to enter the food service market (*via* wholesalers). Downstream actors such as chefs and consumers are also increasingly aware of their potential to help ensure demand and easy-access to the more-sustainable and affordable legume-based food options, but this potential further needs to be encouraged.

The central role of legumes and legume-based products to underpin sustainable agri-food systems is not effectively exploited by actors in the food service market. Greater awareness of, and capacity for, legume and legume-based products is therefore necessary across the food service market. This requires development of structures and capabilities to ensure legumes are visible, accessible and affordable. Also, that the underpinning information and know-how on (for example) labelling and best-for-purpose culinary options are entrenched as basic requirements within professional and domestic kitchens alike. To help ensure their rightful place as staple foods, home-grown legumes and legume-based products should not be diminished by labelling such as simply ‘vegetable’ or ‘meat-substitute’.



1. TRUE Project Background

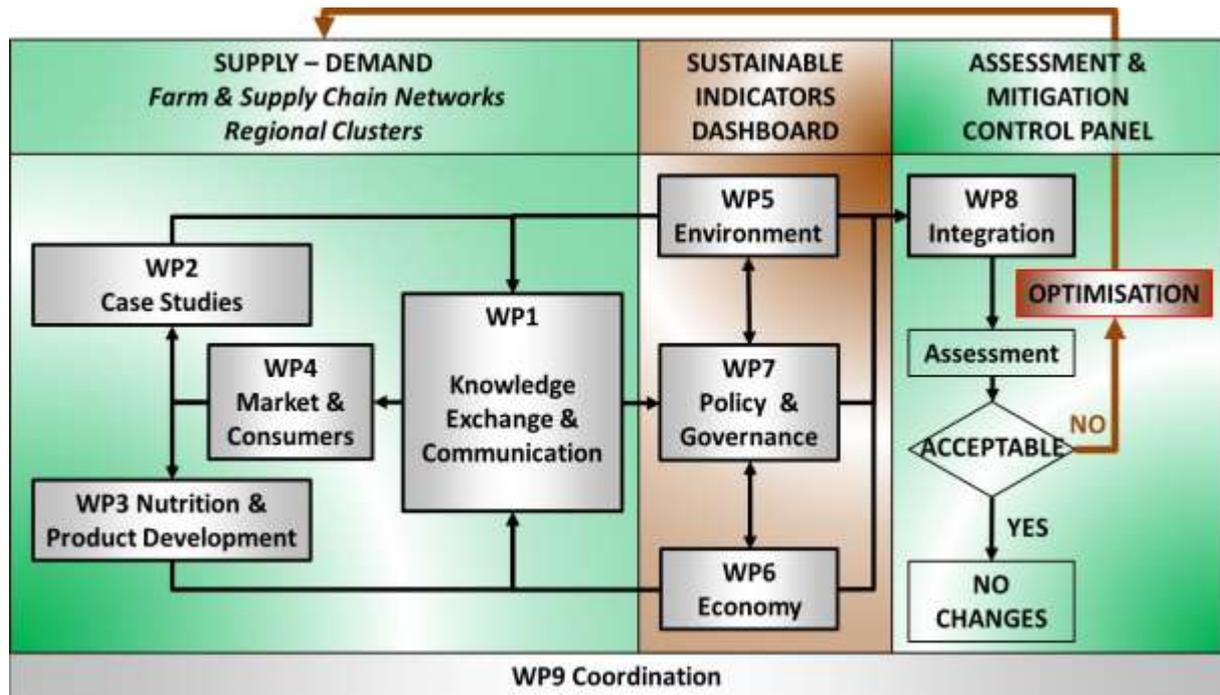
1.1 Executive Summary (abbreviated)

TRUE's perspective is that the scientific knowledge, capacities and societal desire for legume supported systems exist but that practical co-innovation to realise transition paths have yet to be achieved. TRUE presents 9 Work Packages (WPs), supported by an *Intercontinental Scientific Advisory Board*. Collectively, these elements present a strategic and gender balanced work-plan through which the role of legumes in determining how the 'three pillars of sustainability', 'environment', 'economics' and 'society' may be best resolved.

TRUE realises a genuine multi-actor approach, the basis for which are three *Regional Clusters managed by WP1 ('Knowledge Exchange and Communication'*, University of Hohenheim, Germany), that span the main pedo-climatic regions of Europe, designated here as: *Continental, Mediterranean and Atlantic*, and facilitate the alignment of stakeholders' knowledge across a suite of 24 Case Studies. The Case Studies are managed by partners within WPs 2-4 comprising 'Case Studies' (incorporating the project database and *Data Management Plan*), 'Nutrition and Product Development', and 'Markets and Consumers'. These are led by the Agricultural University of Athens (Greece), Universidade Catolica Portuguesa (Portugal) and the Institute for Food Studies & Agro Industrial Development (Denmark), respectively. This combination of reflective dialogue (WP1), and novel legume-based approaches (WP2-4) will supply hitherto unparalleled datasets for the 'sustainability WPs', WPs 5-7 for 'Environment', 'Economics' and 'Policy and Governance'. These are led by greenhouse gas specialists at Trinity College Dublin (Ireland; in close partnership with Life Cycle Analysis specialists at Bangor University, UK), Scotland's Rural College (in close partnership with University of Hohenheim), and the Environmental and Social Science Research Group (Hungary), in association with Coventry University, UK), respectively. These *Pillar WPs* use progressive statistical, mathematical and policy modelling approaches to characterise current legume supported systems and identify those management strategies which may achieve sustainable states. A key feature is that TRUE will identify key *Sustainable Development Indicators* (SDIs) for legume-supported systems, and thresholds (or goals) to which each SDI should aim. Data from the *foundation WPs* (1-4), to and between the *Pillar WPs* (5-7), will be resolved by WP8, 'Transition Design', using machine-learning approaches (e.g. *Knowledge Discovery in Databases*), allied with *DEX (Decision Expert)* methodology to enable the mapping of existing knowledge and experiences. Co-ordination is managed by a team of highly experienced senior staff and project managers based in The Agroecology Group, a Sub-group of Ecological Sciences within The James Hutton Institute.

1.2 Work Package Structure – Diagram

Flow of information and knowledge in TRUE, from definition of the 24 case studies (left), quantification of sustainability (centre) and synthesis and decision support (right).



1.3 Project Partners – Table

No	Participant organisation name (and acronym)	Country	Organisation Type
1 (C [*])	The James Hutton Institute (JHI)	UK	RTO
2	Coventry University (CU)	UK	University
3	Stockbridge Technology Centre (STC)	UK	SME
4	Scotland's Rural College (SRUC)	UK	HEI
5	Kenya Forestry Research Institute (KEFRI)	Kenya	RTO
6	Universidade Catolica Portuguesa (UCP)	Portugal	University
7	Universitaet Hohenheim (UHOH)	Germany	University
8	Agricultural University of Athens (AUA)	Greece	University
9	IFAU APS (IFAU)	Denmark	SME
10	Regionalna Razvojna Agencija Medimurje (REDEA)	Croatia	Development Agency
11	Bangor University (BU)	UK	University
12	Trinity College Dublin (TCD)	Ireland	University
13	Processors and Growers Research Organisation (PGRO)	UK	SME
14	Institut Jozef Stefan (JSI)	Slovenia	HEI
15	IGV Institut Fur Getreideverarbeitung Gmbh (IGV)	Germany	Commercial SME
16	ESSRG Kft (ESSRG)	Hungary	SME
17	Agri Kulti Kft (AK)	Hungary	SME
18	Alfred-Wegener-Institut (AWI)	Germany	RTO
19	Slow Food Deutschland e.V. (SF)	Germany	Social Enterprise
20	Arbikie Distilling Ltd (ADL)	UK	SME
21	Agriculture And Food Development Authority (TEAG)	Ireland	RTO
22	Sociedade Agrícola do Freixo do Meio, Lda (FDM)	Portugal	SME
23	Eurest -Sociedade Europeia De Restaurantes Lda (EUR)	Portugal	Commercial Enterprise
24	Solintagro SL (SOL)	Spain	SME

^{*}Coordinating institution



1.4 Objectives (abbreviated)

Objective 1: Facilitate knowledge exchange (UHOH, WP1)

- *Develop a blue-print for co-production of knowledge*

Objective 2: Identify factors that contribute to successful transitions (AUA, WP2)

- *Relevant and meaningful Sustainable Development Indicators (SDIs)*

Objective 3: Develop novel food and non-food uses (UCP, WP3)

- *Develop appropriate food and feed products for regions/cropping systems*

Objective 4: Investigate international markets and trade (IFAU, WP4)

- *Publish guidelines of legume consumption for employment and economic growth*
- *EU infrastructure-map for processing and trading*

Objective 5: Inventory data on environmental intensity of production (TCD, WP5)

- *Life Cycle Analyses (LCA) -novel legumes rotations and diet change*

Objective 6: Economic performance - different cropping systems (SRUC & UHOH, WP6)

- *Accounting yield and price risks of legume-based cropping systems*

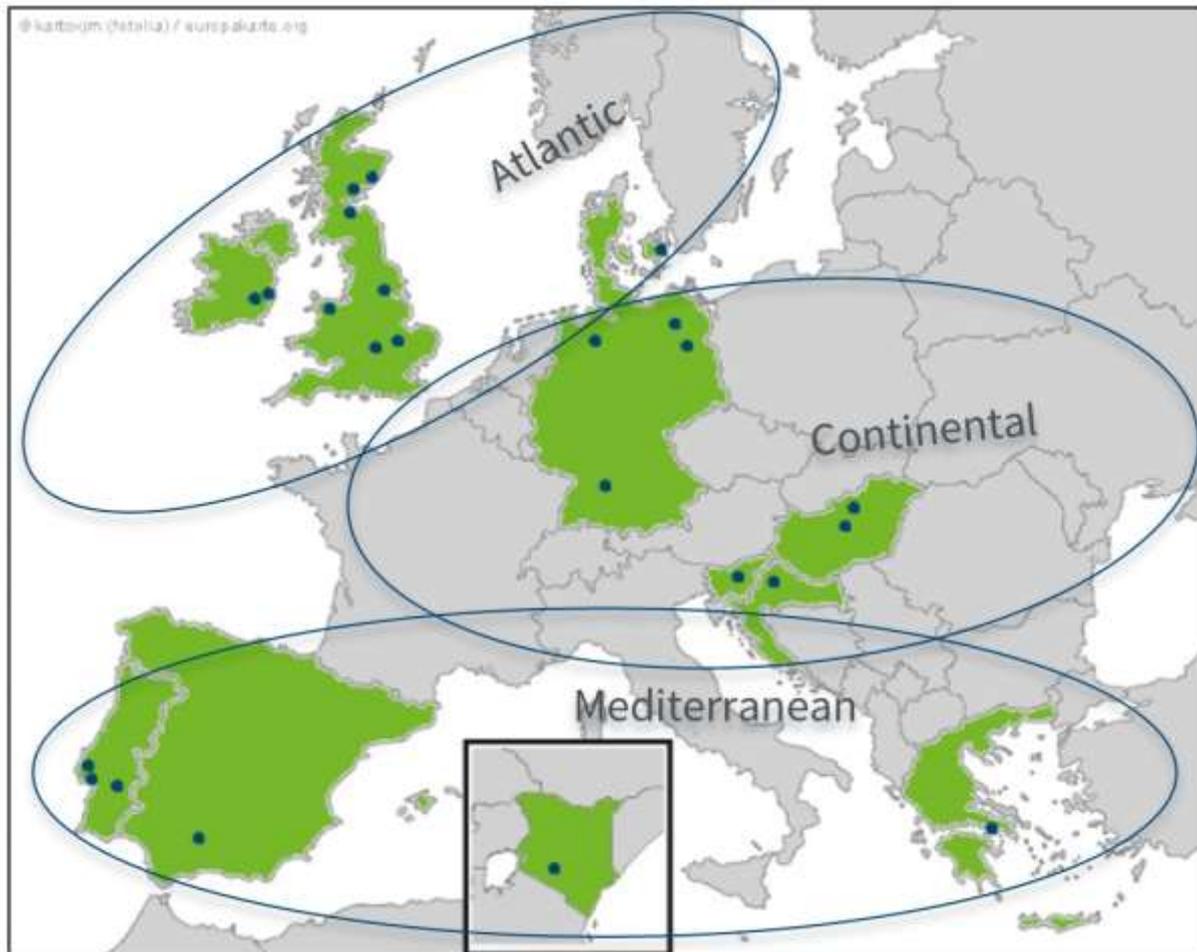
Objective 7: Enable policies, legislation and regulatory systems (ESSRG, WP7)

- *EU-policy linkages (on nutrition) to inform product development/uptake*

Objective 8: Develop decision support tools: growers to policy makers (JSI, WP8)

- *User friendly decision support tools to harmonise sustainability pillars*

1.5 Regional Cluster & Case Study Diagram



Knowledge Exchange and Communication (WP1) events include three TRUE European Legume Innovation Networks (ELINs) and these engage multi-stakeholders in a series of focused workshops. The ELINs span three major pedoclimatic regions of Europe, illustrated above within the ellipsoids for Continental, Mediterranean and Atlantic zones.

2. Defining Public and Private Food Services

2.1 Introduction to food service

The **food service sector** is defined as the preparation and provision of meals to be consumed outside home. Food services may be provided by entities in the public sector or from the private sector. Figure 1 illustrates the main segments in the **food service sector**.

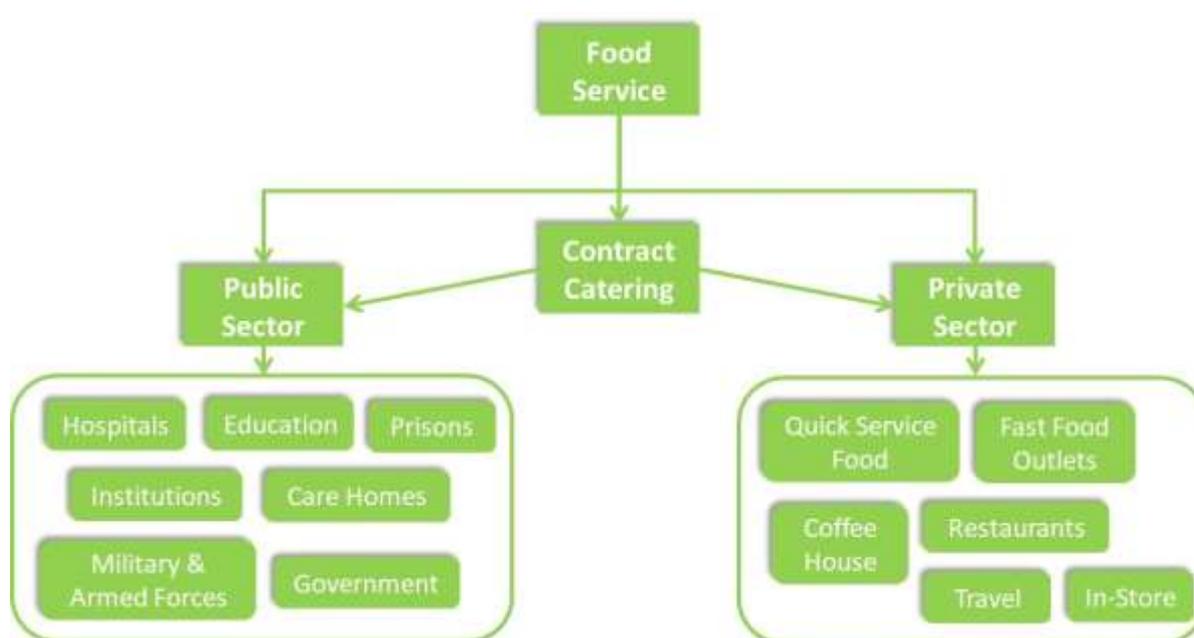


Figure 1: A schematic diagram describing the main segments of the Food Service sector. The structure highlights the two main branches, which serve the Public and Private sub-sectors as well as the role of Contract Caterers, which may serve both Public and Private sectors.

The **public sector food service** refers to kitchens and **outlets** maintained by public funds (taxes), delivered from national, regional or local governmental authorities and operate to serve public **entities** such as hospitals, kindergartens, schools, military bases, prisons and other government-administrative buildings. The **private sector food service** is managed by privately owned companies and operated for a profit. These include restaurants, cafés, fast food **outlets**, bars, **in-store catering** and food for travellers. **Contract caterers** are regarded as a separate group, who may undertake the management of food service operations in both the **public and private sectors** for a profit. Across countries, the private **food service sector** accounts for a far larger share of the total **food service sector** than the public **food service sector** (Figure 2). While the relative balance of the food service market served by **public and private sectors** varies only slightly among European countries (Figure 2), on average these account for approximately 25 and 75 % of the market, respectively¹.

¹ Estimated by IFAU. Estimate based on available literature, interviews, and empirical findings from IFAU.

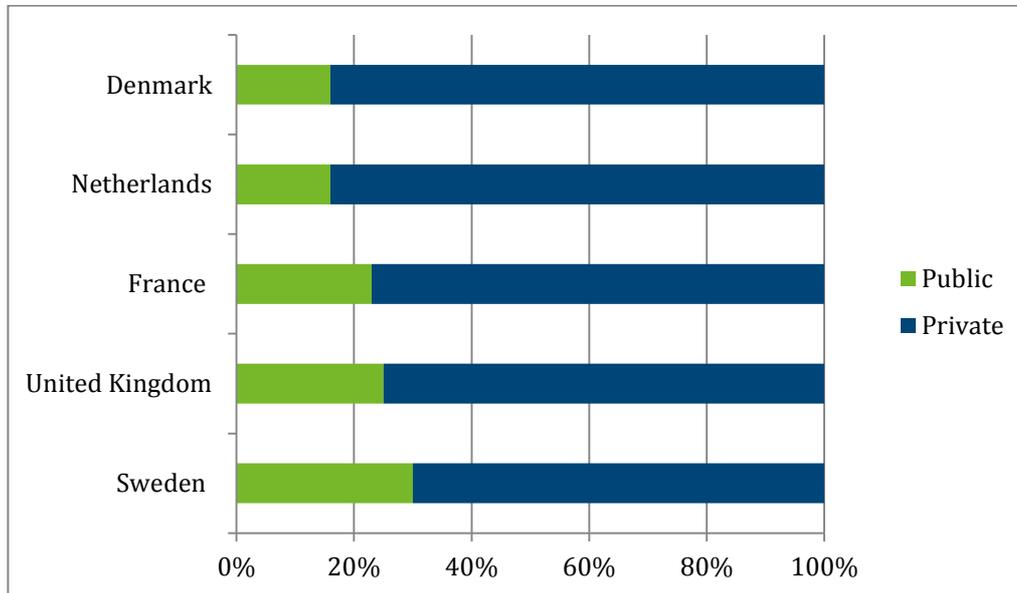


Figure 2. Market share (%) apportioned to the Public and Private food service sub-sectors in various representative EU countries (Hamann 2013; Delfi 2013; Bord Bia 2011; USDA 2016).

One underpinning driver for the variation in the relative balance of private and public sub-sectors of food services market is the **national policies**. For example, unlike Denmark and the Netherlands where parents tend to provide the children with lunchboxes, countries such as UK, Portugal, Germany, France and Sweden include (free) catering for school and Kindergarten children. Thus, with respect to the availability of (free) school meals, these are not a pan-European phenomenon, and such provision is dependent of national policy norms.

Furthermore, the **geographical location** and **local food cultures** have a significant impact on the size and structure of markets available to the private and public sub-sectors. For example, Danish people tend to pack their own lunch, whereas Swedish tend to eat-out more frequently. This differentiation among Scandinavian examples highlights how lunch patterns can define where the demand lies, and so how it may best be exploited to help ensure greater consumption of legumes, or legume-based products. Such differences are accentuated when the relative volume of food provided by each sub-sector is considered, which for the public sub-sector may be as around 23 % in Denmark, compared to 35 % in Sweden (Delfi, 2013) and 45% in the UK. However, despite these national differences, the **food service sector consistently accounts for a large, and growing share, of the food intake across the EU**, and this is driven by increasing levels of people living in urban areas, an ageing population and longer working hours (Seto, 2016).



The **food service sector** is highly diverse as it spans local businesses (*e.g.* the local pub or restaurant), national and international businesses (*e.g.* restaurant chains or contract caterers) and the **entities** belonging to the **public sector**. Within a segment such as restaurants, nursing homes or canteens, there are vast differences among the approaches to food, menus, price levels, services and even sustainability profiles. This diversity points to an important fact, which is that the food and beverages prepared by, or for, food service **outlets** is not uniform and **there are many routes by which new products** (such as those which are leguminous, or legume-based), may enter the market. The decision-making process behind the choice of products to purchase may depend on several features such as the size of operation, whether companies operate public or private sphere, the profile of the **entity**, and the dominant, and artisan, supply chain structures.

The **food service sector** differs from the retail sector in many ways. It is dominated by **'Business-to-Business' (B2B)** commercial models, where two professionals trade with each other, *e.g.* a **wholesaler** and a restaurant, or a grower with a **wholesaler**. In contrast, the retail market is a **Business-to-Consumer (B2C)** market, where a professional trade with **consumers**. The **B2B** market is characterised by professional trading patterns in the supply chains, procurement processes, the importance of **certifications** especially related to food safety, contracted supply chains and purchasing agreements. However, the **food service sector** encompasses more than contracts and big **outlets**; it is also serving aspiring new restaurants, menu and food-culture trends, creative chefs and the more-innovative **suppliers** are breaking into this vast, greening market.

Another important characteristic of the **food service sector** is the varied distances between the **producer** or **supplier** of food products and the **consumer**. This distance may occur as a function of the distance between a **supplier** (*e.g.* a **producer** of frozen peas) and the **consumer** (*e.g.* a **guest** having dinner in a pub). Also, within an **entity** such as the distance from a patient to the chefs in the hospital kitchen. Furthermore, the supply chains in the food service market are not only local, national and international supply chains are also very common. An example with relevance for legumes is the route by which lentils or chickpeas reach the European market. This route may involve an importer serving Europe, trading with a national importer *e.g.* in Sweden, and this importer then trades with major **wholesalers** in the Swedish **food service sector**. Such examples illustrate the complexity of trading fresh, frozen, dried or processed legumes in the European food service market. However, the complexity also holds opportunities for entrepreneurs who find their way into the food service market, since such provision may be best served by specialised **wholesalers' trading on wholefood or organic products**, including dried legumes. This specialised provision may be directed to restaurants from specific legume growers. Thus, while **supply chains** in the **food service market** are on the one hand very **established, rigorous and connected**, on the other hand they may also be **diverse and fragmented**. This understanding is the starting point from which we may develop the access of and demand for legume or legume-based foods in the European food service market.

Figure 3 presents a schematic diagram of the sub-structure to food service market. This illustrates the various relationships and potential routes among the sub-structure actors. If an agreement is formed between a wholesaler and a procurement specialist at a food outlet, a supplier is then enlisted. The supplier (grower or food processor) provides the products to the distributor (wholesaler or C&C), who in turn, provides the products to the caterers, responsible for meal preparation and serving (or delivery) from the kitchen. This arrangement does not preclude producer supplying directly food service actors. The meal is then served to the consumer, who may be a patient in a hospital, or guest in a restaurant. This basic relational structure and the necessary underpinning decision making processes, serve to highlight some key issues, including:

- selection of products to purchase involves many individuals and spans the supply chain;
- desire of the consumer rarely reaches the procurement specialist;
- communication between suppliers and decision makers must be unambiguous; and,
- meal production may not be at the entity where the food is served. That is, the meal is produced elsewhere and transported to a kitchen where the food is heated before being served to the consumer.

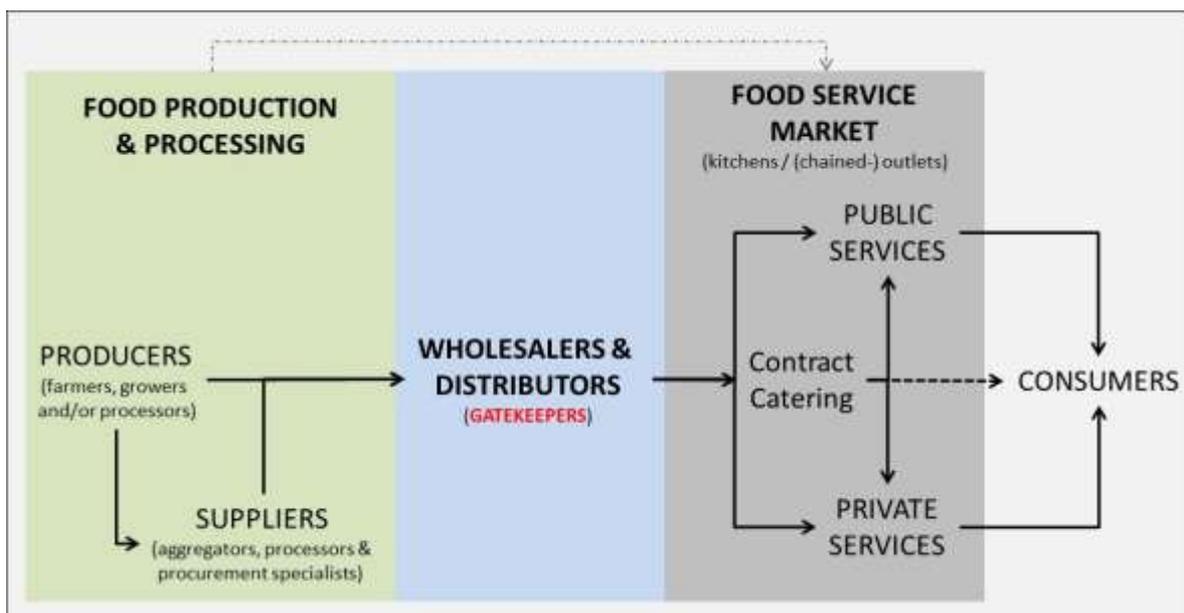


Figure 3. A schematic diagram summarising the dominant (solid arrows) and other shorter supply chains (fine dash-dot arrow) of the public and private procurement service sectors, which handle legume for food (*i.e.* for human consumption). Contract caterers may also supply directly to consumers *via* public or privately funded entities (dashed arrow).

These issues highlight the need to carefully analyse the structure and function of the supply chain for any product(s) to understand the dominant and minor patterns of trade and decision making, and so identify the opportunities for introducing legumes or legume-based foods into the food service market. This is elaborated further in the following sections.



2.2 Food service in the public sector

The **public food service** is defined by its capacity to provide meals *via* the **public sector** *i.e.* funded by public money. Public food service **outlets** encompass **entities** such as hospitals, nursing homes, social care institutions, schools and kindergartens, universities, prisons, the armed forces, canteens in public work spaces and government institutions. The choice of menus and therefore food items consumed through these **outlets** can be shaped by governance and policy initiatives. As the public food service is based on centralised purchasing agreements (Section 3) and provides many meals daily, such **policy initiatives can have a profound influence on shaping the food system, and so the commodities which are cultivated**. **The Danish scheme ‘Organic Eating Label’ and Portuguese policies for nutrition in schools are such examples (Text Box 1).**

For instance, in Denmark a scheme entitled the ‘*Organic Eating Label*’ has been implemented to ensure that organic products constitute up to 60 % of the ingredients used in the Danish public food service (<https://www.oekologisk-spisemaerke.dk>). This has increased demand for basic organic-based commodities such as dairy products, onions, potatoes, cereals and eggs. This led to a change in cooking habits, as kitchens are switching from conventionally grown produce to certified organic sources and the **preparation of ‘homemade food’ from basic ingredients**. **This has also resulted in new recipes based on seasonal produce being created and which featuring new ingredients in dishes.** Here dried-beans, -lentils and -chickpeas have earned a more profound role in Danish cuisine as the public food service entities adhere to the *Organic Eating Label*, a directive which supports and prioritises of vegetarian dishes. The implementation of the *Organic Eating Label* has also promoted the success of organic farming in Denmark which includes organic dairy products derived from clover-grass (not imported-grain) fed ruminants. It is evident that a scheme like the *Organic Eating Label* has increased organic legumes use of human (and animal) nutrition and improved the profitability of organic farm-based enterprises - as well as encouraging the possible environmental benefits that emerge from the greater and proper cultivation of legumes. Similarly, in Portugal new policies designed to increase awareness of what constitutes good nutrition have been implemented in practice *via* accessible provisions. This initiative requires that a vegetarian option is available on the menu every day in school meals alongside the regular menu (Interview, 2018; also see Annex 1, Methodology). A wide assortment of dried beans and other dried pulses historically form part of the traditional Portuguese diet, but the demand for daily vegetarian-only options has required creativity from those preparing the meals. As a result, new recipes containing dried beans were developed to adjunct already popular foods such as homemade-burgers, meatballs, cakes and even ice creams. The large volumes of pulses needed to meet the requirement for vegetarian options has helped develop more robust supply chains through the efforts of school contract caterers preparing the meals for many schools. This was also supported *via* implementation of a centralised purchasing capacities.

Text Box 1: Examples of public policy initiatives shaping food demand

Food services in the **public sector** take many forms. Some **entities** provide food for a whole day such as in hospitals and prisons, providing three meals plus snacks and beverages, whilst others provide fewer meals such as schools or kindergartens serving one meal hot or cold lunch plus beverages, and in some cases perhaps also breakfast. Also, the meal **production system** in the **public sector** follows different patterns, and meals can be produced by either:

- big kitchen at the **entity**, *e.g.* a hospital kitchen;
- a central kitchen in a municipality and distributed as chilled or hot meals to local nursing homes or schools; or,
- food processing companies that produce large volumes of pre-prepared food which is only heated before consumption in large **outlets**, such as hospitals.

The preparation of meals in large public food service units such as hospitals or nursing homes usually uses a combination of industrially produced products and ‘home-made’ options. For example, in Danish hospitals there has been a new trend towards ‘home-cooked’ food because of budgetary restraints. This has led to an increased use of basic ingredients, in-house processing and consequently the increased employment and training of a skilled workforce of cooks, butchers and bakers *etc* (Hamann, 2013). In contrast in the UK, some of the hospitals have contracted industrial suppliers (*e.g.* [Anglia Crown](#)) to produce vegan meals (Text Box 2).

[Anglia Crown](#) produces, in bulk, meals and snacks for hospitals and care homes, supplying pre-prepared food to over 100 hospitals across the UK. Menu items include vegetarian casserole with chickpeas or curries with beans, and even vegan alternatives are available. The meals are distributed nationwide and (where necessary) re-heated before being served. The National Health Service (NHS), the authority responsible for **hospital food in the UK claims that food plays an important role in the NHS ‘Sustainable Development Agenda’**. Also, in spring 2018, the Vegan Society (UK) launched a campaign calling on all UK public services to provide flavoursome and nutritious vegan meals. This request was made in response to the introduction of successful vegan menu options provided by [Anglia Crown](#).

Text Box 2: More vegan meals from Anglia Crown on their way to British hospitals (2018)

European society is ageing and as a result the number of senior citizens who may need to live in care homes, or be provided with meals from public food services, is increasing. In some countries like the Netherlands, Germany or Sweden contract caterers play an important role preparing such meals (Delfi, 2013). In other countries, such as Denmark, meals for senior citizens are prepared in central kitchens at municipality level and distributed daily. Common characteristics of meals served to **senior citizens are: “traditional” foods, high in calories and contain less (fresh) vegetables**. This pattern may change however, due to the growing number of senior citizens from other ethnic backgrounds that demand vegetarian options and this scenario may help drive the transition towards healthier and more nutritious meals through the greater inclusion of vegetables - including legume grains, and legume-based or -derived foods.



As public food services are funded by the governments as part of national social care systems the cost allowance provided to a given **entity** for purchasing and preparing the meals is subjected to prioritisation among other public budgetary priorities. Consequently, the available funds for such meals may be severely constrained which means many **entities** such as schools, hospitals, care homes *etc.*, usually have a limited budget for the purchase of food. Policies on the thresholds which define meal quality, including nutritional provision for senior citizens, span aspects including the production system operating in kitchens which determine the budget thresholds defined *via* standards that include, price *per person per day* or overall price *per meal*. Examples of current budgets are shown below.

- Total cost per patient in the UK hospitals (Plan for Public Procurement, 2014) € 7.50-8.00 / day
- Total cost for senior citizens in care home in France (Hamann, 2015) € 4.80-5.00 / day
- Costs for ingredients for school meals in Sweden (Barling, 2013) € 1.00 / portion
- Cost of a school meal in Berlin (organic; Braun, 2018) € 3.25 / portion

The number of meals served across the EU public food services represents significant volumes and it is estimated that **public food service outlets across the EU provide 33 billion meals per year at a cost of an estimated 100 billion EUR²**. Given these vast numbers, it is evident that the amount of food traded and cooked through public food service is immense and that there is a significant opportunity for using more legumes in the public food service. It could be further estimated that if (local, or nationally, produced) legumes (fresh, frozen, canned and dried) accounted for 1 % of food procured by public authorities, then the purchasing value for legumes for public food services would be 1 billion EUR³. **Highly structured procurement procedures, policies shaping demand for food items and a growing customer base are all strong factors that underpin the power of the public sector to influence what and how food is consumed and cultivated.** The sector is positioned to lead by example, and to encourage shifts in the extent to which legume-based meals feature in menus at large volumes, and consequently to promote legume-supported **production systems**. In this way, the public food service sector has the potential to exercise a strong influence to enable schemes or policies that connects good human nutrition with reduced environmental impact by encouraging the consumption and so the cultivation of legumes locally. Such public food service initiatives may act as an engine of positive changes in food demand and supply chains, and within the sub-tending agri-food system. However, such changes within the sector relies largely on greater progress implementing effective policies. A close collaboration between policy makers within national and regional authorities should lead to the implementation of legume-supportive policies to facilitate such transitions, particularly with respect to the alleviation of local lock-ins to the current over-arching unsustainable paradigm for European production and consumption patterns.

² IFAU estimate, 2018 based on Delfi, 2013, Bord Bia 2011, USDA 2016 and USDA 2012

³ IFAU estimate, 2018 (*cf.* Annex 1, Methodology)

2.3 Food services in the private sector

The **food service** in the **private sector** is also a very diverse industry, where actors share a common goal of operating for profit. It is estimated that in 2017, the private food services in the EU accounted for almost 1.6 million enterprises which generated a total sales value in the region of 440 billion EUR, with forecasted sales for 2018 amounting to 454 billion EUR (www.statista.com). Industry sources have revealed that costs for ingredients account for approximately 30 % of the turnover in food service **outlets** (Horesta, 2013), with variation between different **outlets** (e.g. lower percentages in bars and higher in fine-dining establishments). It is therefore assumed that total purchase value of food and drink in the private **food service sector** is equivalent to around 130 billion EUR, and that the food services sector accounts for 60 % of these purchases (equivalent to 80 billion EUR). It is estimated that legumes (fresh, frozen, canned, dried) account for 3 % of the purchasing of food, hence a purchasing value of 2.4 billion EUR⁴.

The private **food service sector** encompasses **stand-alone units** such as restaurants and, **chained units** like fast food **chains** or pub **chains**, and contract caterers (*cf.* section 2.3). The main segments in the private food services are Quick Service Restaurants (QSR), restaurants, travel, contract catering, pubs, and **in-store catering** (Figure 4). In 2016, the QSR segment accounted for 44 % of the turnover among these private actors, followed by contract catering holdings at 25 %.

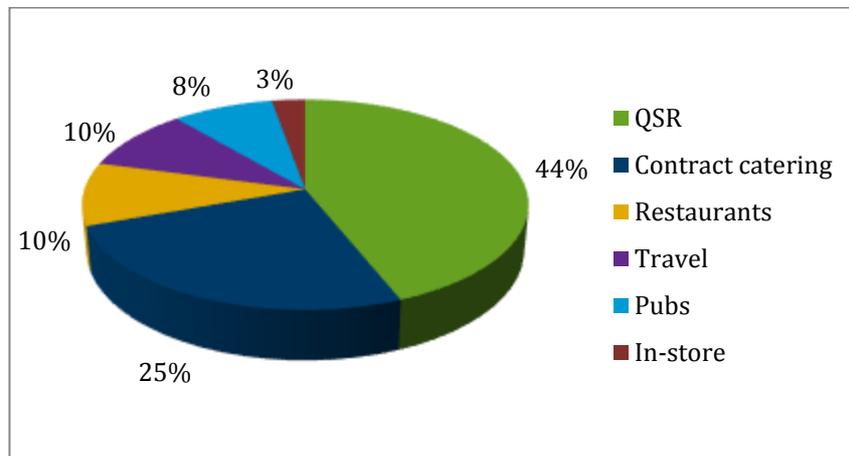


Figure 4: A pie chart illustrating the proportion of the various food service market sectors served by the top 99 most active private sector food operators (2016 data, Weiss and Funnen, 2017). QSR denotes the Quick Service Restaurants sector.

In 2016, the turnover of the top 99 food service operators in Europe grew by 7.7 % compared to 2015 with sales of nearly 110 billion EUR (Weiss and Funnen, 2017). In other words, the top 99 operators hold more than 20 % of the private food service market, and their share continues to grow. Table 1 shows the top 20 actors in the European private **food service sector**. Together, the companies in Top-20 have aggregated sales of more than 75 billion EUR including sales outside Europe (Table 1).

⁴ Figures are estimated by IFAU from interviews (2018, *cf.* details in Annex 1, Methodology)

Table 1: Operators designated as being among the top 20 companies servicing the private food services (in 2016) based on company turnover. Each company is defined by their segment and sales. QSR denotes the 'Quick Service Restaurant' sector.

No.	Company	Main brands	Segment	Sales (million €)	Comments
1	McDonalds	McDonalds	QSR	21,300	+8,000 units in Europe
2	Sodexo	Sodexo	Contract	7,700	+32,000 sites in 80 countries
3	Compass Group	Eurest, Medirest, Scolarest	Contract	6,680	Top-3 countries are UK, France, Germany
4	Elior	Avenance, Arpege, Serunion, Areas	Contract	5,900	France = 60 % of sales. Canteens and travel
5	Yum Rest.	KFC, Taco Bell, Pizza Hut	QSR	4,600	+4,000 units in Europe
6	Burger King	Burger King	QSR	4,250	+4,000 units in Europe
7	Mitchells and Butlers	Harvester, Vintage Inns, Toby Carvery, Sizzling Pubs, Alex etc.	Pubs	2,550	Leading UK operator of managed pubs; 1,800 pubs
8	Domino's Pizza	Domino's Pizza	QSR	2,250	2,700 outlets in Europe Top markets are UK, Ireland, Switzerland
9	Greene King	Hungry Horse, Loch Fyne, Chef & Brewer, Flaming Grill etc.	Pubs	2,220	+1,700 outlets
10	Autogrill Group	Ciao, Spizzico, Puro Gusto	Travel	2,000	24 % of sales in Italy, 22 % in rest of Europe
11	Whitbread	Costa Coffee, Beefeater, Brewer's Fayre etc.	QSR	1,985	Costa Coffee + 3,500 shops worldwide, Pubs sales 560 M €
12	Wetherspoon	JD Wetherspoon, Lloyds No 10	Pubs	1,950	925 outlets in the UK
13	SSP	Caffé Ritazza, Le Grand Comptoir, Upper Crust	Travel	1,890	Operating in 30 countries Sales in Europe = 1,546 M EUR
14	Starbucks	Starbucks	QSR	1,890	+2,200 stores in Europe Top countries: UK, Germany, France, Russia
15	Subway	Subway	QSR	1,690	+5,200 units in Europe



No.	Company	Main brands	Segment	Sales (million €)	Comments
16	Aramark	Aramark	Contract	1,400	Germany, Ireland and UK
17	Groupe Bertrand	Quick, Burger King, Bert's Café, Caffee Leffe	QSR	1,370	Multi-concept player, very strong in Paris, acquisitions of concepts
18	IKEA	IKEA	In-store	1,300	265 locations in Europe
19	LSG Sky Chefs	LSG Sky Chefs	Travel	1,236	Leading player in airline catering
20	Greggs	Greggs	QSR	1,000	Europe's largest bakery chain, sandwiches, +1,700 outlets

The top 20 companies represent all segments of the private food service market. In addition, they operate across Europe running numerous outlets and offer many different menus. It is estimated that the European sales of the top 20 actors represent approximately 60 billion EUR and thus a purchasing value for food and drinks of 20 billion EUR⁵. It is therefore safe to assume that if menus offered in all outlets of the top 20 actors included legumes and/or pulses, the market demand for these specific types of products would increase significantly. In the following sections, examples from the segments in the private food service market will illustrate how legumes are becoming a focal point for such operators.

⁵ IFAU estimate based on Horesta 2013 (raw materials and ingredients = 30 % of sales value)





2.4 Segments in the private food service market

2.4.1 QSR Quick Service Restaurants – chained and stand-alone outlets

The private food service market is dominated by the QSR segment which includes a range of different businesses with restaurant **concepts**. These businesses are built on popular foodstuffs such as beef- and ham-burgers, pizzas, sandwiches, other fast food items and drink sales, especially coffee. **Chained** QSRs account for most of the turnover in this segment, although the number of **stand-alone units** (e.g. the local pizza bar or sandwich shop) is far higher than the number of **chained QSR outlets**. The main **concept** of the **chained QSR outlets** rests on the offer of a standard menu that meets customer expectations e.g. featuring the same kind of food items in terms of texture and taste profiles plus portion size, prepared quickly and presented in a consistent branded fashion across all stores in the **chain**.

There is a trend among the large players in the QSR segment towards offering more-healthy food **options than “typical fast food”**. For example, **McDonald’s** has only in recent time introduced salads and wholegrain buns in the Nordic countries and in 2018 the first vegan hamburger was launched in 200 different *McDonald* restaurants in Sweden, and 60 in Finland. This product was developed in collaboration with *Orkla Foods Sweden*. The burger is made from soya protein and produced and marketed under the brand name, “*Anamma*” (Fast Food Magazine, 2018). This example shows the impact a major fast food **chain** can make when taking the market-lead, hence spurring the development and common acceptance of legume-based products. This lead has subsequently encouraged the production and marketing of a legume-based burger to be sold in the fast food sector and many other smaller food service **outlets**.

2.4.2 Travel

The travel segment spans several operators that offer food and drink to travellers. These companies may be highly specialised such as *LSG Sky Chef* for airline catering. Other companies offer foods such as sandwiches, baked goods and coffee from **outlets** located at train stations, roadsides or airport terminals. Restaurants in airport terminals and roadside restaurants such as the Italian group *Autogrill*, the private food services companies part of the Swiss owned *Mövenpick Group* make effective use of **self-service systems, where customers can purchase food from different “food islands”, and are encouraged to buy menus consisting of a main dish, a side (soup or salad) and a dessert**. Vegetarian menu options and salad bars take centre stage in showcasing menu options, which are plant-based, higher in fibre and low in animal products. These operate in major restaurant companies in the travel segment (Food Service Europe & Middle East, vol. 2017-2018). In addition, in the summer of 2018, airline catering has started including pulses. Onboard *Brussels Airlines*, travellers now have the option of organic salads made with chickpeas and hummus supplied by a Belgian company, *The Food Maker*. Catering on board cruise ships and ferries also belong to the travel segment.

2.4.3 Restaurants – chained and stand-alone outlets

The restaurants segment encompasses businesses not recognised as QSR and represent a diversified group of **chained** and **stand-alone units**, which includes restaurants of all sizes, price levels and menus. The **stand-alone units** in the restaurant segment highly outnumber the **chained** restaurants, and offer an incredible diversity of **concepts**, ideas, menus and price levels. **Chained** restaurants are built on **concepts** focussing on a specific type of food (*e.g.* organic food, noodles, steaks or ethnic types of food) or a specific setting or theme. An example of such **concept is the, “to-go lunch” provided by the chained restaurant Pret A Manger**, or the **chain of organic cafés Exki**, originating from Belgium (Text Box 3).

Exki is a chain of 44 cafés operating in Belgium and France and offering organic food and drinks only. Outlets are located at travel points (*e.g.* airports), universities and city centers. The chain was introduced more than 10 years ago as a frontrunner of green menus. In 2018, *Exki* offers salads, sandwiches, soups and a small range vegetarian dishes made with legumes and legume-based products. Although the assortment of soft drinks is large, there are currently no legume-based drinks available. *Exki's* sustainability strategy is based on the reduction of waste, the recycling of materials and support of citizen led projects.

Text Box 3. The organic food concept of *Exki*

The restaurant sector in Europe is experiencing a large increase in the popularity of green (environmentally friendly) and healthy eating options with more restaurants, including more-conventional businesses, offering vegetarian, vegan and menus considered to offer more-ethical consumption options (Food Service Europe & Middle East, vol. 2017-2018). Dedicated vegan restaurants are also starting to develop, although still occupying a relatively small portion of the market and have become an expected and integrated part among dining-out options (Text Box 4).

In the UK, approximately 542,000 people have embraced a plant-based diet today compared to 150,000 ten years ago. Many restaurants now offer menus rich in vegetables, legumes, seeds and wholegrains to accommodate the demands from consumers seeking healthy or vegetarian alternatives. For example, at [Lyle's](#) in Shoreditch (London, UK) there are pescatarian, vegetarian, or vegan options on the menu at an average cost of 10 EUR (2017). This restaurant featured on the Top-100 of British restaurants suggesting that meat-free dining now represents a top standard on the restaurant scene.

In Italy, only 1 % of the population is vegan, and 7 % is vegetarian but these numbers are increasing rapidly. [Universo Vegano](#) is a vegan fast food concept, which started in 2013. Today there are 18 units across major Italian cities, which offer menus featuring sandwiches, burgers, kebab, falafel, salads, soups, pasta, pizza and desserts. The concept is implemented in five formats: fast food outlets, kiosks (for *e.g.* parks), **restaurants with a gourmet offering**, **“Your Way” for travel locations** and **“Street Burger”**, a mini-truck available at street food festivals. [Universo Vegano's](#) business model showcases how a food service company can diversify and adapt a concept to meet the requirements of different customer groups at various locations.

Text Box 4: How vegetarian and vegan restaurants are forming part of the dining scene in Europe (2018) (Treanor, 2017)

In-store catering refers to food service **outlets** located inside stores such as in department and furniture stores (*e.g.* [IKEA](#)) or bookstores. [IKEA's in-store catering](#) activities follow a standardised **concept** inspired by Swedish food traditions. The most famous food on **the menu is the “Swedish meatballs with mashed potatoes and lingonberry jam”**. **It could be claimed that IKEA has strongly contributed to making “Swedish meatballs” internationally recognised, since IKEA's food business generates sales worth 2 billion EUR annually and serves 650 million customers.** This makes [IKEA](#) the biggest restaurant rooted in Sweden. [IKEA](#) has expanded beyond the in-store **outlets** by offering its food products for retail sale in the in-store bistros. For example, in UK stores customers can buy an array of selected Swedish frozen foods such as meatballs, wafers, mashed potatoes and vegetarian ready meals, which include frozen vegetarian balls prepared with chickpeas and peas combined with other vegetables and spices and which retails at 3.50 EUR per kg. Danish stores also offer Swedish food products for retail sales alongside items on the menu at the bistro. This example shows how creative thinking in product development may be used to exploit existing market channels in food service to create marketing advantages and pave the way for the launch of new legume-based products.

This brief introduction to the segments of the private food service sector illustrates the diversity and creativity of the sector, and the many opportunities available to introduce new foods or concepts into the market.

2.5 Contract caterers

Contract caterers are businesses which provide catering services for a fee and mainly directly to **consumers** e.g. in canteens in workplaces, healthcare institutions, educational establishments and institutions or for private celebrations and events. It is claimed that approximately one third of firms and collective organisations in the EU use these types of services, hence helping this business sector generate a turnover of 24 billion EUR in 2017, with dominant companies such as *Sodexo*, *Compass Group* and *Elior* acting as market leaders (Table 1). The following statement, taken from the [Food Service Europe website](#) illustrate the dimension of this segment:

- contract caterers serve 67 million **consumers** every day;
- one in four meals are eaten outside home;
- one in every two meals are taken at the workplace;
- more than one in four meals in schools; and,
- more than one in ten meals in healthcare or social institutions.

Across the EU, the contract catering companies play an important role in providing meals (most commonly at lunchtime), and in ensuring a diversity of nutritious foods and the **greening of menus**. Extracts from interviews with contract caterers (Annex 1) highlight how menus may offer more vegetable- or plant-based options.

- *“In our canteens, we are experiencing a demand for more meat-free alternatives such as vegetable (vegetarian) burgers. Our customers appreciate the option to be flexitarians, we therefore must provide such alternative meals and as a result we are using more processed legume-based products from branded producers like Findus, Orkla and Nestlé. We also offer legumes and legume-based products for our salad bar, which is prepared every day”.*
- *“Our clients are looking for healthy, non-meat and non-fish food, so we have to provide such alternatives. We have increased our demand for legume-based processed products like burgers, meatballs or even cereal bars with legumes. We need to be creative in the way we prepare food since our national cuisine already incorporate many pulses”.*
- *“We strive to prepare fresh, home-cooked and highly varied menus in the canteens we manage, and legumes play a key role on our menus. We do not offer a 100 % vegetarian menu, but we do try to accommodate customer’s demands for less meat by using more pulses. We have developed our own training programme for our chefs and kitchen staff so they can learn how to cook with legumes ensuring high quality meals”.*

A survey carried out in 2017 across Denmark, Norway, Sweden and Finland showed that there is a significant interest from the **consumers** in canteens across the Nordic countries to discuss, understand and realise more-sustainable diets (Table 2). The survey was based on 2,000 interviews with male and female **consumers** between the age of 16 and 64 and who took their lunch in canteens (Fazer, 2018). For example, in canteens in Danish and Swedish workplaces the interest in meat-free days is evident, and the demand for organic products strong. In Finland, a similar pattern is observed although to a lesser extent.

Table 2: Consumers' perceptions of food in the Nordic countries, showing the percentage of consumers who increased their vegetarian or flexitarian consumption habits (defined as at least 1 meat free day in the last week), and the most common reason given for that [in square brackets] (Fazer, 2018).

Consumption Change	Denmark	Sweden	Finland
Reduced meat	60 %	60 %	50 %
Increased Vegetarian or Flexitarian	60 % [money saving]	66 % [environmental protection]	42 % [environmental protection]
Increased organic	40 %	40 %	20 %

Given the high number of meals provided by the **contract caterers**, they play an important role in providing inspirational and nutritious food to customers eating in canteens in public and private work places, as well as in schools and institutions. Customer reactions evidently point to the need **for contract caterers to provide 'greener menus'** (*i.e.* with less meat) resulting in a higher demand for legumes and legume-based products, and the employment of skilled chefs and food **professionals** to prepare the meals. Having the right professional skills at hand and with the pallet to enable an excellent gastronomic experience and variability, **the contract caterers are regarded as an attractive point of entry to the food service sector for a supplier**. Interviews with international contract caterers operating canteens in several EU countries reveal that canteens, particularly in the finance and business sectors, act as entry point for new or specialty products and are therefore regarded as **attractive partners for trialling new foods and leading new food cultures**. This added to their centralised purchasing procedures (*cf.* also section 3) contract caterers **may also enjoy 'purchasing-power', that is accessing commodities in large volumes, and so at prices** which are often lower than that commonly available (Hamann, 2010).

3. Procurement Procedures and Supply to the Food Service Market

3.1 Procurement procedures in the public sector

The development of more sustainable procurement patterns could have a profound impact on the sustainability of the European food system. Governance initiatives, or business policy schemes can shape the demand for certain food items, as explained in Section 1, such as certification schemes emphasising environmental-friendly production *e.g.* Red Tractor or LEAF from the UK (Bonfield, 2014). Another example is the *KeyHole label* owned by the Swedish National Food Agency and used in Scandinavia and Iceland to shape demand for healthy food, which impacted on the demand for vegetables, including legume grains, pods and sprouts (recently germinated seedlings). In addition, governmental policies for public procurement could play an especially important exemplary and educational roles to serve consumers and private sector operators. Green public procurement, the purchasing of environmentally friendly goods and services by public authorities is a policy suggested by the European Commission (EC), which aims at reducing the environmental impact of the public sector. The policy also encourages the creation of guidelines (or restrictions) to help support the private sector develop “green products and services” (European Commission, 2016). As an example of a green procurement practice policy that supports legume-based production systems, is the purchasing of organic produce used in public institutions such as schools (Text Box 5).

In 2014, the authorities in Berlin introduced a new public procurement policy for school catering which requires that a minimum of 15 % of organic produce are incorporated in school meals and additional incentives encourage contract caterers to increase that share to up to 50 %. This policy emphasises organic certifications over the use of local produce. In addition, Berlin’s authorities fixed a price of 3.25 EUR per meal with the intention of contract caterers competing through quality rather than price. However, this price was considered too low to ensure that the requirements for organic produce could be met entirely by local supply chains. As a result, contract caterers had to turn to wholesalers, some being specialised in trading organic produce. As contract caterers, already purchase from wholesalers, it was easy for them to substitute organic local produce for non-local ones. The key purchasing criteria of the contract caterers were: 1) (pre-processed) quality; and 2), price and in that priority order. This shows that policies can drive demand for environmentally friendly products, *e.g.* organic ones but have less impact on the provenance of product.

Text Box 5. Policies may shape demand but have lower impact on product choice (Braun *et al.*, 2018)

A key characteristic of public food services is the use of centralised purchasing agreements, which means that a public entity (*e.g.* at state, regional or local governance levels) will enter into an agreement with one or more wholesalers to supply (deliver) all the required food items. All food service entities *e.g.* kindergartens under the governance of this authority (*e.g.* a municipality) would have to buy the food and beverages through a purchasing agreement with the defined wholesaler(s).

Centralised purchasing agreements of typically one- or two-years duration can be outlined with a specialised wholesaler for a narrow product range such as meat, or it may be that the total needs of the professional kitchens are supplied by one or two major wholesalers (delivered supplies). Centralised (in some cases nationally) purchasing agreements therefore have strong impact on supply chains due to the longevity of the procurement contracts and the large volumes purchased.

EC Procurement Laws outline the rules for public procurement contracts. That are, contracts should be advertised for fair and transparent tendering in an open-bidding process. It is the responsibility of the authority in-charge to define the product range which is to be included and more importantly to define the product specifications related to product qualities - such as to agronomic production technique (*e.g.* organic), certification but not to 'brand names'. Text Box 6 provides an example of the bidding criteria defined by a Danish authority calling for tenders, which shows that "frozen vegetables" is not a uniform group and encompasses products with individual specific specifications. A tenderer must provide information for each product they intend to supply.

A Regional Authority in Denmark has put out a call for tender for several categories of foods and drinks: frozen vegetables, meat, frozen meat, desserts, dairy products, grains, flours and sugars, canned products, drinks, and more. Legumes only appeared in the frozen vegetables category. Suppliers of frozen vegetables were requested to provide information including prices for the following products (2.5 kg packs):

- Green beans, haricots, 6-8 mm;
- Green beans, sliced; Haricot verts;
- Green peas, small peas;
- Green peas, medium-fine, quality grade II;
- Green peas, organic;
- Green peas and carrots, medium-fine size

Text Box 6. Extract from a Call to Tender (Call for Tender, Region South Denmark, 2017), with relevance to greater inclusion of legume-, and including, pulse-based products.

Procurement staff in public food service entities have an influence on the purchasing decision, as they design the menus. To support their choice of product, the British Government developed a 'Balanced Scorecard' in 2014. The "Scorecard" was a tangible outcome of the 'Plan for Public Procurement of Food Services' (Bonfield, 2014) and was developed as a tool to promote sustainable purchasing. The key aspect of the "Scorecard tool" was that for each product group (*e.g.* meat, dairy, seafood and fresh produce), the certifications that promoted sustainability were listed. This way, procurement could be undertaken with a view to sustainability aspects such as environmental protection, fair trade, authenticity and provenance (Bonfield, 2014).

Although the staff in the kitchens of schools, nursing homes and hospitals may influence the choice of product, in reality choice may be limited by contractual agreements and range provided by the distributors.

3.2 Green public procurement

3.2.1 The regulatory framework

On February 26th 2014 the Council of the European Union and the European Parliament adopted a new directive (Directive 2014/24/EU) aimed at simplifying and increasing flexibility of public procurement. These new rules had to be incorporated into national law by April 2016 by all EU countries and seek to ensure greater inclusion of common societal goals in the procurement process. These goals include environmental protection, social responsibility, innovation, combating climate change, employment, public health and other social and environmental considerations. Hence, the [Directive 2014/24 covers the framework for Green Public Procurement \(GPP\)](#). The GPP targets all goods and services purchased through public procurement processes at all governance levels. GPP is a voluntary scheme; that is, Member States and public authorities can determine the extent to which it is implemented (Boyano *et al.*, 2017). As procurements by public authorities represent an immense buying power they can act as catalyst to make European society greener by encouraging a transition towards more environmentally friendly products and reduced fossil fuels dependencies. To achieve this goal, specific areas have been identified, where public procurement is thought to play a major role. With regards to food and catering services, the most important goal is reducing the environmental impact. Table 3 summarises how this overall goal can be broken down to a set of sub-goals, that can be operationalised through public procurement criteria, that are the specifications that the procurement authority defines in the call for tenders and which a supplier must fulfil.

Table 3: Areas of concerns and mitigation strategies to reduce environmental impact in relation to public procurement criteria for food and catering services

Areas of environment concerns related to food and catering services	Examples of procurement criteria
Eutrophication, acidification and toxic impacts on human health and the environment due to the use of pesticides and fertilisers	<ul style="list-style-type: none"> Organic food Food produced under Integrated Production Systems Sustainably-produced or caught aquaculture and marine products
Animal cruelty due to a lack of respect for animal welfare	<ul style="list-style-type: none"> Livestock products with high welfare standards
Packaging waste	<ul style="list-style-type: none"> In-bulk or in-packaging that has a high recyclable content Reusable cutlery, crockery, glassware and tablecloths Environmentally friendly paper (and tin and glass) products
CO ₂ and other pollutant emitted by the modes of transport used to carry out the catering services	<ul style="list-style-type: none"> Improvement in transport routes and energy efficiency and emissions reductions of vehicles use to carry out the catering services
Waste reduction	<ul style="list-style-type: none"> Selective waste collection and staff training
Other areas of environmental concerns	<ul style="list-style-type: none"> Seasonal products Water and energy efficient kitchen appliances

(http://ec.europa.eu/environment/gpp/pdf/toolkit/food_GPP_product_sheet.pdf)

Producers intending to bid for public procurement contracts must present certifications attesting to their compliance to the necessary standard such as organic production. The standards and certifications required by public procurers therefore play an important role in shaping the food system, and especially production and demand in the Food Service Market.

3.2.2 Criteria in GPP with relevance to food and catering services

As the Green Public Procurement system spans across goods and services, and Member States have different priorities in their policies for reducing environmental impact, the importance of GPP criteria for food procurement may differ widely among the EU countries. In line with national (or regional) policies, the procurement authorities may have included food in the GPP. In such a case, when a call is drafted for tender by the public procurement authorities two sets of criteria are used to define the standard of goods and services requested. The criteria consist of a basic level (Core Criteria) and a more advanced level (Comprehensive Criteria). In relation to food and catering services, each level of criteria is defined as follows (European Commission, 2008):

- Core GPP criteria address the most significant environmental impacts and are designed to be used with minimum additional verification effort or cost increases. For food, these criteria address organically produced food and packaging waste, whilst in Catering Services, they focus on organically produced food, waste minimisation and selective collection;
- Comprehensive GPP criteria are used by authorities seeking to purchase the best environmental products available on the market, and which may require additional administrative effort, or imply a certain cost increase compared to other products fulfilling the same function. For food, these criteria address more than simply organically produced food and products which ensure high animal welfare. For Catering Services, the criteria also encourage optimising nutritional provision, and the use of recyclable paper products, including for kitchen utensils and environmentally friendly cleaning products.

GPP criteria must be verifiable, and should be defined by Technical Specifications and Award Criteria as follows:

- Technical Specifications (TS) constitute the minimum compliance requirements that must be met by all tenders. They must be linked to the contract's subject matter (e.g. purchase of food) and not include any corporate practices, only characteristics specific to the product being procured. TS are strictly pass/fail requirements in tenders;
- Award Criteria (AC) detail the desired performance. At the award stage, the contracting authority evaluates the quality of each tender and compares their costs. Contracts are awarded to the most economically competitive tender. The evaluation includes a cost element and a wide range of other factors that may influence the value of a tender such as environmental aspects. AC span the characteristics specific to the product being procured, which include its lifecycle and supply chain. The AC can be used to encourage additional environmental performance without being mandatory. In other words, products not reaching the required level of performance can still enter the market (Boyano *et al.*, 2017).

An example of a call for tender related to food purchasing and with the aim of reducing environmental impact is given in Table 4. It was specified at the beginning of the tendering process, by the **procurement** authority, the need for the food to be at least partially from organic sources.

Table 4: An example of a call for tender relating to the procurement of food produced organically.

Technical Specifications	Verification Methods
X % of the food (defined as product group like meat, dairy or vegetables, or a list of specific products <i>e.g.</i> potatoes, tomatoes, beef, eggs <i>etc.</i>) must be organically produced according to Regulation no. 834/2007	Products carrying a Community or national organic label will be deemed to comply
Award criteria	Verification Methods
Organic food: additional share (more than X%) coming from organic sources above the minimum requirements in the specifications	Products carrying a Community or national organic label will be deemed to comply
Packaging – Percentage of products that <ul style="list-style-type: none"> • are supplied in secondary and/or transport packaging with more than 45 % recycled content; • are supplied in packaging materials based on renewable raw materials; • are not supplied in individual portions (single-unit packaging). 	The supplier must provide a signed declaration indicating which of these criteria are met. The contracting authority will verify compliance during the contract period, and appropriate penalties will be applied for non-compliance.

(http://ec.europa.eu/environment/gpp/pdf/toolkit/food_GPP_product_sheet.pdf)

This example shows the criteria for organically produced food and the requirements regarding packaging, that had to be fulfilled by the prospective supplier and illustrates how additional environmental performance can be encouraged through public procurement procedures; thus indicating a transition path that encourage environmental considerations in relation to food production.

3.3 Procurement procedures in the private sector

3.3.1 Chained restaurants and contract catering companies

Due to the diversity of the **private food service segment**, purchasing processes for food and beverages are highly variable. For **chained outlets** and large **contract caterers**, centralised purchasing is the most common **procurement** procedure, with respect to the private and public services. In such instances, business headquarters enter into agreements with selected **distributors** at the national level. Contracts are then drawn to define the products to be provided by the **wholesaler** who in turn would deliver the agreed products to all units in the **chain**. An example of the purchasing patterns and demand criteria of a Danish contract caterer is given in Text Box 7.

A contract caterer managing nearly 90 canteens in major companies and government building purchases approximately 6,000-7,000 different products annually including legume grains and legume-based products, supplied either by a national wholesaler (most products) or by a specialist wholesaler (organic produce). Legumes and legume-based products form an increasing part of the purchases as more menu choice, which aim to respect good nutritional and environmental values, are being introduced due to customer demands, and to deliver alternatives to meat-based foods. The contract caterer also has an internal policy stating that some product categories such as legumes and legume-based products must be 100 % organic. The purchase of such products may follow seasonal variations, and it is important for the caterer that the menus offered are varied and appealing to consumers.

Text Box 7: Purchasing patterns for legumes and legume-based products by a Danish contract caterer (Interview, 2018)

In addition to agreements with **wholesalers**, there are many examples of **chained** restaurants such as **McDonald's** entering into agreements with food and drink producers. Agreements with food producers can be with regional coverage such as the provision of flavours for milkshakes in **McDonald's** in Scandinavian countries. There are also examples of **chained** restaurants that contract only one **supplier** (a food or drink manufacturing company) for a specific product and which is supplied to all the units of the **chain**.

3.3.2 Procurement in stand-alone units

Buying from **wholesalers** is the most common way **stand-alone units** in the **private food service sector** to purchase food and beverages. Typically, a restaurant or coffee shop would have entered into an agreement with one or more **wholesalers** regarding the assortment of products required. The restaurant would then order the products online, and the **wholesaler** would deliver the goods the next day. The food service businesses may have contracts with full-service **wholesalers**, who can supply all required items (food, drink and non-food products), or in some cases contracts with **wholesalers** specialising in a certain product range such as fresh fruits and vegetables, meat, cheese, organic, gluten-free or specific imported products.

Another group of **wholesalers** are the **Cash & Carry outlets (C&C)**. The **C&Cs** stock a very wide assortment of products (food, drink and non-food items), **functioning as a “mega-supermarket”** and buying their goods from food manufacturers, importers and **wholesalers**. The customers using this distribution channel mainly represent cafés, coffee shops, restaurants, pubs, canteens and smaller contract caterers but, also actors from the public **food service sector**, *e.g.* kindergartens. In contrast to the delivered goods, costumers demanding smaller volumes can buy products directly in the **C&Cs** with access to a comparable quality and range. It is estimated that **C&C outlets** account for one third of the wholesales activities in the EU food service market with delivered wholesales holding the remaining two thirds (Hamann, 2014; IGD, 2017).

To add to the complexity of the purchasing patterns in food service, there are also examples of **stand-alone units**, such as high-end restaurants buying directly from **producers** to obtain a specialty product. Such interaction helps assure food provenance to **consumers** and develop the identity, brand or values of the restaurant such as supporting local business *via* the sale of products that support individual and environmental well-being (Text Box 8).

In the South of Germany near Stuttgart, a farmer **Woldemar Mammel**, who is passionate about organic production, **saw the potential of lentils selected by the German plant breeder Fritz Späth in the early 1900's**. The varieties were lost from German fields during the 1950-60's because of the mechanisation and industrialisation of farming, and widespread use of synthetic nitrogenous fertilisers. However, in 2006 the varieties were found and rescued from a crop genebank in St. Petersburg (Russia), and multiplied and selected by **Woldemar and colleagues into two distinct varieties**, '*Späths Albinse-I and II*', which are specially adapted for the challenging arable terrain and pedoclimate of the Swabian Alb mountains foothills. This has included the development of the types for their production in an intercrop, and most commonly with **barley** (Wang, 2012).

Cultivated as part of a cooperative with other local farmers certified organic lentil crops are now produced. The lentils are sold from the farm-shop under the brand name "***Alp Leisa***" which references their provenance. The cooperative has established a unique distribution channel for the lentils as they are used by the neighbouring Inn (pubic house and restaurant) to prepare a unique vegetarian dish ('**lentil steaks**'), and for which the establishment has become renowned for. This example demonstrates how food service (and development of locally adapted landraces), can play an important role as a route to market and how collaboration on the marketing benefits both the cooperative and the inn. For more information, click [here](#).

Text Box 8. Example of a local supply chain for organic lentils from a farmers' cooperative, which supplies to local food services (Interview, 2018)

The purchasing procedures described in Text Box 8 show that the provision of food and drink to entities in the food service market may follow a specific and unique pathway, and that an **entity** in the public or private **food service segment** may buy from any **supplier** or distribution channel. This also indicates that **products are selected based on the supplier's understanding of their customers**, and this relationship is complex as existing and emerging markets are served.

3.4 Developments in the wholesales business

3.4.1 Consolidation in the wholesales sector

Wholesalers who deliver their products have developed large-scale businesses where margins tend to be low and competition fierce, profits are accrued *via* high absolute levels of sales. In many European countries, a structural development process has been ongoing for a decade, which led to a highly consolidated wholesale business (Hamann 2013 and IGD Retail Analysis, 2018). An example is the acquisition by the American wholesaler *Sysco* of the market leading British wholesaler *Brakes* in 2016 and the Swedish leading wholesaler *Menigo* in 2017 (Menigo, 2018). A similar pattern was staged by the major Danish wholesaler *Dansk Cater*, first acquiring local Danish wholesalers and later expanding by buying wholesalers in Sweden and Poland. This process of consolidation puts enormous pressure on the wholesalers' suppliers to deliver specific and high volumes of products, which in turn strengthens the bigger food producers' competitiveness compared to smaller ones. As a result, the latter must find alternative distribution channels which could be regional wholesalers, specialised wholesalers (e.g. within organic products or horticultural products), distributors targeting up-market outlets such as specialty stores and high-end restaurants, or other options such as the formation of larger cooperatives.

3.4.2 Wholesalers as frontrunners for innovation

Wholesalers can act as frontrunners for new initiatives in the food service sector. For example, in the UK the campaign "*Peas Please – Food Foundation*" brings together farmers, growers, processors, distributors, caterers and the government to make it easier for everyone to eat pulses. This involves the second-largest food service wholesaler in the UK, *Bid Food*, who stated the following: "We have signed up for this initiative as a proactive business, for promoting nutrition and supporting our customers to achieve healthier menus across the food service sector".

Similarly, the Danish horticultural producer *Bent Dam* was contacted by a major Danish food service wholesaler enquiring about new types of peas and beans to be sold as fresh produce. In the summer 2018, the horticultural producer then started to grow two varieties, which were hitherto uncommon in Danish horticultural production: *Tetragonolobus purpureus* Moench (asparagus-pea) and *Vigna unguiculata* (L.) Walp. (cow pea) for their edible green seedpods. The idea was to produce a type of fresh legume as new vegetables for the Danish market and which could also be of interest to restaurant chefs. As a result, *Bent Dam* succeeded in growing the novel crop (for that region), the produce was then sold through the wholesaler at a price twice that of other fresh pea and bean pods. Despite the success in cultivating the new crops, the market uptake accounted for only low volumes, possibly due to the higher market price and cost of growing these new crops (Interview, 2018).

3.4.3 Branded products and wholesalers' private labels

Branded products are recognised in the retail market and are commercially as important as **wholesalers'** own-brands. In wholesaling, branded products are recognised by the buyers in food service **entities** as well-known products from well-known and trusted producers. **Campbell's** vegetable soups or **Heinz'** "baked beans" are clear examples of branded products made with pulses, peas and beans. Companies of a certain scale producing branded products usually have a dedicated department dealing with customers in the **food service sector**, which organises events such as "mini-fairs", evening tastings and cooking classes with an overall purpose of building relations with the buyers in the professional market and with the personnel in charge of products purchase (Hamann, 2013).

Wholesalers are offering an increasing number of products under their own private labels which span from standardised commodity-type products (e.g. dried pulses or frozen vegetables) to premium specialties such as fresh produce and processed products. For example, the British **wholesaler Fairway** offers frozen peas and beans under the private label "Fairway". This means there are now more routes for providing products to customers, and it may prove challenging for a food producer to identify the (best) ways into the food service market.

3.4.4 Categorisation

Categorisation is a system of organising products through a hierarchy of groups, sub-groups, products and finally by brand label. **Categories** are chosen by traders or companies to organise trade, and such classification is different from the product codes used by other agents such as **Customs Authorities**. Furthermore, companies' systems of **categorisation** do not (usually) extend to plant-type of origin. Examples of product categories are frozen food, meat, dairy products and bread. Pulses and legume-based products can be found within categories such as: frozen food; canned products; dry goods, fresh produce or ready meals. Taking canned food as a **category** and organic, pre-cooked kidney beans as product, and this would appear in the **listings** of a **wholesaler** as follows:

Canned products => canned vegetables => canned beans => canned pre-cooked beans => canned pre-cooked kidney beans => organic canned pre-cooked kidney beans => brand names or private labels for organic, canned, pre-cooked kidney beans.

Since there is no distinct product **category** for pulses or legume-based products, buyers must use their own initiative to look for legumes and legume-based products among other items and in multiple **categories**. This calls for an active decision-making by procurement personnel whether they serve large or small **outlets**. As such, there must be an incentive to find legume or legume-based products, and such incentivisation could very well be stimulated by public policies e.g. the Organic Eating Label from Denmark, or the requirements for vegetarian options in school meals in Sweden and Portugal. From TRUE interviews with contract caterers, a growing demand for menus which present food options that are regarded as more-sustainable exist. For example, in canteens salad bars or vegetarian dishes including peas, canned (pre-cooked)-pulses such chickpeas and beans. Kitchen and procurement staff need to be aware of legumes and legume-based products, and to know where to find these products in the **wholesalers' lists** of assortments. It is therefore evident



that kitchen and procurement staff need to be educated in terms of legumes if they are to seek those types of product. Additionally, this scenario highlights the fact that in the food services industries legumes are not seen as a commodity in their own category, but rather are most often viewed simply as either a vegetable or meat-replacement; thereby undermining their suite of nutritional benefits, and which span a range of plant and meat categories. Thus, from the standpoint of their nutritional provisions, it may be argued that legume grains (*e.g.* pulses, such as pea and beans, or oleaginous legume grains like those of lupin, peanut and soybean) are staple foods, which deserve their own category. Similarly, legume-based products may also deserve a category on their own, perhaps within the legume category. As such, the classification of a ‘legume-based food’ product could be used to identify other legume products beyond that of whole or whole-processed grains, and towards the inclusion of legume-adjuncted products and even meat derived from animals, which had been legume fed.

This might ease the opportunity whereby buyers may identify ‘legume products’, whether these are fresh, frozen, canned, dried or otherwise processed and from the wide assortment of grain and forage-legume types. Another advantage of introducing a ‘legume product’ is that it may ease how ingredients for vegetarian and vegan meals are identified, hence stimulating the demand among suppliers and encouraging the development of new innovative products over the longer-term. The ‘**Legume Product**’ category could be linked to sustainability initiatives such as supporting specific legume-supported cropped systems, good nutrition and other ethical ‘**circular economy**’ based initiatives. Thus, the separate categorisation of legumes and legume-based products could be recommended, though the details underpinning such classifications would need discerned by multi-stakeholder discussion.

3.5 Certification

Food safety is a key requirement in European food supply chains and food services market. To ensure producers, distributors and kitchen staff provide safe food to the consumers - as food safety certification must be provided by all actors in the supply chain. In addition to food safety, several other certification schemes exist to assure specific standards. Certification schemes can be regulated by specific authorities, private bodies such as producer organisations or companies and by NGOs such as Fair-Trade organisation or the *International Federation for Organic Agriculture Movements* (IFOAM), for organic certifications. Some schemes are recognised internationally, and this is especially true for those related to specific food safety schemes (such as ISO22000 or BRC systems), whilst some apply in only national contexts (such as Red Tractor in the UK or Svensk Sigill in Sweden). National schemes tend to promote sustainable production or provenance. To ensure the validity and transparency of any scheme and their compliance, certified businesses are subjected to further inspection by the scheme holder, or an accredited external body. In addition to food safety, certifications related to quality are common and may relate to one or a range of attributes spanning production method, provenance and nutrition (Table 5).

Table 5. Examples of internationally recognised certification schemes and national schemes used in supply chains for food service (2018) (Annex 2, Certification Schemes)

Certification topic	Certification scheme acronym and website
Food safety	<i>ISO 22000</i> including the principles of HACCP <i>BRC</i> <i>IFS</i>
Environmental production methods	<i>EU Organic certification</i> National schemes complying with EU regulations for organic food <i>Bioland</i> (Germany) <i>Red Tractor</i> (UK) <i>LEAF</i> (UK) <i>Svensk Sigill</i> (Sweden)
Nutrition and consumption requirements	<i>Suitable for vegetarians</i> <i>Key Hole Label</i> (Scandinavian)
Quality and authenticity	<i>PDO and PGI</i> (EU recognition of provenance) <i>Red Tractor</i> (UK)
Sustainability	<i>Fair Trade</i> <i>Marine Stewardship Council MSC</i> (seafood only)

From the content of Table 5, it may be discerned that the environmental benefits that may be achieved by having more legumes in cropping systems are not represented or acknowledged in any of the listed schemes. Additionally, none of the schemes that link legume-based diets to human health and other environmental and societal benefits (*i.e.* beyond the cropped system). As suggested above, the central role of legumes to underpin sustainable agri-food systems is not being directly addressed or exploited by actors in the Food Service Market, which is further evidenced by interviews conducted for this report with **wholesalers** and **contract caterers**. However, **there is a significant interest in “sustainability” among wholesalers, chained restaurants and contract caterers**, and these interests are mainly centred around reducing food waste, food transportation, using recyclable packaging, plus menus with greater plant-based product inclusion and that may extend to encouraging local food production and community-food based projects. More recently, increased **consumers’ awareness of ‘sustainable sourced’ fish, especially from marine sources, has prompted many food providers to identify ‘sustainable fish’ options, and may categorise sustainable options by specific species and the means of capture (e.g. rod and lien only)**. This approach serves the **consumer’s** desire to achieve more sustainable consumption, or in other words, to reject more-industrial forms of food acquisition. The approach and success of sustainable fish initiatives remain to be adopted for legume and legume-derived products.

To summarise, further research is urgently needed **to ascertain how “sustainability” can be operationalised** in relation to legumes and legume-based or -derived products, and the associated supply chains which are targeted at food service outlets. In addition to the potential environmental benefits of legume-supported food systems, the cost-benefit balance in terms of public health improvement have not been accounted and therefore (arguably), been underestimated.

4. Legumes and Pulses in the Food Service Market

4.1 Types of legumes and pulses used in the food service market

4.1.1 Frozen vegetables

It is evident from interviews with **wholesalers**, **procurement** staff and **food service** operators that frozen peas and beans are used commonly within the **food service sector**. Frozen peas and frozen beans (*e.g.* haricot verts, or long slim and cylindrical green beans) are commodity products that are stocked by almost all **wholesalers** and **C&C outlets**, and the assortment of frozen vegetables is comprehensive. It is anticipated that the most important segments using frozen peas and beans are the **chained** restaurants including pubs, institutional catering (*e.g.* hospitals, schools), and to a certain degree, canteens in workplaces. Frozen peas and beans are commonly served as part of a hot meal or used cold for salads. For example, in the UK peas are very often served with fish and chips as “mushy peas” (mashed marrow peas, often infused with mint).

In an interview with a major **wholesaler** in Sweden it was stated that 90 % of the legumes the company distributes are frozen vegetables, and the remaining 10 % are canned and dried legumes and legume-based products. In the case of Sweden, the canned and dried legume grains are mainly imported from other European countries such as Italy, France or Poland (for the canned legumes), and France (for products like dried lentils). This example illustrates the international supply chains prevailing in the food service market. The high representation of frozen vegetables in the market reflects numerous aspects of **consumer** behaviour, which may largely be due to their desire for good tasting food, and mainly a sweet and fresh product which meet their nutritional expectations (protein, vitamins and fibre) as encouraged by historic private (and governmental) marketing (and education) campaigns. In addition, frozen products are relatively convenient to use by chefs.

The carbon footprint cost of frozen vegetables, including the popular leguminous products like peas and beans have not yet been accounted in nutritional value x environmental impact (of consumption) indicators, and a comparative analysis of fresh-frozen and dried legume products would be informative in this regard. It is also interesting to note that in the UK, sales of frozen peas and broad beans has declined in recent years, whilst sales of pre-cooked canned pulses, especially in flavoured sauces, **more exotic than ‘baked beans’ are increasing** (Souza Monteiro, 2018).



4.1.2 *Dried pulses*

Dried beans, lentils and chickpeas are mentioned in interviews with food service entities emphasising their growing use in professional kitchens. These interviews revealed that demands for dried beans (such as kidney beans, butter beans and white beans) are increasing particularly in the contract catering and restaurant sectors. In contrast, the demand for dried-split and -yellow peas seem to be stagnant across all segments in the public and private sectors. However, demand for high quality marrow fat peas is ever increasing from snack food processors, and such products compete with more established favourites such as ‘potato chips’ (or -crisps) and has led to the common inclusion of pulse flours in such baked products, whose composition was historically only-potato.

Contract caterers claim in interviews that the successful use of dried pulses requires prolonged period for meal preparation compared to other options. Contract caterers’ staff are usually trained to cook with dried pulses, and hence possess the necessary skills to use a wide assortment legume grain types, and especially since such capabilities are expected and respected among their peers as an important professional ability.

4.1.3 *Canned products*

The assortment of canned legume grains has until recently consisted of well-known products such as baked beans and a range of canned pre-cooked beans, peas, lentils and chickpeas. Baked beans play a profound role in the food service market as a key component of the “English breakfast”, a meal served in all types of restaurants, cafés, pubs, canteens and in the institutional catering sector. Canned beans for the food service market come in smaller cans of 340 g and large cans of 2.5 kg, depending on product and producer. The large cans are typically used in the institutional market, whereas the smaller cans appeal to customers in the café and restaurant segments. Canned beans have enjoyed a revival in the Nordic food service market due to the launch of a wide selection of canned and pre-cooked legumes and legume-based products in 2018 by “Orkla”, a large Scandinavian food manufacturer (interviews with food service professionals in Denmark).

For staff in the food service kitchens, canned beans, chickpeas and lentils offer a clear advantage over dried pulses as they are ready-to-use (no extra preparation or soaking required before use). In food service, the additional time needed to prepare raw materials such as dried pulses can be regarded as “extra costs for staff time”. Research conducted on the Scandinavian and German food service operators (Hamann, 2010 and 2014) showed that food items that shorten the time needed to prepare the meals are preferred compared to raw materials. This trend favours “ready-to-use” products such as the canned and pre-cooked items and is also observed with wholesalers and contract caterers (2018).

4.1.4 Other processed legume-based products

Soybeans are widely used for manufacturing vegetarian alternatives to meat and dairy products. As a result, the range of processed products prepared from soya is constantly expanding. From being a food item mostly targeting the vegetarian segment of the food service market, processed soya-based products are penetrating more segments due to a widening assortment. Also, the easy availability of soya as a “minced meat” substitute, or soya-based “chicken nuggets” mimics, has made it possible for food service entities to offer meat-like vegetarian alternatives to more customer segments.

A wide range of processed legume or legume-based products used in the food service outlets originate from the food processing industries. Food service entities seek such processed products that are easy-to-use or even ready-to-serve as they allow faster meal preparation, widen the options on the menus and may help ensure increased standards of food safety. Furthermore, the processed products can be more cost-effective compared to using basic raw materials. Examples of such products targeted at professional kitchens and made with legumes are listed in Table 6.

Table 6. Examples of processed legume-based products used in food service entities, and covering both fresh, dried and processed products.

Processed Products	Legume grains or pulses traditionally used in the product
Hummus (usually chick pea based)	Chickpeas
Falaffel	Chickpeas
Burgers, schnitzels, nuggets, meatball etc	Combinations of soya protein, pulses and wheat protein
Canned, fresh or frozen soups	Peas, beans, lentils, chickpeas
Baked beans	Beans
Marinated beans	Haricots and other types of beans
Tofu	Soybeans
Pasta	Lentils, peas or soybeans
Plant-based dairy alternatives such as soy milk, pea milk or milk made from almonds or oats	Soybeans, peas, nuts, oats

An example from Sweden illustrates how demand for more environmentally sustainable menus can change even strongly embedded food cultures, here for the beef- and hamburger-oriented segment (Text Box 9).

Max is the largest burger chain in Sweden having more than 100 outlets across the country with restaurants in Norway and Denmark. In 2016, *Max* launched their “Green Family” concept by introducing one vegan and four vegetarian burgers to their range of hamburgers. With already one vegetarian salad featuring on the menu, six green alternatives are now available. During 2016, sales of these green alternatives quadrupled. The aim of this launch was to have one in five orders to be non-meat (*i.e.* vegetable, chicken or fish protein based) by 2020. However, this was revised in 2017 with *Max* now aiming at one in three orders by 2020. That same year, *Max* launched the “BBQ Burger” campaign with three new burgers including one vegetarian “BBQ Halloumi” option.

Text Box 9. Example of how the Swedish company *Max* has met increased market demand for vegetarian options *via* its “Green Family” marketing campaign and product range (Treanor, 2017)

In addition, the more-sustainable consumption options can be motivated by more than environmental and pro-nutrition concerns. Increasingly, consumers have become aware of anti-nutritional aspects, *i.e.* allergic risk, of the food to which they may be exposed, which results in the demand for professional kitchens either avoiding specific commodities, or at least informing consumers about allergen risk whether contained in the meal, or indirectly *via* general use in the kitchen. Of relevance to grain legume-based foods is the intolerance to lactose (a protein common to milk from dairy cattle), which has created a strong and growing market for dairy-free alternatives. Here, products such as soy-based “dairy” products (*e.g.* milk substitutes and derived food stuffs such as yoghurts) have claimed a strong foothold in the food service market (Food Service Europe & Middle East, 2017-2018).

Following the success of the soy-based “dairy products”, other types of plant-based ‘milks’ (*e.g.* pea-milk and milk made from almond or oats) have now found their way into the food service market. Plant-based dairy alternatives are offered in many outlets including *e.g.* coffee shops, canteens, hospitals or hotels. This development pattern indicates that the food service operators are increasingly catering to the demands of people who suffer from intolerances; have specific dietary preferences; or simple consumers who take an interest in food. It could be argued that the market for plant-based products, originally founded on soya, has now developed into a new era where diversity, environmental impact and nutrition are integrated in new supply chains and new products.

Such transition paths have been driven and demanded a broadening of the array of processed legume-based product options. This increased demand for grain legume-based products is expected to be maintained and expand to meet expectations that legumes have been the feedstock for meats derived from animal and aquaculture production. Such as, assurance may need given to **consumers** on the extent to which they were sustainably sourced (*e.g.* local or not-from cropped systems which were historically rainforest) or are GM-free. Such interest may now extend to whether beef has been obtained from cattle that has been fed (only) on clover-based grass pastures. Thus, such a push-pull (push from **consumers** and pull from processors) scenarios would be in-line with sustainability initiatives in the **food service sector** as well as EC oriented policy initiatives, which are geared towards lowering dependency on protein imports, which currently run at an average of around 70% of the total demand, and mainly from meat **producers** (especially pig and poultry farms).

4.1.5 Fresh produce

Offering menus featuring seasonal produce is particularly important in restaurants and canteens selling more expensive meals. In relation to legumes, this would mean the provision of meals including fresh peas and/or beans. For professional kitchens, the time required to clean and prepare the fresh vegetables has to be assessed against the possibilities of charging a price premium for the fresh produce compared, to use industrially processed fresh vegetables (*e.g.* washed and sliced). The economics, staff skill level, profile of the **outlet** and availability of the fresh produce all play a role in this equation. Therefore, no generalisation can be made on the extent to which fresh legumes may be included or how they may (or should) be presented, as this must be assessed on a case-by-case basis. However, innovative approaches to diversify product options have extended to the inclusion of fresh pea-sprouts in salads, and pea flowers for decoration of cakes. Pea sprouts are used in the Nordic countries for decoration of hot dishes and in salads at more expensive restaurants.

4.2 Demand patterns for legumes and pulses

Legumes and legume-based products are widely used in the **food service sector** and their demand is steadily increasing as evidenced in interviews reported here with contract caterers, procurement officials and **wholesalers**. They are used in all segments of the food service market but variations in demand are segments specific. The demand for pulses and legumes in food service depends on several factors and include the following:

- the time available to prepare the food;
- the skills of the kitchen staff;
- the menu of the **outlet**;
- the economics; and,
- corporate, regional and national policies.

For kitchens in the **public sector outlets**, the staff' **time available to prepare meals is limited due to tight budgets** resulting in the use of food products which reduce **meal preparation time** and “**ready-to-use**” **commodities**, such as pre-cooked beans or canned or frozen products are often preferred. These ready-to-use products are also important in **outlets** where staff' **cooking skills are low such as**

in cafés employing non-skilled cooks. The opposite side of the competence spectrum is found in the restaurant sector and in premium canteens where skilled chefs prepare the meals and a professional pride dictates that basic ingredients are used - which helps increase demand for fresh and dried-legume-based products. It should be noted here that despite tight budgets in institutional catering, there are examples of large Danish hospitals employing skilled butchers and other food professionals, which indicates a willingness to produce high quality “home-cooked food” using genuine (*i.e.* provenanced) ingredients that have not been highly processed. These might include dried pulses, fresh produce, frozen vegetables and even legume-grass pasture fed cuts of locally produced meat. However, all consumers and users of legumes should be aware of the potential risks and mitigation strategies (Text Box 10).

Pulses or oleaginous legumes grain and green legumes (such as green beans *e.g.* edamame or pods as used in mangetout), may present an excellent food choice providing options, which are high in protein and essential minerals including iron -, dairy, animal fat- and gluten-free. They are also high in fibre and present resistant carbohydrates (releasing energy slowly), to help reduce the risk of heart disease and type 2 diabetes. In addition, there are no specific human pathogens associated with legumes used as either dried pulses or fresh and frozen vegetables. Therefore, only general or common hygiene rules apply, especially once dried grains are rehydrated. However, many legume grains do contain anti-nutritional factors whose level of consumption needs to be regulated. Such as in the case of *Lathyrus sativus* L. (fava beans or grass pea), which contain low levels of a toxic amino acid (oxalyldiaminopropionate). Problems can occur if this commodity is eaten in large quantities, *i.e.* as a staple food when it could cause *lathyrism*. Other pulses contain toxins which can be destroyed by proper preparation and cooking, such as for kidney beans, a type of common bean (*Phaseolus vulgaris* L.), which contain a naturally occurring plant toxin called *lectin*. Soybeans and lentils contain *trypsin inhibitor* that will inhibit food digestion. Such risks, and the preparation time involved, mean that ready-to-consume pulses often presented in tins, and without salt or sugar added, present attractive options to the more health- and environmentally-conscious consumer.

For further information see the following articles as examples: Ibanez *et al.*, 2003; Verma *et al.*, (2013); Scala *et al.*, 2018).

Text box 10. Food safety concerns, which may be associated with the preparation and use of legumes for human consumption and of which consumers should be aware

Food safety is a key element in the food service sector, which is closely monitored by food safety authorities in all EU countries. If a food service outlet is found to breach the food safety regulations a loss of business may ensue and therefore the importance of maintaining a high safety standard is imperative if the markets are to be maintained. The use of processed products reduces food safety hazards; a strategy which is evident across the food service segments. Food safety certifications of

the food manufacturers, *e.g.* ISO 22000, BRC or IFS play a pivotal role in purchasing procedures in public and private food service **entities**.

4.3 Purchasing criteria for legumes and pulses

The basic economic aim of the private food service is to make a profit from producing and selling meals. There are unlimited variations in the production and selling prices of a meal, reflecting the number and type of **outlets** and segments. Research across food services in Denmark, Sweden and the Netherlands revealed that the costs of raw materials for a meal in the public as well as private segments represent on average 30 % of the sales price (Hamann, 2014; Delfi, 2013; Horesta, 2013; Bord Bia, 2011). Therefore, as the margin between the production and sales price narrows, so too does the necessity to source low-priced ingredients. For legumes, this could point to the demand for both low-priced basic ingredients, and perhaps processed products depending on the premium these products command. According to interviews reported here with procurement staff and actors in public and private food service **entities**, there are several criteria which buyers prioritise when making decisions regarding the purchasing of legumes or legume-based products. It is also clear that the purchasing criteria vary across the different segments of the **Food Service Market** and for each individual product.

Thus, it is a very important for buyers in the professional market that the price is *right*, and price was the most significant **‘deciding criterion’ mentioned by respondents in most interviews**. However, the maximum price the buyers are willing to pay for purchase is unknown. This pattern is especially evident with reference to dried pulses (*e.g.* beans and chickpeas), fresh-frozen items and to some extent processed products like canned beans. Regarding fresh produce, the most important purchasing criteria are freshness and appearance followed by price and origin. In an interview with a **wholesaler** from the UK, it was revealed **that**, *“local products are preferred by our customers, but only to a certain level, when local products become too expensive compared to imported ones”*, and **that** *“organic products may be twice as expensive as conventional pulses, but some consumers regard organic as a quality attribute they are willing to pay for”*. **These statements were made in relation to organic pulses but demonstrate how buyers and distributors are balancing different quality aspects when making purchasing decision (Table 7).**

Policies encouraging the use of organic products in the **food services market** are an obvious reason for having organic certifications as the top purchasing criterion. The examples provided for Denmark (Text Boxes 1 and 6) and Germany (Berlin, Text Box 5) show, how policies can encourage the decision of buying organic products. Such scenario’s also highlight how organic commodities are perceived by **consumers**, as either better for them and or the environment and so deserving of a price premium. This is despite the reality that while organic production does not use man-made inputs, **it does use “contentious inputs”, as acknowledged in the literature and via EC supported projects (*e.g.* *Organic Plus*)**. In addition, the benefits of organic practice on soil quality and biodiversity on and one farm may be equally contentious, since the certification is, fundamentally, input focused. However, we can assume that organic systems are highly legume-dependant (with or without animals), as a source of organic nitrogen to drive production. The main point here is that avoidance of man-made pesticides and environmental benefits are perceived as Unique Selling Points (USPs), which command added value in the market place. That is, the organic USP may not be sufficiently

focused on the use and benefits of legumes *per se*. The question may then be posed that this USP (environmental protection *via* natural nitrogen fertiliser use from legumes), may be an undeveloped or unappreciated logic among many purchasers of organic products.

Table 7. An overview of the most important purchasing criteria for different groups of legumes and pulses among food service professionals (Interviews, 2018).

Type of product	Purchasing criteria (in no particular order)
Frozen vegetables	<ul style="list-style-type: none"> • Price • Consistent and expected quality • Food safety
Dried legumes and pulses	<ul style="list-style-type: none"> • Price • Origin • Variation and novelty • Certifications (related to production method and provenance) • Food safety
Canned products	<ul style="list-style-type: none"> • Convenience (pre-cooked products) • Brands • Price • Variation • Consistency in quality • Food safety
Other processed products	<ul style="list-style-type: none"> • Convenience • Variation in menus • Meal preparation facilities and staff' cooking skills • Selection of specialty product • Price • Food safety including guarantees to food intolerant customers • Vegan or vegetarian certifications
Fresh produce	<ul style="list-style-type: none"> • Freshness and appearance • Seasonality • Short supply chain • Price • Certifications (related to production method or provenance)

Taste is also amongst the most important purchasing criteria for buyers among **contract catering services with respondents mentioning that if, “taste and palatability are acceptable then they would be willing to buy the product even if it was not the cheapest one”**. This statement is supported by



comments made by a **wholesaler** who mentioned that, “*their customers in the food service sector are willing to pay the price if the quality is acceptable*”. The **challenging aspect** is, however, the definition of “*quality*”.

For some actors, the provenance of legumes and legume-based products is also regarded as a purchasing priority. In an interview with a British **wholesaler** it was mentioned that, “*it is a priority to buy local or at least domestically produced products, if the price is bearable compared to the price of imported products - in this case imported dried beans*”. Respondents in the contract catering sector mentioned that provenance of the legumes and especially dried pulses was not an important purchasing criterion compared to price and quality. From this statement, it is anticipated that the combination of price and a consistent and expected quality are the key purchasing criterions.

5. Transition Paths to a Legume-supported Food Service Market

5.1 Identifying transition paths to realise legume potential in the food service sector

The analysis in this report on the market potential for legumes in the **food service sector** is elaborated from a predominantly European perspective. The content builds on examples from mainly Scandinavia, the United Kingdom, Germany and Portugal, though also France, the Netherlands and Hungary. The findings are also based on literature reviews, and interviews with stakeholders that include dialogues captured during the TRUE project European Legume Innovation Network (ELIN) transdisciplinary workshops (as specified in Annex 1, Methodology). The resulting dataset is extensive and comprises qualitative information spanning food service sector structure, examples of effective market strategies and detailed behaviours of food service market actors including the importance position of some entities as ‘**gate-keepers**’. The insight gained indicates how critical aspects of the **food service sectors** such as public and private **procurement** contribute to shape, or not, the demand for legumes and legume-based products.

Our research of the **food service sector** indicates that the business related to the **private sector** accounts for approximately 75 % of the activities, and the **public sector** the remaining 25 % (Hamann, 2010 and 2013; Delfi, 2013). Also, and in terms of scale, the EU food service market for legumes and legume-based products (dried, frozen, canned, fresh and processed) would then be estimated at 680,000-800,000 tonnes⁶. This figure underlines the potential of the **food service sector** in shaping food demand and so agri-food system structure. However, current production-focused EU policies have failed to enable significant or sustained increases in food legume cultivation in Europe. Also, we highlight a similar low-baseline for legumes in the food services sector. There is an urgent need for more-effective policies that elevate the status of legumes in the food services throughout the EU, so that legumes may play a more effective role than is currently facilitated.

⁶ The volume is estimated by IFAU, 2018. The variation reflects the difficulties in assessing the volume for legumes and legume-based products across all relevant product categories.



If this vision is to be achieved innovation across the **food service sector** is essential. This systemic approach should establish developments at several levels such as new technical capacities and logics to enable more effective and cooperative business models. Such innovation must be adopted strategically to overcome the numerous ‘lock-ins’ or barriers that are identified. Towards that strategic ideal this report aims to help inform the necessary co-designed policies that will encourage demand- or consumer-driven change. **Among the desires of consumers’**, the following attributes of legume-based products feature highly: **highly desirable organoleptic qualities, ease of use (cooking) and affordability**. At the other end of this market, producer and **suppliers’ aggregation potential and processing-infrastructure capacities** appeared critical. In the centre of this food chain, **improved visibility of legumes at wholesalers and for well- informed consumers** need reinforced with effective marketing options.

Table 8 (below) aims to help elucidate the opportunities and barriers with recommended remedial actions or transition paths towards a central role for legumes in more-sustainable food markets.

Table 8: Transition paths and recommended actions for having more legumes and pulses* in the European food service market

The situation today	Opportunities	Barriers	Transition paths – Recommended actions
Food service accounts for 25 % and up to 40 % of the food consumed across EU countries	<ul style="list-style-type: none"> Engage in this big and growing market Legumes and pulses are used in all food service segments and in all product formats 	<ul style="list-style-type: none"> Where to start? Competition in the market is strong with established trade relations Lack of awareness of “legumes and pulses” 	<ul style="list-style-type: none"> Educate in the nutritional and environmental benefits of legumes and pulses Communication efforts to all supply chain actors
Policies contribute to shape demand for food products	<ul style="list-style-type: none"> Organic legumes and pulses or pulses with provenance are well in line with public policies on organic food and local supply chains 	<ul style="list-style-type: none"> Centralised purchasing contracts are difficult to engage in for smaller suppliers Local supply chains lack volume and logistics 	<ul style="list-style-type: none"> Educate smaller suppliers on how to engage in food service supply chains Promote collaboration between suppliers including novel distribution models
Budgets and certifications are important in the procurement of food for public food services	<ul style="list-style-type: none"> Certified suppliers have access to a big market Policies on food and nutrition encourage vegetarian options Legumes can play a role for reducing price of a meal 	<ul style="list-style-type: none"> Suppliers must be listed with a wholesaler Certifications are necessary for suppliers, it is the way in Institutional menus may be hard to change 	<ul style="list-style-type: none"> Communicate the benefits of legumes and pulses to procurement personnel Emphasise the role of legumes and pulses in a sustainability context Educate suppliers to obtain certifications Educate staff in public kitchens to use legumes and pulses
Centralised purchasing agreements are the way into public food service, restaurant chains, and contract caterers	<ul style="list-style-type: none"> There are few entry points to a big market Large contracts mean consistent supply of a volume 	<ul style="list-style-type: none"> Supplier needs to be listed with the contracted wholesaler Legumes and pulses are not specified in a category of their “own” 	<ul style="list-style-type: none"> Collaboration (among legume suppliers) to get listed with wholesalers Suppliers to promote legumes and pulses with staff responsible for procurement and menu planning Consider options for developing a “legumes and pulses category”



The situation today	Opportunities	Barriers	Transition paths – Recommended actions
Direct procurement of fresh produce from growers is uncommon	<ul style="list-style-type: none"> Build supply chains directly linking growers to food service actors, focussing on specialty crops, freshness, quality and local produce 	<ul style="list-style-type: none"> Food safety certification requirements in contracts Volumes and logistics of growers may be a challenge Growers do not know procurement procedures 	<ul style="list-style-type: none"> Support the relation-building between growers and food service actors Support growers to obtain required certificates Educate growers about the requirements for trade, e.g. how to deal with a call for tender
Standardised products (e.g. frozen vegetables and dried pulses) are traded as no-name products	<ul style="list-style-type: none"> Diversify the product range and build a brand, also applicable to smaller suppliers 	<ul style="list-style-type: none"> Contracts for standardised products can have price as first purchase criterion leaving little room for innovative products 	<ul style="list-style-type: none"> Identify market opportunities in smaller markets rather than the entire food service sector Target specialised or regional distributors (and growers) for collaboration
Wholesalers are always looking for new products	<ul style="list-style-type: none"> Wholesalers can be frontrunners by demanding innovative products Established logistics facilitate market uptake of new products 	<ul style="list-style-type: none"> Demand for volumes may be a barrier Who covers the costs of developing the new product? 	<ul style="list-style-type: none"> Promote wholesalers as collaborative partners Understand how to communicate in food service (decision making, consumers, communication tools)
Private food service operations are highly diverse, there are large and small operators	<ul style="list-style-type: none"> New green concepts gaining foothold in the market Green menus are a Hot Topic Many local entry points Volume not a requirement Diverse purchasing procedures 	<ul style="list-style-type: none"> Listings with wholesalers and C&C could be required Legumes and pulses are not (in all outlets) an “important product” Food preparation time and cooking skills may be limited 	<ul style="list-style-type: none"> Identify innovative actors and engage in collaboration to build a supply chain and to promote legumes for the menu Offer products with attributes such as organic, pre-cooked or ready-to-use
Restaurants chains (fast food) do not use many legumes and pulses	<ul style="list-style-type: none"> Market leaders among contract caterers and restaurants are evaluating the demand for green menu items 	<ul style="list-style-type: none"> Top-down collaboration led by the chain New product to be marketed by the chain – legal aspects? Food safety aspects 	<ul style="list-style-type: none"> Processors of legumes and pulses to strengthen collaboration with chained actors



The situation today	Opportunities	Barriers	Transition paths – Recommended actions
	<ul style="list-style-type: none"> Chains have many outlets (some international as well) Opportunities for developing new products 	<ul style="list-style-type: none"> Legume suppliers are unlikely to benefit in the marketing 	<ul style="list-style-type: none"> Chain to emphasise legumes (plant protein?) and pulses in the marketing of the product to food service customers
Contract caterers operating canteens in workplaces	<ul style="list-style-type: none"> Strong trend for greening of menus – healthy food Few entry points to many meals Growing demand for organic food 	<ul style="list-style-type: none"> Centralised purchasing as entry point to supply chain Time to prepare the meals is tight Kitchen staff not used to legumes and pulses 	<ul style="list-style-type: none"> Support education and inspiration of kitchen s and procurement staff Trial menus in “flagship” canteens to increase demand and for marketing purposes
Contract caterers supplying meals in public food service	<ul style="list-style-type: none"> Growing public food service sector means more meals Policies on green food and healthy food Budget restraints for meal price 	<ul style="list-style-type: none"> Centralised purchasing in the public sector Listing with wholesalers a requirement Budget restraints for meal price 	<ul style="list-style-type: none"> Identify opportunities in procurement contracts for local supply chains Certification requirements as a tool to shape purchasing patterns of contract caterer
Many processed legume-based products used in food service	<ul style="list-style-type: none"> Trend for plant-based diets leads to a growing demand for products targeted at meat-free menus Time and budgetary restraints in professional kitchens call for processed products 	<ul style="list-style-type: none"> Standardised products (<i>e.g.</i> canned pulses or frozen legumes) contribute in volumes but may have limited growth potential Lack of (innovative) recipes for using processed legume-based products 	<ul style="list-style-type: none"> Innovate to expand large-volume products (canned and frozen categories) Develop new products with attributes adapted to routines in food service (<i>e.g.</i> pre-cooked, convenience, ready-to-use, or specialties like drinks)

Some of the transition paths identified in Table 8 can be implemented in the short-term whilst others require more profound actions and a long-term approach. To have more legumes and legume-based products available in the food service market quickly, it is suggested to first ensure that legumes are built into existing supply chain structures (including at the point of production), to achieve a balanced level of inclusion. These levels remain to be defined, and will be dependent on the pedo-climate, socio-economics and cultural history of various food systems. Also, it is critical to encourage new (disruptive) supply chain structures, and new types of business-collaboration models that develop legumes and legume-based products as commercially competitive alternatives to current non(-local) legume-supported provisions.

5.1.1 Collaborative Initiatives

To have more legumes and legume-based products in the food service supply chains, focused collaboration between suppliers and wholesalers is essential as wholesalers can operate as gatekeepers by preventing or encouraging suppliers to become listed. Furthermore, wholesalers are also the preferred entry points to supply chains targeted at chained actors and contract caterers and many outlets in the private food service markets. For smaller suppliers, establishing cooperatives to build volumes may be a necessity to become listed with national wholesalers. Alternatively, suppliers would have to identify smaller or regional wholesalers or suppliers to work with.

5.1.2 Education and Communication

The education-based transition is essential to help build food service professionals' skills in cooking with legumes and legume-based products, particularly in response to the demand for vegan or vegetarian menu options. The staff in food service kitchens may need to be trained on how to use different types of dried pulses and vegan foods or to substitute conventional on-legume-based ingredients for organic (*i.e.* legume-based) food items. Many initiatives have already taken place for building competencies with food professionals, but more targeted actions centred round legumes and legume-based products are urgently needed. Such actions could be instigated with immediate effect.

The distance between those deciding to purchase a legume or legume-based product (*i.e.* kitchen staff), and those entering into the purchasing agreements (*i.e.* procurement responsible personnel in public authorities or headquarters of restaurant chains) with wholesalers, can be very wide in terms of hierarchy or location. To overcome this, it is necessary to enlighten all staff across such disparate procurement departments (public and private sector) regarding the benefits of legumes and legume-based products in a food and nutrition, as well as sustainability contexts. This line with such educational initiatives, time for the development of training programmes and associated educational materials and routines would need to be developed ahead of any effective action by procurement and marketing staff. Therefore, effective education-to-marketing initiatives are presented here as a medium-term approach. Nowadays, wholesalers host events to promote products to buyers in the public and private sectors targeting those in charge of product purchase. The involvement of procurement managers in such events should therefore be encouraged to raise awareness of the beneficial inclusion of legumes and legume-based products into the purchasing



agreements, and downstream marketing initiatives. Such promotional activities are already ongoing but needs to be expanded further.

The analysis has shown that **certification schemes** play a significant role in guiding **procurement** within the **food service market**. This implies that products fulfilling certain schemes, *e.g.* organic (legume-supported) **certification**, are favoured in some **procurement** situations. Other dominant schemes are related to food safety or provenance of products. If **suppliers** (growers as well as food manufacturers) are to exploit the opportunities available supplying certified and provenanced products, it is essential that the suppliers understand the use of the certification scheme(s) in procurement situations and, that they have the necessary competencies to comply with them. It is recommended that **suppliers** are encouraged to investigate the requirements for obtaining the mentioned schemes, and this would (probably) present a longer-term approach. In addition, it is also necessary that **suppliers** are developing internal capacities to ensure long-term compliance and quality assurance for such schemes.

5.1.3 Procurement and Policies

As previously mentioned, neither “legumes” or “legume-based products” are represented in the **procurement** system as a specific **category**. Instead, they are buried within product categories such as frozen food, frozen vegetables, canned food, processed food, grains and flour, or horticultural products. **The establishment of a product category named “legumes” and or “legume-based products” must be** considered as a priority as it is likely to prove beneficial to encourage the **procurement of these products**. The EU’s **Green Public Procurement** initiative encourages consideration of environmentally sustainable consumption in public **procurement** contracting, and legumes present a key product in this respect. The development of this new **category** would reduce the environmental impact of food production but, its instigation needs to be discussed and developed at regional and national levels to ensure fair but effective commercial competitiveness. This may indicate that realising thresholds and underpinning policy and monetary supports for “legume and legume-based” **food category** or categories may be necessary. This is presented here as a long-term vision.

Procurement criteria in the **food service sector** are firstly defined by prices, followed by a range of **other criteria such as: quality, freshness, local, ease of use and certification**. The term “*quality*” is mentioned by **procurement** personnel, but not defined in detail. This could indicate a need to design **a “quality scale” for legumes and legume-based products** that could include sustainability, organoleptic and or nutrition-quality parameters (*cf. TRUE WP5 activities and outputs*).

Growers and other food companies willing to engage in the (local) food service market and supply chains need to possess the required **certificates**, particularly with relation to food safety requirements. Other certifications (Annex 2, Certification Schemes) related to other aspects of ‘quality’ include **production method, nutrition and provenance** and can be used in policy-making and marketing strategies, which are geared to shape market demand. The analyses presented here also revealed that there is no consensus among food service **entities** regarding the definition of ‘*sustainability*’ and associated with the word are identified proxies such as ‘*reducing food waste*’, and ‘*food miles*’, using “*recyclable packaging*”, “*greening-menus*”, “*healthy-option*” menus and “*local food*” including commodities from “*community*” projects. Further research and testing



activities involving food service actors are needed to clarify how “sustainability” can be operationalised or implemented to ensure legumes and legume-based products are fully recognised and acknowledged in the food supply chains and food service market.

Supporting coordinated efforts which link suppliers with buyers across large- and small-volume food chains could promote more-sustainable consumption across the food service sector regardless of their size. Additionally, smaller-food chains such as craft- and artisan-operations do not suffer the lock-ins that larger food chain actors are exposed to. Therefore, the operatives within shorter and simpler chains have greater freedom and more rapid responses to consumers’ needs. In addition, such agents play a critical role in leading consumer sub-cultures via their capacity to highlight directly to consumers quality benefits. Such activity promotes the role of the ‘consumer citizen’ to question and so impact on the effectiveness of current public procurement foci and practices. Example businesses include the company *Hodmedod’s* and NGOs such as *Nourish Scotland* and the *Soil Association*. The way in which such a coordinated effort should be supported by governance structures, whether with public or private enterprises, remains to be defined.

5.1.4 Exploiting Novel Entry Route to the Food Service Sector

Legumes and legume-based products are already finding their way into new large market segments such as the snack- and fast-food markets. They dominate markets which might not seem obvious such as alcoholic beverages and aquaculture markets, which can require large volumes of legumes and deliver high value legume-based products. Integration of legumes to existing markets could therefore greatly increase the scale of legume inclusion within cropping systems across the EU member countries. Such large-scale markets have proven to be a strong vehicle for bringing legume-based alternatives into the food service sector (e.g. salmon production in Scotland (*Beans4Feeds*)) and have been realised as collaboration between a market leader and a large food processing company. Such examples underline the importance of innovation and collaboration and calls for large-industry engagement to modernise existing supply-chains towards greater inclusion of legumes.

6. Final Remarks

There is no doubt that legumes and legume-based foods will remain a strong driver in the European food service market in the coming years, which will have a positive effect on their demand. An increase in demand will spur growth in the production and marketing of fresh produce and processed and dried products across the European food service market. The challenge is now to grasp the marketing opportunities for every actor of the legume-based supply chains to gain a foothold in the continuously growing and diversifying legume-based food service market.



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Other information sources

- Outputs of the three TRUE-Project European Legume Innovation Network (ELIN) transdisciplinary workshops of partners and stakeholders: one output for each of the ‘Atlantic’, ‘Continental’ and ‘Mediterranean’ **biogeographical regions**. Available online at, <https://www.true-project.eu/lin-workshops/>
- Hoerkram Julemesse (Hoerkram Christmas) Trade Fair is an event hosted by one of the largest food service wholesalers in Denmark, Hørkram (<https://www.hoka.dk/da-dk>). The trade fair showcases new products across all food categories to mainly procurement executives and professional chefs. IFAU attended the fair to identify current legume-focused innovation trends, and this included a focus upon lines using fresh, dried, processed and canned products. IFAU registered the names of the producing companies (mostly Danish), brands and product descriptions. To supplement this information, catalogues from wholesalers were also gathered. These illustrated the assortment of legume (and meat free)-based alternatives. To learn more about the innovation trends for legume-based products, random and unstructured interviews were also carried out with company representatives. The information gathered from the visit has been used to elaborate sections of this report and with special respect to wholesalers and supply chain structures for legumes, the purchase criteria, the range of legume-based products offered and menu trends.



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Annex 1

Methodology

The analysis is carried out and reported here as qualitative research findings and includes a quantitative element focused on Scandinavia, the United Kingdom, Germany and Portugal. The work has included data collection from desk-top based research, interviews, TRUE-Project European Legume Innovation Network (ELIN) transdisciplinary workshops and the Hoerkram Julemesse (Hoerkram Christmas) Trade Fair in Denmark (see the Other Information Sources section for more information).

The desk-top based research element aimed to provide data on the structure and growth rates of the food service market; identification of trends, products and supply chains; and, opportunities for having more legumes and legume-based products in the food service market. This approach was also used to identify respondents for interviews. For the purpose of this report, the priority was to identify food service actors as respondents, who would provide information about menu trends, purchasing structure and preferences, and about development trends in other segments. The respondents were identified through **European trade magazines and from IFAU's network** of major companies in the Scandinavian **food service sector**. Main sources consulted for information about market trends, new products and businesses are trade magazines, industry reports, catalogues and company reporting from supply chain actors, academic papers, and websites.

Information about **green public procurement** procedures at EU level and for selected Member States has been gathered from desk-top based research including the case study of the *Organic Eating Label* in Denmark. This case study has allowed access to a knowledge pool on the implementation and impact of the *Organic Eating label*, and demand for organic legume-based foods. The data **gathering focused on literature reviews regarding the legislative basis for 'green public procurement'**, the implementation of **green procurement** practices in selected Member States. This largely desk-based initiative included reviewing EC- and national government-websites, company websites, trade magazines, and industry reports. The dataset has been supplemented by information retrieved from academic peer-reviewed papers.

Information from stakeholders in the food supply chains have been collected from a range of structured interviews with food service **professionals** and consultation with stakeholders at ELIN workshops in the United Kingdom and Germany. Combined, these methods have provided the views of more than 50 stakeholders representing food manufacturing, trade, food service, the farm sector, plus research and NGOs. The semi-structured interviews were planned to collect detailed information about purchasing behaviour, preferences for legumes and legume-based products, learning how trends for greening menus were implemented in practice, understanding supply chain dynamics and entry barriers, and to gather information about market structures. Respondents whose core activities are in the **food service sector** and who have participated in the semi-structured interviews are listed in Table 9.

Interviews were carried out by IFAU as telephone interviews during May and June 2018. Due to the competitiveness in the food service market, it was agreed with respondents will remain anonymous **in the report, therefore information derived from interviews is marked in the text as “interviews”**. As the replies from respondents provide information with limited variation, it is perceived that the interviews give a realistic picture of **today’s structures**, challenges and opportunities in food service, when it comes to legumes and legume-based products.

Table 9. Information on the respondents to our semi-structured interviews with food service professionals

Country	Respondent
Denmark	Contract caterer 1
Denmark	Contract caterer 2
Denmark	Public procurement authority 1
Denmark	Public procurement authority 2
Denmark	Public procurement authority 3
Denmark	Public procurement authority 4
Denmark	Food trader 1
Germany	Wholesaler 1
Germany	Food processor 1
Germany	Research 1
Portugal	Contract caterer 3
Sweden	Wholesaler 2
Sweden	Contract caterer 4
Switzerland	Producer of food processing equipment 1
United Kingdom	Wholesaler 3
United Kingdom	Wholesaler 4
United Kingdom	NGO 1
United Kingdom	NGO 2
United Kingdom	Food trader 2
United Kingdom	Food processor 2

The interviews have been supplemented with stakeholder consultations performed during the ELIN workshops organised within the TRUE project and included those hosted in Hohenheim (Germany) in November 2017 (Continental Workshop, C-LIN), and at PGRO, Peterborough (United Kingdom) in December 2017 (Atlantic Workshop, A-LIN). During the A-LIN and C-LIN, stakeholders representing food manufacturers, **distributors**, NGOs and the farm sector were engaged in discussions on markets and supply chains through facilitated workshops. The workshops were organised according to the World Café procedure, and the stakeholders were asked to discuss: 1) factors hindering and/or hampering legumes access to food supply chains first at an aggregated, then a more detailed level; and 2) future changes needed to introduce more legumes in the food supply chains. At both



workshops, there was a facilitator and a secretary ensuring a continuous discussion and collection of input from the stakeholders. The discussions evolved around themes such as: the types of legumes; organic *versus* conventional food chains; market power and brands; profitability; sustainable food systems; Corporate Social Responsibility (CSR); sustainability indicators; consumer demands and trends; and legume-focused collaboration and communication.

To identify processed products made from legumes and legume-based products and used by food service professionals, a visit to the largest Danish trade fair for the *Danish trade fair food service sector* was carried out in December 2017. There, innovative products were identified, and catalogues from producers and distributors were collected.

The synthesis presented here also includes reference to quantitative elements such as market size and growth rates, some of which have been identified *via* literature based sourced, whereas others are estimated by the lead author (IFAU). Quantitative data related to market size, number of meals, and growth rates have been identified from statistics and industry reports listed in the References section.

It is important to highlight that far less statistics are available for the food service market compared to the retail market, due to the complexity and diversity of the food service market. This challenge should be addressed to help develop more sustainable policies and business strategies. For the retail market, more data-recording systems are available at national and EU levels. Consequently, only estimated values have been used to indicate quantitative aspects of the food service market. When estimated values are quoted their basis are described. The 'principles for estimation', applied by IFAU, are to identify the most robust sources from the literature, and to compare the basis and values of that data with other estimates retrieved from dependant market actors. This approach provides thresholds, which can be improved as more accurate or/and detailed data become available.

Annex 2

Certification Schemes

The certification schemes referenced in this report are listed below, with a brief description and a link to the relevant website, where more information can be found. As such, the list provided below is not exhaustive, and a wide array of other certification schemes may be discerned by readers' own efforts.

- BRC (BRC Global Standards): a global standard for food safety; <https://www.brcglobalstandards.com/>
- EU Organic certification: a scheme for production of organic products; https://ec.europa.eu/agriculture/organic/organic-farming/what-is-organic-farming/organic-certification_en
- Fair Trade: a global scheme for better trading conditions for the benefit of farmers in developing countries; <https://www.fairtrade.org.uk/What-is-Fairtrade/What-Fairtrade-does>
- IFS (International Featured Standard): a global standard for food safety; <https://www.ifs-certification.com/index.php/en/>
- ISO 22000: a global standard for food safety; <https://www.iso.org/iso-22000-food-safety-management.html>
- Key Hole Label: a Nordic scheme for healthy food products; <http://www.norden.org/en/theme/former-themes/themes-2016/nordic-nutrition-recommendation/keyhole-nutrition-label>
- LEAF: a UK scheme for environmental-friendly crop production and food provenance; www.leafuk.org
- MSC (Marine Stewardship Council): a global scheme for sustainable fisheries; <https://www.msc.org/for-business/certification-bodies/supporting-documents>
- PDO (Protected Designation of Origin) and PGI (Protected Geographic Indication): an EU scheme for food product provenance; https://ec.europa.eu/info/food-farming-fisheries/food-safety-and-quality/certification/quality-labels/quality-schemes-explained_en
- Red Tractor: a UK scheme for environmentally friendly agricultural production including crops, food safety, provenance and traceability; www.redtractor.org.uk
- Svensk Sigill: a Swedish scheme for environmental-friendly crop production; www.sigill.se
- Vegetarian and vegan label: a European scheme for vegetarian and vegan products; <http://www.euroveg.eu/v-label/>