The protein shift: will Europeans change their diet?
Executive Summary: the protein shift in Europe

Protein balance in consumption raises concerns

Animal protein is important in EU diets
Dairy, meat, fish and eggs play a major role in European diets and have become the main source of protein in our diets. Besides their economic, social and functional importance, animal products also offer high nutritional values compared to many plant-based protein sources, like grains, pulses, nuts and mushrooms.

Is our diet sustainable?
Environmental issues, health issues related to diets, and discussions on animal welfare underline the importance of a more sustainable balance in EU protein consumption. Especially because growing global food demand increases the pressure on the global food system.

Plant protein sources are part of the solution
A different protein mix in European diets can be part of the solution as plant-based protein sources are generally more sustainable. But is it likely that European consumers will substitute part of their animal protein intake with plant-based products over the next ten years? To answer this question we surveyed 13,000 European consumers, consulted industry experts and conducted extensive desk research.

Animal protein consumption in Europe has been stable at high level since the 1990s...
Animal protein consumption per capita in Europe

...but with several trends that will impact future supply and demand...
Climate policies will affect animal food production
Better plant-based alternatives become available
Consumer preferences shift, health most important driver

...the likelihood of a protein shift increases
Executive Summary: the protein shift in Europe

Will European consumers change their diet?

Europeans love cheese
When it comes to diets, changes don't happen overnight. For any number of reasons consumers don't seem inclined to make drastic changes to their diet. Of all European respondents in the ING International Survey, 95% would miss one or more animal food products if they were no longer available to them. Across Europe, our survey found that cheese is valued the most, followed by chicken and milk.

25% expects to eat less meat
Still, the willingness to change is clearly present among some consumers. One out of four European respondents expects to eat less meat in five years time, mainly due to associated negative health effects. The combination of concerns on animal food products fuels attention for alternative protein sources, of which many are plant based. Both companies and governments influence market conditions and can accelerate a protein shift.

Food companies look into alternative proteins
Food companies are challenged to provide everyday alternatives that are able to replace the high value consumers currently place in meat, dairy, fish and eggs. Investment and innovation in meat and dairy substitutes creates mature markets for plant-based products. New generations of products become available and the development pipeline is filled with ‘novel’ protein sources.

Protein puzzle creates dilemmas for policymakers
Policymakers possess the tools to stimulate a protein shift. European reduction targets for greenhouse gas emissions provide a common ground for the decision-making process. However, many of the policymakers’ tools remain unused as the economic importance of livestock production, limited electoral support and uncertainties on tax-related measures prevent governments from taking more decisive action.

Main reasons why a protein shift is likely to happen

- There is unmet demand among consumers.
- Alternative proteins are top of mind for food companies.
- Policy makers acknowledge need to act because of CO₂ reduction targets.
Executive Summary
Protein balance in consumption raises concerns 2
Will European consumers change their diet? 3

Part 1 | Animal protein in the EU: important but under pressure 5
How will consumption of animal food products in Europe develop in the next ten years and what are the main concerns regarding animal protein consumption?

1.1 The importance of animal food products
EU consumers spend over € 400 billion on animal products 6
Europeans especially fond of cheese 7
Animal products remain popular 8

1.2 Defining the problem of the protein shift
Environment, health and animal welfare put pressure on animal products 9
Lower emissions not on our menu 10
Limited room for environmental gains in production 11

Part 2 | What are the drivers and barriers for a protein shift in Europe? 12
Key for protein shift lies in policy, innovation and consumer preferences 14

2.2 Public policy
Policy makers can influence our menu... 14
... but are anxious to regulate freedom of food 15

2.3 Innovation
Big food and tech companies invest in protein shift 16
Next generation of protein sources in the making 17
Plants provide growth opportunities 18

2.4 Consumer preferences
Alternatives need to outperform the real deal 19
Cheese would be missed most 20
Health main driver for lower meat consumption 21
Meat consumption expected to decline by 3% 22

Colophon 23
Part 1 | Animal protein in the EU: important but under pressure
Animal protein in the EU: important but under pressure

EU consumers spend over €400 billion on animal products

More than half of protein intake from animal food products
Dairy, meat, fish and eggs play a major role in European diets both in nutritional and financial terms. Compared to many plant-based protein sources animal protein products offer high nutritional values making them the main source of protein in our diets. Since the 1960s two distinct periods can be identified in EU consumption.

1960-1990 - Balance shifts towards more animal food products
• Per capita consumption of animal products increased sharply (+50%) due to rising incomes while higher yields and more efficient production technologies resulted in improved availability and lower prices.
• The share of animal protein in total protein intake increased from 48% in 1960s to 59% in 2007.

1990-2015 - Consumption per capita stabilizes
• Rising incomes become less important for consumption growth. Shifting consumer preferences and demographic change (ageing populations consume less) gradually become more influential.
• Western and Southern Europe experience a slight reversal in total consumption as intake of milk and beef falls. Central and Eastern countries are still catching up to average EU consumption levels.

Meat is biggest category in €900 billion EU food retail market

Total food expenditure in EU 28 in 2016, in billion euro

EU consumer spends 800 euro per year on animal food products
Average expenditure on food categories per inhabitant, EU 28 in 2016

Until the 90s the only way was up for EU animal food consumption, since then most products stabilised
Consumption in kilogram per capita per year, based on animal food supply

Source: FAO data on EU 27 / ING Economics Department, *Dairy expressed in cheese equivalents
Animal protein in the EU: important but under pressure

Europeans especially fond of cheese

Hard to live without animal food products
Many European consumers find it hard to imagine their diet without animal food products. Out of all animal products cheese would be missed most. Chicken ranks second and milk third. Only a small minority of 6% of all respondents say they wouldn’t miss any animal food product.

Most Europeans are regular meat eaters
The consumption of animal food products in general and meat in particular varies widely between consumers. The largest share (74%) of Europeans consider themselves regular meat eaters and eat meat several times a week. Almost 10% reports eating meat every day.

1 out of 25 Europeans doesn’t eat meat
Only a small share of around 4% of European consumers state that they don’t eat meat. This is more common among female and younger consumers than among male and older consumers.

Don’t take away our cheese – out of all animal food products cheese would be missed the most
Question: Imagine the animal products below were not available to you anymore. Which would you miss the most? Percentage of European respondents

<table>
<thead>
<tr>
<th>Animal Product</th>
<th>Percentage of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>cheese</td>
<td>20%</td>
</tr>
<tr>
<td>chicken</td>
<td>17%</td>
</tr>
<tr>
<td>milk</td>
<td>14%</td>
</tr>
<tr>
<td>beef</td>
<td>11%</td>
</tr>
<tr>
<td>eggs</td>
<td>11%</td>
</tr>
<tr>
<td>pork</td>
<td>10%</td>
</tr>
<tr>
<td>fish</td>
<td>9%</td>
</tr>
<tr>
<td>lamb</td>
<td>2%</td>
</tr>
<tr>
<td>other</td>
<td>1%</td>
</tr>
<tr>
<td>none</td>
<td>5%</td>
</tr>
</tbody>
</table>

Source: ING International Survey

74% of European consumers eat meat regularly
Question: how often do you eat meat?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>4%</td>
</tr>
<tr>
<td>Once a week or less</td>
<td>22%</td>
</tr>
<tr>
<td>2-3 times a week</td>
<td>43%</td>
</tr>
<tr>
<td>4-6 times a week</td>
<td>23%</td>
</tr>
<tr>
<td>Every day</td>
<td>8%</td>
</tr>
</tbody>
</table>

Source: ING International Survey

Looking for more results?
The results on this page are just a selection of the ING International survey. More detailed results on products and countries can be found on pages 20-22. Additional statistics can be provided on request, see colophon for contact details.

* This is self-reported data meaning that it could be possible that respondents under- or overestimate their consumption.
Animal protein in the EU: important but under pressure

Animal products remain popular

Total consumption of animal food products still growing
European projections show that total consumption of most animal food products will grow during the next decade. A gradual growth of Europe’s population, from 511 million to 514 million, is a major driver.

Beef and milk likely to decline while intake of cheese, eggs and poultry increases
Forecast consumption of food products per capita is mixed and depends on developments both on supply and demand side.

- The expected decline in EU beef consumption is the result of both lower availability (mainly smaller dairy herd size) and lower demand.
- Cheese consumption is expected to grow due to higher intake in Central and Eastern Europe and the increasing use of cheese in processed foods.
- Poultry wins in popularity because of its affordability, healthy image and the lack of religious and cultural barriers for consumption.

Per capita consumption of cheese expected to rise most within EU*
Forecast of consumption per capita (retail weight), index 2016 = 100

Source: EU Agricultural Outlook,
* Due to the complex set of variables many possible outcomes exist for future animal protein consumption. This means that these forecasts need to be interpreted as a base case scenario.

Consumption gap within Europe is getting smaller
Central and Eastern European countries (EU-N13) are catching up other member states (EU 15) in terms of consumption of animal food products. Differences in consumption levels will become smaller within the next ten years.

- While total meat consumption per capita in Western and Southern Europe is falling, it is still rising in Central and Eastern member states.
- Demand for pig meat per capita in EU-N13 countries will increase gradually mainly driven by Poland and Romania.
- For poultry the rate of growth in the EU-N13 will be less than in previous years due to markets reaching maturity. EU-N13 per capita consumption of poultry has overtaken EU-15 levels since 2012.

Source: EU Agricultural Outlook

Global demand for animal protein still growing fast
The most dynamic markets for animal protein can be found outside the EU. Global population growth and rising incomes in Asia and Africa provide a solid growth base for animal protein consumption. This will involve large scale growth of local production and the additional need for imports.

Source: EU Agricultural Outlook
Animal protein in the EU: important but under pressure

Environment, health and animal welfare put pressure on animal products

Growing concerns over animal food products
The popularity of animal food products is connected to several societal issues. Current consumption levels of animal protein have serious implications for the environment (greenhouse gas emissions, land- and water use and biodiversity), health and animal welfare.

Greenhouse gas emissions are main concern for policymakers
Raising livestock and related activities in the supply chain account for 10% of EU greenhouse gas (GHG) emissions. Due to the contribution of livestock farming to emissions, all EU countries want to reduce related emissions according to the Paris Agreement proposals. Because of this common goal we consider the environment to be the main reason for EU governments to influence the protein balance on our plates.

Tackling the emission issue through production or consumption?
Policymakers can direct measures at producers, consumers or both. Agricultural policies stimulate higher yields and efficiency gains on the production side. This has also resulted in lower emissions in the food chain. The scope of measures aimed at achieving a change in protein consumption is still limited and consists mainly of awareness campaigns.

“ A protein transition is needed for a sustainable agro food chain, the production and consumption of plant based protein play an integral part in this”
Dutch Ministry of Economic Affairs 2018 budget

Governments can stimulate lower emissions on production and consumption side. Current measures primarily aimed at production.

Health and animal welfare most important concerns for consumers
According to the ING International Survey, the main issue for consumers regarding meat consumption is health. Respondents also rank animal welfare higher than environmental concerns.

Health: meat intake, AMR and zoonotic diseases
• Both the World Health Organization and national food guidelines point to health risks of diets high in processed meat.
• Antibiotics use in the livestock sector contributes to antimicrobial resistance (AMR) in humans.
• Fears exist that outbreaks of zoonotic diseases such as avian flu can harm human health.

Animal welfare: pressure on producers and retail to raise welfare standards
The total European animal herd equals 2.5 billion (mostly chickens) or an average of 5 animals per person. The overall size of production and ongoing trend towards large scale farming fuel discussions on animal rights. This is especially the case in countries like the Netherlands and Germany where NGOs are very influential in the public debate.
Animal protein in the EU: important but under pressure

Lower emissions not on our menu

Consumption trend is no driver for lower emissions

When we combine the European outlook for meat, dairy and eggs with the average emissions during production it shows that total emissions won’t decline towards 2025 (see below). Although emissions related to beef and milk are likely to decrease, this effect is reversed by the increasing consumption and emissions of cheese, lamb and poultry.

Beef related emissions: not all beef is equal

Consumption of beef is responsible for the largest share of CO₂ emissions but the differences between the most (approx. 20kg CO₂ per kg) and least efficient (>100kg CO₂ per kg) production method are large. Agro-ecological conditions, farming practices and supply chain management determine these differences. On average beef cattle raised in extensive production systems has a higher footprint than meat from dairy cows in intensive systems. Europe’s large dairy herd helps to keep European emissions relatively low.

No change in total emissions despite anticipated dietary change

Emission intensity, consumption and total emissions for selected animal food products

<table>
<thead>
<tr>
<th>Animal protein</th>
<th>Average CO₂ EQ per kg</th>
<th>Beef related emissions: not all beef is equal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef</td>
<td>22,6</td>
<td>Consumption of beef is responsible for the largest share of CO₂ emissions but the differences between the most (approx. 20kg CO₂ per kg) and least efficient (&gt;100kg CO₂ per kg) production method are large. Agro-ecological conditions, farming practices and supply chain management determine these differences. On average beef cattle raised in extensive production systems has a higher footprint than meat from dairy cows in intensive systems. Europe’s large dairy herd helps to keep European emissions relatively low.</td>
</tr>
<tr>
<td>Cheese</td>
<td>9,2</td>
<td></td>
</tr>
<tr>
<td>Pork</td>
<td>3,5</td>
<td></td>
</tr>
<tr>
<td>Lamb</td>
<td>40,0</td>
<td></td>
</tr>
<tr>
<td>Poultry</td>
<td>1,7</td>
<td></td>
</tr>
<tr>
<td>Eggs</td>
<td>1,7</td>
<td></td>
</tr>
<tr>
<td>Milk</td>
<td>1,3</td>
<td></td>
</tr>
</tbody>
</table>

Although lamb has the highest emissions per kilogram...

Average CO₂ EQ per kg...

...and we mainly eat pork and poultry...

in million ton / meat = edible meat...

...it’s beef that has the largest share in total emissions...

in million tons CO₂ EQ, 2016...

And although we will eat less beef in the future...

Consumption change 2016-2026 in million tons...

...total emissions will hardly change.

Change of emissions due to consumption 2016-2026 in million tons CO₂ EQ

Assumptions for calculation

- Outcome is based on assumption that CO₂ EQ per kg remains stable between 2016 and 2026. However it is likely that production will become more efficient.
- Total emissions include CH₄, N₂O (due to soil emission, enteric fermentation and manure management) and CO₂ (fossil fuel and electricity used for production).
- Average emissions for cheese are based on CO₂ EQ of milk x 6,5 (6 to 7 litres of milk is needed to produce 1 kg of cheese).

Source: Average CO₂ EQ per kg - Lesschen et al, EU consumption statistics - EU Agricultural Outlook, Emission forecast – ING Economics Department.
Animal protein in the EU: important but under pressure

**Limited room for environmental gains in production**

**Emission reduction in production proves to be more difficult to achieve**

When consumption isn’t contributing to emission reductions, it’s up to food producers to realise lower emissions. Many cost-effective measures to improve efficiency on the production side have already been taken. Because of this the reduction of livestock-related GHG emissions since 1990 is well within the European 2020 target (-20%). However, without additional policy measures, future progress and a contribution to the general 40% reduction target for 2030 will be very limited. This is why the EU Commission studies the desirability of further emission reduction in food production and the willingness to bear the costs involved.

**Further reductions come at a cost**

European animal food production is already very efficient compared to other regions. This makes it increasingly difficult and costly to reduce emissions, because:

1. Internalising the costs of external effects (for example through taxing CO2 emissions) eventually leads to higher production costs. This can lead to higher prices and pressure on European competitiveness.
2. Increased efficiency in production can be conflicting with other societal goals like animal welfare.

---

**Downward trend in livestock related emissions has stopped**

Average change per year in livestock related emissions in EU28

<table>
<thead>
<tr>
<th>Year Range</th>
<th>Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991-1995</td>
<td>-2.6%</td>
</tr>
<tr>
<td>1996-2000</td>
<td>-0.8%</td>
</tr>
<tr>
<td>2001-2005</td>
<td>-0.9%</td>
</tr>
<tr>
<td>2006-2010</td>
<td>-0.7%</td>
</tr>
<tr>
<td>2011-2015</td>
<td>0.2%</td>
</tr>
</tbody>
</table>

Total reduction 1990-2015: 22%

Source: European Environment Agency, excluding emissions in processing, transportation and retail

---

1 See also PBL – The Protein Puzzle
Part 2 | What are the drivers and barriers for a protein shift in Europe?
What are the drivers and barriers for a protein shift in Europe?

Key for protein shift lies in policy, innovation and consumer preferences

Protein shift is dependent on three key drivers

We identify three main drivers (public policy, innovation and shifting consumer preferences) that shape future protein consumption in Europe. Besides the three drivers described in this chapter, macro-economic factors (such as exchange rates and oil prices) and development of yields can also influence future availability and consumption of animal and plant-based products.

Why can a protein shift move faster than expected in EU forecast?

• Public policy. Governments haven’t been fond of policies influencing our menu. Still they have a lot of options to influence consumption of products with a large footprint. Reducing CO₂ emissions and balancing the ‘costs’ of these reductions between producers and consumers are important reasons to reconsider existing policies (see page 14-15).

• Innovation. The number and availability of alternatives for animal food products is growing as Big Food and tech companies invest in plant protein and overall quality is improving (see page 16-18).

• Consumer preferences. There is untapped potential among consumers who are willing to change their diet but face barriers to do so. Breaking down those barriers can help to stimulate dietary changes. Food influencers like NGOs and role models play an important role in creating awareness (see page 19-22).

Drivers of a protein shift and possible outcomes when European consumption pattern changes

Drivers of a protein shift and possible outcomes when European consumption pattern changes

Current protein mix

Availability and consumption of protein will be influenced by

• Public policy
• Innovation
• Consumer preferences

Which can lead to

1. Animal to non-animal proteins
Meat, fish, eggs and dairy get replaced by alternatives.

2. Different animal proteins
Resource intensive products get replaced by less intensive products.

3. Lower consumption of protein
Proteins gets replaced by other nutrients following dietary guidelines.

Future protein mix
Public policy

Policy makers can influence our menu...

From a general reduction target to specific policies
European governments aim for a significant reduction of emissions. Still there is no blueprint for future policy regarding food production and emissions. Due to the many actors involved in the globalised food chain there are many uncertainties on the effectiveness of additional legislation. Either way, when policy measures are taken this will have economic implications for both companies and consumers.

The policy toolkit
Policy makers possess several instruments to influence the balance between animal and plant-based food products. Governments can guide producers and consumers in a certain direction through:

1. Direct and indirect subsidies
   Both animal and plant-based products receive direct and or indirect subsidies. Examples include support for innovations or means to promote products within the EU or abroad.

2. Differentiating tax regimes
   In general animal and plant based products fall under same tax regimes but this could change.

3. Using legislation to set production standards.
   Standards on production methods of animal protein have been widely adopted. With some countries (like The Netherlands) raising the bar even further.

4. Creating awareness through education, media campaigns and/or food guidelines.
   Dietary guidelines propose a more even balance between animal and plant-based products. Those guidelines are influential but so is the marketing of food producers, retailers and restaurants.

Policymakers clash on protein
- Germany’s Environment Ministry no longer serves meat and fish at its functions “to set a good example as vegetarian food is more climate-friendly,” said spokeswoman Nina Wettern (source Bloomberg). But Germany’s agriculture minister called for a ban on “pseudo-meat” labels such as “vegetarian schnitzel” and “vegan curry sausage”, arguing that they mislead consumers (source Reuters).

Policy toolkit consists of subsidies, tax measures, legislation and awareness campaigns

Source: Reuters
Public policy

... but are anxious to regulate ‘freedom of food’

European policymakers face dilemmas
Although potential benefits exist governments are reluctant to interfere with current food consumption patterns.

Why would governments use additional policy measures?

1. Environmental benefits
   Lowering consumption of resource-intensive (animal) food products helps achieve (local or global) climate goals. Livestock is a relatively large contributor to total GHG emissions in countries like Ireland, Denmark and Romania.

2. Healthier diets
   A reduction in intake of red and processed meat can yield health benefits among the population.

3. Local pressure
   Large scale and intensive farming creates opposition among citizens, especially in EU regions with high livestock densities (like the Dutch province of Noord-Brabant).

Why are governments reluctant to interfere?

1. Economic importance
   Millions of farmers rely on animal food products for their income and the EU is a net exporter of dairy products, pigmeat and poultry. Policy measures influence the Food & Agri sector and will certainly receive resistance.

2. Public opinion
   Public opinion is generally sensitive towards governments that meddle with food choice (‘nanny statism’). In the IIS only 14% of respondents say governments should be leading in a possible reduction of meat consumption. In The Netherlands support is relatively high (25%) while in Austria, Germany and Poland it is only 6-8%.

3. Tax measures lack support and outcome is uncertain
   Just 13% of respondents would advise their government to impose taxes on meat to reduce consumption. When taxes are imposed, it is yet to be seen if this would be effective. Researchers at Oxford University identify multiple unwanted side effects of taxing meat.

Conclusion: topic is on the agenda but limited progress
Food related policies are being discussed at both a European and country level. Even if consensus is reached it will take time to implement measures. In the meantime, governments are trying to influence the balance between animal and plant proteins by creating awareness. It remains to be seen if governments will ‘beef up’ their efforts with additional policy measures or remain focused on emissions from other sectors like energy and heavy industry.

Source: ING International Survey, EU Agricultural Outlook
Protein buzz grabs hold of food industry
High sales growth, ample opportunities for innovation and the possibility of attracting consumers with a positive (health/sustainability) rather than a negative (salt, sugar, fat) angle leads to a lot of buzz around plant protein. These dynamics are illustrated by takeovers, successful investment rounds and plant protein producers expanding capacity.

Plant protein attracts attention of ‘Big Food’
Companies in plant-based protein prove to be interesting takeover candidates for Big Food. Examples include Danone buying Whitewave Food (owner of organic dairy brand Horizon and non-dairy milk producer Alpro) for US$12.5 billion, Nestlé buying US-based Sweet Earth and Monde Nissin’s acquisition of Quorn in 2015. The European market is still quite fragmented with many privately owned brands with roots in the meat industry, like Vivera and Rügenwalder Mühle, and challengers, like De Vegetarische Slager.

“In the United States, we’re experiencing a consumer shift toward plant-based proteins. One of Nestlé’s strategic priorities is to build out our portfolio of vegetarian and flexitarian choices in line with modern health trends”.
Paul Grimwood – Nestle USA Chairman and CEO

“It is not only about innovation and new products but also about tempting a larger audience to go and try the many good alternatives that are already available.”
Jeroen Willemsen – Founder Green Protein Alliance

Plant protein ‘start-ups’ attract US$500 million
US plant-based companies like Impossible Foods, Beyond Meat and Hampton Creek have attracted more than US$500 million in investments in the past five years. Most of it from outside the traditional food industry. Backed by large R&D and marketing budgets they aim to change conventional thinking about food.

Source: Crunchbase

European production capacity expanding
Growth in demand and positive business sentiment lead to large investments along the plant-based production chain as these examples illustrate:
• French food ingredient company Roquette is investing €340 million in pea protein processing facilities in both France and Canada.
• Quorn is planning to invest €165 million in its UK production facilities.

Source: Company websites
**Soy, mycoprotein and wheat dominate meat substitute market**

Many alternative and plant protein sources exist and their use is facilitated by research into new possibilities for the extraction, processing and texturing of these sources. Meat substitutes based on soy, mycoprotein or wheat and dairy substitutes based on almonds or soy are most well-known due to their availability and capabilities. Pea protein is on the rise and other grains and protein sources like algae, seaweed and lab meat (also called clean meat) are further down the development curve.

**Range of alternative protein sources is still in infancy stage in Europe**

**Infancy stage**

- Novel protein sources that are not (yet) accepted by average consumer

- Soy
- Mycoprotein
- Wheat
- Nuts
- Almonds
- Quinoa
- Teff
- Lab meat ('clean meat')

**Adolescent stage**

- Runner up protein sources. Pea, oats and lupine are increasingly used as food ingredient.

- Soy
- Mycoprotein
- Wheat
- Nuts
- Almonds
- Oats
- Pulses
- Pea
- Lupine
- Niche grains (teff, quinoa)

**Mature stage**

- Protein sources that are generally accepted and are widely available

- Soy
- Mycoprotein
- Wheat
- Nuts
- Almonds
- Oats
- Pulses
- Pea
- Lupine
- Niche grains (teff, quinoa)

“Do vegetarian meat alternatives need to mimic meat? If they do, people will keep comparing the two, and improved products need to be developed to satisfy consumers. If they don’t mimic meat, more creativity is necessary to create new products that replace the function of meat”.

*Flavio Garofalo - Givaudan - Global Business Development Manager, Proteins*

**Meat replacements face own challenges**

Replacing animal products in terms of flavour and texture is hard. Products get increasingly better and in some cases it will be just a matter of time until consumers won’t taste any difference. Besides taste and mouthfeel we identify five other bottlenecks that can impede the use of plant-based protein:

1. **Supply**: competition between crops for food and biofuel can be harmful for protein crops. As long as oil prices remain low competition remains low. Limited supply of non-GMO soy is an issue for the European food industry.
2. **Production capacity**: capacity to process plant protein is growing, but scale remains limited compared to animal food operations.
3. **Nutritional value**: some alternatives and products have a lower nutritional value compared to meat or are criticised because of high levels of salt and other additives.
4. **Consumer acceptance**: novel protein sources like algae or labmeat face acceptance barriers among consumers. Almost 75% of respondents in the IIS wouldn’t consider eating either an insect, seaweed, algae or labmeat burger on a regular basis.
5. **Allergens and intolerance**: alternatives based on soy and wheat are not suitable for all consumers.
Innovation

Plants provide growth opportunities

Plant-based protein presents growth opportunity in mature markets
High growth in plant-based protein markets drives innovation, investment and startup activity. Still the EU’s leading position as a producer of animal food products and legacy can withhold incumbent firms from developing alternatives.

“We invest heavily in our production facilities and our R&D share lies far above the average in the meat-free industry”.
Gert Jan Gombert – Commercial Manager at Vivera, Europe’s 3rd largest producer of meat substitutes

Why European food & agribusiness embrace a protein shift

1. Opportunities in high growth markets
Categories like meat substitutes, plant-based dairy and pulses show high growth rates. Global sales of plant-based meat substitutes are growing at twice the rate of processed meat and have gained 8% a year since 2010, to about US$2 billion currently (Bloomberg Intelligence). The popularity of non-dairy milk has lead to a revenue share of 7.5% of the US total milk market.

2. Public image
Contributing to a protein shift can be a way for companies to improve their public image for both consumers and shareholders.

3. Increased regulation and consolidation
Higher production standards for animal foods within Europe lead to higher investment levels and larger scale farming. Small firms face difficulties remaining in the market and new entrants cope with higher entry barriers. Dynamic plant protein markets provide opportunities for those companies.

Why European food & agribusiness will stick to animal protein

1. Vested interests
Animal protein represents the largest share of the EU food market, is dominated by some of the largest food companies and provides the highest number of jobs in the food industry.

2. Growing global food demand and growth outside Europe
Global demand for animal-based food products is still growing fast and can make up for sluggish demand in Europe. For example, Asian revenues are becoming more important for the Dutch dairy company Friesland Campina and Danish meat producer Danish Crown.

3. Favourable conditions for production in Europe
The European climate and specialisation give producers a competitive advantage and support Europe’s leading position n the production of animal protein.

Conclusion: added value of plant-based product gets more recognition
Many food companies realise that when a product is plant based this in itself can have an added value. Some meat companies currently already earn the main share of their revenue out of meat substitutes. However, the large majority of animal protein producers is still reserved for the role of alternative protein within their strategy.
Consumer preferences

Alternatives need to outperform the real deal

Consumers love animal food products
Moving towards diets with a lower environmental impact is not a problem of supply as retailers provide ample alternatives for animal food products. The key question is which consumer needs are to be addressed to ease people into making a shift. Because the economic, functional, social and nutritional value of animal food products are high this is not an easy process.

Plant protein products need to provide a better alternative
Alternatives for animal food products have to address several elements to be even considered by consumers. They need to outperform on a combination of quality, price, health, convenience and good conscience to be able to appeal to the majority of European consumers. Progress is being made on all these five key elements.

Why protein is not like smart phones and electric cars
When consumers are provided with innovative alternatives that are both better and provide better value, a transition can move really fast. The switch from mobile phones to smart phones provides a good example. Other transitions, like electric cars, are heavily stimulated by governments through tax incentives and future bans on diesel and petrol cars. The protein shift is a different matter. Food lacks the kind of network effects linked to digital technology and while governments can discourage consumption it is unlikely that they limit freedom of choice as is happening with cars.

Improved alternative protein products address five key elements
- Better conscience: Alternative protein sources score better on animal welfare and have on average lower environmental footprints.
- Faster: Convenience is improving due to the growth in points of sale, product range and better usability.
- Cheaper: Current generation of meat substitutes is better in terms of taste and texture and the next generation is ready to hit the market.
- Healthier: Increased competition improves affordability. Necessary to convince consumer because on average meat is still cheaper.
- Products are becoming less reliant on salt.

Meat substitutes still in upper range in terms of price
Range of consumer prices per kilogram for several protein products

- Pulses
- Pork meat
- Cheese (Gouda)
- Beef (burger)
- Chicken
- Nuts
- Meat substitutes
- Beef (steak)

Source: AH.nl, *average protein content per product is different

Source: ING Economisch Bureau

Increased competition

Why protein is not like smart phones and electric cars
When consumers are provided with innovative alternatives that are both better and provide better value, a transition can move really fast. The switch from mobile phones to smart phones provides a good example. Other transitions, like electric cars, are heavily stimulated by governments through tax incentives and future bans on diesel and petrol cars. The protein shift is a different matter. Food lacks the kind of network effects linked to digital technology and while governments can discourage consumption it is unlikely that they limit freedom of choice as is happening with cars.
Consumer preferences

Cheese would be missed most

Men love beef, women love cheese
On average cheese, chicken and milk have the highest emotional value for consumers but large differences on a country level can be found. The results of the ING International Survey show that:

• Men are bigger meat lovers than women. The share of men answering beef or pork is almost twice that of women. Women place higher value in cheese, milk and eggs in their diet.
• 20% of consumers consider cheese as hardest product to miss. Italy has the highest share, which is understandable considering the importance of cheese in Italian favourites like pizza and pasta.
• Chicken is the UK’s favourite: owing to the cultural and religious diversity of the UK population.
• Beef ranks highest in France and the Benelux and scores relatively low in Central European countries were affordability of beef is generally lower.
• While consumption of pork is high in volume terms it’s fan base is rather small and mainly concentrated in Central Europe and Germany. At the same time a rising number of consumers with a Muslim background limit the popularity of pork.
• Consumption of lamb is limited in most countries. However it is important in Greece and Turkey.

Country favourites: cheese in Italy and chicken in the UK
Percentage of respondents indicating they would miss a certain animal food product, top three countries per product

“A 100% plant based diet is utopian thinking for the average consumer. The human body is not adapted to that. A shift in the balance between animal and plant based is possible”.
Jos Goebbels – President of Dutch Meat Association
Health main driver for lower meat consumption

What values are involved in a dietary change?
The economic, functional, nutritional and social values of our current diet influence the willingness to adapt to a different consumption pattern.

Majority has no inclination to change meat consumption
Plenty of reasons prevent people from lowering their consumption of animal food products. These include:
- culinary culture and traditions;
- rising incomes;
- lack of knowledge of negative effects;
- lack of financial incentive to switch;
- overall food environment which puts animal food products first.

Health most important driver to reduce meat consumption
For consumers who expect to change their diet, health is the main reason but often in combination with one or several other reasons.
- **Health.** Especially older consumers and people in Italy and Spain consider cutting back their meat intake for health reasons.
- **Animal welfare.** An important reason in some countries, for example in Germany more than 30% of respondents (or around 7 million consumers), claim to eat less meat in the future mainly because of animal welfare.
- **Price.** On average the impact of rising prices on demand for meat is higher than for other animal food products. Price is the most important reason for French consumers to cut back on meat.
- **Environment.** Environmental concerns are relatively important to consumers aged 18-35. Out of all respondents 44% considers eating meat and fish to be harmful for the environment. 33% considers eating meat not to be harmful and 22% doesn’t know if it’s harmful or not.
- **Social environment.** Family members or friends who change their consumption pattern or role models who recommend a certain lifestyle can influence others.

• Other reasons, such as age and taste. Ageing European populations tend to consume less food and different products. Meat is harder to eat/digest for older consumers.

Conclusion: consumer preferences are changing slowly
Among consumers it is more common to reduce meat consumption than to step up intake. Still, many barriers prevent consumers changing their diet. Because of this we expect European diets to change gradually over the next five years as the untapped potential is clearly present.
Consumer preferences

Meat consumption expected to decline by 3%

Untapped potential exists. Will it be fulfilled?
In most European countries the willingness to reduce meat consumption is clearly present. This is especially the case in Luxemburg, Belgium and France, countries where awareness of the negative environmental impact of eating meat and fish is also relatively high.

Lower meat consumption likely
Consumer expectations give an indication of the potential shift in meat consumption. According to our calculations this translates in a 3% decline in EU meat consumption for per capita and total consumption. In this figure both current consumption patterns and the level of change are taken into account.

Older consumers more inclined to reduce meat consumption
There is a clear link between the willingness to reduce meat consumption and age. For people aged 18 to 24 the two groups (eat more meat / eat less meat) are evenly balanced. Within all other age groups the share of respondents expecting to eat less meat is bigger and especially for consumers older than 55. So even while millennials are considered to be trendsetters, the biggest target audience of people wanting to cut back on meat is to be found among older age groups.
Experts interviewed

Nicole Freid Hak
Flavio Garofalo Givaudan
Jos Goebbels COV
Gert Jan Gambert Vivera
Arielle de Jong RVO
Ernesto Kerkhof Arla Foods
Jan Klerken Scelta Mushrooms
Anthony Mol Mol Onion Ingredients
Rolinde Oosterheert RVO
Stephan Peters NZO
Jaap Petraeus FrieslandCampina
Henk Westhoek Planbureau voor de Leefomgeving
Jeroen Willemsen Green Protein Alliance

ING International Survey

The ING International survey took place in 13 countries with 1,000 adults over 18 in each country, apart from Luxembourg with 500. Ipsos conducted this survey between 2 June and 22 June 2017. Sampling reflects gender ratios and age distribution, selecting from pools of possible respondents furnished by panel providers in each country. European consumer figures are an average, weighted to take country population into account.

Sources

• CCAFS CGIAR - Agriculture’s prominence in the INDCs: data and maps
• Dutch State Government - Ministry of Economic Affairs 2018 budget
• Dutch Consumers Association - Research: alternatives for meat
• European Commission – European Agricultural Outlook 2016-2026
• European Commission – 2020 climate & energy package
• European Environment Agency - Total greenhouse gas emission trends and projection
• FAO – Global Livestock Environmental Assessment Model
• FAOstat
• Fellman et al (2017) - Major challenges of integrating agriculture into climate change mitigation policy frameworks
• Lesschen et al (2011) - Greenhouse gas emission profiles of European livestock sectors
• PBL – The Protein Puzzle
• RIVM - Milieubelasting van de voedselconsumptie in Nederland