Spotlight on sustainability:

Future-proofing the food supply chain

Fi Global Insights

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Contents

Supply chains & sourcing

1. EU aims to lead green transition with Corporate Sustainability Directive **4**
2. Going beyond the logo for sector-wide sustainability **5**
3. Regenerative agriculture: Are brands doing enough? **10**
4. What is the best way to measure sustainability? **12**

Technology

5. How technology is disrupting the food system and driving sustainability **14**
6. Can we farm animal proteins in plants? **16**
7. Synthetic biology promises to create sustainable supply chains – but at what
8. Cost to sustainable development? **18**
9. Exploring the most promising materials for plastic-free packaging **21**

Consumers & products

10. Leveraging the power of upcycled ingredients **23**
11. The innovative startups putting upcycled ingredients centre-stage **26**
12. How carbon footprinting on products can help brands **27**
13. Strategies to encourage more sustainable purchases **30**

Supply Chains & Sourcing

EU aims to lead the green transition with its Corporate Sustainability Directive

By Niamh Michail

There is appetite among EU lawmakers to make sustainability the norm, as seen by the recent proposed legislation that will set mandatory legal standards for due diligence – and wide support for the proposed new rules among the European food industry, according to a recent Fi Global Insights survey.

The draft **EU Directive on Corporate Sustainability Due Diligence** will require companies to identify and (where necessary) prevent, end, or mitigate the adverse impacts of their activities on human rights, such as child labour and exploitation of workers, and on the environment, for example pollution and biodiversity loss.

Aimed at advancing the green transition and protecting human rights in Europe and beyond, the EU says the new rules will give businesses legal certainty and create a level playing field while providing more transparency for consumers and investors.

Which companies will be affected and when?

The legislation has not yet entered into force. The Commission's proposal will now go to the European Parliament and the Council for approval and, if adopted, member states will have two years to transpose it into national law.

The rules will apply to EU-companies that have more than 500 employees and a net worldwide turnover of more than €150 million, or EU companies with more than 250 employees and a net worldwide turnover of more than €40m – provided that at least 50% of this net turnover was generated in a 'high-risk' sector. High-risk sectors include food manufacturing, agriculture, forestry, and fisheries, as well as textiles and clothing. According to David Pineda Ereño, legal expert and managing director of Brussels-based DPE International Consulting, the nutraceutical and functional food industries, as well as ingredient multinational companies, would be largely impacted by the Directive.

The rules also apply to non-EU companies that have a net turnover of more than €150m generated within the EU; or between €40m and €15m, provided that at least 50% of its net worldwide turnover was generated in one of the high-risk sectors. Businesses must bear the cost of establishing and operating the due diligence procedures to ensure compliance with the new rules.

The EU Directorate-General for Agriculture and Rural Development could not confirm how many food and drink companies and producers would be affected but, according to an article co-authored by partners and associates at Chicago-headquartered law firm Mayer Brown and published on the **Harvard Law School Forum on Corporate Governance,** around 13,000 EU companies and 4,000 non-EU companies appear to fall within the criteria.

The legal experts say that the extraterritorial scope of the draft directive is of particular note and could have "significant implications" for multinational groups based in the US, UK and Asia. Non-EU companies that meet the requirements will be required to appoint an EU-based representative to liaise with EU supervisory authorities.

Overwhelming EU food industry support

EU policymakers have hailed the directive as a real game-changer that will allow the EU to stand up for human rights and lead the green transition. But how much support is there within the European food industry for such legislation?

Fi Global Insights questioned over 34,000 European companies in our database and received hundreds of responses, ranging from multinational groups that generate billions in annual turnover to small and medium enterprises (SMEs), and from non-profit organisations to governmental food and trade departments.

The survey revealed overwhelming support among respondents for government intervention to ensure sustainable targets are met whilst creating a level playing field for businesses. A massive 90% agreed governments should establish a minimum legal standard for corporate sustainability and due diligence. Only 10% said they opposed such mandatory action.

A strong majority of our food industry respondents were also in favour of such regulations having teeth. Eighty-one percent (81%) said businesses should be penalised if they did not adhere to the minimum legal standard for corporate sustainability and due diligence, with 19% saying they should not be penalised.

Deloitte: Act now to ensure your business is compliant

However, risk advisory consultants at Deloitte **recommend** that companies start to put in place solid actions to move towards compliance.

> "The time to get started is now. A good idea is to kick off with a baseline assessment of your current due diligence activities to identify potential gaps or areas for improvement," they write. "A risk and impact assessment could then shed light on the environmental and human rights topics that should be prioritised. After this a roadmap can be established to implement an effective due diligence framework targeting environmental and human rights risks."

To read the directive in full
click here

Going beyond the logo for sector-wide sustainability

By Niamh Michail

Food and drink packaging is crowded with ethical labels and CSR logos but their efficacy in bringing about sector-wide sustainability has plateaued at around 4% of market share. It's time to put the onus on manufacturers, not consumers, says the executive director of Solidaridad, Jeroen Douglas.

The average consumer spends no more than four seconds looking at a product's packaging on a supermarket shelf, according to Dutch brand packaging agency BrandBuilders. When a package does catch a consumer's eye, the sustainability logo is just one element of information that is taken into consideration. The price, perceived taste, ingredient list, and ingredient origin are also important factors. The amount of time spent considering sustainable certifications is therefore likely to be much less than four seconds.

Split-second purchase decisions & label fatigue

Canadian researchers at the University of Guelph **used eye-tracking technology** to determine the degree to which people looked at different elements of the packaging. They found that less than half of the people even looked at a label while most of those who did look did not change their initial choice.

"It may be tempting to try to give consumers more and more information in order to 'improve' choices," concluded associate professor and chair in food system leadership at Guelph, Michael von Massow. "However, the evidence suggests that it doesn't work. In my view, adding more information may actually reduce the amount of information that consumers take in. We need to think long and hard before we add more labels. We're likely better off actually removing some labels."

Jeroen Douglas, executive director of Solidaridad, a non-profit organisation that works to make supply chains fairer and more sustainable, agrees.

"It's even unethical to ask the end consumers to make that decision nowadays, so I'm against product labelling at this stage in mature markets," he told Fi Global Insights. "One higher level up, where the category managers are, [is where] the job needs to be done. In principle, all products on every retail floor should be sustainable. I don't think we should give consumers the choice."

"Frankly speaking, we are still stuck with the main problems in some of the commodity supply chains. The labels haven't brought the breakthrough for the items of sustainability that we are fighting for."

Jeroen Douglas
Solidaridad
Executive Director

Making sustainability a reality: The pyramid of change

While sustainability labels have played an important role historically, their potential to drive systemic change has reached its limit, said the executive director.

Solidaridad is taking a different approach that it represents with its 'pyramid of change'. This pyramid forms the basis of its multiannual strategy to achieve sustainable practices across global supply chains and commodities from palm oil to gold, bananas to cotton.

The top of the pyramid is made up of consumer-centric voluntary labels, such as organic and Fair Trade; the second tier is made of company-driven Corporate Social Responsibility (CSR) initiatives; and the third tier is producer-led round tables and multi-stakeholder initiatives that seek to instigate sustainability at a sector-wide level, such as the Roundtable on Sustainable Palm Oil (RSPO). The fourth tier is government-led and includes mandatory national and multinational sustainability standards and agreements. It is this fourth tier that reaches the biggest volumes and has the greatest potential for large-scale change, according to Solidaridad, and where action must now focus.

SOLIDARIDAD'S PYRAMID OF CHANGE

Moving towards mandatory sustainability standards

Solidaridad was a founding member of the Fairtrade movement and Jeroen Douglas helped found three roundtable associations – the Round Table on Sustainable Soy (RTRS), the Global Roundtable for Sustainable Beef (GRSB), and Bonsucro for sustainable sugar. He is therefore well-placed to see the benefits and limitation of each tier.

"After 30 years of experience, I have come to the conclusion that sustainability labels were good. Indeed, in the beginning we needed the end consumer to make a change. But if we really want to move forward, [we] must come now to the fourth layer of the pyramid [where] we bring all those learnings from the voluntary sustainability standard world to a more mandatory sustainability standard world," he said.

That said, the situation is more nuanced than simply removing sustainability labels everywhere, Douglas admitted. Although on-pack labels have lost their strength in mature markets, such as western Europe, Douglas said he does see opportunities in emerging markets like China and Brazil where there is less experience in "connecting sustainability throughout the supply chain". `

Even in these markets, however, the labels will still only be relevant for a small percentage of consumers willing to pay a premium while government-led action could have further-reaching impact.

Mandatory systems include national standards and regulatory frameworks such as the EU's Green Deal and **Due Diligence Directive.**

The Due Diligence Directive, for instance, would require companies to identify and – where necessary – prevent, end, or mitigate adverse impacts of their activities on human rights, such as child labour and exploitation of workers, and on the environment, such as pollution and biodiversity loss.

What does this mean for manufacturers who may be operating in many different countries and jurisdictions? Douglas said brands must respect mandatory regulations – this goes without saying – and follow due diligence. But they should also look to implement a "smart mix" of both mandatory and voluntary systems, he added. This creates brand value by showing their customers they are not simply opting for the minimum bar.

Implementing sustainable purchasing: The case of palm oil

Indonesia is the world's biggest palm oil producer, responsible for around **60% of global production,** and millions of smallholder farmers produce around 38% of the country's palm oil. However, the commodity in Indonesia has become synonymous with major habitat loss and pollution due to deforestation and the burning of peatlands to clear land for plantations.

Most deforestation linked to palm oil has historically been driven by large-scale producers, however smallholders are increasingly identified as important actors in deforestation in Indonesia, according to a **Climate Focus and Meridian Institute report.** The role of smallholders is also expected to grow as they are pushed into ecologically sensitive areas, it says.

Most of Indonesia's production goes to local consumption or is exported to India, where it is used as a cheap cooking oil by consumers who are unable to pay a premium for certified oil bearing a sustainable logo.

"I think if [companies] really want to behave more sustainable, they should also, in their purchasing, try to reflect a good balance between purchasing from large farms on the one hand and clusters of smallholders on the other hand. I think then they are doing a better job not only business wise but also for the world," Douglas said.

Can industry be profit-driven and sustainability-focused?

Does this mean manufacturers should be willing to cut into profits by sourcing certified sustainable commodities even when they cannot pass on the premium to consumers?

"I'm too long in this business to be naïve," said Douglas. "In practice, companies are profit driven. Nonetheless, there is an emerging movement indeed, and that tries to put a third pillar of sustainability to large industry. This 'B Corps thinking' and the move towards stakeholder models rather than shareholder models is slowly, but certainly, emerging."

Douglas said he feels more optimistic about the possibility of meaningful change coming from family-run or privately-held companies rather than those that are accountable to shareholders.

In the past, for instance, Unilever, has been praised for making sustainability a priority in its sourcing and portfolio – but it has also attracted some criticism from the financial world. In a scathing open letter, fund manager Terry Smith **said** the manufacturer had "lost the plot" and that it was labouring under the weight of a management obsessed with "publicly displaying sustainability credentials at the expense of focusing on the fundamentals of the business".

The Solidaridad executive said: "The anonymity of the financial markets is a serious obstruction for sustainability because you don't feel the farmer behind the product; you don't even feel the product behind the dollar. Making things more transparent, IT solutions for fair data sharing can be methods to ensure that we are gradually changing."

Regenerative agriculture: Are brands doing enough?

By Lucy Whittaker

Regenerative agriculture practices are growing in popularity amongst food and beverage manufacturers. Which actions have already been taken and which additional steps are needed to establish more sustainable food systems?

Healthy soil lies at the heart of the global food system. Providing the essential nutrients and elements to support plant growth, soils act as the foundation for agriculture and the means to a staggering proportion of the world's total food production: a study by the Food and Agriculture Organization (FAO) of the United Nations found that as much as **95% of the food we consume today** is dependent on healthy soil.

Yet, the agricultural practices performed by humans over the past 100 centuries have significantly impacted the sustainability of global food systems and now pose serious threat to human, animal, and environmental health.

Increasing crop and financial yields

A way of combatting the issues associated with traditional farming, regenerative agriculture seeks to restore soil ecosystems via a range of methods including minimised ploughing, crop diversification and the use of cover crops.

Benefitting both people and the planet, regenerative agriculture can improve crop yields and **boost the nutritional quality of crops,** while simultaneously reversing the negative effects of climate change.

Companies can also take advantage of the increased opportunities for carbon offsetting that these more sustainable methods of farming create.

Companies leading the curve

As companies become increasingly concerned with their eco-credentials, several key players in the food and beverage industry have taken steps to put regenerative practices into place.

Aiming to go beyond merely 'sustaining our planet,' US-based food giant General Mills has pledged to utilise regenerative agriculture practises across one million acres of farmland before the turn of the decade.

Paying close attention to the mechanics and impacts of regenerative farming, the manufacturer recently launched a series of pilots which track five variables: economic resiliency, soil health, water use, biodiversity, and animal health and wellbeing.

General Mills believes that educating the current and future generations of farmers will be a key component in creating more sustainable food systems. For this reason, the pilot programme combines technical support, collective research, and educational workshops with use of the **General Mills Regenerative Agriculture Self-Assessment tool** to help farmers understand and adapt their practices.

As of late 2021, the company has enrolled **115,000 acres in agricultural pilots,** which it says amounts to around 20% of General Mills North America sourcing footprint.

As a global producer operating in more than 100 countries across six continents, there is no doubt that the company still has a long way to go before it can be considered a true leader of regenerative agriculture. Despite being a step in the right direction, global food manufacturers such as General Mills should look to introduce sustainable practices across all locations in which they operate. Introducing initiatives such as this one on a global scale is what will truly drive sustainability in the food production system.

"A lot of [regenerative agriculture] practices are being driven by the consumer, and it is consumers who are demanding that large corporates take more accountability. Thinking about how CPG companies are offsetting their carbon footprint, they have the possibility to influence upstream to the growers," said Jacqui Campbell, global head of technology and operations at Syngenta, during the industry event F&A Next 2022. "Where it doesn't quite add up is that the growers are not being compensated for making those changes."

Also looking to empower the next cohort of farmers, multinational food producer Danone has signed long term contracts with 40% of its farmers to encourage investment in regenerative and sustainable methods.

Since 2018, Danone North American also contributes $6 billion towards soil health research via its **soil health initiative,** in collaboration with various academic partners.

Going beyond carbon sequestration

From a policy standpoint, the European Union's Green Deal and its Farm to Fork strategy seek to improve diets and reduce food loss across Europe, while at the same time improving the resilience of food systems.

"Creating food systems able to feed the growing global population is critically important, but, at the same time, we need to make sure these systems are sustainable," **MEP Petros Kokkalis said in a blog published by FoodDrinkEurope.**

When adopting regenerative agriculture initiatives, it is important that companies focus on more than just carbon sequestration.

"Agricultural practice and policy should promote efficient use of resources, protect biodiversity and natural ecosystems and enhance the resilience of people and rural communities," Kokkalis said.

Leveraging technology & certification for transparency

Advances in technologies such as smart sensors and Blockchain are paving the way for consumers to increasingly track how sustainable food producers are.

US fast food restaurant **Chipotle launched a tool called 'Real Foodprint'** that allows consumers to monitor environmental variables ranging from water usage and biodiversity to carbon dioxide emissions and carbon soil sequestration.

To create food systems that are sustainable and appeal to the growing base of consumers who seek regenerative products, certification and labelling must keep up to pace with this transition.

Certifications such as the **'Regenerative Organic'** label from the Regenerative Organic Alliance which ranks producers as bronze, silver or gold will likely be directive in leading this change towards more sustainable food production systems.

What is the best way to measure sustainability?

By Caroline McDonald

Communicating sustainability has become increasingly important for food companies, and third-party assessment services have multiplied. Which are the most robust and effective, and how can companies choose the best option for their business?

A growing number of consumers chooses brands with their social and environmental impacts in mind, and 91% of global consumers expect businesses to address these issues, according to **a 2015 study.** A **Unilever survey** of 20,000 consumers across five countries (UK, Brazil, Turkey, US and India) found that one-third chose brands based on social and environmental factors, and the **European Commission** has also found that protection of the environment is personally important to 94% of Europeans.

Reliable measurability has been a major part of quashing accusations of greenwashing, and services include life cycle assessments, carbon footprint measurement, B-Corp certification, and many more. For food and beverage companies, a range of additional certifications could indicate organic production or fair trade, among others.

Providing trust and credibility

Chief marketing officer of the **Green Business Bureau,** Bill Zujewski, said: "Third party sustainability certifications provide credibility. Certifications from respected third parties reinforce and amplify a company's sustainability efforts and are clearly viewed as the most trustworthy source of green credibility for business...If you are a product-centric business, then a certified green product seal may be the most advantageous."

Some of the most popular and credible certifications include organic labels, Fair Trade certification or the Rainforest Alliance Network seal. Alternatively – or in addition – companies can certify the sustainability of their entire business, including operations. Popular green business certifications include: LEED, which covers buildings; ISO, which focuses on manufacturing; Green Business Bureau, which can be particularly useful for small businesses as it provides an online eco-assessment procedure; and B-Corp, which covers corporate governance, as well as environmental and social responsibility.

Toward higher goals – and higher sales

According to Zujewski, the benefits of sustainability certifications go well beyond a rating or certificate of proof.

"The process itself becomes a journey to create a green corporate culture and a more sustainable, socially responsible business," he said. "A sustainability certification programme engages employees and drives company-wide commitment and purpose."

Some companies may also consider that sustainability certifications could help boost sales in certain markets, but their effect on sales is difficult to quantify. Green Business Bureau reports that some companies have increased sales by 10% to 50%, but Zujewski highlights the less tangible benefits of sustainability that could have a very real impact on turnover, including increased transparency and trust, competitive differentiation, and higher staff morale.

"Companies that are greener tend to be perceived as more ethical, reliable and responsible," he said. "Letting people know your business cares about the environment and society will associate 'good' with your brand and improve your overall brand identity. Sustainable businesses are also perceived as being more honest, with higher quality products and services."

He added, "Being known as a green business will attract new customers, specifically consumers and companies who seek out sustainable businesses, products and services."

How to measure

When it comes to the most effective ways to measure sustainability, he suggests that companies with a physical product should carry out a Life Cycle Assessment, but that all companies should measure how sustainable their business operations are.

"There are two ways to do this, either calculate your carbon footprint, or complete an EcoScorecard," he said. "In most cases, doing both gives the most complete picture."

Technology

How technology is disrupting the food system and driving sustainability from farm to fork

By Lucy Whittaker

Technology is revolutionising the global food and beverage industry. What is driving this change, and what opportunities are there for companies to leverage technology to promote sustainability?

There is no denying the fact that technology, in all its forms, is disrupting the global food and beverage industry. From large corporates striving to maintain their market share and value through innovation and acquisitions, to SMEs and startups penetrating the market with new innovative technologies, tech is now affecting every stage of the food value chain.

According to a Madrid-headquartered startup consultancy, Eatable Adventures, 11 core technologies are currently disrupting the food system, including the Internet of Things (IOT), bioprinting, novel foods, mycelium, and e-commerce.

Technology as a pervasive food industry trend

A universal phenomenon, the waves of technological innovation that are currently passing through the food industry have been compared to those of the dot-com bubble in the late 1990s and in the same way, offer the ability to transform the entire food ecosystem.

Speaking at Fi Europe 2021, José Luis Cabañero, CEO and co-founder of Eatable Adventures, drew similarities between the initial public offering (IPO) of tech giant Yahoo in April 1996 and that of meat alternative manufacturer Beyond Meat in May 2019. Both events, despite existing in different industries over 20 years apart, sparked next-to-identical performances on the stock market and signalled the start of a new, technological era for the respective sectors.

> "When [Yahoo] launched to market, they opened the internet era. For us, the IPO of Beyond Meat signalled the beginning on the foodtech investment era," Cabañero said.

In every major industrial sector, technological advancement and innovation are paving the way for new and exciting breakthroughs when it comes to products, brands, concepts, and processes.

> "The digitisation and connectivity of the system, driven by the application of different technologies, is causing this evolution to occur much faster than in the past," Cabañero said.

Technology is driving a second wave of domestication

According to Cabañero, technology is driving a 'second domestication' in the food industry, revolutionising traditional processes, such as fermentation, at a microscopic level. Precision fermentation, for example, involves editing the DNA of microorganisms like yeast so that they produce a specific molecule of interest.

The impact can be seen in the protein sector which, throughout history, has undergone three key production processes: first hunting, then farming, and currently biosynthetic techniques. Supported by new food processing technologies, the protein market is expected to experience fundamental change in the near future. A look at the **$1.2-billion pepsin or $7.5-billion heparin markets** demonstrates this. Both are commonly used animal-derived products which can now be produced animal-free via methods of precision fermentation, conducted by the likes of **foodtech startup, Clara Foods.**

> "The whole way across the end-to-end food value chain, every element is being affected by new technologies," Cabañero said.

From nutrition to packaging: The wide-ranging applications of food tech

With many key industry players prioritising innovation in their corporate strategies, the intensity of R&D expenditure is growing year-on-year.

Large corporates both from within and outside the food industry, such as PepsiCo and Rabobank respectively, are pumping huge amounts of capital into collaborating with tech-focussed startups and creating venture programmes to acquire the latest innovations.

Accelerator programmes, such as PepsiCo's Greenhouse accelerator and Rabobank's FoodBytes! programme, reflect the vast diversity of startups who are using tech to revolutionise the global food system. The FoodBytes programme, for instance, has a foodtech section, which is divided into the subcategories: food safety & traceability; alternative protein technology; nutrition technology; and packaging innovations.

Foodtech companies are the fastest growing in the sector, increasing in value by around **€416 billion in the five years to 2020,** according to DealRoom, as compared to the top 10 food manufacturers, which grew in value by approximately €67 billion during the same time-period.

Technology as a driver of sustainability

On a wider scale and through a sustainability lens, technology offers the possibility to transform the global food production system, which currently accounts for **30% of greenhouse gas emissions worldwide.** Developments such as gene editing and the aforementioned precision fermentation could transform the end-to-end value chain to produce increased amounts of food, with fewer resources and a decreased environmental impact.

In practice, this may amount to a rise in the price of traditional animal products, offset by new, cheaper alternatives, cultivated mainly in laboratory environments.

> "The combination of the industrial production of biomass with new techniques for aggregating this biomass into final consumer products will represent a significant drop in cost of meat," said Cabañero.

All in all, the hope moving forward is that advancements in technology will allow consumers to access cheaper, healthier, and more sustainable food products, in a more convenient way.

Can we farm animal proteins in plants?

Plant molecular farming (PMT) has been used for years in the pharmaceutical industry, and scientists are now turning their attention to food ingredients, using plants as 'factories' to produce animal-derived ingredients like whey protein without animals. Companies in this space say PMT is more sustainable than traditional farming, but regulatory barriers remain.

The research and commercialization of animal proteins like whey, casein and egg whites by genetically modified organisms is rapidly expanding. However, it is a major challenge using commercial fermentation processes to scale these and other animal proteins to the point where they have a significant market share.

Tony Hunters
Future Cubed
Strategic Consultant

What are the advantages of plant molecular farming?

Plant Molecular Farming involves the incorporation of genes into plants, permanently or temporarily, to produce new proteins, essentially making them biodegradable single-use bioreactors. So, why use plants instead of giant stainless-steel bioreactors? Well, plants have quite a few advantages.

1. They're inherently safe because no human pathogens grow in plants.
2. There's no need for sterile growth conditions as plants can use their own immune systems to fend off disease.
3. Many of the methods used to incorporate genetic material into plants can be scaled to thousands of hectares of plants.
4. The desired protein production can be achieved within four to eight weeks or sometimes three to five days after inserting the desired DNA sequence.
5. Capital expenditure is much lower. It has been estimated that the capital cost of a 60,000-litre S1 safety level greenhouse can be built for 25 to 55% of the cost of a similar bioreactor facility.
6. They are sustainable; many side streams can be extracted; and any remains are biodegradable.

Plant Molecular Farming does have some disadvantages, such as low productivity compared to bacterial production, high downstream processing costs, and potential 'escape' of genetic material. However, these can be mitigated through techniques such as transient rather than permanent genetic modification; using new plant breeding techniques like CRISPR-cas to dramatically improve plant growth rates and increase yields; and the use of vertical farming to address the low productivity and genetic contamination issues.

Producing casein or whey from plants

The most recent example of PMF is the announcement by Nobell Foods that it can produce casein proteins in soybeans. Casein is the milk protein which makes cheese 'stretchy', so it can vastly improve alternative cheeses. Nobell has recently emerged from stealth mode after raising $75 million in Series B funding and having raised $100 million in total to date. It will use the funds to scale up production and plan a small-scale release of cheddar or mozzarella cheeses in 2022.

Other animal proteins have also been made in plants. Moolec Sciences produces chymosin, used in cheese-making, from safflower. Moolec is currently developing whey protein-producing oats and this combination crop can be used in alternative milk products. There is no extraction of the whey protein; it is left as part of the oat component of the milk. Not stopping there, it is also developing an egg protein-containing wheat product for the bakery industry.

The cross-over of PMF products to alternative proteins extends to cultivated meat as well. Iceland-based company ORF Genetics produces human growth factors from barley as bioactive cosmetic ingredients and it is now turning its expertise to producing growth factors for growing cultivated meat. Similarly, Belgium based Tiamat Sciences is targeting growth factors and other media components for growing cultivated meat. It is claimed that growth media components made using PMF will be much cheaper than current products and could significantly reduce cultivated meat production costs. Another step on the journey to price parity with conventional meat.

Regulatory challenges for plant molecular farming

Plant molecular farming has been around for over 30 years, and it has taken time to build momentum, but could now be having its day in the sun. Many PMF products in the pharma space are either on the market or in clinical trials, so the technology is becoming more and more sophisticated.

Comparatively, food ingredient manufacture is still less developed but certainly presents no greater challenges than producing pharma products. The most significant barrier for PMF food industry applications is differing regulations around the world.

Plant molecular farming could also address one of the criticisms about the transition from animal-based to plant-based diets that asks: what will we do with all the corn that is currently grown to feed animals? In the not-so-distant future, will many of the cornfields be used, not for feeding animals, but for growing animal protein-containing-crops to make meat and dairy products?

Synthetic biology promises to create sustainable supply chains – but at what cost to sustainable development?

By Niamh Michail

Synthetic biology promises to make the food industry more sustainable by radically changing the way ingredients are produced, yielding 'deforestation-free' palm oil and 'child labour-free' cocoa. But could sourcing ingredients from labs instead of farms have a negative impact on sustainable social development?

Synthetic biology transforms certain microorganisms, such as microbes, yeast, enzymes or even algae, into 'cell factories' by instructing the organism's DNA to begin expressing a molecule of interest. These molecules are then manufactured at scale in a controlled fermentation process in bioreactors. The result is palm oil without oil palms, cocoa without cocoa pods, and dairy proteins without dairy cows.

Artificial intelligence is making synthetic biology a reality

Advocates of 'SynBio' say it could be used to sustainably produce large quantities of high-value molecules with fewer inputs and energy requirements. When extracted from natural resources, ingredients such as palm oil or stevia require huge amounts of land, water, and other inputs and can be responsible for emitting greenhouse gases.

Machine learning and artificial intelligence are also allowing scientists to mine a huge amount of data quickly and efficiently to find the right organisms for their process, which is speeding up the synthetic biology (also known as precision fermentation) process enormously.

Peak B, for instance, is a start-up spun off from a University of California, Davis research project that has successfully synthesised a blue cyan colour from red cabbage. To find the right enzyme to convert the cyan, Peak B's scientists screened millions of enzymes, tested a small number in the lab, and then used computational methods to search through an unfathomable number of potential protein sequences — 10 to the power of 20, or more than the number of stars in the universe – to design the enzyme capable of carrying out the conversion efficiently.

If lab-grown food becomes the norm, what will happen to sustainable supply chains?

Many companies operating in this space are targeting commodities that traditionally have 'problematic' supply chains. New York-based C16 Biosciences and Dutch start-up NoPalm are producing microbial palm oil in a lab, describing it as 'conflict-free' and 'deforestation-free', respectively.

However, changes in global supply chain are rarely without consequences. If environmentally conscious consumers switch from buying certified sustainable palm oil to lab-grown palm oil, this may force current palm oil producers to find alternative markets for their products, and they could well turn to emerging economies where demand for certified sustainable palm oil is very low. The Roundtable on Sustainable Palm Oil (RSPO) claims that reduced demand for palm oil in Europe (which **imported 86%** of RSPO-certified sustainable palm oil in 2019) could **reinforce unsustainable practices,** leading to less sustainably sourced palm oil.

In a 2019 commentary entitled **Harnessing synthetic biology for sustainable development,** researcher Katherine French warned of the potential negative fall-out from synthetic biology – but also made several recommendations.

> "If left unchecked, synthetic biology-based industries could exploit the genetic resources of non-Western countries by producing synthetic versions of natural products, thereby increasing global inequality," she wrote. "The mass production of plant compounds using synthetic biology, including vanilla, palm oil and artemisinin, could affect the livelihoods of millions of farmers worldwide."

Who is responsible for smallholders' livelihoods?

Co-founder and CEO of NoPalm Lars Langhout said it was hard to predict the reaction of purchasing countries to these ingredients of the future, but he believes that NoPalm's non-GM oil, produced using biomass sidestreams as a microbial feedstock, is inherently sustainable.

> "We believe all palm oil, both RSPO and non-RSPO should be replaced by microbial oil. There is no point in farming, refining, and transporting a product across the globe that can be made locally everywhere," Langhout said.
>
> "In [emerging economies such as Asia and Africa], sidestreams are not yet utilized as they are in, for example, Western Europe. We see a future for those smallholder farmers that work on palm oil plantations – that by the way are mostly run by large corporates – to focus on sidestream accumulation and perhaps even help make microbial oil there on-site."

Once it reaches industrial scale, NoPalm has pledged to devote part of its profits to supporting smallholders in producing countries to focus their efforts on rainforest preservation. It has not yet defined a percentage of profits but said it would represent a "substantial support" to those smallholders.

"[...] we believe there will be a transition in which a true price tag will be put on products. This means that there is money to be made by conserving nature and we see a role for those smallholder farmers to do so," Langhout told Fi Global Insights.

> "The responsibility for that transition is with the current palm oil corporates, the traders buying and selling palm oil, and the companies importing palm oil. We pro-actively also take responsibility by applying parts of our profits but, in the end, it's the current companies that work with them. They cannot simply disregard them as companies have done with the car manufacturing industry in the US or even before that the coal and textile industries."

California Cultured: ‘We’ve thought a long time about this question’

US startup California Cultured produces cocoa without cocoa plants. Although currently early-stage, it is scaling up and aims to serve the mass market with cell-cultured chocolate that costs less than one dollar per kilo by 2025. At that price point, it would be even cheaper than commodity chocolate. Could undercutting the cost of mass cocoa cause demand to dry up, thus putting millions of smallholder producers out of work?

> “We’ve thought a long time about this question and [...] we see that the vast majority of chocolate produced today is very environmentally destructive and unethical and many of these problems will only get worse in the future. In addition to that, we see the demand for chocolate rising,” said Alan Perlstein, CEO of California Cultured, speaking to this publication previously.

Perlstein added that, without cell-cultured chocolate, this increase in demand for chocolate would likely fuel deforestation and spur an increase in intensive, monoculture agriculture that is currently associated with child labour, worker exploitation and cocoa pathogens.

Areas for action: ‘Synbio’ at the service of sustainable development

According to Katherine French, the competitive production of steviol glycosides by major chemical companies, such as Cargill and Evolva, was a prime example of a synthetic natural product on its way to replacing its living counterpart that has received little attention. The Indigenous Guarani people in South America who traditionally cultivated and used the stevia plant have not received any benefits from the commercial use of their traditional knowledge and natural resources, she added.

Nevertheless, French believes that synthetic biology can contribute to sustainable development – but only if the **United Nations’ 2030 Sustainable Development goals** are used as a reference guide.

It should be mandatory for biotech companies to have an ethics officer, French suggested, and governments should develop regulatory approval procedures via a centralised authority that upholds fair-use policies, such as those found in the **Nagoya Protocol.** Opportunities to carry out synthetic biology in non-western countries should also be supported, making natural product development fairer and more equitable.

Exploring the most promising materials for plastic-free packaging

By Caroline McDonald

Plastic is food-safe, functional, widely recyclable and ubiquitous in food packaging, but many manufacturers are seeking alternatives as its environmental impact has come under scrutiny. What are the latest plastic-free packaging solutions, and how much real-world potential do they have?

Concern about plastic pollution has soared in recent years, driven by campaigns to raise awareness, and to reduce and recycle more plastic waste, as well as new EU regulations targeting plastic packaging and waste reduction.

Globally, annual plastic production has risen sharply in just a few decades, from 1.5 million tonnes in 1950 to 359 million tonnes in 2018, according to **figures** from the European Commission, and only about a third of plastic in the EU is recycled. The largest proportion of European plastic waste (42.6%) is incinerated for energy recovery, and about a quarter goes to landfill.

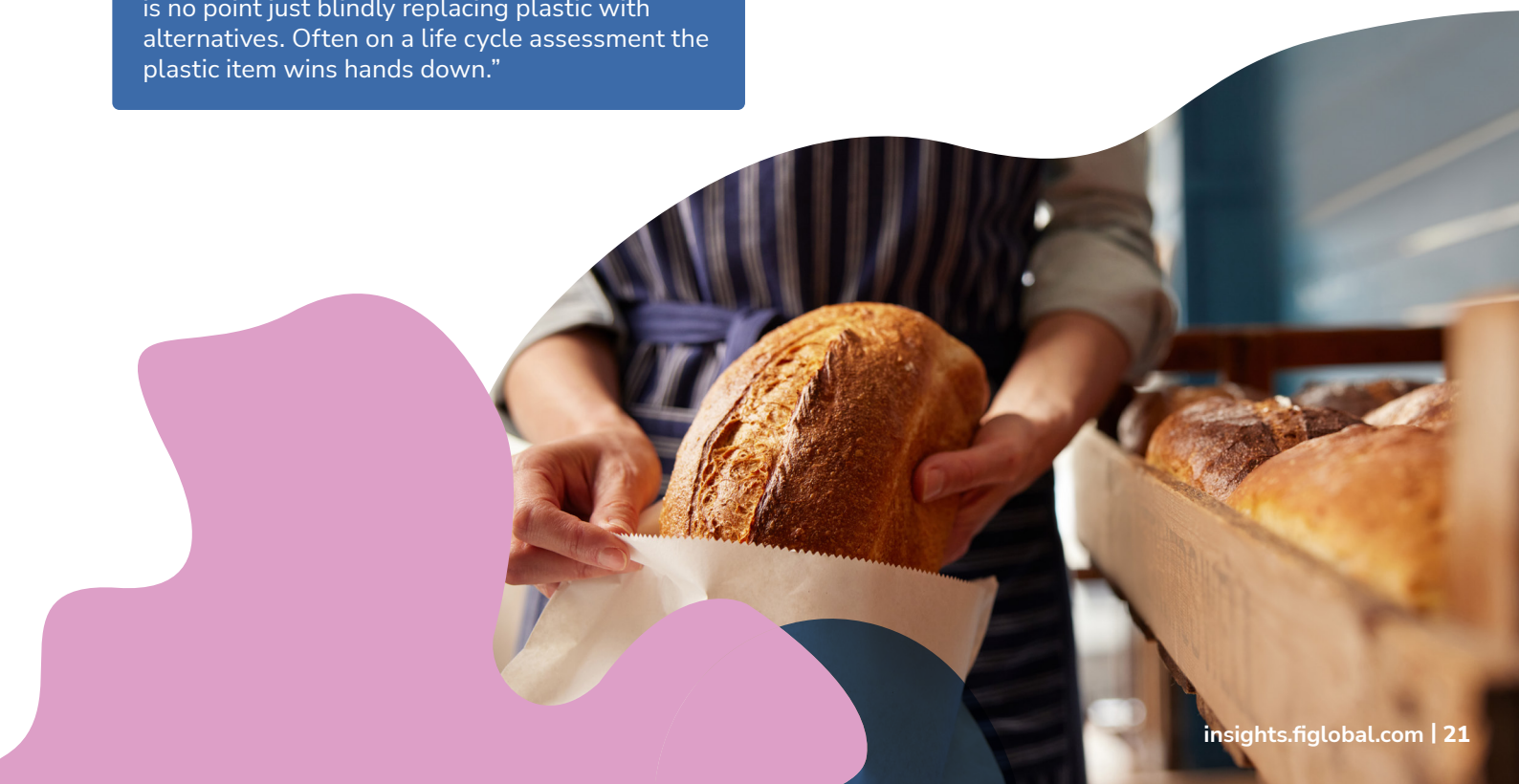
If they are to compete with plastic, alternatives to plastic packaging need to be not only sustainable but also readily available, affordable, functional and food-safe. Well-established alternatives like glass and metal have **limitations** when it comes to the expense and carbon footprint associated with recycling, while card and paperboard are not suitable for all food applications.

Plastic versus food waste

According to Martin Kersh, executive director at the Foodservice Packaging Association, demand for plastic alternatives must be balanced with concerns about food waste, as plastic packaging is particularly useful in prolonging the shelf-life of perishable foods.

> "You can't just replace plastic with board," he said. "You need some kind of barrier, and the best barrier is a plastic one...Of course there is no point just blindly replacing plastic with alternatives. Often on a life cycle assessment the plastic item wins hands down."

He argues that better plastic recycling infrastructure and measures to prevent plastic pollution also need to be part of the solution if the goal is to make food packaging more sustainable.



Renewable packaging sources

Meanwhile, packaging options from renewable sources are expanding: bagasse is made from sugarcane waste and is suitable for making bottles, tubes, jars and lids; biodegradable starches from corn and wheat can be used to replace polystyrene and plastic for trays, bags, lids and plates; mushroom waste can be used to make a biodegradable polystyrene-type product; and seafood waste products such as prawn shells could be used to create a variety of plastic alternatives, including flexible films.

Each has its advantages – and particular uses for which they are best suited – but the infrastructure to scale up often is still lacking. In some cases, producers face regulatory hurdles to certify that the packaging is safe. Seafood-derived packaging, for instance, could bring a potential allergen risk, although that would be mitigated if it were used to package seafood, as is the intention of CuanTec, a Scottish firm focused on developing packaging from seafood waste products.

Norway-based B'Zeos is another company looking to the sea for plastic alternatives, but with a focus on seaweed. Its material can be used for transparent windows for paper-based packaging, for flexible films and sachets, or as a biodegradable barrier coating for takeaway foods, for instance. However, the company says it is still quite water-permeable, which limits its shelf life as well as its suitability for certain products.

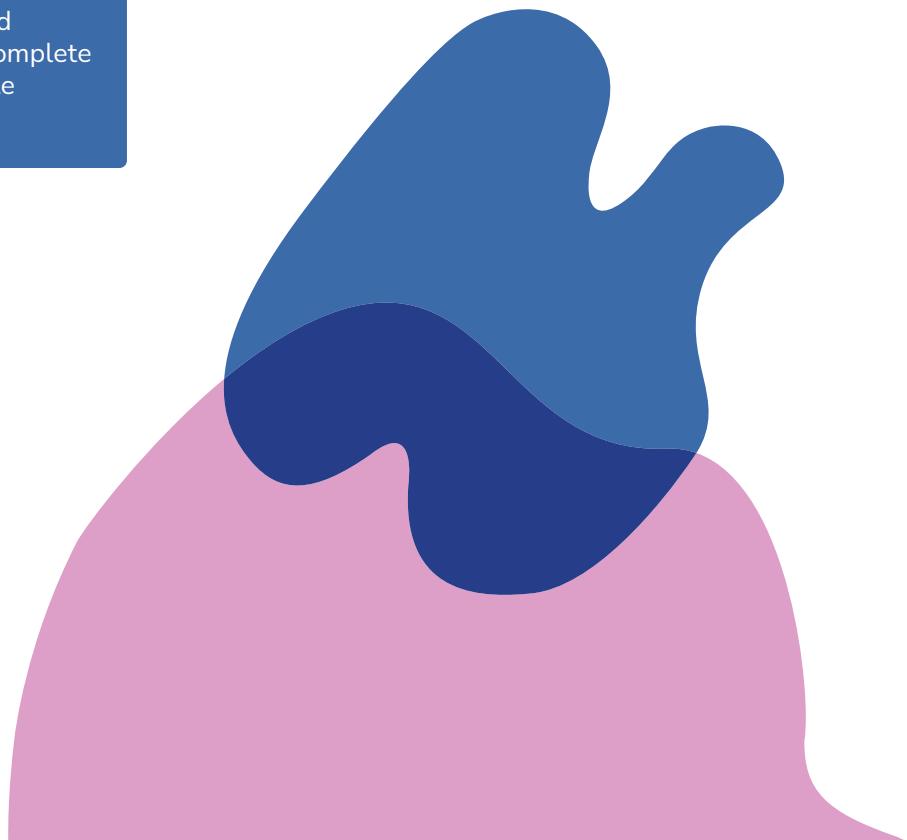
Recycling – and better eco alternatives

Neil Farmer is a veteran of the packaging industry and owner and founder of Neil Farmer Associates. He said that given the expense and technically demanding nature of developing effective plastic alternatives, improved recycling for existing food packaging should be a major focus.

> "I would say the need to find alternatives to non-recyclable plastics in the extended shelf-life food sector is one of the most important areas of development in the market," he said. "This is because flexible plastic packaging materials used for food products to prevent deterioration are often non-recyclable multi-layer, multi-material substrates. Therefore, for many in the food packaging industry, the drive to provide complete recyclable material solutions in the flexible packaging sector is of vital importance."

He added that the Covid-19 pandemic has underlined the need to balance sustainability with food waste reduction through the hygienic qualities of packaging.

> "The need to reduce food waste is now greater than ever before," he said. "...Improved performance of sustainable packaging is therefore an important innovation in flexible packaging for food markets in 2022 and beyond."



Consumers & Products

Leveraging the power of upcycled ingredients

By Niamh Michail

As consumer demand for sustainable products grows, upcycled ingredients are emerging as a solid business proposition with environmentally friendly credentials, and both small startups and major multinationals are getting involved. However, work is needed to improve consumers awareness, say stakeholders.

Market research company Euromonitor included environmental concerns in its top 10 global trends that are impacting consumer demand throughout 2022.

"Eco-anxiety is driving environmental activism and purchasing decisions. In 2021, one-third of global consumers actively reduced their emissions and one-quarter used carbon offsets to compensate for them," it said. "Climate Changers make more sustainable choices whilst demanding action and transparency from brands."

Using upcycled ingredients can resonate with consumers by offering a solution that addresses such concerns.

Food waste is a growing consumer concern

Mintel research suggests that people may see products made from upcycled food waste positively. Fifty-eight percent of Canadian shoppers say they are concerned about food waste, and they rate it just behind packaging waste (63%) as a concerning environmental issue. In the UK, 43% of people agree that limiting food waste is one of the most important factors when making food and drink purchasing decisions.

A growing number of startups are centring their entire portfolios or production methods on upcycled food ingredients.

However, giant multinationals are also embracing the concept. Via its wholly-owned subsidiary EverGrain, AB InBev, the world's largest brewery, launched a plant-based barley drinking milk made with brewer's spent grain under the consumer-facing brand TakeTwo. In Australia, Nestlé launched a carbonated soft drink made using cascara, the husk that surrounds coffee cherries which, although packed with polyphenols, tends to go to waste.

Upcycled unknowns: Industry needs to educate consumers

One entity working to increase the number of brands embracing upcycled ingredients is the Upcycled Food Association. Its CEO, Turner Wyatt, told Fi Global Insights it wanted to double the growth rate of the upcycled economy. However, Wyatt noted that challenges remain.

> "While 80% of consumers would be interested in upcycled products, currently less than 10% of consumers know what they are! This means there are millions of consumers that we need to reach to educate them about what upcycled products are; the more people we educate, the more people who will buy upcycled products."

The Upcycled Food Association currently has over 190 members across more than a dozen countries around the world. Last year, it launched a third-party certification programme and created a trademarked logo – Upcycled Certified – that brands can add to their product packaging to inform consumers that it contains upcycled ingredients. At the time writing, almost 200 products and ingredients had become certified.

> "When testing the Upcycled Certified [logo] in a consumer trial, the most common associated words were sustainability, and food waste solution," Wyatt said.

Wyatt explained that, since the certification scheme launched relatively recently, many certified products were still working through their previous packaging. However, the first Upcycled Certified products with the on-pack logo were starting to appear on supermarket shelves, and the Association is conducting research on how much the logo impacts product sales.

> "The cost [of becoming certified] depends on company size and how many products are included in the application," he added. "The time needed also varies but many brands get through the process in just a handful of weeks."

More big businesses are setting explicit food waste reduction targets

Food waste has established itself as an **emerging business category** driven by a growing focus on climate change, concerns about supply chain disruptions, and validation from food waste success stories, according to Alejandro Enamorado, capital and innovation manager at ReFED, a US non-profit dedicated to ending food loss and waste in the US through data-driven solutions.

In the US, private food waste investment reached $4.8 billion (€4.52bn) in 2021 compared to $3.7b (€3.48bn) for 2020, equivalent to around 30% growth, fuelled by more deals and higher valuations. However, Enamorado sees room to grow this further, particularly as this growth was moderate compared to overall venture capital in the US. (By comparison, startups in the US raised around $300bn (€282.85bn) last year, an increase of around 100% from 2020, he said).

> "Investment into food systems should continue despite a recessionary environment. From retailers to grocers, many are recognizing that curbing food waste is good for both the planet and business," Enamorado wrote.
>
> "Climate change-driven impacts will continue to pressure businesses, as food input prices risk increasing due to fluctuating growing conditions, water scarcity, and other extreme weather events (on top of pandemic-driven price increases). More big businesses are setting explicit food waste reduction sustainability targets."

The innovative startups putting upcycled ingredients centre-stage

Sophie's BioNutrients makes plant-based proteins using microalgae strains that it feeds with food waste. The company trialled over 1,200 microalgae strains before identifying four strains that could grow in the dark, feed on food waste, and produce a light, flavourless protein flour.

Mi Terro uses synthetic biology processes to transform food waste into alternative packaging. It extracts protein from agri-food co-streams and modifies it to make a flexible film. The benefit of using plant-based agricultural waste is that it does not compete with potential food sources, it says.

California start-up **ReGrained** uses a patented thermo-mechanical process to transform brewers' spent grain into a barley-based functional flour. The flour contains more than three times the amount of fibre than wheat flour and contains micronutrients such as iron, magnesium, and manganese. It also has a low glycaemic index score because the grains' natural sugars are used up during the beer brewing process.

Israeli start-up **Nutrilees** has developed a proprietary process to remove the sour taste from wine lees, the residues that appear at the bottom of wine production tanks after the fermentation process. Lees have an anthocyanin content of between 6 and 11.7 mg per gram of dry weight and around 29.8 mg of other phenolics. Nutrilees' product is a nutritious purple powder that can be used in baked goods and other applications.

Canadian company **Comet Bio** upcycles wheat straw, soy husks, corn stover, and other agricultural waste using a steam activation and water extraction process. It currently has two upcycled ingredients in its portfolio: a dextrose sweetener and a prebiotic arabinoxylan dietary fibre made from hemicellulose.

Capro-X uses naturally occurring, non-GM microbes to upgrade dairy waste streams into clean water and natural bio-oils. It focuses on acid whey, a by-product of the Greek yoghurt manufacturing process that is harmful to the environment.

Israeli startup **Anina Culinary Art** uses 'ugly' vegetables that have been rejected by retailers for aesthetic reasons to create clean label ready meal capsules that can be prepared in minutes. It developed a dehydration technique that preserves the vegetables' nutrients and produces flexible vegetable-based sheets.

German startup **Spoontainable** manufactures edible ice cream spoons from the fibre of cocoa pod husks. The cookie-like spoons stay hard for up to one hour and have a crunchy texture and biscuit taste.

Swiss-Ghanaian startup **Koa** transforms the juicy white pulp surrounding cocoa beans, which makes up 25% of the fruit and currently goes to waste, into cocoa fruit juice, a fruity drink with a sweet and tangy flavour profile.

Renewal Mill makes baking flours and pre-mixes using by-products such as soybean pulp (known as okara), oat pulp, and almond pulp. It dries and mills the pulps to create ingredients that contain macronutrients such as dietary fibre and protein.

How product carbon footprinting can help brands

By Lucy Whittaker

Labels stating the carbon footprint of products are appearing more frequently on our shelves. What is driving this trend and how can companies get on board?

Since a quarter of a century ago, when nutritional labels first started appearing on food and drink products, scanning packaging for calorie, fat, sugar and salt levels has become the norm for consumers.

Yet today, simply understanding the nutritional content of the products we consume is no longer enough. As environmental, social and governance factors become increasingly important to consumers, the demand for transparency around not only the contents but also the wider impact of food and drink products is rising.

Increasingly, food and drink manufacturers are opting to use carbon footprint labels as a way of communicating the environmental impacts of their products with consumers.

Carbon footprint labels: A growing trend

A product's carbon footprint refers to the total greenhouse gas emissions emitted throughout a single product's life cycle. When calculating the carbon footprint of a product, two different approaches are commonly used. According to the Carbon Trust, the most frequently used approach by consumer goods companies is **cradle-to-grave.**

This approach considers emissions released at every stage of the product life cycle, from the extraction of raw materials to the manufacture, distribution, and disposal of the product.

Since the launch of the first carbon footprint label in 2007, there has been a surge in popularity in both the use of and demand for such labels.

"Currently, we are experience a strong growth in demand for our services, as well as a surge in popular demand of carbon claims on products," said Paula Schmidsfelden, EU business development manager at The Carbon Trust.

The step-by-step process of carbon footprinting

For companies to manage resources, monitor supply chains and increase the circularity of products, it is important that they have a clear understanding of carbon product footprinting.

The first step in determining the carbon footprint of a product is analysing the total cradle-to-grave emissions of a product. Carrying out this analysis allows manufacturers to make sense of the data and put an effective management plan into place.

> "A big part of management is reduction. This analysis can help companies to understand where they can implement levers that will have an impact in reducing costs and emissions," Schmidsfelden said.

The next important step in carbon product footprinting is certification. Once the footprint has been accurately measured, it is necessary to ensure that it is comparable and in line with best practice. A number of standards are available to companies for this, including those from the Carbon Trust and the International Organization for Standardization **(ISO).**

To make claims which are credible and add to a company's brand value, it is key that the results are independently verified by an autonomous third party or international body.

Only once these steps have been taken can a product be awarded with a carbon product footprint label.

Carbon product footprinting generates multiple advantages

Achieving a carbon product footprint can offer various benefits to manufacturers, as well as the planet at large. As per the **Paris Agreement,** many governments and companies have set ambitious carbon reduction targets, to which carbon product footprinting can be a means of achieving.

Food manufacturers in particular are facing growing stakeholder pressure to decrease their environmental impact by minimising the amount of carbon their products generate.

Product statements represent strong claims for brands, which can influence stakeholders, from investors to NGOs to consumers, and offer benefits to the manufacturer vis-à-vis each of these groups.

> "Products within the food industry, particularly within Europe, are subject to tighter regulation and as such, stating the product criteria can help to heavily reduce risks ... companies can mitigate the risk of potential negative publicity by always ensuring that claims are valid and genuine," Schmidsfelden said.

When it comes to consumers, research shows that they are more likely to think positively of a brand that can show that it is managing its carbon portfolio and are willing to pay a premium for carbon footprint labelled products.

More and more consumers are actively seeking labelled products, with over two thirds of consumers across all markets regarding carbon footprinting as a good idea, **survey data** from the Carbon Trust shows. Furthermore, over 50% of consumers say that they are likely to recommend labelled products, as opposed to non-labelled alternatives, to others.

Transparent and confident communication is key

As consumers continue to play closer attention to their personal carbon footprint and those of the products they purchase, it is essential for companies to communicate claims clearly and accurately.

Quorn, a global meat alternative brand, was awarded a Product Carbon Footprint certificate for its Mince and Pieces products a decade ago. To do this, the company undertook a **'farm to shop'** analysis of its top 30 bestselling products which, once certified by the Carbon Trust, was made available to all consumers and stakeholders.

Since June 2020, Quorn has added carbon footprint labels to products, communicating the data behind this extensively via packaging, social media, advertisements, and PR coverage.

"The footprint label helps us to transparently, and confidently communicate sustainability initiatives to our partners and customers" said Louise Needham, sustainability manager at Quorn.

More recently, other key industry players such as **Danone** and Nestlé for its **Nespresso brand** have pledged ambitious net-zero goals and revealed carbon neutral strategies for the coming years.

"Product footprinting and labelling is really enabling companies to implement impactful action within product supply chains within product value chains," concludes Schmidsfelden.

Strategies to encourage more sustainable purchases

By Caroline McDonald

An increasing number of companies now accepts that sustainability must be built into the food system – and there is money to be made in the process – but nudging consumers to buy more sustainable products often is still challenging.

Five Seasons Ventures is a European impact venture fund focused on food technology, with investments in companies that tackle pressing human health or sustainability issues. There is no lack of companies working in the space, but senior associate Saskia Hoebée said consumers often presented the trickiest hurdle to wider uptake of more sustainably produced food.

"I think the biggest difference that could be made would be if consumers changed their mind," she told attendees during a panel discussion, 'Transitioning to sustainable food systems' at Fi Europe, explaining that they have the most power to validate any approach or technology through how they choose to spend their money.

"It will take time – people don't change their habits that quickly," she said. "...In the end, people just want to eat food that tastes nice, is affordable and is convenient."

Eatable Adventures is an accelerator and investment hub, which is developing a network of startups focused on driving sustainable growth.

Its ecosystem development manager Paula Alvarez said, "We are seeing a lot of investments in direct-to-consumer projects. The consumer is increasingly concerned about sustainability, and the startups in this area are growing."

Legislation has a role to play in educating consumers

However, she urged a more systemic shift, with investment in technologies for novel ingredients and supply chain transformation, as well as updated regulation to make it easier to bring food produced with new technologies – such as gene editing and precision fermentation – to market.

> "Legislation has a big role in education of the consumer," she said. "The benefits in the end are the cost of the product and the nutrition of the product. Legislation in Europe needs to be updated and make these technologies more acceptable to the public. If you are legislating against these technologies, you are saying to the consumer that they are not safe. There needs to be more investment in testing of these ingredients."

Position eco-friendly products as win-win for people & the planet

Speaking on the same panel, Mike Hughes, head of research & insight at FMCG Gurus, said consumers were genuinely interested in sustainably produced foods, but industry could do more to encourage better choices.

> "Consumers may say they are concerned about a variety of environmental issues, and they generally are, but we tend to overestimate how altruistic they are," he said, adding that eco-friendly products need to be positioned as win-win, providing a personal benefit as well.

Companies that position their brands as good for animal welfare are one example, as consumers also tend to associate free range eggs or grass-fed beef with higher quality, healthier foods because of the production process.

> "Consumers are willing to spend more on products that elicit an emotional reaction, that answer a specific need state," Hughes said.

Combatting greenwashing to increase consumer trust

Currently, there is **no regulated definition** for a sustainable food system, and this can make communicating sustainability difficult, especially when consumers may already be sceptical about brands' motives when it comes to environmental issues.

"They want the story behind the brand," Hughes said. "They want to know the benefit, and they want continuous development... There's a general view that brands can sometimes prioritise profits over the planet. Consumers don't just want claims anymore, they want evidence, and they want third-party endorsements."

Continuous development could mean a company starting with a focus on reducing carbon footprint, to being carbon neutral, to actually being carbon negative in the longer term, for example.

"Purely because of the resources to invest in this, big business can lead the way," Hughes added.

Doing business sustainably is responding to consumer trends

Alvarez said Eatable Adventures saw the value of collaboration with bigger corporations, which are more likely to have the resources to bring new technologies to the mainstream. She gave the example of Pascual Innoventures – a spin-off from the Spanish dairy company Calidad Pascual – which has launched Mylkubator, an incubation programme for cellular agriculture technologies in the dairy industry.

"The whole objective of the programme is to add value for startups," she said. "...In the end we need collaborations to scale these technologies, because they are really time-consuming and costly."

Hoebée added that it was not always possible to wait for bigger industry players, which might take their time to get moving when it comes to new technologies. Smaller brands can then take market share as they get to market faster.

"I also do believe in the value of a bit of healthy competition in the field," she said, adding that sustainability is not just a moral thing – it also pays. Companies that invest in sustainability tend to do better financially than those that don't.

"It's not just doing good, it's doing good business," she said. "If I were a major food company, I would be looking at all these trends, because the future is sustainable."

Spotlight on sustainability:

Future-proofing the food supply chain

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