Sustainable dairy in Europe

Safeguarding our resources
Sustainability and climate impact represents some of the biggest challenges for humankind in the 21st century and taking action to address it is one of the European Union’s top priorities. The EU has set ambitious targets for this challenge in 2030:

- At least a 40% reduction of the emission of greenhouse gases (GHGs) from 1990 levels.
- At least a 27% improvement in energy efficiency.
- At least a 27% share of renewable energy.

With these targets, the EU plays an active role in the achievement of the UN’s Sustainable Development Goals (hereafter SDGs). The European dairy sector is focused and working hard to be part of the solution. This Fact Book has been produced as part of a three-year campaign ‘Sustainable Dairy in Europe’, launched by the European Milk Forum, funded by the EU.

In Ireland, the Irish dairy sector acknowledges that sustainable development and climate change are pressing challenges that must be acted on and is committed to continuing to contribute to solving these issues. Our grass-fed, family farm structure is a positive platform to work from.

In 2016, Dairy Sustainability Ireland was established, a pro-active industry led, whole of sector and whole of Government partnership which is working to develop and implement new approaches to dairy farm sustainability at both economic and environmental levels. This new initiative has been established to help farmers meet environmental targets, improve profitability and to copper fasten Ireland’s reputation as a world leader in grass-fed dairy production. This represents the globe’s first “whole of sector/whole of government” approach to addressing the challenges of our industry”.

EU sustainable development

safeguarding our resources
From the Brundlandt Report defining sustainable development in 1987 to the UN Sustainable Development Goals adopted by world leaders in 2015, both stressed the need for EU-wide commitment. These economical and ecological policies must be firmly integrated if we are to achieve a sustainable future.

At the launch of the UN Sustainable Development Goals in 2015, the world was called upon to commit themselves to push the sustainable transformation further. Governments, industry and businesses are all vital in this transition.

The UN 2030 Agenda and Sustainable Development Goals establishes a holistic concept of sustainability where all aspects must be taken into account: Climate, environment, health, economic growth, circular production and consumption, clean water, biodiversity, equality and many more.

Clearly, the dairy sector plays an important part in this movement; for example, in securing a nutritious and healthy diet for the growing populations all over the world, as a major contributor to economies, and in employment. But most importantly, the dairy sector is a key element in the management of terrestrial ecosystems, supporting biodiversity and addressing environmental degradation and climate change, for example, by sequestering carbon in the soil.

In October 2016 the global dairy sector, represented by the International Dairy Federation (IDF) and the UN Food and Agriculture Organization (FAO), formally committed itself to push a sustainable transformation by signing a declaration that the global dairy sector will with the UN Sustainable Development Framework. The declaration was signed in Rotterdam and is referred to as the Rotterdam Declaration (FAO, 2016).

Over the last number of decades, Europe has witnessed an environmentally-conscious movement and a demand for sustainable transformation.

As part of this sustainable transformation, patterns of production and consumption must be transformed. Consumption in the developed world leads to an immense use of resources – and this is expected to more than double towards 2050, if we don’t make a change (IPCC, 2017). Such an immense use of resources leads to large emissions of greenhouse gases, a lack of biodiversity and natural eco-system imbalances.

The dairy sector is committed to reducing the pressure on the world’s resources while producing more nutritious food to a growing, global population.

With this publication the European dairy sector is taking stock on sustainable transformation thus far. How far have we come? And what challenges still lie ahead of us?
Climate change is costly for nations, communities and people. Changing weather conditions, rising sea levels and imbalances to natural eco-systems are challenging communities and economies all over the planet. These changes are mostly caused by the excess emission of greenhouse gases (GHGs) from human activity such as production of energy, transportation, manufacturing, household emissions and agriculture. This overproduction of greenhouse gases started roughly in 1900 with the industrial revolution, and has been rising ever since.

When talking about sustainable development, tackling the effects of climate change is the first issue that comes to mind.

The climate changes are costly

At European level the agricultural sector emitted just 10% of all greenhouse gases in 2016 (European Commission, 2018). Being highly productive and efficient, the European agriculture’s emissions of GHG are relatively small, according to the IPCC (IPCC, 2006, p. 823). In Europe transportation is the second largest emitter of greenhouse gases, next to the energy sector emitting 24% of all GHGs in 2016 (European Commission, 2018).

Where do the greenhouse gas emissions come from?
The largest emitter of greenhouse gases is the energy sector. Producing and transporting energy and electricity for factories, production sites and households all over the world have a huge impact on the climate with 35% of all of GHG emissions in 2014 (IPCC, 2014). When looking at European level, the energy sector’s share is even bigger. In Europe the energy sector emitted 54% of all greenhouse gases in 2016 (European Commission, 2018).

Agriculture is the second largest contributor to greenhouse gases globally. Agriculture, forestry and other land use cause 24% of all greenhouse gas emissions worldwide. Agriculture alone accounts for 10% to 12% of all GHG emission at world level. Livestock and manure are responsible directly for 7% of all GHG emission at the world level and the rest of the emission of greenhouse gases come from forest and changed land use (UNFCC, 2015).

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Methodology: IPCC methodology
Europe has reduced emissions by 18% since 1990
Since 1990 the total emission of GHG’s have reduced by 18 percent in Europe, when looking at the national inventories (European Commission, 2015). This overall reduction of emissions stems mainly from a reduction of emissions from waste management and industrial processes. The European agricultural sector has reduced its emissions with 23 percent over the last 30 years (European Commission, 2015).

Emissions from transportation has increased by 19% since 1990, and aviation and maritime transportation have increased their emissions by a whopping 66% over the last 30 years (European Commission, 2015). Other research shows that the tourism sector is a vast contributor to the GHG emissions – and it is a sector where emissions continue to grow (Lenzen et al., 2018).

Meanwhile it is important to note, that greenhouse gases are natural and that they are all – especially CO2 – an important part of nature. For example CO2 is needed for plants to grow. The aim is thus not to bring the GHG emissions to zero, but to get closer to the natural level of emissions.

Different methodologies:
There are two different methodologies for assessing the greenhouse gas emissions from the different sectors: The Intergovernmental Plan on Climate Change (IPCC) methodology and the Life Cycle Assessment methodology (European Commission, 2018).

IPCC Methodology
The national inventories of greenhouse gas emissions from the economic sectors – the methodology used by the IPCC. These numbers are solely based on the emissions of GHGs from each sector. This methodology differs from the Life Cycle Assessment (LCA) methodology, which is used in many scientific publications (IPCC, 2014).

Life Cycle Assessment
The Life Cycle Assessment (LCA) considers the entire life cycle of a product, from raw material extraction and acquisition, through energy and material production and manufacturing, to use and end of life treatment and final disposal. Through such a systematic overview and perspective, the shifting of a potential environmental burden between life cycle stages or individual processes can be identified and possibly avoided (ISO 1404).

Methodology: IPCC methodology
Source: IPCC 2014
Livestock is accountable to 14.5% of GHG emissions worldwide.

The production of milk is accountable for 2.9% of GHG emissions worldwide.

European initiatives support the international sustainability agenda, and with the latest proposed reform of the European Common Agriculture Policy (CAP), the direct payment system for European farmers can be changed into a more environment-friendly system.

**The European Agriculture Policy is going green**

European initiatives support the international sustainability agenda, and with the latest proposed reform of the European Common Agriculture Policy (CAP), the direct payment system for European farmers can be changed into a more environment-friendly system.

Consequently, farmers who use farmland in a more sustainable way and care for natural resources as part of their everyday work, benefit financially. Such sustainable ways of using farmland include diversifying crops, maintaining permanent grassland and dedicating 5 percent of arable land to ecologically beneficial elements.

This system will aim to secure environmental and climate benefits as part of agricultural activity in order to counterbalance the fact that the markets still haven’t recognized the price on safeguarding biodiversity in farming (European Commission, 2017).

What is the dairy sector’s share?

Food production in any form has an impact on the climate. Whether it is the production of animal or plant foods, production emits greenhouse gases and thus impacts the climate.

When using the Life Cycle Assessment method, the total livestock sector accounts for 14.5% of all human-induced emissions globally. This relates to all livestock, both ruminant and monogastric. If we look exclusively on ruminants the share is 10%, which includes both cattle and smaller ruminants. When zooming in on the production of milk and production of meat linked with milk, the sector is accountable for 4% of the global emissions. And from this, emissions from the production of milk emits 2.9% (FAO, 2013).

Source: FAO, 2013

Grasslands suck out carbon from the air

Grasslands are major ecosystems and a form of land use that gives us a range of useful products. As grass is not edible by humans, livestock will process the grass and turn it into useful products and resources, such as milk, meat, hides, to name a few, but also key ecosystem services. This includes biodiversity protection of clean water, food production and carbon sequestration.

The “locking up” of carbon (also called sequestration in soil) has a key role in the context of climate change. Permanent grasslands can “lock out” carbon from the atmosphere and store it in the soil. This means that the emissions of greenhouse-gas carbon can be mitigated by the use of grasslands. Currently permanent grasslands sink up to 3.1 million tons of carbon every year, and are set to sink even more in the future.

These numbers are based on the Life Cycle Assessment methodology, see more about the methodology above.

When assessing the sustainability of the dairy sector, it is also important to look at other aspects of sustainability as well as the emission of greenhouse gases. Keeping this in mind, we must consider aspects such as contribution to biodiversity, clean water, effects on health and nutrition, feeding a growing population, and the sector’s influence on economic growth. In the Rotterdam Declaration, the international dairy sector committed itself to taking on the role of diminishing the impact on climate change and contributing to solving the problems of feeding and expanding world population.

"Currently permanent grasslands in Europe sink up to 3.1 million tons of carbon every year"
Chapter 2

A National Perspective
The Irish dairy industry is a **key component of the economy in Ireland**, providing much needed employment spread across rural areas.

**Irish dairy is exported to 155+ markets worldwide.**

**Dairy Sustainability Ireland**  
In 2016, Dairy Sustainability Ireland was established, a pro-active industry led, whole of sector and whole of Government partnership which is working to develop and implement new approaches to dairy farm sustainability at both economic and environmental levels. This new initiative has been established to help farmers meet environmental targets, improve profitability and to copper fasten Ireland’s reputation as a world leader in grass-fed dairy production. This represents the globe’s first ‘whole of sector/whole of government’ approach to addressing the challenges of our industry.

The introduction of the Sustainable Dairy Assurance Scheme, the first national dairy scheme of its kind anywhere in the world is a clear indication of dairy farmer’s commitment to farm sustainability. It sets out requirements for best practice on Irish dairy farms in animal health and welfare, land management, biosecurity, safe farming practices and the production of quality milk. Close to 100% of farmers are now certified in the Scheme which is an indication of their commitment to operating and maintaining the highest possible sustainability measures.

**Ireland’s dairy industry solutions to reaching the EU targets for reductions in 2030 and 2050.**

Dairy Sustainability Ireland set out to provide real solutions to reconnect with stakeholders and give positive environmental outcomes for all, along with improved farmer incomes and overall company sustainability.

A DSI forum was established containing all 14 members of Ireland’s dairy processing industry, including the Specialised Nutrition companies. These were joined by all the main farm organisations, and finally they were augmented by the relevant state agencies, including the Department of Agriculture, Food and the Marine, Department of Housing with Responsibility for Water, the EPA, Bord Bia, Teagasc, and the Local Authorities.
Launch of the **Agricultural Sustainability Support & Advisory Programme (ASSAP)**.

**Water Quality**
Under the Water Framework Directive (WFD), Ireland has a requirement to achieve good status in waters by 2021 or by 2027 at the latest. This will be a major challenge and will be measured by improvements in water quality supported by increased awareness and adoption of best practice. There is real significance in this for Irish farmers and dairy farmers in particular as failure to achieve improvement in water quality over the next four years will jeopardise nitrates derogations currently held by Irish farmers and damage the image of the Irish dairy sector in important international markets.

Current data from the EPA shows that 1,460 water bodies are classified as at risk of not meeting quality objectives. Agriculture is the main pressure on 53% of these, so the programme has been set up to provide free and confidential agricultural advice from dedicated sustainability advisors to those who require it. With over 7000 farmers in derogation it is important that we see improvements in water quality in order to retain the Nitrates Derogation post 2021.

**Improvements**
At the end of 2017, the Agricultural Sustainability Support & Advisory Programme (ASSAP) was established funded by the Department of Housing & the Department of Agriculture and fully supported by the members of Dairy Sustainability Ireland. This is a new approach to achieving improvements in water quality by providing free and confidential agricultural advice from dedicated sustainability advisors to farmers operating in the Areas for Action. The sustainability and water quality improvements will be achieved through three main areas of focus on farm:

I. **Improved nutrient management** with more targeted use of slurry and fertiliser
II. **Better farmyard management & practices**
III. **New approaches to land management to reduce nutrient losses in critical source areas.**

The ASSAP involves a resource of 30 Agricultural Sustainability Advisors. 20 Advisors will be managed by Teagasc’s environmental and regional units and a further 10 Advisors are being managed by the Dairy Industry who will work with their dairy farmers in the areas for action. The free and confidential advisory service will work with existing advisory services in each area for action to support farmers operating within these catchments.

The initial stream assessments will be undertaken by the LAWSAT scientific assessment teams in the selected Areas for Action. The LAWSAT teams will assess each catchment and identify locations within each catchment where non-agricultural and agricultural pressures are to be addressed. Non-agricultural pressures will be dealt with by local authorities and where agriculture is identified as the pressure, relevant farms will be offered the free advisory service from a Co-Op advisor for dairy farms and a Teagasc advisor for all other sectors.

The co-operatives have identified 10 sustainability advisors who are a mixture of experienced and new staff that will work on the ASSAP and also with current Co-op programmes. All advisors will work in co-operation with existing advisory services engaged by the farmers in an area for action.

By focusing on these specific catchments (Areas for Action) and by providing a free and confidential advisory service to farmers it is hoped that this will lead to a direct improvement in water quality and provide security for potential growth of the dairy sector into the future.
Dairy Industry Ireland members have committed to:

› All of the processing dairy companies at all levels will fully support this new sustainability drive to achieve improvement on farm sustainability outcomes

› This work will be supported up the supply chain by the specialised nutrition Dairy Industry Ireland members

› DII members will provide and fund 10 Sustainability Advisors to work within a shared Partnership strategy and governance in the new ASSAP programme

› The Sustainability advisors will work cohesively and in an integrated way with the Teagasc team

› All of the sustainability advisors will be trained with the Teagasc team by Teagasc to the same standard

› The Sustainability Advisors will support an internal change programme within the companies as part of this new programme

› All dairy industry personnel in direct contact with farmers will be trained in this new approach

› Work within the Partnership, to develop a new communications strategy to support on-farm sustainability and climate change best practice

› Co-op communication channels with their suppliers and supplier network structures will be utilised to drive this new strategy

The Outcomes

› The current company Farm Pilots for Nutrient Management Programme best practice will be expanded to all Processing Dairy Companies

› Two new Pilots will be established with the Department of Agriculture, Food and the Marine; Teagasc; and the EPA; to understand and devise best practice in Critical Source areas – to break nutrient pathways

› The processing companies will actively promote the implementation of the New Nitrates Action programme to all farmer suppliers

› The Co-ops will seek that all dairy farms implement best practice in NMP

› The Co-ops will support the development of new approaches and best practice re the broader Sustainability & Climate Change Agenda
What are Irish consumers’ greatest concerns in relation to sustainability and the dairy sector?

A survey on Irish consumer attitudes towards sustainability and the dairy sector was undertaken in Spring 2018.

The European Milk Forum conducted the survey in six markets – Ireland, Northern Ireland, France, Denmark, Belgium, and the Netherlands as part of a European campaign that aims to disseminate facts and solutions on how to safeguard our planet, reduce climate change promote sustainability in dairy systems. The purpose of the survey, commissioned by the European Milk Forum, was to establish the responsibilities Irish consumers feel themselves towards the environment, and the role they see the Irish dairy sector has in making a change.

The survey was based on a representative sample of 2,000 respondents in Ireland, undertaken during July – August 2018.

Climate Change
The survey showed that 94% of Irish consumers believe in climate change and fear for the world their children or grandchildren will grow up in. Extreme weather conditions, extinction of plants and animals and floods topped the reasons why Irish people worry about climate change.

The majority of respondents (71%) pointed to themselves when asked who has the greatest responsibility in contributing towards a sustainable future, followed by the production industry (58%), politicians (54%) and farmers (28%).

However, just 4 out of 10 Irish consumers actually feel well-informed about sustainability, proving it can be hard to navigate through the myriad of advice and guidelines that they are exposed to from several sources in the public debate.

Although Irish consumers see themselves as the ones with the biggest responsibility in creating a sustainable future, only 12% think that sustainability is the most important factor when buying dairy foods. Nutritional value (57%), healthiness (55%) and price (53%) were cited as their top priorities.

Dairy Sector
80% of Irish people believe that the dairy sector plays an important role in creating a sustainable future, and 80% also believe that the dairy sector must focus even more on producing in a sustainable way by measures such as producing its own animal feed, waste re-use and recycling. Only 25% of those surveyed were aware that almost 100% of Irish farmers are certified in the Sustainable Dairy Assurance Scheme in Ireland. 59% of respondents believe that the dairy sector can help feed the world in a sustainable way.
Chapter 3

Sustainable diet
A nutritious diet is not only constituted by healthy food items but also defined by the combination of foods in certain quantity.

How do we feed a growing population?

Data from the UN’s Food and Agriculture Organization, FAO shows that one billion people suffer from hunger and a further billion people suffer from “hidden hunger”, which is nutritional deprivation even when the supply of food is sufficient, because of poor diet quality.

This need for available, affordable and nutritious diets for the growing global population is challenged by the need to reduce our use of resources and impact on the planet. How can these conflicting demands be met?

The need for a holistic concept of sustainable diet

In our search for new ways of producing and consuming foods in a sustainable manner, we must take a holistic approach to sustainable diets. Such a definition has been established by the FAO in 2010 with the publication Sustainable Diets and Biodiversity:

"Sustainable diets are those diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable, nutritionally adequate, safe and healthy, while optimizing natural and human resources" (FAO, 2010).

With such a holistic approach to a sustainable transformation of the food sector, it will be possible to feed the growing population in a nutritious, accessible, and culturally appropriate way, with a low impact on climate and the environment.

Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable, nutritionally adequate, safe and healthy.

Carbon footprint is only part of the picture

Climate change and emission of greenhouse gases cannot be the sole dimension on which we assess the sustainability of foods. We must also consider the environmental footprint, nutritional value, economy and food culture.

Today the metric for measuring the sustainability of foods is often solely linked to emissions of greenhouse gasses per kg of food. When looking solely at this metric, animal products in general emit more carbon than plant-based products per kg of the product. So theoretically, carbon emission from diets could be reduced by eating only plant-based food.

But in reality, the calories and nutrients lost by avoiding animal products must be compensated by a lot of other plant-based foods, which also have an environmental footprint. In the LiveWell study a database was created that linked nutrient composition and GHGE data for 82 food groups, and models were built based on UK diet. The conclusion of the study showed that a sustainable diet that meets dietary requirements for health with lower GHGEs can be achieved without eliminating meat or dairy products (Am J Clin Nutr doi: 10.3945/ajcn.112.038729).

A similar approach has been applied in the Netherlands, with a nutrient calculation model, and the conclusions confirm that consuming less dairy does not reduce the GHG emission of the diet, because when omitting dairy, which is very nutrient rich, the nutrients have to be provided by other products.

When you add up the environmental effects of products that replace dairy, it results in the same carbon emissions and land use (Source: Stephan Peters, decreasing the environmental footprint of our diet, nutrition magazine).
The Feed vs Food Debate

A new analysis of the feed vs. food debate (source: Global Food Security, vol.14, p. 1-8). Researchers from the USDA and Virginia Tech conducted an analysis of the impacts of removing animals from US agriculture and warned that changing one facet of a complex ecosystem has ripple effects and unexpected collateral impact.

As much of the land in the US is unsuitable for high value crops, the research indicated that over 57% of the additional food produced would have to come from grains such as corn and soybean. The overall reduction in greenhouse gas emissions was lower than expected at just 2.6%, and since the plant-only system increased the probability of population deficiencies of calcium, vitamin A, vitamin B12 and important fatty acids, it was not considered a viable option.

A decrease, equivalent to the full GHG attributed by animals, was not realized because of the need to synthesize fertilizers to replace animal manures, dispose of inedible byproduct feeds that had been used as feed for animals, and produce additional crops on land previously used by animals. Feeding an entire population solely with plant-based products is thus a very complex scenario, which has been shown to be ineffective as a solution to sustainability challenges. (Source White RR, Hall MB. Nutritional and greenhouse gas impacts of removing animals from US agriculture. Proc Natl Acad Sci 2017; 114:E10301-E10308)

If we only focus on the environmental and climate impact of the foods, we risk running counter to the human nutritional needs which must also be a key dimension when we measure sustainability. In the context of more holistic dietary guidelines, the health effect of foods as such or dietary patterns must also be taken into account. This goes beyond merely looking at the nutritional value or nutritional composition of foods. (Drewnowski, 2018)

When we compare this to the measure of carbon footprints, we see that vegetables and fruits were precisely the group of foods that have the lowest carbon footprint per kg of product. But if these foods don’t provide the necessary number of calories or nutrients, they cannot constitute a nutritional correct diet by themselves. (Drewnowski, 2018)

When looking at nutrient profiling of foods on kilocalories, fruits and vegetables provide very few calories per serving, whereas dairy and dairy products provide more calories per serving. At the other end of the scale with energy dense foods we in particular find grain snacks and confectionery as well as fats and oils. (Drewnowski, 2018)

Nutritional profiling is key

Nutritional value is often measured with the twin concept of energy density and nutrient density of foods, which is measured in kilocalories per 100 g. and nutrients per 100 g. or nutrients per 100 kcal.

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A sustainable diet must meet the norms

Different cultural, religious, political and social norms shape our views on food. While proteins from insects or green algae may meet a nutritional demand, they have different degrees of sensory or cultural appeal. In our search for the sustainable diet we must take these factors into account as they have major impact on food choices, both regionally and globally. Selection of dietary sources of protein, in particular, may be determined by religion, society, and culture, in addition to economy. Furthermore, the amount and quality of protein from meat and dairy are higher than what can be obtained from any plant foods.

These measures of nutritional value of different food groups demonstrate why it is important to couple the nutritional profiling with the carbon footprint. We must also pay particular attention to the affordability and cultural appropriateness of the different foods.


Designing the sustainable diet

In designing a sustainable diet, the quantity consumed must be taken into consideration first (Source: Masset G. et al, Which functional unit to identify sustainable foods? Public Health Nutrition, 2015). The total quantity of food consumed explains a larger part of the food items’ greenhouse gas footprint than the carbon intensity of the item itself. If the dairy products are replaced by other items, the CO2 equivalent per calorie of the substituting food item must also be considered. (Source : Vieux F. et al, Greenhouse gas emissions of self-selected individual diets in France: Changing the diet structure or consuming less? Ecological Economics, 2012)

The complex issue of evaluation of sustainable diet is still an emerging field of research, and the peer-reviewed science on the matter is still sparse. There is still incomplete coverage of relevant environmental areas of concern. Environment is not just greenhouse gas emission, but so far the majority of studies take only this indicator into account, ignoring carbon storage under grassland and ecosystem services provided by ruminant production like biodiversity maintenance. It is thus too early to drive a strong conclusion.
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