

# ‘From grass to glass’: how dairy can go green

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Feeding strategies, like incorporating seaweed into fodder, can reduce methane emissions from cows by around 30%. [[Arctic Wolf / Flickr](#)]

*This article is part of our special report [Rural innovation](#).*

**Polluting emissions have long been a concern in the dairy industry, with methane released from cow belches and flatulence fueling global warming, causing floods and droughts, which in turn impacts on production.**

Creating a sustainable supply chain from “grass to glass” while expanding into global markets is a huge challenge for European dairy farmers.

[According to Greenpeace](#), dairy production is the most emitting farming sector, with a total of 235.73 MtCO<sub>2</sub>eq emissions in 2018. [A study in 2018](#) found that the five largest meat and dairy corporations were responsible for more annual greenhouse gas emissions than global oil majors ExxonMobil, Shell or BP.

Cutting down on these is essential to helping the EU meet its net zero emissions target for 2050 and make dairy production sustainable.

Kees de Koning is innovation manager at the Dairy Campus in the municipality of Leeuwarden, northern Netherlands. To cut down on pollution, he says farmers have only two solutions: either they reduce the number of cows or cut down on the emissions they create.

The [Dairy Campus](#) in Leeuwarden is an open ecosystem and living lab, where researchers work together with the business community, education and dairy farmers on innovations that contribute to a more sustainable dairy chain.

Researchers at the Dairy Campus work in cooperation with two other thematic campuses in Leeuwarden, the WaterCampus and the Energy Campus, to combine the interlinking issues of water technology, energy and dairy.

One solution they are working on to cut down emissions is through animal feed, looking at how farms can incorporate seaweed in feed to reduce methane emissions. One

project in Australia four years ago found that [emissions could be cut by over 90%](#) by feeding the cows with seaweed.

“We know already that, if we look specific differences among cows and combine that with breeding and feeding strategies, you can reduce methane emission by around 30%. If you add some additives to the feed, you can reduce the methane emission by over 50%,” de Koning said.

Another project that can reduce dairy emissions and save water is by [using membranes to filter water from milk](#) before it is sent to factories for processing. Milk is around 90% water and removing some of this before processing saves 400,000 litres of water per year for the average farm.

This in turn reduces the need to transport milk around, and decreases traffic on local roads, as well as pressure on finite water resources.

### **Hybrid farming systems**

A combined system of solar panels and grazing for animals is also being looked at in Leeuwarden to create a dual income stream and tackle problems arising from global warming, giving shade to cows and their grazing ground.

When installed directly above crops, agricultural photovoltaics – or “Agri-PV” – can provide shade for animals while protecting crops against hail or frost, thus enabling more stable crop yields.

“I think if dairy production could be organised in the most efficient way, we could do much more with less land,” said de Koning, who warned however that consumers may not like the idea of a more intensive agricultural system.

[39% of EU territory is grass and cropland](#), but renewable energies like solar are also looking at arable land for building small-scale solar plants. Putting solar panels on less than 1% of the world’s agricultural land could produce enough energy to satisfy global electricity demand, according to a [recent study](#).

The idea, currently submitted as a project proposal, is to develop a hybrid system, where solar and fodder production work side by side with solar panels that can be positioned in more ways to function symbiotically with grassland that can still be harvested.

SolarPower Europe, an industry association, says the development of agricultural photovoltaics could help drive the energy transition in rural areas. “If Agri-PV were

deployed on only 1% of Europe's arable land, its technical capacity would be over 700 GW, generating more than 25% of the EU's current electricity consumption," [the association said](#).

### **Sustainability tailored to local area**

While sustainability is a global challenge for dairy production, solutions need to be adapted to the local level.

In Leeuwarden, the Dairy Campus looks into various topics, including smart farming, biodiversity, green energy, emissions, resilience, feed efficiency and soil utilisation, with around 300 hectares of land and 550 dairy cows.

It educates students from secondary applied and vocational sciences institutions to ensure the developed innovations can be applied by future professionals across Europe.

According to de Koning, the key to sustainable milk production is to adopt a holistic approach. "I think that's the biggest challenge – how to find a good balance in the requirements, expectations of consumers, citizens, society."

"In that way, perhaps we have to reinvent our agrifood system in Europe," he said.

The activity around the Dairy Campus had another added bonus for the municipality. By attracting students, researchers and business representatives from across the world, it also helped revive the entire region.

"Close cooperation with entrepreneurs and business sector is key, this is our golden milk triangle," [the campus says on its website](#).

Looking at the next decade, de Koning sees a combination of intensive and small-scale farming developing alongside each other, depending on location and how much land is available to farmers.

Some regions like Brittany, Northern France, parts of the Netherlands, Denmark and Northern Germany might focus more on industrial farming, whereas the mid-Netherlands and areas around the Alps in France, where land is more limited, might choose smaller scale, traditional farming.

Innovation is key across these places, with new data analytics tool being increasingly used to develop sustainability by collecting information from individual cows, including weight, milk yield, feed intake, emissions and location.

But to make a difference, these innovations must also be viable for the farmer.

“If we request more from farmers, I think we should also pay more. We should not just go for the lowest price, but for a good price,” said de Koning, adding there are three Ps when it comes to sustainability: people, planet and profitability. “Don’t forget profitability.”

“Nowadays I see we are focusing on people, we are focusing on planet, but profit for some reason is far away. I think without profit future sustainability will be extremely difficult,” he added.

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