

RESEARCH

Teagasc – the Agriculture and Food Development Authority – is the national body providing integrated research, advisory and training services to the agriculture and food industry and rural communities in Ireland. We invite you to find out more about the research we do below.

IN THE CLOVER

If you have ever walked through a field, you will have seen a humble plant with white or pink flower heads. This is called clover. Although it doesn't look like much, this plant has special qualities that make it good for the environment.

Clover can fix nitrogen from the atmosphere. This means that fewer artificial fertilisers are needed for grass to grow.

Our researchers are testing how clover plants perform on Irish farms on a long-term basis and if cows can digest them properly.

With the help of bacteria living on it, clover captures nitrogen from the atmosphere and releases it into the soil once it dies. The nitrogen then helps plants in the field to grow.

Teagasc also has a clover breeding programme; our researchers are working on developing clover varieties that are perfect for the Irish climate.

Teagasc researchers are going one step further by using multi-species grasslands that include plants such as plantain and chicory.



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DIGESTING THE RESEARCH

Our bodies require fuel to function. When we eat food, we get energy from digesting carbohydrates, fats and proteins. On top of that, different types of food have a range of vitamins and minerals that help the immune system and give us healthy skin, hair and bones.

Food scientists at Teagasc study food digestion and the release of these important nutrients into the bloodstream. Studies on the human digestive system can be invasive, expensive and difficult. Instead, we are using a lab experiment that mimics the human gut using common lab equipment and chemicals.

Our scientists are looking at how different foods are digested and analysing the end products like sugars, fatty acids and amino acids (the building blocks of protein). For example, they are currently studying whether plant-based foods are digested in a similar manner to dairy or meat. In particular, they want to know how much of the protein in plant-based foods can be digested, absorbed into the bloodstream and delivered to where it is needed.



REDUCING FOOD WASTE

The leafy vegetables like spinach we enjoy for our dinner have a high water content, which means that they can go off quickly and tend to be thrown away, contributing to food waste. Plastic-based packaging can help spinach last longer but we all know that synthetic plastics are not good for the environment. Researchers at Teagasc are tackling this problem in two different ways.

Our horticulture scientists are working on bio-based products – which use materials from living organisms, such as plants and other agricultural substances – that can be applied to spinach leaves while they grow. Spinach leaves continue to respire (or breathe) after they are harvested, which builds-up moisture and allows mould, fungi and bacteria to grow. These bio-based products will reduce respiration and give the spinach a longer shelf life.

Teagasc food scientists are developing new ways to preserve spinach and other fruit and vegetables using drying technologies. Drying is one of the oldest methods of food preservation and advances in technologies like freeze drying allows us to extract and create valuable ingredients from fruit and vegetables. These dried products can then be used in healthy, ready to eat snacks, breakfast cereals and yoghurts.



HELPING SHAPE THE FUTURE OF FARMING

You may have heard news reports about farm income on social media or the TV or radio. Our economists at Teagasc analyse and report on this information.

Every year, our team of farm recorders collect information from about 900 farms. The farmers we ask to take part in this survey are randomly selected by the Central Statistics Office.

We use the information gathered to track the performance of dairy, cattle, sheep and tillage farm enterprises across Ireland. This information is used to help monitor the economic, environmental and social sustainability of farming in Ireland.

The farmer and the farm recorder work with each other to go through the information relating to the farm. They then put together the data necessary to calculate things such as farm profitability, the number of hours worked on the farm and the impact the farm has on the environment.

All of the information across the 900 farms is collected to create a national report on Irish farming, showing how the different farm enterprises are performing. This is very valuable to farmers, farm advisors and policy makers, not only in Ireland but also in Europe. This information also feeds into the European Commission's Farm Accountancy Data Network (FADN) so we can see how our farms are performing in comparison to those in other European countries.



SOIL MICROBIOLOGY

Soils are so much more than meets the eye. Soils are home to a staggering abundance and diversity of living organisms, most of which we cannot see with the naked eye.

Soil biology is of vital importance to the health and productivity of our farming systems. In fact, soil has a million times more bacteria on the planet than there are stars in the universe. This is where we get the term “the soil is alive”.

These soil organisms range from the microscopic (like bacteria and fungi) to larger organisms (like earthworms and ants).

Soil biology is important for climate regulation (regulating greenhouse gases in the atmosphere); plant health (providing vitamins, hormones and suppressing plant disease) and plant establishment (maintaining the soil structure that anchors the plants).

It can even influence the flavour of crops and it provides many antibiotics and vaccines. Without the soil biology, we would lose all of these essential functions.

Our researchers at Teagasc are investigating the life in our soil with the aim of harnessing soil biology to provide natural-based solutions to combat global climate challenges and improve plant health and food. After all, the organisms that live in our soils are essential members of the farming workforce.



THE LAND FROM ABOVE

The land around us is home to plants, animals and tiny microbes. It can store carbon from the atmosphere or release it, we work it for food and other products, and it defines how we live in our communities.

Mapping the land – learning about the where – is an important part of understanding what is happening in the world. A whole field of science – which you know as ‘geography’ – has developed around how location drives the earth’s processes and influences, and is influenced by, the living beings on it.

For a long time, mapping meant physically putting feet on the ground, but we can now use new technologies to view large areas of land. This helps us to learn what occurs there (buildings, rivers, fields) and how it is used (is it tilled, grazed or left to its own devices?).

Satellite or drone-mounted sensors help us see how vegetation grows, and if it is suffering from drought or diseases. We can interpret the sensor outputs ourselves simply by looking at them, or we can feed them to new machine learning algorithms that can cover large areas much faster than the human eye.

Using Geographic Information Systems (GIS), our researchers at Teagasc pull together these and other data, such as soil properties, climate data or settlement patterns to help us understand how these interact and help future decision making.



BREEDING POTATOES FOR THE FUTURE

We Irish love our potatoes. Ireland's average annual potato consumption is 85kg per person – two-and-a-half times higher than the world average.

Our researchers at Teagasc have been breeding potatoes since 1962 and have bred some really popular varieties that you will see in your local supermarket. The most popular potato we have bred is called the 'Rooster'.

It's important to keep breeding new varieties of potatoes so that we can keep on top of new pests and diseases.

Climate change, reducing pesticide use and feeding an expanding global population presents a lot of challenges to our potato breeders. They are focusing on developing varieties that are resistant to drought, as well as to important diseases affecting our potato crops.

Our potato researchers are using the latest genome-based breeding programmes to speed up the breeding process. The recently released Buster variety was the first variety to come from our new strategic breeding programme.

Such is their level of expertise, Irish potato researchers are involved with potato growing and research projects as far away as Africa. In fact, Irish-bred potatoes are grown on every continent, marketed by Irish Potato Marketing.

So, whether you prefer mashed or roast potatoes, chips or crisps, you can thank Teagasc potato researchers for your highly nutritious meal or snack.



MILK PRODUCTION GOES HI-TECH

Have you ever wondered about the technology behind a simple glass of milk or slice of cheese?

Milking a cow has come a long way from a bucket and a pair of hands. Ireland's farmers have embraced many new technologies in recent years, from virtual fencing to automatic (robot) milking.

Teagasc researchers have teamed up with Information and Communication Technology (ICT) specialists and other research institutes that use the latest available technologies, such as data analytics, telecommunications and sensors, and are applying them to the process of making milk and other dairy products.

In Ireland, we have over 1.5 million dairy cows and they produce eight billion litres of milk a year. It's important that we process this milk as efficiently as possible.

The cows that help us in our research wear activity trackers (much like your FitBit) – but around their neck. These sense what the cow is doing (standing, lying, grazing or sleeping) and can tell us how healthy the animal is.

Researchers at VistaMilk SFI Research Centre, hosted by Teagasc, are working on producing a digital milk map, which will help milk processors decide what food products the milk should be used for. For example, some milk is ideal for drinking, while other milk is better for cheese-making.

Our genetic scientists at Teagasc are studying to see if they can breed animals that belch less methane (one type of greenhouse gas). They do this by pairing cows with good genetic traits to breed.

