PRIFYSGOL ABERYSTWYTH UNIVERSITY

Sefydliad y Gwyddorau Biolegol, Amgylcheddol a Gwledig
IBERS ABERYSTWYTH
Institute of Biological, Environmental and Rural Sciences

Summer 2009

IBERS work is worth billions

Report shows range of benefits for farmers, economy, environment and health

The Institute of Biological, Environmental and Rural Sciences (IBERS) at Aberystwyth University produces almost £60 million for the UK economy and supports almost 700 jobs, according to an economic study.

But the Institute's research work is worth far more again – in the future it could save or earn hundreds of millions of pounds a year for farmers and the wider economy.

Consultants DTZ, independent specialists in economic impact studies, have, for example, calculated that work being done by IBERS scientists on reducing methane emissions from farm animals could be worth £322 million to the economy each year.

This is just one example of the practical value to agriculture and society in general of IBERS research which is aimed at improving agricultural productivity and food security, improving human health and providing environmental benefits.

Much of the work at IBERS will also have major benefits for other countries across the world – for instance, by developing high yielding crops that can withstand the effects of climate change and diseases in developing countries or by leading to the production of vaccines against diseases such as TB and bilharzia.

- Direct operating output of IBERS is worth almost £24 million a year and the Institute employs 341 people. When the knock-on effects on suppliers and others are included, both figures more than double.
- Research and products developed at IBERS are currently worth millions of pounds and provide massive benefits for the wider economy – for instance, seed sales are worth £8 million a year and clover research saves UK farmers £13.5 million in fertiliser costs. Improving the use of grassland is estimated to save farmers £400 million a year in feed costs.
- The addition of yeast probiotics to the diets of dairy cattle would increase the milk yield and could earn UK farmers an extra £116 million a year.
- IBERS research in two major sheep breeding programmes could lead to an extra £15 - £30 million per year for the UK sheep Industry if the research results were to be fully adopted. Schemes to improve ram quality have been underway since the 1990s.

Many of the projects will also provide environmental benefits – for example, developing miscanthus as a bio-fuel could produce electricity for millions of people and reduce carbon emissions, while new deep-rooting grass hybrids, which are under development, could help in flood prevention.

Professor Noel Lloyd, Vice-Chancellor of Aberystwyth University, welcomes the findings of the study by DTZ:

"The establishment of IBERS as one of Europe's largest centres for research and teaching in land use is a great opportunity for Aberystwyth University. Not only does this report highlight the significant economic contribution that IBERS is already making, but it also underlines the great potential for future developments that will benefit agriculture and food producers around the world".

The full report will be published later this year.

The world and Wales – an international and national vision

IBERS is set to become an international centre to tackle three of the major issues facing world farming – food, energy and water security.

The Institute will also develop its traditional role of finding specific answers for Welsh farmers, spreading best practice and giving the next generation of farmers the special skills they will need.

All these aspects come together in the Institute's research work – IBERS Director Wayne Powell sees the Welsh environment as a test bed for global solutions.

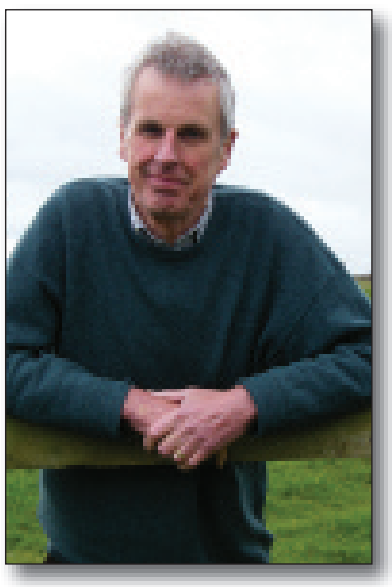
"The environmental issues in Wales are important and by addressing them we can develop a template for other parts of the world."

In the same way, IBERS research works from the tiniest biological units up to whole ecological systems.

Wayne Powell is planning a £25 million investment programme for the Institute's sites at Gogerddan and Penglais, taking the work of tackling climate change on to another level.

"We already have labs here that allow us to conduct cutting edge molecular biology research and we have a tradition of applying science to solve practical problems so that we can address the three great security issues – food, water and energy."

Graham out to grass at the Royal Welsh



Grass's greatest friend will be one of the star guests at IBERS Education Pavilion at this year's Royal Welsh Show.

Graham Harvey has written more than 500 editions of The Archers and is agricultural editor for the series, but he has also written a seminal book praising grass-based farming as the saviour of the environment.

The journalist and author of *The Carbon Fields* will take part in a seminar at the Show on Monday – an opportunity to hear more about his conviction that farming has been hijacked by global corporations.

He mentions some of the grassland work done by IBERS as one of the hopeful signs of a change of heart – the kind of grass-based farming that is traditional to Wales is the best hope for the future.

Much of the research work being done at IBERS is aimed at improving the performance of grassland and the relationship between better forage and feedstuffs and better produce at the farm gate.

"If we are serious about saving the planet, we need to put more of our farmland back into pasture," says Graham Harvey. "Grass-fed is the new organic; a return to grass-based farming is beneficial to us all."

Success – today and in the future

A message from IBERS Director, Professor Wayne Powell

On all fronts, IBERS has had an excellent year and is laying down the foundations for even more success in the future.

There have been immediate successes – the unprecedented six new entrants onto NIAB's Recommended Grass and Clover List is one of the most obvious, but the wide range of our research projects is producing benefits of all kinds for Wales and the world.

The independent report produced by consultants DTZ shows that we make an immediate contribution of almost £60 million to the UK economy, that we are saving millions of pounds a year for farmers and, in the future, our contribution will be massive, in financial, social and environmental terms.

This was underlined in a review of our science, this time by the Science Impact and Advisory Board. The report highlighted the quality of our research and its practical value for agriculture, the environment and the economy at home and across the world.

The seeds of future success are also being planted, through the new facilities being developed, particularly on the Gogerddan campus. The investment there will be £25 million, providing world-class resources to match the quality of our science.

As well as housing the new International Institute for Food, Water and Energy Security, Gogerddan will be the enterprise hub for the Agricultural, Food, Bio-renewables and land-based industries.

Those facilities will support the teaching work done by IBERS and there is success on that front too. Undergraduate provision continues to thrive with the current number of applications standing at 1000, representing an increase of 10% in applications and intake on 2008.

This is proof of IBERS enviable reputation, building on the good name of its predecessor organisations.

This reputation will grow further as our research teams continue to produce results that can help agriculture and society face up to its greatest challenges in Wales and throughout the world.

Hefin Williams and the three degrees

Hefin Williams likes Aberystwyth ... that's why he's on his third degree course there.

He's also from a farming background ... and that's why his research work for a doctorate at IBERS is more than just an academic subject.

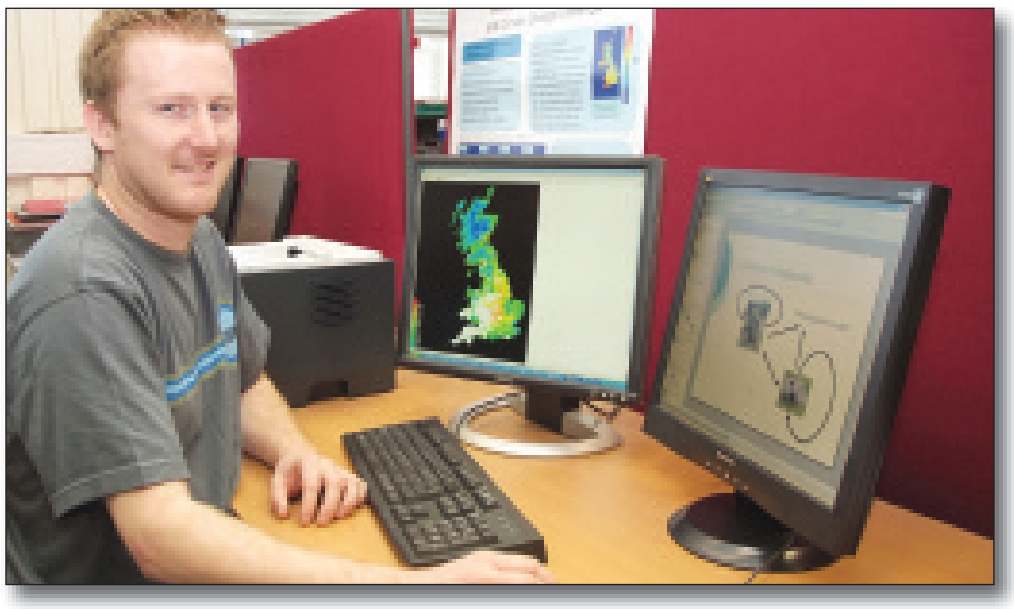
The 25 year old from near Machynlleth is almost ready to publish his first paper on research to investigate the effects of climate change on TB in cattle.

Whilst other studies so far have largely ignored the possible influence of the environment, Hefin's work is particularly about climate change and the potential effect of changes in temperature and rainfall on the disease.

The next step will be to narrow the focus of his work to study the disease at a local level in Pembrokeshire, looking for similar – or different – patterns in the landscape.

"The main objective is to ask questions and look for trends. Is there more or less risk in different circumstances?"

Hefin is part of a research group at IBERS studying the theme of a changing environment in the transmission of important human and veterinary diseases. For example, studies underway on malaria in Africa may teach us valuable lessons about controlling other diseases that are transmitted by insects, such as Bluetongue in Wales.



Working with leading scientists has been an inspiration for Hefin, whilst the merger that created IBERS means that the research teams can now draw on the facilities of three different campuses and more working farms.

During his time at Aber, he has seen the resources being transformed with far more opportunities for students. As well as taking advantage of world-class facilities they are studying in an atmosphere of pioneering research.

Hefin is also helping to nurture the next generation of potential farmers and scientists – he lectures at IBERS in addition to carrying out research.

His special responsibility is to develop modules through the medium of Welsh, meeting another vital need of farming in Wales in the future.

On his own future, he's keeping his options open. The family farm may offer opportunities eventually but, at the moment, his father and uncle are young enough to carry on and the income isn't enough for three.

"For the time being I'm happy to take the opportunity to do some diversification!" says Hefin, before turning back to his work on bovine TB.

Linking farming and science – for the benefit of both

Farmers at the Royal Welsh Show this year can take part in a Clover Clinic thanks to the Grassland Development Centre at IBERS.

Like any good clinic, the secret lies in listening. Dr Heather McCalman, manager of the extension team at the Centre, believes in matching solutions to circumstances.

"We will start by talking to the farmers and finding out exactly what they do and what could help them. We can then offer suggestions from IBERS menu of research, and from other sources too.

"In the case of clover, for instance, we might be able to show how it can save a farmer on buying nitrogen fertiliser whilst also offering high quality forage."

Heather and her team are the link between scientists and farmers, passing the benefits of research on to Welsh agriculture.

At the same time, feedback from farmers can help guide research and development work, helping IBERS to aim their research at real, practical issues.

Another example might be the introduction of oats – showing how it can be an alternative crop and a way for poultry farmers to grow some of their own feedstuffs.

Heather herself can draw on years of experience of practical farming – through her general agriculture degree at Bangor, through her work as a livestock specialist with ADAS and then on one of Aberystwyth University's farms.

Her PhD was on grassland beef farming and, as well as an interest in organic farming, she has travelled and worked in Africa too.

"Much of IBERS research is of relevance to Welsh farming and rural communities, especially as we move into a new era of government policy for the countryside. The key will be bringing together profitable farming, improving the environment and finding new uses for land."

She hopes IBERS will be able to help farmers and others working on the land to identify new opportunities and make the most of them.

Huw and the model farms

When Huw McConochie left school at 16 and started work as a farmworker on a Youth Training Scheme, he could hardly have imagined being in charge of more than 1000 hectares and experimental crops that could change the face of world farming.

The 36 year-old from the Aeron Valley is manager of IBERS farms, a portfolio that rose to 11 holdings when the new Institute was formed.

He is now in the process of reorganising the way they work, concentrating activities on three centres, and developing systems that might be a pattern for local farms in the future.

And these are no ordinary farms – as well as selling their own produce, part of their income comes from growing special crops, both for IBERS and commercial businesses.

"Some of the work is very different," says Huw, who worked his way through a day-release scheme to an agricultural diploma and then a degree in Animal Science at Aberystwyth, followed by a doctorate studying the way milk is produced in the udder.

The combination of practical experience and scientific know-how makes him an ideal manager for IBERS farms – as well as having the traditional skills, he needs to understand the thinking behind some exciting research.

There are crops growing on IBERS farms that could transform agriculture – crops such as miscanthus and willow that will help provide energy security, as well as experiments with silage that will improve the quality of stock and food security.

Huw rents out plots of land to other departments in IBERS to grow their controlled samples whilst other products are boosting the local economy, both through the farms' own produce and through growing crops specifically to meet a local demand.

The most famous is the malting barley grown for local Penlôn brewery, but the farms also produce meat for Aberystwyth University's kitchens. Cig Ger y Lli has even been named after the University's Welsh nickname.

"This is the pattern for farms in the future," says Huw. "You need to raise the value of the produce – there is more money to be made outside the farm gate than on the inside."

The other message is sustainability; growing crops for feedstuff and reducing the need for bought in fodder, another idea that could be a pattern for Welsh farms in the future.

"The last couple of years have shown how volatile feedstuff prices can be; growing our own gives us greater control of costs. It's the way farmers will have to think."

And farmers, too, will change. The other role the farms have is to provide work experience, practical education and research openings for students at Aberystwyth University.

Like Huw now, they may have to be scientists too, understanding the biology and techniques involved in more efficient farming; another model for the future.

Committed to rural Wales

Huw McConochie works from a main office at Gogerddan.

All the farms are run as one unit – "the workforce is the most important asset of any business and this is certainly the case at IBERS" says Huw, who is supported by a team of some 18 staff, clerical and hands on, herdsmen, tractor drivers and shepherds."

Organising the work calls for management skills and delegation as well as farming knowledge, and for business acumen.

Huw uses some of the same strengths in the community, with two children attending a small local school, he is committed to the rural communities of his native Ceredigion.

As chairman of a working party, he has helped provide a new future for one of the former cheese factories in Felin-fach, the village where he did his day release training many years ago. He also keeps in touch with the nearby National Trust – owned Llanerchaeron estate where he was the first full-time farm manager before joining the University at Aberystwyth.

"The merger between the University farms and IGER has certainly been a challenge which I relish greatly, and a steep learning curve for all the staff involved" said Huw. "Everyone within the team at IBERS has to understand that this new and exciting structure is a 'business operation' as well as a vital research resource working for the benefit of the farming industry and rural economy in Wales". "It is almost a symbol of the challenges facing Welsh agriculture itself".

Research – from lab to farmyard

Research at IBERS involves working with the basic components of agriculture to improve the quality of crops, soil and livestock, all with the aim of improving the quality of products, raising farm incomes and preparing the industry across the world for the effects of climate change.

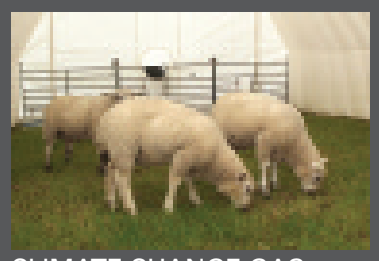
As well as projects to study the effects of the environment on animal diseases (see page 3), there is a range of research involving the whole agricultural process, from improving soil to developing innovative processing techniques for meat.

Many of the most important projects will offer direct practical benefits for farmers both in Wales and internationally. At the same time, they will help the environment.

PROSOIL, a project involving farmers, scientists and the food industry, is finding out how improving the health of the soil could improve the quality of forage and feedstuffs and so improve the quality of livestock and farming businesses in Wales.

Through PROSAFE BEEF the aim is to control and restrict bacteria that can cause infectious diseases in cattle and make beef products even safer. PROBEEF involves research to increase the levels of beneficial polyunsaturated fatty acids in beef, to develop pioneering processing techniques and products that will add value to the meat.

SUPERGEN - Understanding the chemical makeup of plants could help the development of crops for energy. IBERS is testing 250 types of Miscanthus grass for a chemical called lignin – high levels make the grass suitable for burning for electricity generation; low levels make it possible to ferment it for ethanol. Seaweed too, with its sugars, can be used to produce ethanol.



CLIMATE CHANGE GAS MITIGATION - Flatulence in cows is well known as a cause of methane, but is no joke. Because Wales is so rural, 87% of all its nitrous oxide and 70% of its methane emissions come from agriculture. That's why IBERS scientists are working on developing forage crops that reduce the amount of methane produced in the animal's digestive system. Possible solutions include better management, and better forage crops and dietary additives.

BREEDING LINK aims to improve the genetics of forage crops and clovers to help animals make more effective use of nutrients, such as phosphorus and nitrogen, and to help the plants withstand drier conditions caused by climate change.

Best year yet for plant breeding at Aber

The plant breeding programme at Aberystwyth has had its most successful year yet, with no less than six new herbage varieties selected for the Recommended Grass and Clover List issued by the National Institute of Agricultural Botany.

The new entrants from IBERS include:

- Two contrasting white clovers called AberAtom and AberSpring.
- A tetraploid perennial ryegrass called AberBite.
- Three diploid perennial ryegrasses – AberChoice, AberFarrell and AberSweet 2009.

Both clovers offer improved yields and are more persistent under different kinds of grazing or cutting.

AberBite is being heralded for setting a new standard in tetraploid perennial ryegrasses breaking records for grazing and silage and for late developing perennial ryegrass.

The three diploid perennial ryegrasses also outscore their counterparts under different headings.

This year's success is the result of long-sighted decisions and work over the past 20 years, says IBERS Dr Michael Abberton, with ever increasing success in the Recommended List.

"This year's unprecedented success is another significant step forward," he said.

"I believe the opportunity for livestock farmers in the UK to be sustainable and environmentally sound using forage-based systems is now greater than ever.

"Grass and clover breeding programmes such as those taking place at IBERS have a major part to play in this."

Of the new IBERS-bred varieties on the list, first seed will be available from British Seed Houses from AberBite and AberChoice from the 2009 harvest, with other varieties not available until 2010.

Gogerddan children in clover

These could be the farmers – or the research scientists – of the future.

Children at Bright Horizons nursery at Gogerddan, home of Aberystwyth's Institute of Biological, Environmental and Rural Sciences, have been experimenting with one of the wonderful crops being developed there.

They have been given packets of clover seeds to plant. Work carried out at IBERS to produce better and more productive strains of clover are already saving millions of pounds a year for farmers in Wales and beyond.

Gerwyn, Emily, Conor, Seren, Luke, and Jay at the Plas Gogerddan Nursery

Free packets of clover seeds for children to take home are available on the IBERS Pavilion in the Countryside Care area at the Royal Welsh Show this year.

For more information, please contact IBERS at:

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