



## HOW TO FEED *12 Billion by 2100*

**Nothing short of the wholesale re-engineering of arable farm production could result from a £1.5 million collaboration between Europe's most successful cereal breeders, sustainable farming advocates, and plant scientists and microbiologists at the University of Sheffield.**

Building on almost a decade of groundbreaking research into the genetic make-up of cereals and how microbes in the soil are the key to sustainable growth, researchers at the University of Sheffield are close to solving one of the world's most intractable problems – how to feed a global population that is heading towards 12 billion by the year 2100, while at the same time being environmentally friendly and sustainable.

"Farmers know that sustainability is the way forward. We have been working with them to deliver the productivity gains they need, but in a way that is also sustainable and friendly towards the natural environment," says Dr Duncan Cameron, Director of the recently formed P3 Centre of Excellence for Sustainable Technologies.

Dr Cameron is part of a five-member team leading the Biotechnology and Biological Sciences Research Council (BBSRC) funded project, along with Professor Jonathan Leake, Professor Steve Banwart, Professor Julie Scholes, and Dr Jurriaan Ton, who is also a Director of P3.

**"Our work is based on fundamental research, but because of the remarkable facilities we have at Sheffield, and the range of research expertise we have in the P3 family, we are able to rapidly translate fundamental science into real world situations, scaling things up to a level that has relevance to agriculture, and that business understands."**

Dr Duncan Cameron

A recent meeting with members of the Organic Growers Alliance, who are backing the project, praised Sheffield for the way they were 'demystifying' science and taking on board the needs of the industry.

Sheffield's research-based approach could end the sharp decline in global cereal production, caused in large part by the degradation of the world's soil. "Right now the soil is so degraded it is just something that sits there to hold the plants up, it does precious little else," says Dr Cameron, whose work with "weird and wonderful" fungi has opened up the possibility of restoring the soil through the introduction of beneficial fungal microbes that will restore soil quality and improve crop performance.

"These symbiotic fungi, or mycorrhizas, receive sugars from plant roots in return for providing nutrients and water to the plants, it's a win-win relationship that we want to harness to feed the world in a more sustainable way," he added.

Dr Cameron, who last year won the World Economic Forum's coveted Young Scientist of the Year award, is already having an impact on the production of apples through a collaborative venture with Heineken – the world's largest cider apple producer – that was part-funded by the Natural Environment Research Council (NERC).

Likewise, his work with RAGT Seeds, one of Europe's biggest cereal producers, has resulted in the development of new varieties of wheat which are less dependent on pesticides and chemicals – many of which could be banned under new EU rules.

"In that case it took just seven years to go from firing lasers at single cells in the lab here in Sheffield, to developing a new variety of wheat that is now growing successfully in Cambridgeshire," he said. "Now that is impact."

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**Watch a short film about Dr Duncan Cameron's research**

