



grow
Green

Success stories
of plant protein
agriculture



Many start-ups and several larger organisations have seen large growth rates in their plant based product lines.

Start-ups in the United States like Impossible Foods¹ and Beyond Meat have raised millions of dollars² in venture capital over the last couple of years from noteworthy investors including Bill Gates. Mainstream companies are also launching their own plant based product lines. For example, here in the UK coffee and sandwich chain Pret A Manger opened a pop-up vegetarian-only restaurant, Veggie Pret³. It performed so well that it has since become a permanent fixture in Central London's Soho area and two further shops opened in 2017. In September 2017, the sandwich giant has led the charge in veggie and vegan convenience food announcing plans for a third shop to be opened before the end of the year. Such changes in business and investment are a reflection of the consumer trend of moving away from animal protein, with estimates suggesting that the plant based meat market is set to reach £4.3 billion by 2022⁴ and could make up a third of the market by 2050. Worldwide sales of non-dairy milk alternatives more than doubled between 2009 and 2015⁵ to £15 billion over concerns regarding the treatment of animal as well as saturated fat levels, lactose intolerance, hormone content and antibiotic use in dairy cows.



A selection of British-grown pulses from Hodmedod

It seems that now really is the time to grow green - and we recently spoke with several businesses who are already doing precisely that. Their stories highlight how not only is it possible to make the transition away from animal agriculture, but that there is also a growing consumer demand for plant protein products. Here's a snapshot of their stories.

The British Quinoa Company⁶ supplies conventional and organic quinoa for sale to food manufacturers, retailers and various independent outlets. Founded in 2005 by Stephen Jones, it grows and sells quinoa for the human consumption market. Not only is it a thriving business, but it helps connect other family farms by working together to supply quinoa to the consumer.

Another British business, Hodmedod⁷, was founded in 2012 by Nick Saltmarsh, Josiah Meldrum and William Hudson following research into the scope for production and supply of plant protein in the UK. While the main British protein crop, fava beans, is almost entirely exported, the vast majority of dried and canned pulses on British shop shelves are imported. The founders of Hodmedod ran a trial project through the summer of 2012 to see if people in Norwich would enjoy eating fava beans from East Anglia – they did. Hodmedod has since grown to work with over 20 farmers and is now sourcing over 100 tonnes of pulses and quinoa annually for supply to retailers, caterers and manufacturers across the UK.:

"Our farmers grow some of the very first British quinoa, neglected varieties of bean and pea, heritage grains and new trial crops like lentils. We offer dried pulses and grains for cooking, canned beans and peas, gluten-free pulse and quinoa flours, flaked barley and quinoa, puffed quinoa and ready-to-eat roasted bean and pea snacks. We're committed to providing wholesome quality food with provenance that's more sustainably produced."

1 www.impossiblefoods.com/ [accessed 26/09/2017]

2 www.cnbc.com/2016/07/29/impossible-burger-our-test-tube-meat-tastes-great.html [accessed 26/09/2017]

3 <http://uk.businessinsider.com/veggie-pret-in-soho-is-being-made-permanent-2016-9?r=US&IR=T> [accessed 26/09/2017]

4 <https://www.visiongain.com/Report/1850/Meat-Substitutes-Market-Report-2017-2027> [accessed 25/09/2017]

5 <https://www.ft.com/content/7df72c04-491a-11e6-8d68-72e9211e86ab> [accessed 25/09/2017]

6 <https://www.britishquinoa.co.uk/> [accessed 26/09/2017]

7 <https://hodmedods.co.uk/> [accessed 26/09/2017]



Cleator Organic Farm in Canada has been farming without animal inputs since 2008.

It's not just in the UK that farmers are turning to farming plant protein for the human food market. In Canada, Cleator Organic Farm⁸ is successfully run by Ian Cleator and his wife without any chemicals or animal manure:

"My farm is an Organic Crop Improvement Association (OCIA) International organic certified grain farm of 4 sections near Wynyard, Saskatchewan in Canada. We've been farming organically since 2008. We grow ancient grains such as Red Fife wheat, emmer, spelt as well as peas, legumes, oats, alfalfa and are bulking up rare ancient varieties such as Rivet wheat, Triticum turgidum and Einkorn. We also have 67 acres of orchard and rare plants with medicinal action such as sea buckthorn and white lupins. We don't use any chemicals or animal manure and have no cattle or "commercial animals" on the farm. We use shelter belt (7.5 miles on 5 rows) to protect somewhat against contamination from neighbours' spraying."

Staying on that side of the Atlantic, husband and wife team Carl Rosato and Helen Atthowe from Woodleaf Farm⁹ in Oroville, California, have been living by farming organically, and without any animal products, for over 20 years. As Carl explained to us:

"For the last 20 years or so I haven't used any animal products because I found that using compost made from leaves and wood chips sold better than manures. My wife is vegetarian

and we're also doing more research in to how veganic farming with strip tillage and beneficial habitat is working without any outside inputs. We sold our 2,200 tree, fruit farm 1 1/2 years ago and on that farm we hadn't used manures for over 20 years. Now we're setting up a smaller fruit farm and we're only using the grasses and clovers that are growing on the farm to fertilise the fruit and veggies. We have 85 varieties of fruit and we're growing grain and vegetables to feed ourselves - making up about 90% of what we eat. Our goal is to grow strong healthy plants that resist insects and disease. We leave lots of beneficial habitat near all the plants and so far we seem to be having good success in growing healthy and tasty plants."

Jannelunds Farm outside Örebro in Sweden is a family owned, 200 acre farm and has been organic certified since 1995. What is particularly interesting about this farm is that until very recently it was an animal-based farm with 100 ewes giving birth to 250 lambs a year. However, as owner Adam Arnesson told us, in 2015 he and his parents reached an ethical and financial crossroads:

"We wanted to grow the farm in terms of profitability and employment, continuing a high output of ecosystem services... but also produce more food with less impact on climate change. We didn't want an animal factory, so increasing our numbers of animals wasn't an option. Instead we decided to make a change in land use, growing more protein crops, cereals for human consumption and vegetables."

What makes Adam's farm particularly interesting is that it is a milk producer - yet there are no dairy cows. What it does produce, however, are oats. Lots of oats. Until recently, those oats went directly into animal feed, either sold or fed to the animals on his farm. However, the support of Swedish drinks company Oatly¹⁰ heralded a shift in the farm's ethical and commercial direction, with the same oats now being used to produce an oat milk drink and in the process tapping into the growing market for dairy alternatives across the country. As CEO of Oatly, Toni Petersson, underlines, the company is just "telling people what the science tells us about the need to consume more plant-based foods"¹¹.

Although Adam's farm is still in the process of moving away from animal agriculture, he underlines the importance of the growing plant protein market for the farm's future:

"We have a collaboration with Oatly for our heirloom oats - making a special product each year. We also are collaborating with other organisations and businesses in the food industry for our other crops. Animals are still an important part of our farm but the vegetable part of the farm is increasing and will be more important for our profitability."

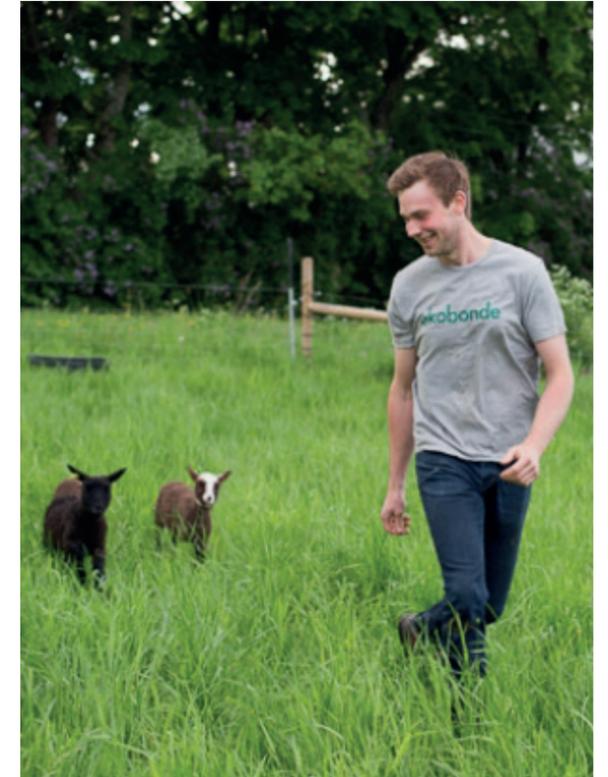
So why are these businesses moving into non-animal farming? What has motivated them to move into growing plant protein and away from a reliance on animal agriculture or products? For Stephen Jones from The British Quinoa Company, it seems that it was quite simply the natural, and most financially beneficial, choice:

"I grew up with a mainly non-animal farming background, and so crops were the natural choice to work with. As I developed growing quinoa in the UK I never really looked back. Working with quinoa was mainly a personal choice, but it also offers a financial return to live on, which is great!"

Similarly, Nick Saltmarsh, co-founder of Hodmedod, found it a natural, and indeed financially beneficial business to work in. Not only that, he underlined the ethical reasons for moving away from animal agriculture and increasing the availability of plant protein for human consumption:

¹⁰ <http://www.oatly.com/> [accessed 29/09/2017]

¹¹ <https://www.theguardian.com/sustainable-business/2017/aug/26/wow-no-cow-swedish-farmer-oats-milk-oatly> [accessed 29/09/2017]



Adam grows oats for plant-based milk brand, Oatly.

"The motivation for the founding of Hodmedod in 2012 came from a research project carried out by East Anglia Food Link (EAFL) for the Norwich Transition Towns group. The project looked at an ideal achievable sustainable diet for Norwich and identified increased vegetable protein, ideally locally produced, as a major element of this. Having identified that significant volumes of vegetable protein (dried beans and peas) were already being produced in the hinterland of Norwich but primarily used for livestock feed or export, EAFL carried out a small trial project to see if local people would be interested in eating locally produced fava beans. The extremely positive response inspired the foundation of Hodmedod to further develop the production and supply of British-grown beans and other pulses and grains for consumption in the UK. The reasons [for working in non-animal agriculture] are therefore personal (the founders of Hodmedod share a passion for pulses and desire to see vegetable protein more widely eaten and enjoyed), financial (we could see a potential business opportunity)

and ethical (we believe that the benefits, particularly environmental and health but also animal welfare, of increased vegetable protein consumption are multiple and significant)."

Similarly, Adam from Jannelunds farm stressed the ethical reasons for beginning to move away from animal farming, underlining the impact such methods have on climate change and his motivation to be more connected with the environment:

"Animals are still at our farm. However, the reason we're not increasing the number of animals is absolutely ethical... As I see it, the role of a farmer is to take care of the planet, and my motivation for working as a farmer is what I call biosphere stewardship – something that is not compatible with "animal factories". We are transitioning towards more plant-based food because of the importance of the environment and climate change. People need to eat less meat, and we need to produce crops close to us, it's as simple as that."

For Helen Atthowe, from Woodleaf Farm in California, the reasons were also ethical, underlining a strong desire to move away from animal agriculture after having witnessed first-hand the realities of 'cattle' farming:

"I began farming veganically after growing up in Montana cattle production country. When I realized what happened when the calves we babied at birth grew up, I became a vegetarian in my early teens. I became a vegan later in life after watching the film "Earthlings" and began experimenting with no-manure and no animal product vegetable and fruit farming."

Prior knowledge about the disadvantages of animal agriculture, coupled with the known benefits of organic, plant protein farming has also led farmers to make the transition. The businesses we spoke with told us how they were inspired to grow plant protein because they believed it to be a healthier and less risky approach to farming, underlining the positive benefits for public health. Similarly, they found that the plants were much happier too using green waste compost opposed to animal manure:

"My wife and I have an extensive background in science and medicine and our reasons [for moving away from animal agriculture] stem from our knowledge of this area. We didn't want to introduce the extra risk



Helen Atthowe grew up on a cattle farm in Montana. Today Helen farms without any animal inputs.

to our customers from bacteria such as haemorrhagic E. Coli from animal manure in our products."

"I started using green waste compost as my main fertiliser...and within a few years the organic matter levels went up and the plants were doing so much better!"



Reaping the rewards

So what are the benefits of non-animal farming? As The Vegan Society's original Grow Green report underlined, traditional livestock farm business incomes are low and uncertain, particularly for farmers relying on animals, such as in the production of cow's milk. Changing weather patterns, tight economic margins, increasing care cost such as feed and veterinary care, and low farmer confidence are all particularly severe for UK livestock farmers. Plant protein farming can offer a positive alternative livelihood for farmers, with lower and more stable input costs. Furthermore, as the businesses here have told us, increasing consumer interest in value-added food and drink products based on plant protein crops offers a potentially good return on investment. This is evident in businesses such as Hodmedod, whose success was underlined by the announcement in September 2017 that they had won Best Food Producer in the 2017 BBC Food & Farming Awards¹²:

"Hodmedod has proved to be a successful business venture and we see demand for vegetable protein products only increasing. Working with our projects has the further benefit of seeing (and experiencing ourselves) the enjoyment and cultural richness they can offer as ingredients for a wide variety of dishes, cuisines and diets from across the world. Meeting and communicating with others involved with pulses and grains, in the UK and beyond, is continually inspiring."

Supporting those farmers who wish to move away from animal farming towards plant protein farming can also improve the wellbeing of individual farmers:

"I guess quinoa crops do not need milking at 5am every morning, so the occasional lie-in is great!"

Adam Arnesson from Jannelunds Farm spoke of the holistic benefits of moving away from animal farming, underlining not only the impact on economic security and the sense of wellbeing this creates, but his sense of meaning and purpose

¹² <https://hodmedods.co.uk/blogs/news/bbc-food-awards-best-food-producer-2017> [accessed 26/09/2017]

connected with his livelihood:

"Profitability is one big benefit. We have a really good connection and cooperation with food companies too so it's made it really good for us... but I also really feel like moving towards plant protein farming has increased our sense of purpose and motivation."

A move towards plant protein farming doesn't just create a sense of personal, subjective wellbeing. As Adam explained to us, the benefits are becoming evident in tangible, quantifiable form as well: after the first year of producing oats, analysis by researchers at the Swedish University of Agricultural Sciences found that Jannelunds Farm was producing double the amount of calories for human consumption per hectare and had halved the climate impact of each calorie produced¹³:

"In our transition to plant-protein farming our farm will support three times as many people with food and have half the climate effect per produced calorie just after one year. For me that is extremely motivating and it gives me pride in being a farmer and a biosphere steward."

Stimulating the production of plant protein sources and encouraging a gradual transition from livestock products bring benefits to the soil and the planet as a whole. As we underlined in the original Grow Green report, the fundamental benefit of growing protein crops for human consumption is the effect of releasing the pressure on land and water in countries that are currently using these resources to feed the UK appetite for meat. A shift to plant protein agriculture can reduce methane emissions, a potent GHG associated with animal farming, and demand for fertilisers reduced – which further results in lower GHG emissions. The businesses we spoke with have indeed noted these benefits:

¹³ <http://www.sciencedirect.com/science/article/pii/S0308521X15300421> [accessed 29/09/2017]

"The soil is much better and the plants are doing great."

"The benefits are there... and should be sustainable...production should increase as the years go by. A lot of our work is on the soil which is being destroyed by conventional farming and chemicals in most of the prairies."

As Ian Cleator underlines, conventional animal agriculture and the chemicals it employs can be detrimental to the health of the soil, as well as the wildlife and plants which rely on it to thrive. 20-plus years of growing plant protein has shown him that the soil is indeed much healthier than when it was used for conventional animal farming methods: grain legumes, for example, can be grown as a valuable addition to crop rotations. Pulses can provide a 'break' from diseases of the dominant crops, and deter animals which eat the crop. Peas, beans, lupins and other grain legume crops can significantly benefit the next crop, reducing input costs, and also increasing yields. Furthermore, as Ian explained to us, by growing both grain and green manure legumes, there is less need for farms to rely upon animal manures for fertility. This reduces the risks associated with animal manures, such as varying costs and

availability, and potential contamination.

Protein crops also support increased biodiversity, including pollinating insects. By providing nectar and pollen, the massflowering of protein crops contributes to the maintenance of bee populations. Additionally, the over-wintering of cereal growth prior to the spring sowing of protein crops stimulates increased populations of birds, small mammals and favourable insects:

"It's better all-round for us, the soil, the plants and the wildlife...it may be slow going at first but the benefits are there and they're sustainable."

"Increasing diversity of production on farms benefits the local environment."

Community cohesion

The benefits of growing green are not limited to the farmers and businesses themselves, nor just the soil they work with. There are also real and tangible benefits to the community, which is arguably increasingly important when feelings of disconnection, isolation and instability are rife in conventional animal farming communities. Community Supported Agriculture schemes are becoming more common, seen, for example, in local vegetable box delivery initiatives or local farmers markets. Farmers who are linked to communities can then grow suitable crops wanted and needed by local people, as well as providing jobs in rural communities where unemployment may be particularly high, as the businesses we spoke with told us:

"We provide work and therefore jobs for many local businesses who help us with our brand design, packing and storage, even smoking our quinoa!"

"We aim to provide a fair return to the farmers we work with and also increase local employment by localising the entire supply chain."

"In terms of benefits, we do no harm to the land and provide \$1 million of work in our area annually. We also adhere to the highest standards for cleanliness and food production including cleaning and packaging other organic farmers' crops in our area."



Stephen Jones from British Quinoa Company inspecting his crop.





Woodleaf Farm helps farmers in their community to see the benefits of growing without animal inputs.

So what's it really like?

We've heard the reasons why farmers are growing plant protein and the positive impact it has had on their own lives, the environment and the communities they work with. However, what's it actually like? What are the challenges and how are they overcome? For Carl Rosato from Woodleaf Farm in California, growing crops organically without the use of any animal fertilisers has been a successful and relatively straightforward experience, and has enabled them to help other farmers in the process:

"We're growing fruit and hazelnuts to sell and it's actually been relatively easy keeping everything healthy. Local farmers and gardeners are often coming to our farm to see the way we are growing our produce and we've also helped other farmers to try out new ways of growing their crops too."

For UK businesses like Hodmedod and The British Quinoa Company, a crucial part of growing protein crops has been developing an awareness among farmers of the benefits of growing such produce and, importantly, building public demand to ensure people want to buy their products:

"We are working ourselves to encourage more farmers to grow such crops by building the market for them. The key to this is building public demand for pulses and grains by encouraging people to incorporate more into their diets, while also developing awareness of and demand for these products from British farms (as has been more widely achieved for other categories, e.g., fresh produce)."

"I think it is equally important to encourage consumers to eat more plant based products as much as farmers to grow them, as there has to be a demand for the crops to be grown initially. Without having a sufficient market, growing more crops could potentially lead to lower prices, making it difficult for farmers to make a living moving away from animal agriculture."

There are, of course, some challenges along the way. As Nick from Hodmedod highlights, some crops are easier to grow than others:

"The core of our business is working with farmers to develop production of dried beans, peas, lentils, quinoa, seeds and grains. Our experience is that these crops can be successfully grown though some remain challenging (e.g. quinoa, lentils)."

As Nick told us, whilst the farmers he works with are successfully growing an array of different plant proteins, quinoa can be a rather difficult crop to grow. However, although some crops may be more challenging than others, that doesn't mean it is an impossible task – as evidenced by the success of the British Quinoa Company:

"In my experience growing quinoa for human consumption is very difficult in terms of all the challenges it presents, but extremely satisfying once the final product is being delivered and eaten by consumers."

The amazing success of The British Quinoa Company goes to show that plant protein crops, including those which may be somewhat more stubborn than others to begin with, can indeed be successfully grown in the UK.

Similarly, in Sweden, with a little knowledge, effort and investment in the right tools, it is indeed possible to grow crops which aren't always thought of as suitable for the cold Swedish climate:

"We grow all sorts of beans - black beans, borlotti, broad beans, also grey peas and lentils. Even though some of the crops aren't necessarily the most suitable for our climate (in cold Sweden), with knowledge and some investment in machinery it actually works fine. We also have lots of heirloom oat varieties that work great."

And there are more plans in the making for Adam and his parents in Sweden, underlining his enthusiasm and, in his own words, his genuine pride for making the transition away from animal farming:

The first step will be to scale them [oats] up to a more commercial state, and that's what we are working on at the moment. Networks between farmers who try these things are very important to create a community, both for pride in this transition and the experience.



Nick Saltmarsh from Hodmedod, who won Best Food Producer in the 2017 BBC Food and Farming Awards.



Support needed

Loss of farms and farmers, and the erosion of localised food networks and regional economies through unemployment are growing issues, largely due to intensification. Thousands of farmers and workers in animal agriculture are forced to leave the industry each year because of the low prices they receive for their produce and the increasing environmental problems associated with climate change. What can be done, therefore, to help farmers who may want to move away from such industries? We have seen that there are indeed farmers out there who have already made a transition to growing green. There are already businesses successfully involved in growing and providing plant protein products for the human food market. It can be done, and, as noted by the individuals we spoke with, it can be a tremendously rewarding experience. However, it is important to ask what may be needed so that similar businesses can continue to develop, grow and flourish. As businesses such as Hodmedod and The British Quinoa Company in the UK have told us, developing the market and encouraging consumer demand for sustainable plant protein alternatives is key to their continued success, and supporting farmers who wish to move away from animal farming is crucial:

"I think supporting farmers to take advantage of market opportunities, or start new diversifications is key. Farmers can only move away from animal farming if they have other ventures that can offer a viable financial return and make use of the resources available to them on their farms."

Similarly, Adam from Jannelunds Farm echoes the point about financial support for farmers who are keen to make the transition away from an industry which has such a devastating impact on the environment. Furthermore, he highlights the need to encourage consumers to buy such new, plant-based products locally and for a price which reflects what should be a dignified, meaningful and rewarding way for farmers to make a living:

"There needs to be support to make the transition towards organic agriculture. Farming that produces more food with less negative effects on the climate should receive beneficial support both nationally and from within the

EU Food companies and industry also have a responsibility in making the transition profitable for farmers. Quite simply, we need to buy from local farmers and pay the price they need."

Education and research, including in issues concerning animal welfare and public health, is also crucial in order to develop, maintain and grow public interest and demand for organic, plant-protein crops:

"More research is needed to provide evidence of the positive benefits. I think it would be really helpful to show case studies of farms that use forms of carbon other than manure for fertiliser."



Adam believes that financial support is needed for farmers transitioning away from animal farming.

So what can be done, post-Brexit, to support plant protein growers, farmers and businesses alike?

"Post-Brexit, it would be great to be given support in ensuring we can be competitive with the risk of cheaper food imports arriving in the UK. This might mean support in accessing better technology (precision farming/ high tech cleaning equipment) so we can improve our production efficiency and reduce our costs."

"A fairer subsidy system that reflects the true environmental impact of farming and is accessible to small and innovative farmers. Increased media coverage of non-animal farming, rather than the obsession with milk production as the supposed mainstay of UK agriculture. We would also like to see continued grant support available for research and investment into more local food production and processing."

One thing is clear. We need to see a shift to plant protein agriculture, for the good of the environment, our health and animal rights. Such a shift could help to provide a new lease of life, as well as a renewed sense of community and wellbeing to UK farmers. The opportunity is there, and it's ripe for picking.

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