FRC Food Brexit Briefing

Brexit and Grow It Yourself (GIY): A golden opportunity for sustainable farming

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July 2019

Series editor: Rosalind Sharpe

FOOD RESEARCH COLLABORATION

an initiative of the

Centre for Food Policy

Educating, researching & influencing for integrated and inclusive food policy

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Contents

page

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Introduction

The subtitle of my new book is 'Gardening to Save the Planet'. You may think I am rather optimistic to hope that gardening could do much to save our planet, and wonder what this has to do with Brexit. I will argue here that gardens and allotments provide clues as to how we can both support biodiversity and produce ample healthy food in a truly sustainable way. My vision requires a radical rethinking of our farm subsidy system to redirect payments away from industrial-scale monoculture farming, and towards getting many more people back onto the land and supporting sustainable production of healthy fruit and veg for local consumption.

Policy recommendations

1. Remove area-based subsidies that currently give most money to the biggest landowners.
2. Use the money instead to:
    - Buy land for allotments;
    - Provide encouragement, support and training to encourage people to grow their own food;
    - Divert the bulk of farm subsidies to small farms using minimal/no pesticides, focussed on producing fruit, veg, meat and eggs for local consumption;
    - Provide funds for R&D into optimising sustainability and productivity of this type of farming.

The state of the global environment

We are making a terrible mess of our beautiful planet. The human population has already overshot that which the planet can comfortably support, and will rise to at least 10 billion in the coming decades. As a result of humanity's many activities, our climate is changing, and may soon reach a point where the changes become irreversible. Our soils, rivers, air and seas are polluted variously with plastics, heavy metals, pesticides, fertilizers, and many thousands of other man-made chemicals. Globally, soil is eroding and degrading, rivers and aquifers are being depleted of water, fish stocks are being over-harvested, and coral reefs are bleaching and dying. We are in the midst of the sixth mass extinction event, with species disappearing at a rate that the Earth has not experienced for 65 million years, since the dinosaurs were extirpated. Insects have experienced massive declines in abundance; UK surveys show that butterflies, moths, bees and hoverflies have been in steady decline for at least five decades, and a recent study from Germany found that insect biomass on nature reserves has dropped by 76% over the last 26 years. This is particularly alarming, since insects are vital to the functioning of ecosystems. They make up about 60% of all known species, and are food for many of the rest. They pollinate the large majority of wild plants and 75% of the crops we grow. They recycle dung and corpses, keep the soil healthy and control pests. Without insects, life as we know it would cease.

Why are insects and other wildlife disappearing? In short, it is due to us. We are destroying habitat around the globe, to make way for roads, factories, housing estates, open cast mines, car parks and much, much more. Intensive, industrial farming eradicates almost all life from the land, focussing on growing vast monocultures of single crops that have to be drenched in fertilizers and pesticides. Some modern pesticides are terrifyingly toxic; for example it takes just 1 teaspoon of a neonicotinoid insecticide to kill one and a quarter billion honeybees. These particular pesticides are so widely used, and so persistent in the environment, that a recent study found them in 75% of honey samples collected from around the world. Three-quarters of the world's honeybees (and presumably all other flower-visiting insects, which includes countless wasps, beetles, flies, butterflies, moths and more) are being routinely exposed to these highly potent insecticides. More broadly, 500 different pesticides are licensed for use in the EU, 900 in the USA. Farmers in the UK alone apply 16.9 thousand tons of pesticide to the landscape each year. Our landscape is awash with a toxic cocktail of poisons.

How gardens and gardeners can help

We often feel helpless in the face of huge, global conservation issues such as tropical deforestation, climate change, or the demise of polar bears as the ice melts. Thankfully, conserving our insects is something everyone can get involved in, and feel they are making a difference. Unlike polar bears, insects live all around us, in our gardens, parks, on road verges, railway cuttings and roundabouts. Even a tiny garden or a balcony can provide food for pollinators such as bees and hoverflies. All

you need to do is grow a few of the right kinds of plants; as a rule, old-fashioned cottage garden plants and herbs tend to be good. Think lavender, rosemary, marjoram, comfrey, catmint and thyme (see short videos here: http://bit.ly/Goulsonvideos). Avoid annual bedding plants such as busy-lizzies, begonias, petunias and pelargoniums, and double varieties of flowers such as roses that bees cannot enter. Try mowing your lawn less often, saving petrol and your own time, and you might be surprised by how many flowers pop up: buttercups, daisies, dandelions, clovers, selfheal. More generally, try to rethink your attitude to 'weeds'. You can get rid of all the weeds in your garden at a stroke if you simply reimagine them as wildflowers.

You could also make you garden a pesticide-free zone – there is just no need for pesticides in the garden, and why would you want to bring poisons into the place where your children play? I speak from experience, as I have a two-acre garden full of flowers, fruit, vegetables and wildlife, all living in approximate harmony without any artificial chemicals. You might also write to your local council and ask them to stop spraying pesticides in your local park, and along the road verges and pavements. There is no need; France recently placed a blanket ban on pesticide use in urban areas. If France can do it, why not everywhere else?

Finally, you might try providing homes for some types of insects in your garden. A lot of fairly useless 'bug hotels' are sold in garden centres, but some work, particular some of the ones that provide homes for solitary bee species. Bees such as red mason bees and leafcutter bees simply need horizontal holes to nest in. You can make a hotel for them yourself, by drilling ~8mm holes in a block of wood, or tying bundles of bamboo together (see https://bit.ly/2Wc6LzU). Some fancy commercial designs have windows that allow you to see what is happening inside the hotels, fascinating for both children and adults. You might also provide a 'hoverfly lagoon', a miniature pond in an old plastic milk bottle or similar, that will hopefully attract some beautiful hoverflies to lay their eggs (details here https://bit.ly/2Z5dvl4).

If we could somehow persuade most homeowners to do these things, and persuade councils to make parks and other public spaces similarly wildlife-friendly, our villages, towns and cities could become part of a vast network of miniature nature reserves, which could really make a difference for wildlife. Gardens alone cover half a million hectares of land. Imagine our road verges and roundabouts also sown with wildflowers, our streets planted with flowering trees, our parks containing wildflower meadow areas. We could invite nature in to live with us in our cities.

What about farming and food?

Let us not get too carried away. Seventy percent of the UK is farmland, and while that remains mostly inhospitable to life, the nation's wildlife will always struggle. Most of us seem to accept that industrial farming is the only way we can feed the world, and we implicitly seem to accept that wildlife declines are unavoidable collateral damage. In a sense, it is a choice between nature and us; and of course we will always choose us. But is this really the choice? Is it impossible to grow food and support nature at the same time? I would argue that we can do both, that we can have our cake (or carrot) and

eat it. I would go further, and argue that if we pursue intensive, industrial farming we will wipe out not just nature but ultimately ourselves, for our very survival depends upon a healthy environment.

Approaches to more sustainable food production

One approach is to take conventional farming and tweak it to enhance biodiversity. For several decades we have explored using farm subsidies to support agri-environment schemes, such as planting wildflower strips, bird food strips, nesting plots for skylarks and so on. Roughly half a billion pounds is spent each year on such schemes, and there have been some small local successes, but at a national scale these measures have not halted the seemingly inexorable decline of our wildlife (though it would presumably have been worse without them). I would argue that we need more profound change to the way we grow food.

Another option would be to encourage more organic farming, to reduce the pesticide burden on the environment. A counter argument is that organic farming produces lower yields, so that if the world went organic we would need to bring even more land into production, with negative impacts for wildlife. It is true that organic yields are often lower – global estimates suggest that organic yields are 80-90% of those obtained by conventional farming. On the other hand, we currently waste approximately a third of all the food grown in the world, a staggering figure. If we could significantly reduce food waste, the whole world could abandon pesticides and we could still easily feed everybody. Consider too that people in developed countries now eat far more than is good for them, propelling an epidemic of obesity and diabetes that is estimated to cost the UK economy £27 billion per year, and rapidly rising. Not only do we eat too much, but we eat too much processed food, and too much meat. Eating grain-fed beef is a spectacularly inefficient way of feeding people, requiring about thirty times the land that would be needed if a person ate plants directly. If we could reduce food waste, reduce overconsumption, and switch to eating only small quantities of meat (eliminating grain-fed beef entirely), we would need much less farmland than at present, while using no pesticides, and we would be much healthier.

Learning from allotments

So far this all sounds pretty attractive to me, but I think we should go further. Some organic farms look much like conventional farms; they are still trying to grow large monocultures of crops. This is difficult, because large-scale monocultures are breeding grounds for pests. Even on an organic farm, a large field of wheat does not have high biodiversity, so that there are few natural enemies to control outbreaks of pests and diseases. I think there are better ways to grow food, and I would argue that farming could learn something from allotments. Allotments typically have lots of different crops grown in small patches, and often look quite messy. You might think them an unpromising model for what food production could look like, but let me tell you a little more about them.

Firstly, a recent study from Bristol University, based on data collected from around the UK, found that allotments had the highest insect diversity of any urban habitat, higher than gardens or city parks, higher even than city nature reserves. Secondly, data we have been collecting at Sussex University on the productivity of allotments suggests that they can produce a lot of food. Competent allotmenters can produce the equivalent of about 35 tons of food per hectare, a few producing even more. This compares very favourable to the main arable farmland crops in the UK, wheat and oilseed rape, which produce about 8 and 3.5 tons per hectare, respectively (much of this going to animal feed or to produce the processed foods that help make us fat). Bear in mind also that the allotment produce is ~zero food miles, zero packaging, healthy fruit and veg, often produced with minimal or no pesticides. Thirdly, allotment soils tend to be healthier than farmland soils, with more worms and higher carbon content, helping to tackle climate change. Fourthly, a study in the Netherlands found that allotmenters tend to be healthier than neighbours without allotments, particularly in old age (though whether this was due to the consumption of fresh fruit and veg, the exercise gained from allotmenting, or perhaps from the social benefits of having an allotment was not clear). To summarise, allotments seem able to produce lots of food, support high biodiversity, have healthy soil, and make people healthy. A win, win, win, win.

It is sad, then, that an estimated 90,000 people are on waiting lists for an allotment in the UK. Given the benefits above, wouldn't the government be wise to free up more land to accommodate these people? Perhaps a tiny fraction of the £3.5 billion currently given out in farm subsidies could be diverted to purchase land for allotments? Some might also be spent on encouraging even more people to grow their own food (either in allotments or in their own gardens), perhaps via a programme of public education as to the benefits, and provision of training, support, and free vegetable seeds?

In the UK we currently consume about 6.9 million tons of fruit and veg per year, of which 77% is imported at a cost of £9.2 billion, shocking statistics when one considers that our climate and soils are well suited to growing many of these crops. Why do we import two thirds of the apples we eat, when we live in a land perfect for growing apples? Very crudely, under allotment-style management, all of our current fruit and veg consumption could be grown in the UK on just 200,000 ha of land (the equivalent of 40% of the current area of gardens, or just 2% of the current area of farmland).

What is it about allotments and small-scale veggie gardens that enables them to produce abundant food while supporting a healthy environment? There is a number of factors. Small patches of crops are much less susceptible to pests, which find it much harder to locate their preferred food amidst all the other crops. Natural enemies such as ladybirds, ground beetles and hoverflies tend to be much more abundant, and the diversity of vegetation provides plenty of places for them to hide, so even if pests do find a crop they tend not to flourish. As a result, it is easy to grow plentiful fruit and veg without using pesticides. Pollinator populations are high, also benefiting from the diversity of habitats, so crops yields are not limited by a shortage of pollinators. By growing dozens of different crops in close proximity, the allotmenter gets multiple harvests per year, rather than just one. Different crops can be grown between one

another, making maximum use of the space. The allotment is never stripped bare (as happens when an arable crop is harvested), so the soil does not erode and organic matter can build up over time. Perennial crops such as fruit bushes, rhubarb and trees also help to hold the soil together.

Farming systems already exist which use these principles. Permaculture, agroforestry and biodynamic farming are all variants on this theme. They are often regarded as 'alternative', left-field, 'hippy' approaches to food production, but their basic methods are ecologically sound and deserve to be more mainstream, with suitable investment in support and research. The only real downside to this type of food production is that it is much more labour intensive. Industrial farming is heavily mechanised and requires very few people (a major driver of the demise of rural communities). To scale up allotmenting or permaculture to provide a significant proportion of our food supply would require getting many more people back on to the land, but would that be such a bad thing? It is predicted that many traditional occupations will disappear in the next few years as advances in technology and Artificial Intelligence make us humans redundant. Perhaps one of the ways we could find gainful employment is by expanding small-scale agriculture.

A vision of the future

I have a fanciful vision, in which the nation's gardens teem with wildflowers, bees, birds, butterflies and vegetables, and in which urban areas are free of pesticides. Our cities are scattered through with and ringed by allotments, and by small, productive, labour-intensive market garden/permaculture farms, so that most of the fruit, vegetables, eggs and chicken eaten by city dwellers is grown within a few miles of where they live. In this world, people have reconnected with nature and with the benefits of eating quality, fresh, seasonal, local produce.

This might all seem far-fetched, but it is not impossible. Whatever your view on Brexit, it frees us from the Common Agricultural Policy and provides a golden opportunity to turn farming on its head, to make the radical changes that are urgently needed before most of our wildlife and our soils have gone. The £3.5 billion per year in farm subsidies currently takes taxpayers' money and uses it to support industrial farming, with the most money going to the biggest landowners. Imagine if instead this money was given to small-scale, truly sustainable farming systems, aimed at producing food for local consumption, so that such small farms become financially viable. We should have Government-funded experimental farms doing research into how to optimise this type of agriculture. If a gardener or allotmenter can get 35 tons of food from a hectare of land without any training or research and development to back them up, imagine what might be possible if we took a scientific approach to properly evaluating the best practices. Researchers could investigate which combinations of crops grow best together, develop crop varieties best suited to this form of farming, test how to boost populations of useful insects such as ladybirds or earwigs, and work out how best to ensure that the organic matter content of soils slowly grows over time, rather than declining. With this approach to growing food we could have a truly sustainable farming system, in which wildlife thrives and people have access to plentiful, locally produced and nutritious food.

References

1, The Garden Jungle, by Dave Goulson, is published on 11 July 2019 by Jonathan Cape. https://www.penguin.co.uk/books/111/1117058/the-garden-jungle/9781787331358.html

2, Hallmann, CA, Sorg, M, Jongejans, E, Siepel, H, Hofland, N, Schwan, H, Stenmans, W, Müller, A, Sumser, H, Hörren, T, Goulson, D & de Kroon, H. 2017. More than 75 percent decline over 27 years in total flying insect biomass in protected areas. PlosONE 12: e0185809.

3, Sanchez-Bayo, F & Wyckhuys, KAG. 2019. Worldwide decline of the entomofauna: A review of its drivers. Biological Conservation 232: 8-27.

4, Noriega, JA, Hortal, J, Azcárate, FM, Berg, M, Bonada, N, Briones, MJ, Del Toro, I, Goulson D, Ibañez, S, Landis, D, Moretti, M, Potts, S, Slade, E, Stout, J, Ulyshen, M, Wackers, FL, Woodcock, BA Santos, AMC. 2018. Research trends in ecosystem services provided by insects. Basic & Applied Ecology 26: 8-23.

5, Goulson, D. 2013. An overview of the environmental risks posed by neonicotinoid insecticides. Journal of Applied Ecology 50: 977-987.

6, Mitchell, EAD, Mulhauser, B, Mulot, M, Mutabazi, A, Glauser, G, Aebi, A. 2017. A worldwide survey of neonicotinoids in honey. Science 358; 109-111.

7, Goulson, D, Thompson, J & Croombs, A. 2018. Rapid rise in toxic load for bees revealed by analysis of pesticide use in Great Britain. PeerJ 6: e5255

8, See https://www.france24.com/en/20180830-frances-ban-bee-killing-pesticides-begins-saturday accessed 17.6.19

9, Badgley, C, Moghtader, J, Quintero, E & Zaken, E. 2007. Organic agriculture and the global food supply. Renewable Agriculture & Food Systems 22: 86-108.

10, Seufert, V, Ramankutty, N, Foley, JA 2012. Comparing the yields of organic and conventional agriculture. Nature 485: 229-232.

11, Public Health England 2017. https://www.gov.uk/government/publications/health-matters-obesity-and-the-food-environment/health-matters-obesity-and-the-food-environment--2, accessed 17.6.19.

12, Baldock, KCR, Goddard, MA, Hicks, DM, Kunin, WE, Mitschunas, N, Morse, H, Osgathorpe, LM, Potts, SG, Robertson, KM, Scott, AV, Staniczenko, PPA, Stone, GN, Vaughan, IP, Memmott, J. 2019. A systems approach reveals urban pollinator hotspots and conservation opportunities. Nature Ecology & Evolution 3: 363-373.

13, Edmondson, JL, Davies, ZG, Gaston, KJ, Leake, JR .2014. Urban cultivation in allotments maintains soil qualities adversely affected by conventional agriculture. Journal of Applied Ecology 51: 880-889.

14, Van den Berg, A, van Winsum-Westra, M, de Vries, S, van Dillen, SME. 2010. Allotment gardening and health: a comparative survey among allotment gardeners and their neighbours without an allotment. Environmental Health 9:74.

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We are grateful for the Esmée Fairbairn Foundation for funding our work.

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Centre for Food Policy

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ISBN: 978-1-903957-50-9

Dave Goulson. Brexit and Grow It Yourself (GIY): A golden opportunity for sustainable farming. Food Research Collaboration Food Brexit Briefing.

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