

The potential of biodynamic farming to respond to the current crises in UK food and farming systems

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Introduction

The UK's self-reliance in regard to food production and supply has been slowly decreasing since the 1980's, despite the Department for Environment, Food and Rural Affairs (DEFRA) reporting that the system is a resilient one which can withstand shocks (Lang, 2020). COVID-19 and Brexit are two key situations which are creating and exacerbating existing challenges that continue to test the resilience of the UK food system (Moran et al., 2020).

Biodynamics is a holistic, ecological and ethical approach to farming, gardening, food and nutrition which has evolved globally since the 1920s (Biodynamics Association U.S, n.d.). Despite using organic methods of production and sharing related aims and ideals with organic practices, biodynamic farming is different due to the metaphysical and spiritual roots associated with it (Biodynamic Association UK, n.d.). The aim of biodynamic farming is resilience and regeneration (Biodynamic Association UK, n.d.). Therefore, this essay will identify a variety of challenges currently facing the UK food and farming systems whilst investigating the use of biodynamic farming to address them, consequently, improving the resilience of the food and farming systems.

UK Food Insecurity

Food insecurity and Covid-19

In the UK, it was estimated that 1.97 million people were undernourished in 2017, with an estimated 2.2 million people classed as severely food insecure and therefore experiencing hunger (Parliament, 2019). This is the highest level of insecurity reported within Europe with Romania being the second highest with 0.8 million severely insecure, thus highlighting the need for changes to be made to the UK's food system (WHO, 2018). The Covid-19 pandemic has exacerbated these issues with there being an estimated quadrupling in levels of food insecurity as a result of three main factors: temporary shortage of basic food within shops (driven by panic-buying), self-isolation resulting in inability to access shops, and economic reasons

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(such as those as a result of furlough) (Loopstra, 2020). This rise in insecurity was not evenly distributed amongst the population with those from Black, Asian and minority ethnic groups, unemployed adults, households containing children and people with health conditions or disabilities, most at risk (Barker and Russell, 2020). A consequence of this is an increased demand for emergency food relief in the form of food banks (Barker and Russell, 2020).

Biodynamic techniques adopt a triple bottom line approach meaning that they seek to achieve ecological, social, and economic sustainability (Biodynamics.com, n.d.). Biodynamic farmers form partnerships with other farmers, schools, and organisations in the form of community supported agriculture (CSA) partnerships which allow those involved to benefit from the production, rewards and responsibilities associated with the production of food (Biodynamic Association UK, n.d.). Within the UK, there are over 80 CSAs including Stroud Community Agriculture, Gloucestershire which has 350 members who farm on 70 acres of land over three sites (Stroud Community Agriculture, n.d.). Therefore, by implementing a biodynamic farming approach, farmers may be able to form partnerships with communities including those who are at higher risk from food insecurity, thus aiming to reduce the current disparities within the UK food system.

Food insecurity and dietary related illnesses

Food insecurity can result in poor diets, especially for those with low incomes (Lang et al., 2018). Firstly, food insecurity increases reliance on inexpensive highly palatable energy dense food (Laraia, 2013). During Covid-19, the panic buying would have had a severely negative impact on those in the population who rely on these lower priced food items, as it was identified that panic buying was often associated with those who had a higher income and could afford to stock up on supplies (Bentall et al., 2021). Additionally, in low income households, there is often a cyclical nature where individuals have a plentiful supply of food at the start of the month but experience insecurity at the end of the month which has the potential to result in weight gain in a short time frame (Laraia, 2013). This is of concern as the rate of obesity is rising to unsustainable levels (Hancock, 2021), which poses great challenges on the NHS which currently spends £16 billion to treat illnesses occurring as a result of overeating (Lang et al., 2018). This is not surprising considering the UK had the highest proportion of ultra-processed food consumption across 19 EU countries between 1998-2011, with the average household availability of ultra-processed food being 50.4% (Monteiro et al., 2018). Furthermore, there have been studies which link household food insecurity to chronic diseases, especially type 2 diabetes (Laraia, 2013).

There is extensive research regarding the health benefits of organic food which is applicable to biodynamic food (Biodynamic Association UK, n.d.). Studies suggest that consuming biodynamic food reduces allergic reactions (Biodynamic UK, n.d.). Children who consumed organic dairy products have been shown to have a 36%

lower chance of developing the allergic skin condition eczema (Kummeling et al., 2008). Milk from cattle which have not had their horns removed (a key belief of biodynamic farming) is said to be more digestible, even by those who have an allergy to milk, whilst also being of a higher quality (Baars et al., 2007).

Biodynamically farmed foods are said to contain higher levels of certain nutrients including vitamin C (Crinnion, 2010). Organic foods have been reported to contain 21% more iron, 29% more magnesium (Larion, 2009), and 27% more ascorbic acid (Worthington, 2001) than non-organic foods. Additionally, they contain higher levels of crucial antioxidant phytochemicals; anthocyanins, flavonoids and carotenoids (Crinnion, 2010). The foods contain lower levels of nitrates (around 15% less (Worthington, 2001) and pesticide residues which is also beneficial to those consuming it (Crinnion, 2010). Therefore, this farming approach may increase the health of individuals which brings wider benefits by potentially reducing the stress on the health services. Furthermore, biodynamically farmed produce could be used to reverse damage caused by poor diets by reducing the reliance on ultra-processed foods by providing healthier, nutrient rich alternatives.

Since 2020, 29% of British people have altered their diet (Walker, 2021 in The Food Foundation). 40% of those surveyed reported an increase in their levels of fruit and vegetable consumption as a result of the Covid-19 pandemic (Walker, 2021, in The Food Foundation). Additionally, there was an increase in sales of organic produce by 12.6% compared to 2019; the highest growth rate in 15 years (Footprint, 2021). This highlights that there is a greater demand for not only more fruits and vegetables in general but also organic ones. Furthermore, as health was identified as the biggest driver for individuals to change their diets (Walker, 2021 in The Food Foundation, 2021), it would suggest that there is a requirement for more fruit and vegetables which are said to provide greater health benefits such as those produced organically. Therefore, biodynamic farming can be used to supply these nutrient rich foods to the population, if more awareness is spread.

Environmental Land Management Schemes

As a result of Brexit, the UK is no longer part of the Common Agricultural Policy, therefore, the UK Government are trialling new Environmental Land Management (ELM) schemes. There are three schemes; Sustainable Farming Incentive, Local Nature Recovery and Landscape Recovery, which will reward farmers for producing public goods including biodiversity, cleaner water and air, improvements to soil and reducing carbon emissions on their land (DEFRA, 2021), all of which can use biodynamic farming techniques to achieve these goods whilst creating wider benefits.

Soil Improvements

Biodynamic farming is focussed on the regeneration and transformation of farming systems including the soil (Biodynamic Association UK, n.d.). It aims to transform

agriculture in ways which increase the health and vitality of soils, crops and livestock (Biodynamic UK, n.d.). Biodynamic farming uses a total of nine herbal and mineral preparations to improve the health and vitality of soil, compost and crops (Biodynamic UK, n.d.). These preparations are said to encourage the processes which form humus within the soil, increase soil microbial biomass and diversity and encourage plant growth (Biodynamic UK, n.d.). Horn manure (field spray preparation 500), is said to increase life in the soil and improve the relationship between the soil and crops grown (Giannattasio et al., 2013). Organic crops are able to better exploit the soil and profit from root symbiosis by mycorrhizae fungi (Fliessbach et al., 2000). Furthermore, the compost preparations including preparation 500 and 501 (horn silica) strengthen the soil quality by stabilising the levels of nutrients including nitrogen (Carpenter-Boggs et al., 2000) and increasing the microbial biomass and diversity (Maeder et al., 2002).

Soil is said to be fertile if it provides a typical biotic community which is species-rich and biologically active for its location, and if it has the typical soil structure whilst supporting undisturbed decomposition (Fliessbach et al., 2000). Applications of biodynamic techniques have been shown to enhance soil fertility and biodiversity in a 21 year field trial known as the DOK-field trial (Fliessbach et al., 2000). Composted manure has been shown to have positive impacts on the pH and organic matter within the soil with chemical fractionation, showing that there was a larger proportion of stable organic matter compounds present, which consequently helps to prevent acidification of soil (Fliessbach et al., 2000). Furthermore, studies by Fliessbach et al., (2000) identified that organically managed soils had almost twice the density of arthropods present on the soil surface compared to conventional soils. This was a result of prey deficiency due to the influence of pesticides in addition to a greater number of weed flora in the standing crop which was less dense than in the conventionally farmed plots (Fliessbach et al., 2000). The total mass of microorganisms in organically farmed systems was 20-40% higher when compared to the conventional system treated with manure and a 60-85% higher mass than the conventional system without manure (Fliessbach et al., 2000).

It is important to note that an average of 20% lower yields have been reported, however, this varied depending on crop type and between years (Fliessbach et al., 2000). Therefore there may be more land required to adopt biodynamic techniques to produce the volumes of food needed to meet the ever increasing demands. However, the adoption of such techniques could benefit the UK food and farming systems on a longer term by allowing the production of food to continue for an extended period of time due to the health of the soils, thus, improving the sustainability.

Carbon Sequestration

Long-term field studies have shown that topsoil treated using the complete set of biodynamic preparations treatment and on-site composted manure can sequester up

to 200kg more carbon per hectare per year compared to that which is not treated using biodynamic treatments or composted manure (Granstedt and Kjellenberg, 2018). Thus, by adopting these farming techniques, not only will the farmers be able to receive grants to support them, but this will also be contributing to the reduction of greenhouse gases within the atmosphere, consequently providing wider environmental benefits. This is needed as the farming industry currently contributes to 17% of total greenhouse gas emissions directly through agricultural activities and between 7-14% more through land use changes (OECD, 2016).

Brexit and Food and Farming Systems

Food shortages

The UK is only around 60% self-sufficient in terms of its domestic food production (Finlay and Ward, 2020), with the EU supplying 30% of the unprocessed food consumed in 2016 (DEFRA, 2018). The UK food system is one which is engineered on a 'just-in-time' system, providing food for only three to five days, therefore, there is the potential for this to collapse in around one week if challenges are faced regarding imports of produce at borders (Lang et al., 2018). Furthermore, companies may choose not to export to the UK anymore, with there being a 45% reduction on exports to the UK since January 1st 2021 as reported by members of the Food and Drink Federation (Helm, 2021), thus, increasing the need for the UK's food systems to become more self-sufficient. As a key principle of biodynamic farming is the concept of each farm being self-sustaining, the adoption of these techniques has the potential to contribute to reducing the reliance on imports from other countries. Furthermore so, individuals may wish to adopt the concepts of biodynamics in their own gardens and allotments which would reduce the pressure placed on the wider farming systems within the UK.

Antibiotics, UK policies and Biodynamics

The adoption of biodynamic farming would be beneficial in assisting the UK in achieving the aims of their 20-year vision on antimicrobial resistance. This is because biodynamic farming only permits the use of antibiotics in cases to prevent suffering of livestock and chooses to use organic, homeopathic, natural remedies in the first instance (Biodynamic Association UK, n.d.).

By reducing the use of antibiotics and consequently the potential of antibiotic resistance, you will be reducing the creation of new diseases known as 'superbugs' which are not able to be treated using existing medicines (Department of Health and Social Care, 2019). This has numerous benefits, as if a new superbug is developed, there is the potential for it to have extreme consequences and in the worst case scenario result in a global disaster such as the Covid-19 pandemic, which has severe knock-on effects on both the supply and demand of food within the UK.

One aspect of the 20-year plan which is an important aspect of biodynamic farming is that it aims to protect animal health and welfare. The plan aims to reduce the impact of resistance on animals through best husbandry practices which can result in low prevalence of infectious diseases (Department of Health and Social Care, 2019). Biodynamic farming techniques use humane management practices whilst focussing on the health and vitality of their stock (Biodynamic Association UK, n.d.). Biodynamic farming methods are less intensive and have been proven to be better for the health of animals whilst reducing the requirement for livestock to be medicated with antibiotics (Button, 2021). By enhancing the health of the animals, it ensures their efficacy for future generations which can be beneficial to the UK by ensuring there is a steady supply of food in the future.

Conclusion

In conclusion, Biodynamic farming techniques can be adopted within the UK to respond to the crises currently being faced by the food and farming systems as a result of many challenges including Brexit and Covid-19. Biodynamic farming can increase the security of the food supply whilst reducing the reliance of the UK on food imports from Europe. Healthier produce can be consumed to reduce the number of dietary related illnesses people are experiencing whilst consequently reducing the strain on the NHS as a result of this. Biodynamic techniques are able to be used to achieve the aims of the new Environmental Land Management approach which would also have many positive impacts on the environment. Furthermore, the techniques can be used to help the UK achieve its 20-year plan for antimicrobial resistance. There is the potential for Biodynamic farming to be taken up by farmers on a larger scale or even by individuals who are wanting to adopt such techniques due to the wide range of benefits which they bring.

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