Proof of Evidence: General support of the concept of enabling new entrants to farming to develop innovative new businesses based on ecological principles and sound business planning

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Planning appeal: Wealden District Council, non-determination planning application WD/2017/0340/F

Description: Siting of three temporary agricultural workers' dwellings for a period of 5 years together with an agricultural barn with PV array and alterations to existing highway access to provide three affordable smallholdings to new entrants to ecological agriculture

Location: Field south of Copyhold Cottages, Arlington, Hailsham, BN26 6RU

1. Structure and Endorsement of the Proof

1.1 Summary

1.1.1 Professor Moya Kneafsey of the Centre for Agroecology, Water and Resilience, at Coventry University has 21 years academic experience in sustainable foods systems research and teaching.

1.1.2 The aim of this proof is to provide research and scholarly evidence in general support of the concept of enabling new entrants to farming to develop innovative new businesses based on ecological principles and sound business planning. The proof draws on i) research evidence regarding the economic viability of small scale ecological holdings combined with 'short food chain' routes to market; ii) research evidence about the social benefits of small scale ecological farming systems; iii) the need for continued research and evaluation of small scale ecological farming and iv) evidence regarding the growing international recognition of the need to transition towards agroecological systems, of which the ELC is an exemplar initiative.

1.1.3 ELC example Business Plans demonstrate that the produce of their ecological smallholdings will be sold via short food chains direct to consumers and local businesses. This is recognised as a cost-effective way for small scale, ecological producers to access markets, through shared distribution and logistics, and collective bargaining with local buyers such as restaurants, hotels and schools.

1.1.4 Market research carried out by the ELC has shown that demand for locally produced food exceeds supply. Trends over the last few years have seen demand for local food stay relatively stable and even increase, with consumers particularly keen to support local businesses.

1.1.5 Local food systems often deliver substantial local environmental, health and socio-economic impacts, including: biodiversity, animal welfare, governance, climate change mitigation and affordability to consumers. They also benefit the local economy with £10 spent in a local food outlet worth £25 to the local economy compared with £10 spent in a supermarket generating only £2.40 locally.

1.1.6 In England the number of small scale, ecological food enterprises which are demonstrating the financial viability of this sector is growing. One example is the growth of the Community Supported Agriculture (CSA) movement. There are now over 100 CSAs in the UK CSA network some of which have been operating for over 20 years.

1.1.7 There is a growing body of evidence which counters scepticism and demonstrates that small scale ecological holdings can be viable, especially when using short food chains situated within the context of collaborative networks. Together, these can form local food systems providing a diverse product range for consumers. There is advice and information available to support the new enterprises proposed for Arlington and in addition, the ELC, through its site at Greenham Reach, now supports 3 viable holdings selling direct to local markets.

1.1.8 Small scale ecological holdings can deliver benefits for farmers, consumers and communities. By providing rewarding jobs and livelihoods, they can counteract the disintegration of rural communities and cultures which has occurred due to the declining numbers of farms and farmers. As referred to in the ELC's planning statement, the number of young people entering farming is at an all-time low as the industry struggles to provide a stable, enjoyable livelihood. The number of small scale farmers has also fallen dramatically over the years whilst it is increasingly recognised that they are a vital part of the diverse agriculture sector. According to Defra, the average age of the UK farmer is 59 years old, and more than 60,000 new entrants to farming are required over the next 10 years.

1.1.9 One reason for the decline of small farmers is the difficulties faced by new entrants to farming who are often excluded by the high cost of agricultural land but would benefit from access to small units from which to develop their businesses, such as those proposed by the ELC in this application.

1.1.10 It is essential that such units include provision for residence on the land, because of the particular requirements of ecological production which are outlined in the business plan (e.g. early morning and evening watering, high attention to weed control).

1.1.11 The fact that ecological approaches often require more labour can be positive since they can slow rural flight to the cities and encourage rural development. Ecological, small scale farms selling via short food chains require skilled workers and can create fulfilling jobs which enable young people to stay on the land. This is an important social benefit for rural England.

1.1.12 Small scale ecological farms can also deliver social benefits for urban populations. A common feature of many such enterprises is their willingness to be connected with local communities and this forms a vital part of the ELC business model, which requires a 'reconnection' between the producers and consumers of food. This delivers public benefits in terms of education and access to greenspace for mental health and wellbeing. Small ecological farms can provide an ideal setting for people to connect with nature and learn about where food comes from. Ecological farms produce high quality, nutritious foods which are essential for healthy diets. By reaching out to the general public, they help to teach people about food, seasonality and health.

1.1.13 From a research point of view, the activities of the ELC are of high importance, due to the rigorous and regular monitoring that they are committed to undertaking and making public. Examples of such careful monitoring on ecological farms in the UK are rare and extremely valuable because they enable us to establish baseline indicators from the start of the interventions, and then to monitor change over time.

1.1.14 The need for transition to agroecological food systems has been recognised by numerous international organizations including the United Nations Food and Agriculture Organization, the World Bank, national governments and social movements. This is because corporate controlled industrial food systems have been found to have caused major environmental, social and economic problems. It is increasingly recognized that agroecology can play an important role in regenerating environmental resources and empowering farming communities to begin their recovery from social and economic marginalisation.

1.1.15 This proof of evidence argues that the ELC proposal represents an important initiative to develop the local and regional food system in East Sussex along the principles of agroecology. The sheer scale of the environmental, social and economic challenges which are directly impacting the UK agriculture and food system mean that there need to be many more spaces created where small scale farming on ecological principles can be enabled to flourish. In these spaces, innovative practices can be developed to restore biodiversity and other natural resources, the local agricultural skills base can be strengthened, viable businesses can grow and rural livelihoods and communities can be maintained.

1.1.16 These benefits would all contribute towards achieving the ambition of the government's 25 Year Environment Plan to leave the environment in a better state than we found it. They would also help the UK meet its commitments to achieve the Sustainable Development Goals.

1.1.17 The ELC's scheme for three residential agroecological smallholdings takes a joined-up approach, considering housing, markets and labour skills, with a focus on the use of local renewable resources and inputs. As well as proven environmental benefits, their model can deliver important social and economic goods including the creation of decent rural jobs and the 'reconnection' of consumers with healthy, nutritious food. The initiative proposed in Arlington would enable local producers, consumers and communities to play their own role

in stepping towards a food system which delivers environmental regeneration, health and sustainability.

1.2 Expert's Qualifications

1.2.1 I have 21 years of experience in research and teaching on the topics of local and regional food systems, rural development and tourism, and community-led food trade. Currently I am Professor of Food and Local Development at the Centre for Agroecology, Water and Resilience, at Coventry University. I lead the research theme on *Community Self-Organisation for Resilience,* supervise PhD students on various aspects of sustainable food systems and undertake applied research and consultancy projects. Since 1997 I have delivered research projects to the value of over £5 million, published 3 books, and written over 50 journal papers and book chapters. In 2008 I was commissioned by the Campaign to Protect Rural England (CPRE) to lead a team developing a toolkit for mapping local foodwebs. This subsequently led to a number of case studies and a report published in 2012 which provides indicative data on the scale and impact of England's local food sector. In 2013 I led a comprehensive evaluation of the state of play of Local Food Systems and Short Food Chains in the EU, funded by the European Commission. In 2015 I was the co-ordinating expert for an international expert focus group on the Innovative Management of Short Food Chains, again funded by the European Commission and in recent years I have been invited as an expert speaker on short food chains at numerous international workshops (e.g: Athens, Croatia, Cluj-Napoca, Edinburgh, Krakow, Nicosia, and Rome). I am a member of the editorial board for the international journal *Sustainability* and am currently working on a major new undergraduate textbook on '*Food Geographies'.* I am a member of Coventry's 'Five Acre' Community Supported Agriculture scheme. The evidence which I have prepared and provide for this appeal in this Proof of Evidence is true and I can confirm that the opinions expressed are my true and honest opinions.

2. Proof of Evidence

The aim of this proof is to provide research and scholarly evidence in general support of the concept of enabling new entrants to farming to develop innovative new businesses based on ecological principles and sound business planning. The proof draws on i) research evidence regarding the economic viability of small-scale ecological holdings combined with 'short food chain' routes to market; ii) research evidence about the social benefits of small-scale ecological farming systems; iii) the need for continued research and evaluation of small-scale ecological farming and iv) evidence regarding the growing international recognition of the need to transition towards agro-ecological systems, of which the ELC is an exemplar initiative.

2.1 The economic viability and benefits of small-scale ecological holdings combined with 'short' chain routes to market

2.1.1 The overall aim of the ELC's 3 Business Plans with supporting information that formed part of the planning application is that the produce of the ecological smallholdings will be sold direct to consumers or to local retailers – in other words the route to market will be via 'short' food chains. These have a limited number of intermediaries and are organised so as to ensure a fair profit for the producers and a highly transparent supply chain providing a high-quality product for the consumers[1]. Short food chains are increasingly recognized as providing a viable route to market for

[1] Kneafsey, M. *et al* (2013) *Short Food Chains and Local Food Systems in the EU: A State of Play* https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/short-food-supply-chains-and-local-food-systems-eu-state-play-their-socio-economic

small-scale producers throughout the world[2]. Experience shows that collaborative behaviours lead to greater success in short food chains[3]. This is where farm businesses and their supply chain partners work together to create 'win-win' rather than 'win-lose' situations. Recognising the importance of collaborative business models, the EU has introduced measures to support such activities through provisions in the Rural Development programme (2014 – 2020) of the CAP. This is because it has been recognised as a cost-effective way for small-scale, ecological producers to access markets, through for example, shared distribution and logistics and collective bargaining with local buyers such as restaurants, hotels and schools. Similarly, in the United States, collaborative behaviours amongst small-scale producers are being supported by the US Department of Agriculture as part of its drive to enhance local and regional food systems through the creation of 'values-based supply chains' and local / regional food hubs. The idea is for networks of small businesses to work together to generate efficiencies by sharing resources and data and to create 'distributed' agricultural economies featuring a diverse ecosystem of enterprises, rather than the conventional model of concentration, consolidation and vertical integration in the agro-food industry. This collaborative ethos is reflected in the ELC example Business Plans: for example, although there will be 3 separate businesses, they will co-operate to share items such as machinery and delivery vehicle, and Holding A could for instance, supply the vegetable transplants for Holdings B and C.

2.1.2 The example business plans submitted by ELC demonstrate that the applicants have undertaken market research in the locality and found that several producers are dropping out of production but demand for locally produced food exceeds supply. This is in keeping with trends over the last few years which have seen demand for local food stay relatively stable and even increase[4], with consumers particularly keen to support local start-ups. Moreover, the ELC has approached the other existing producers in the vicinity to establish collaborative and co-operative relationships and identify gaps in local provision. A number of these enterprises have signalled their support for the ELC plans and provided advice on the production and marketing aspects.

2.1.3 Short food chains are primarily (although not exclusively) associated with local food systems. In the UK, there is growing recognition that our local food sector needs to be better supported and developed, an issue which has been brought into focus by the Brexit process which has shone a light on our dependence on external food sources and raised the strong possibility that the costs of food could rise quite significantly following the UK departure from the EU. For example, Professor Tim Benton, former UK Global Food Security champion stated to the recent House of Lords European Union Committee[5], that the UK needs to produce more local food. In terms of the resilience of UK food supplies, supporting the local food sector can hardly be argued against. This view is supported by growing evidence about the benefits of more localised food systems. For example, in one of the most comprehensive studies so far, Schmitt *et al* (2017)[6] assessed 14 different local and global food products in four different EU countries, using 5 different indicators of sustainability. Global foods consistently came last in the analysis. The local food products showed particular strengths in indicators relating to health and socio-economic impacts including: biodiversity, animal welfare, governance, climate change mitigation and affordability to consumers. Local food systems often deliver substantial local economic benefits and multiplier effects too. The Campaign to Protect Rural England's (2012)

[2] Committee on World Food Security (2015) *Connecting Smallholders to Markets* http://www.fao.org/3/a-bq853e.pdf
[3] EIP-AGRI (2015) *Innovative Management of Collaborative Short Food Supply Chains* https://ec.europa.eu/eip/agriculture/en/publications/eip-agri-focus-group-innovative-short-food-supply
[4] https://www.foodmanufacture.co.uk/Article/2017/03/14/Local-authentic-British-food-and-drink-sales-on-the-rise
[5] https://publications.parliament.uk/pa/ld201719/ldselect/ldeucom/129/129.pdf
[6] Schmitt, E. et al (2017) Comparing the sustainability of local and global food products in Europe, *Journal of Cleaner Production* 165: 346-359

report estimated that the local food sector sustained about 61,000 jobs (in England)[7]. The New Economics Foundation (2002)[8] found that spending £10 in a local food outlet is worth £25 to the local economy, whereas £10 spent in a supermarket leads to only £2.40 being spent in the local area.

2.1.4 In England there is a small but growing number of small-scale, ecological food enterprises which are demonstrating the financial viability of this sector, given appropriate business models. One example is the growth of the Community Supported Agriculture (CSA) movement. There are now over 100 CSAs in the UK CSA network, which started in 2015 with 28 members. This in turn is connected to the international community of CSAs, which are present in many countries around the world. This has created a large network of knowledge sharing and exchange which means that we are seeing CSAs establish ever firmer financial footings and there are several examples of the pioneering early CSAs which have now operated for over 20 years in the UK.

2.1.5 Moreover, whilst there is scepticism about the viability of small-scale agricultural holdings in some quarters, recent research is providing better insights into the diversity, productivity, financial viability and multifunctional benefits offered by small-scale farms. For example, Laughton's (2017)[9] survey of 69 holdings of 20ha and less found that compared to average UK farm incomes the sample was performing well financially. Seventy-eight per cent of the sample was receiving no farm subsidies, and subsidies made up less than 20% of the income for 19% of those who were receiving subsidies. Most of the farms were adding value either by direct marketing or processing their produce into cheese, juices or preserves. They had an average of 2.3 FTEs working on each holding, much higher than the mean for UK farms of 0.026 annual work units per hectare (Eurostat 2011:5). In unpublished PhD research currently being conducted at Coventry University, preliminary results from a survey of 49 CSAs and Box schemes have found that the median wage paid to workers in the schemes was £8.45, comfortably above the national living wage of £7.83 (as of April 2018)[10].

2.1.6 In an earlier study Maxey *et al*. (2011)[11] examined the economics of growing food on small-scale sites with 10 acres (4 ha) or less. They used eight UK case studies: four fruit and vegetable growers, a mushroom grower, a ducklings hatchery, a mail order seed company, and a mixed holding selling cider, honey, eggs, and lamb. The authors concluded that economically viable and sustainable land-based enterprises can be created on holdings of 4 ha or less. The livelihoods created often follow a slow development trajectory, allowing growers to avoid commercial loans and time to develop "in harmony with the ecosystem". All eight case studies achieved high yields per unit area by intensive and/or diverse cropping and then added value through processing and direct marketing. Enterprise diversity is a common feature of the successful case studies. The most profitable small-scale land-based enterprises are labour intensive and horticulture is seen as better suited to small scale than livestock.

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[7] Campaign to Protect Rural England (2012) *From field to fork: the value of England's local foodwebs* https://www.cpre.org.uk/resources/farming-and-food/local-foods/item/2897-from-field-to-fork

[8] NEF (2002), *The Money Trail: Measuring your impact on the local economy using LM3,* New Economics Foundation and The Countryside Agency, London, p.viii

[9] Laughton, R. (2017) *A Matter of Scale: A study of the productivity, financial viability and multifunctional benefits of small farms (20 ha and less)* https://drive.google.com/file/d/0B5dw4mKBC3yEdzRIOHhNbkFwUFg1MWNycHNpZW5JaDBnWVNr/view

[10] https://www.gov.uk/national-minimum-wage-rates

[11] Maxey, L., Laughton, R., Rodker, O., and Wangler, Z. (2011) *Small is Successful! Creating Sustainable Livelihoods on Ten Acres or Less* http://www.ecologicalland.coop/sites/ecologicalland.coop/files/Small_is_Successful_0.pdf

2.1.7 In summary, there is now a growing body of evidence which demonstrates that small-scale ecological holdings can be viable, especially when using short food chains and situated within the context of collaborative networks. Together, these can form local food systems providing a diverse product range for consumers. To support these businesses, there is now a wealth of information and advice available either through self-organised networks such as the international CSA movement, or institutions. E.g. the European Innovation Platform's (2015) report on innovative short food chain management provides an overview of the stages of setting up short food chains (including advice on the costs that need to be taken into account) and case studies of successfully functioning examples from around Europe. The European Rural Development Network has also produced an excellent guide to short food chains and direct marketing. There is advice and information available to support the new enterprises proposed for Arlington and in addition, the ELC already has ample experience of this through its site at Greenham Reach which now supports 3 viable holdings selling direct to local markets.

2.2. The social benefits of small-scale ecological holdings

2.2.1 Small-scale ecological holdings can deliver benefits for farmers, consumers and communities. For example, by providing rewarding jobs and livelihoods, they can counteract the disintegration of rural communities and cultures which has occurred due to the declining numbers of farms and farmers. In the United Kingdom, we have seen consolidation in the agriculture and food system. This means that in general terms the number of farms has decreased and farms have got bigger. Our farms are therefore amongst the most efficient in Europe, but only in terms of productivity per unit of labour (alternative measures include productivity per hectare)[12]. Yet, highly mechanized industrial systems, heavily dependent on inputs of oil and chemicals, have also led to high levels of economic stress with farmers being trapped on the 'technological treadmill[13]' which requires continuous investment in technology to remain competitive. Those unable to keep up with the treadmill eventually fall off it. Farmers and agricultural workers in industrial agriculture tend to work extensively on their own and are vulnerable to mental health problems and are at higher risk of suicide than the general population[14]. This is compounded by geographical isolation and inaccessibility of many services in rural areas (Gregoire 2002)[15].

2.2.2 The number of young people entering farming is at an all-time low as the industry struggles to provide a stable, enjoyable livelihood. The number of small-scale farmers has fallen dramatically over the years, and yet it is increasingly recognised that they are a vital part of the diverse agriculture sector that we need, a point which has been reinforced recently by the Campaign to Protect Rural England (2016)[16]. According to Defra, the average age of the UK farmer is 59 years old, and more than 60,000 new entrants to farming are required over the next 10 years[17]. One reason for the decline of small farmers is the difficulties faced by new entrants to farming who are often excluded by the high cost of agricultural land but would benefit from access to small units from which to develop their businesses. Moreover, it is essential that such units include provision for residence on the land, because of the particular requirements of ecological production which are outlined in the business

[12] De Schutter, O and Vanloqueren, G. (2011) The new Green Revolution: How 21st Century Science can Feed the World https://www.thesolutionsjournal.com/article/the-new-green-revolution-how-twenty-first-century-science-can-feed-the-world/

[13] The term was first introduced by US agricultural economist William Cochrane, 1958: *Farm Prices: Myth and Reality*

[14] http://www.farmbusiness.co.uk/news/more-then-one-farmer-a-week-in-the-uk-dies-by-suicide-2.html

[15] Gregoire, A. (2002) The mental health of farmers, *Occup. Med.* Vol 53 (8): 471-476

[16] https://www.cpre.org.uk/resources/farming-and-food/farming/item/4347-new-model-farming

[17] Defra (2013) *Agriculture in the United Kingdom* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/315103/auk-2013-29may14.pdf

plan (e.g. early morning and evening watering, high attention to weed control). This would also reduce traffic as there would be no need for the producers to travel to their site of work. As noted by the former UN Rapporteur on the Right to Food, Dr Olivier de Schutter, the fact that ecological approaches often require more labour can be positive, if the harvest provides sufficient incomes, since it can slow rural flight to the cities and encourage rural development. Ecological, small-scale farms selling via short food chains require skilled workers and can create fulfilling jobs which enable young people to stay on the land. This is an important social benefit for rural England.

2.2.3 Small-scale ecological farms can also deliver social benefits for urban populations. A common feature of many such enterprises is their willingness to be connected with local communities and indeed, this is actually a vital part of their business model, which requires a 'reconnection' between the producers and consumers of food and a re-appraisal of the true cost and value of food. The ELC has demonstrated this in its already established site at Greenham Reach, where visitors and volunteers are welcomed to visit the farms (including school visits). This delivers public benefits in terms of education and improving linkages between urban and rural populations. The benefits of access to greenspace for mental health and wellbeing are well documented[18] and small ecological farms can provide an ideal setting for people to connect with nature and learn about where food comes from as well as contributing to the relocalisation of food systems. Last but not least, ecological farms produce high quality, nutritious foods which are essential for healthy diets. By reaching out to the general public, they help to teach people about food, seasonality and health.

2.3. The importance of annual monitoring and research.

2.3.1 From a research point of view, the activities of the ELC are of high importance, due to the rigorous and regular monitoring that they are committed to undertaking and making public. Examples of such careful monitoring on ecological farms in the UK are rare and extremely valuable because they enable us to establish baseline indicators from the start of the interventions, and then to monitor change over time.

2.3.2 The ELC monitoring reports from their site at Greenham Reach are an extremely useful resource, and the fact that they are publicly available means data can be shared widely and used to improve knowledge and understanding of how ecological food and farming systems can contribute to the UK's future food resilience. This extremely valuable data which would be enhanced by the addition of monitoring from the second site at Arlington. This could enable comparative longitudinal studies, and the ELC is well connected with universities and research institutes which means they have potential to collaborate to produce some high value data about the environmental, economic and social impacts of their practices in two different locations. They have also, wisely, included the costs of annual monitoring in their sample business plans.

2.4. The big picture: the internationally recognised need for an 'Agroecological Transition'

2.4.1 The ELC's proposal for ecological small holdings at Arlington would help to support the internationally recognised need for an **agroecological transition**. Since the 1920s, scientists have defined agroecology as the application of ecological principles to agriculture. Over the past 30 years, it has developed a strong blend of social, economic and environmental principles. Agroecology is diverse, because it is adapted to local circumstances, but nonetheless it demonstrates common elements in its different expressions around the world. The Food and Agriculture Organization of the United Nations has identified 10 common features in its framework on agroecology: 1) Diversity; 2) Co-creation and sharing of knowledge; 3) Synergies; 4) Efficiency; 5) Recycling; 6) Resilience; 7) Human

[18] For example, the well-known work of Professor Jules Pretty including 'What is the Best Dose of Nature': http://www.julespretty.com/wp-content/uploads/2013/09/4.-Dose-of-Nature-EST-Barton-Pretty-May-2010.pdf

and Social values; 8) Culture and food traditions; 9) Responsible governance; 10) Circular and solidarity economy[19].

2.4.2 The need for transition to agroecological food systems has been recognised by numerous international organizations including the United Nations Food and Agriculture Organization, the World Bank, national governments and social movements. This is because corporate controlled industrial food systems have been found to have caused major environmental, social and economic problems. The major environmental impacts are:

Habitat destruction and biodiversity losses: large clearances for industrial agriculture, such as soybean in the Amazon rainforest and palm oil in Indonesia threaten entire ecosystems and species. Whilst these problems are occurring many thousands of miles away, our consumption of imported soybean and palm oil helps to drive these processes of mass environmental damage. Despite the activities of the Roundtable on Sustainable Palm Oil, species such as Orangutans and the Sumatran Tiger have been pushed to the edge of extinction due mainly to the clearance of rainforests. The World Wildlife Fund's (2016)[20] biannual review states that populations of vertebrates (e.g. mammals, birds and fish) have declined by 58% between 1970 and 2012, a situation Ceballos *et al* (2017)[21] have described as 'biological annihilation'. Loss of habitat due to agriculture and urbanization is one of the main causes of this biodiversity loss which is now commonly referred to as the 'Sixth mass extinction' and is the only extinction known to have been caused by human activity. The United Kingdom itself has seen some of the worst biodiversity losses in the developed world. The 2016 'State of Nature' report showed that of 3,148 species in the UK, 60% have declined in the last 50 years and industrial agriculture is one of the key contributors to this loss. The same report argued that it is possible to reverse this trend if all parts of society act together to save nature[22].

Degradation of soil and fresh water caused by intensive agricultural production: soil is compacted under heavy machinery, stripped of nutrients by mono-cropping, and made vulnerable to erosion by rain and wind. A major UN (2017) report found that from 1998 – 2013, approximately 20% of the Earth's vegetated land surface showed persistent declining trends in productivity[23]. It demonstrates that "informed and responsible decision-making, improved land management policies and practices, and simple changes in our everyday lives" can reverse the current trajectory which is now at a 'critical juncture'. In the UK, a new study has calculated that poor farming and land management practices are causing soil to be destroyed at approximately 10 times the rate it is being created, costing England and Wales £1.2 billion a year (WWF and Angling and Rivers Trust, 2018)[24]. Moreover, it also points out that soil erosion and pollution from agriculture has damaged waterways so badly that 86% of England's rivers are currently classed as 'unhealthy'.

Industrial agriculture is responsible for an estimated 10-12% of annual Greenhouse Gas (GHG) emissions. The main sources are methane from livestock (responsible for about 40% of GHG emissions between 2001-2011: CGIAR 2018), nitrous oxide from agricultural soils, and carbon dioxide - mainly from energy and fuel use. Certain widespread practices also release carbon into the

[19] Food and Agriculture Organization (2015) *Agroecology – Key Concepts, Principles and Practices* http://www.fao.org/agroecology/database/detail/en/c/454464/

[20] http://awsassets.panda.org/downloads/lpr_living_planet_report_2016.pdf

[21] Ceballos, G. et al (2017) Biological annihilation via the ongoing sixth mass extinction signalled by vertebrate population losses and declines, *Proceedings of National Academy of Sciences of the United States of America*, 114 (30).

[22] https://www.rspb.org.uk/globalassets/downloads/documents/conservation-projects/state-of-nature/state-of-nature-uk-report-2016.pdf

[23] https://global-land-outlook.squarespace.com/the-outlook/#the-bokk

[24] https://www.wwf.org.uk/updates/saving-earth-sustainable-future-soils-and-water

atmosphere, mainly deforestation, heavy and repeat ploughing, and the loss of soil fertility and thus of the capacity of the soil to store carbon. At the same time, agriculture is also vulnerable to the effects of climate change, due to changing average temperatures and weather patterns which all impact on farmers' ability to grow crops. In 2012, Defra published the UK Climate Change Risk Assessment which identified a number of threats to domestic crop and livestock production, due to changes in temperature, rainfall, and sea levels – particularly in southern, eastern and central England. In addition, as the UK is a net importer of food, our food supplies are likely to be perturbed by climate change in many different regions of the world.

2.4.2 In summary, the processes through which much of our food is produced, processed, transported and wasted are causing serious, possibly irreversible damage to Earth's natural resources. The social and economic problems caused by these systems are also serious. Whilst it is beyond the scope of this proof of evidence to examine these processes in full detail, the key point is that it is increasingly recognized that agroecology can play an important role in regenerating environmental resources and empowering farming communities to begin their recovery from social and economic marginalisation. Many scientists, writers, international agencies and social movements are urging governments, corporations and citizens to act now to develop an **agroecological transition**. For example, the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD), a four-year study involving 400 experts from around the world, called for a 'paradigm shift' in agricultural development and strongly advocated the increase of agroecological science and practice. The Food and Agriculture Organization of the United Nations calls for a 'transition to sustainable food and agriculture systems' and states that agroecology offers a pathway to meeting the Sustainable Development Goals by 2030[25]. In 2016 the International Panel of Experts on Sustainable Food Systems (IPES) identified the benefits of moving away from an industrial paradigm to diversified agroecological systems. In the United States, 480 leading scientists and experts recently (2017) signed a statement calling for greater public investment in agroecological research. They comment that agroecology has a "proven track record of meeting farming challenges in a cost-effective manner"[26]. It is crucial to recognise that the agroecological transition is relevant for all countries, not only those in the Global South where people feel the effects of environmental damage and poverty most profoundly. Wealthy countries are also urged to adopt agroecology not only for the sake of their own environment, health and communities, but also because their consumption demands, business and investment behaviours and international development policies are driving damaging effects in developing countries.

2.4.3 Unlike industrial agriculture, agroecology is designed to mimic ecological processes and relationships and in so doing it is able to develop efficient and resilient farm and landscape-scale practices. An increasing number of scientific studies have demonstrated this, and the ELC's independent annual monitoring of its established site at Greenham Reach demonstrates how in just five years, the farming practices have transformed the site from a low-level of biodiversity to a level where it has become a site of 'local importance' for wildlife. However, agroecology is also about much more than this because it combines ecological and social concepts to the design and management of food and agricultural systems. Crucially, it is based on bottom-up and territorial processes, delivering contextualised solutions to local problems: "Agroecological innovations are based on the co-creation of knowledge, combining science with the traditional, practical and local knowledge of producers. By enhancing their autonomy and adaptive capacity, agroecology empowers producers and consumers as key agents of change" (FAO, undated[2]).

[25] http://www.fao.org/3/i9021en/I9021EN.pdf

[26] https://www.ucsusa.org/our-work/food-agriculture/solutions/advance-sustainable-agriculture/scientists-call-public-investment-agroecology#.Wws7OVMvyb8

2.4.2 This proof of evidence argues that the ELC proposal represents an important initiative to further develop the local and regional food system in East Sussex along the principles of agroecology. The sheer scale of the environmental, social and economic challenges described here – which are directly impacting the UK agriculture and food system - mean that there need to be many more spaces created where small-scale farming on ecological principles can be enabled to flourish. In these spaces, innovative practices can be developed to restore biodiversity and other natural resources, the local agricultural skills base can be strengthened, viable businesses can grow and rural livelihoods and communities can be maintained. These benefits would all contribute towards achieving the ambition of the government's 25 Year Environment Plan to leave the environment in a better state than we found it. They would also help the UK meet its commitments to achieve the Sustainable Development Goals.

2.4.3 As noted recently by the UN Convention to Combat Desertification (2017) "Smart land use planning is about doing the right thing in the right place at the right scale: a multifunctional landscape approach advocates for more rational land use allocations that lead to greater resource use efficiency and the reduction of waste; it is based on the principles of participation, negotiation, and cooperation." The scheme proposed by the ELC would facilitate a multifunctional landscape approach which would enhance efficient use of local resources and contribute to further strengthening local co-operative relationships between food producers, their supply chain partners, local authorities and communities. It could set an enlightened precedent for further initiatives in the country and would, along with the existing site at Greenham pioneer an agroecological way forward for food production and consumption. This takes into consideration the forthcoming challenges that the production sector will face and is endorsed and recommended by research and international bodies. Not only is it concerned with production aspects, but it takes a joined-up approach by also considering housing, markets and labour skills, with a focus on the use of local renewable resources and inputs so as to reduce the dependency on vulnerable imports and non-renewables. As well as proven environmental benefits, their model can deliver important social and economic goods including the creation of decent rural jobs, the 'reconnection' of consumers with food and with rural communities, and provision of healthy, nutritious food. The initiative proposed in Arlington would enable local producers, consumers and communities to play their own role in stepping towards a food system which delivers environmental regeneration, health and sustainability.

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