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1 **Defining and Delivering 'Sustainable' Agriculture in the UK after Brexit: Interdisciplinary Lessons**
2 **from Experiences of Agricultural Reform**

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12
13 **Abstract**

14 Defining and achieving sustainability in the context of complex, multi-scale and constantly changing
15 agricultural systems is a challenge for research and policy. In UK agriculture, the European Union and
16 its Common Agricultural Policy has been a key source of funding for and approaches to sustainability
17 in the agriculture and rural development sectors. The decision to leave the European Union
18 represents a significant moment in UK agriculture and rural development policy, and both an
19 opportunity and responsibility for the UK government to set out and commit towards achieving
20 sustainability goals for the sector. In this study a combination of ethnographic case study research,
21 focusing on the case of upland farmers in the Yorkshire Dales, policy analysis and national
22 agricultural sector data is referred to in describing experiences of agricultural policy reform over
23 recent decades. From these experiences lessons for the design and delivery of future agriculture and
24 rural development are drawn out. It is argued that, the integrated assessment of multiple sources of
25 knowledge can provide a means to critically reflecting on evidence about sustainability in complex
26 systems, better understanding trade-offs, and creating a more complete and inclusive knowledge
27 base from which to define sustainable agriculture.

28
29 **Key words:** agricultural systems, sustainability, UK agriculture, interdisciplinarity, Brexit

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31 *Declaration: the publication of this paper is associated with no financial interest or conflicts of*
32 *interest*

1 Introduction

2 Continued contestation over the extent to which the United Kingdom and European Union
3 governments should prioritise agricultural production within multifaceted objectives for the rural
4 economy, highlight the challenging nature of achieving sustainable and multifunctional agriculture. A
5 changing political landscape, which has most recently been transformed by the outcome of the UK
6 public referendum on leaving the EU, and the capacity and willingness of the state to subsidise the
7 agricultural industry, mean that questions about the future of agriculture and what is sustainable in
8 the UK have particular and timely significance. The agricultural sector in the UK is heavily influenced
9 by the single market trading of food and agricultural commodities with EU member states; the direct
10 farm payment subsidies that operate through the Common Agricultural Policy (CAP); and related
11 greening measures, agri-environment schemes and EU environmental directives. Owing to the
12 opportunities and challenges of operating outside of EU governance and the trading agreements, and
13 based on the indicated priorities for the agricultural sector of the UK government as well as its
14 budgetary constraints, Brexit is likely to bring about significant change in UK agricultural policy. Aside
15 from trading agreements, some key issues to be determined are the extent to which the government
16 supports agricultural production through direct payments and the form that agri-environment and
17 ecosystem service payment schemes take. There is limited understanding of the implications of
18 different policy options for the sustainability of different types of agricultural enterprise (i.e. small
19 family farms compared with larger agri-businesses) and for the nature and value of the UK's diverse
20 agricultural landscapes. In considering a future for agriculture in the UK, and how the devolved
21 governments of the UK might support and incentivise change in the sector following their withdrawal
22 from the EU and its CAP, there is much to be learnt from a recent history of experience of agricultural
23 policy reform.

24 This paper is based on the premise that a recent history of CAP reform and associated UK agricultural
25 sector changes, holds within it important analogies and lessons for future policy change. Since its
26 inception in the early 1960s, the CAP has continually shaped markets and farm payments, with
27 significant implications for how agriculture is practiced in the UK. A series of reforms have seen the
28 promotion of modernisation and farm growth in the 1970s, the placing of quotas on production in the
29 1980s and 1990s, and the introduction of environmental stewardship schemes in the 1990s and 2000s.
30 In response to European Commission spending reviews, 2014/2015 reforms of the CAP led to the
31 'greening' of capped single farm payments and support for small farms and young, active farmers. As
32 EU priorities have changed, CAP budgets have contracted and farming practices have shifted in
33 response to the changing value, conditionality and beneficiary profile of subsidy payments.

34 Given the multiple roles that agriculture plays within the rural economy and the diversity of
35 production systems, livelihoods, and interactions with wildlife, there is a need for policy analysis that
36 is broad in scope. Although the sector-wide market implications of some of the potential changes to
37 have been modelled (van Berkum et al., 2016), there is limited understanding of the implications of
38 different policy options for the sustainability of different types of agricultural enterprise and
39 agricultural landscapes. This paper is premised on the assertion that a dialectical cross-analysis of
40 multiple disciplinary approaches can allow for a more critical engagement with complex questions of
41 sustainability. The paper outlines the complex and contested objectives for agriculture and the recent
42 history of change, and describes an interdisciplinary approach to evaluating and drawing lessons from
43 this recent history. It presents evidence from a combination of policy analysis, ethnographic oral

1 history interviews with pastoral farmers in the Yorkshire Dales National Park, and sector-wide data.
2 From these combined approaches, lessons are specifically drawn out in relation to experiences of
3 agricultural sector market liberalisation, the decoupling of subsidies from production, and rural
4 development and agri-environment schemes. The discussion highlights some implications of these
5 lessons from the recent history of agricultural reform for the future design of, and the process of
6 implementing, agricultural policy change in the UK in the post-Brexit era, emphasizing the importance
7 of recognizing diversity within the agricultural sector and drawing on local knowledge of agricultural
8 landscapes.

9

10 **Sustainability and the Future of the Agriculture in a post-EU UK**

11 The European Commission's vision for the future of European Agriculture, set out in the Agenda 2000,
12 advanced a discourse of sustainable and multifunctional agriculture that would simultaneously be
13 characterised by liberalisation and competitiveness, play a key part in a secure and equitable rural
14 economy, contribute to environmental sensitivity and protection, ensure food safety and security, and
15 maintain cultural landscapes (EC, 1997). The 2002 Curry Policy Commission on the Future of Farming
16 and Food set out the following vision:

17 "We look for a profitable and sustainable farming and food sector, that can and does compete
18 internationally, that is a good steward of the environment, and provides good food and a
19 healthy diet for people in England and around the world. ...Farmers are rewarded for looking
20 after their land and for providing an attractive countryside. They have embraced the
21 management of the land for environmental public good as a key part of what farming is
22 about." (Cabinet Office, 2002: 9)

23 Carefully directed public funding that recognises and rewards farming as a public service provision,
24 across the multifaceted objectives of food security, environmental stewardship, and a stimulated rural
25 economy, and the simultaneous need for agriculture to grow as a competitive market-led sector, were
26 central to the vision that the Curry report set out. This principle of multi-functionality has seemingly
27 become manifest within UK policy that has increasingly emphasized farm land diversification (e.g. the
28 1988 Ministry of Agriculture's Farm Diversification Scheme) (Marsden and Sonnino, 2008) and strong
29 support to farmers in their role in conservation activities and environmental protection (McNicholas
30 and Ward, 1997).

31 An emergent discourse of sustainable intensification, linked to international food security concerns
32 and international sustainable development goals (SDGs), has increasingly shaped discussion of farming
33 futures in the UK and globally (Tilman et al., 2011, Godfray and Garnett, 2014). The Environment Food
34 and Rural Affairs Committee of the House of Commons, made the point in relation to the 2013 CAP
35 reforms that "the aim for this round of CAP reform should be to enable EU farmers to achieve the
36 'sustainable intensification' that is required to meet the global challenges of feeding a predicted world
37 population of 9 billion by 2050 without irrevocable damaging our natural resources" (EFRA, 2011),
38 reflecting language used in the 2011 Foresight report on the future of food and farming. As Franks
39 (Franks, 2014) points out, it is a concept that has been differently interpreted along 'land sharing' and
40 'land sparing' lines (see Franks' comparison of the 2011 Foresight Report and the 2009 report of the
41 Royal Society), as well as being accompanied by other concepts of multiple wins agriculture, such as

1 'climate smart agriculture' (Whitfield et al., 2015), that simultaneously contribute to the meeting of
2 multiple sustainability priorities.

3 Although supporting rural economy growth has been recognised as a priority challenge that requires
4 tailored strategies for diverse rural contexts, production systems, and agricultural households and
5 enterprises (Jack, 2009) agricultural subsidies and agri-environment payments have largely been
6 administered in standardized ways, with some research indicating that these have had differential
7 impacts across production systems (Tzanopoulos et al., 2012), and small and large (Lobley and Butler,
8 2010), and tenanted and non-tenanted farms (Maye et al., 2009).

9 Prior to the June 2016 referendum, implications of a Brexit vote for the agricultural sector were
10 associated with significant uncertainty and mixed stances across farming unions, ministers within the
11 Department for Environment, Food, and Rural Affairs (DEFRA)¹, and the farming population
12 themselves². It has been argued since, particularly by the current Conservative government, that
13 withdrawal from the EU will represent greater national control over agricultural policy with the
14 potential for this to be more appropriately targeted at local, landscape and rural economy-specific
15 functions. There is some indication that agri-environment schemes will continue to be funded, at least
16 in the immediate post-Brexit period, and new rural development funds made available, however,
17 trends towards decoupling of payments from production and market liberalization, that have been
18 evident under CAP, are likely to continue. Although the sector-wide market implications of some of
19 the potential changes to these policy aspects have been modelled (van Berkum et al., 2016),
20 interpreting the impacts of reform on multi-functionality of the agriculture across diverse contexts,
21 different types of agricultural enterprise (i.e. small family farms compared with larger agri-businesses)
22 and for the nature and value of the UK's diverse agricultural landscapes, is a significant challenge.

23 A retrospective and cross disciplinary study of a recent history of agriculture sector policy change
24 allows us to draw on experiences of the impacts and experiences of policy changes that are somewhat
25 analogous to, or the precursors of, potential policy change. The CAP has undergone significant reform
26 over its sixty year history, and whilst the initial common and open market objectives have been
27 sustained, the 1980s saw a move away from production protection towards addressing over-
28 production, the liberalisation of international trade, and the rise of the environmental agenda. The
29 reforms of the policy under European Commissioner Ray MacSharry in 1992, represented a significant
30 reduction in support for cereal and meat production and the introduction of payments linked to land
31 stocking quotas and for set-aside land. The vision of the CAP in the new Millennium set out in Agenda
32 2000 saw a restructuring of the CAP into two Pillars that separated direct production payments (Pillar
33 I), which continued to be reduced, from those that were directed towards rural development, through
34 Rural Development Regulation (RDR), and environmental stewardship (under Pillar II). This set in
35 motion a move towards the decoupling of payments from production in 2003, under the Fischler
36 reforms, which would see Pillar I payments allocated through a single farm payment, linked to land
37 area rather than production. Despite the centralized nature of this reorientation of the objectives of
38 agricultural policy, Marsden and Sonnino also describe the associated 'regionalization of rurality';

¹ Demonstrated by the opposing positions taken by DEFRA Secretary of State Liz Truss and Farming Minister George Eustice

² A survey published in Farmers Weekly on 29th April 2016 suggested that 58% of farmers intended to vote 'leave' and 31% 'remain'

1 which manifest in the regionally distinct Rural Development Plans that were drawn up as a strategy
2 for guiding Pillar II action. Under Commissioner Dacian Cioloş, changes made to Pillar I payments in
3 2014 have seen increasing green conditionality be placed on the single farm payment, meaning that a
4 proportion of this direct subsidy was made contingent on the adherence to farmers of some basic
5 environmental cross compliance activities, designed to maintain habitats and reduce soil erosion and
6 runoff, for example.

7 The interconnected nature of agricultural systems, particularly in relation to the trade of commodities
8 and latterly in relation to multiple other cross-scale flows, such as the migration of wildlife, has been
9 a driver of common and centralised governance. Simultaneously, recognition of the localised nature
10 of production practice, agro-environments, cultural landscapes and, in some cases, markets has been
11 associated with a devolvement and decentralisation of governance and agenda setting, as evident in
12 the Rural Development Programmes drawn up as part of requirements of RDR and Natural England’s
13 Landscape Character Assessments used in Local Authority planning processes. Across the multiple
14 scales and stakeholders of farming systems can exist a variety of values and priorities for the system
15 – from economic integration and trade liberalization to maintaining local cultural heritage and
16 livelihoods – a variety of knowledges and experiences, that sometimes sit in conflict with each other
17 and can become the basis of alternative evaluations of sustainability (Scholten, 2013). Achieving a
18 sustainable agricultural system represents a significant challenge, not least for research that as aims
19 at defining what sustainability is in these complex, interconnected, multi-scale and multi-sited, and
20 constantly changing contexts, and, in doing so, to capture the values of those that may be marginalised
21 within or dislocated from the system and to do justice to future generations and non-human stakes.
22 Markets for agricultural commodities, the impacts of rural economies and employment, the
23 movement of livestock and of vector-borne diseases, the cultural services and value associated with
24 wildlife species, for example, can link geographically dislocated actors and processes, within systems
25 that cross multiple spatial and temporal scales. This challenge requires research that “engages
26 critically with questions about sustainability; what is to be sustained, where, at what scales, and for
27 whom” (Whitfield et al., 2015: 1297), and in this paper the assertion that such engagement can be
28 achieved through interdisciplinary research and analysis is explored.

29 **Methods**

30 A cross-disciplinary retrospective study of agricultural change, which draws on critical policy analysis,
31 ethnographic case study work, and sector-wide data analysis is presented. This was conducted as
32 three simultaneous short studies that focus specifically on agricultural policy change from 1992
33 onwards, capturing those that occurred in association with the MacSharry CAP reforms. The findings
34 of the three studies iteratively informed each other. For example, ethnographic research on
35 agricultural choice pointed to key political moments that were subsequently investigated through
36 policy analysis, which revealed key assumptions or sector wide trends that were then investigated
37 through secondary data analysis, which was subsequently triangulated through ethnographic work
38 and farmer interview. As such an iterative cycle of research was somewhat self-propelling.

39 Sheep, beef and dairy production systems in the Yorkshire Dales, UK, represented a focal point of
40 study of agricultural system change, on the understanding that this case study approach offers insight
41 into localised dynamic processes that are themselves linked to sectoral and national-level policy as
42 well as international markets. Upland pastoralists in the Yorkshire Dales are predominantly family

1 farmers operating in medium productivity environments and markets of marginal profitability (Acs et
 2 al., 2010). Subsidies play an important role in making upland agriculture economically viable. In upland
 3 areas, landscape and environmental stewardship generally equates to the destocking and setting
 4 aside of land to prevent overgrazing and conserve certain wildlife habitats and ecosystem services
 5 (e.g. regulating river basin hydrology). However, in the Dales, agriculture itself is synonymous with a
 6 cultural landscape that attracts tourism and that institutions such as the National Park Authority have
 7 been established to conserve. In a context of agricultural policy change, and the demand for cheap
 8 food being met by imports and intensive production elsewhere, there are questions about long term
 9 impacts on the livelihoods of farmers, the stewardship of sensitive areas, and subsequently on rural
 10 cultures and economies in this area. (Shaw and Whyte, 2013, Reed et al., 2006).

11 Analysis of policy and strategy documents, media reports and press statements, and campaign
 12 literature (detailed in table 1), was achieved through manual coding, which focused on the
 13 identification of narratives (or narrative elements) regarding a sustainable agricultural system. Coding
 14 terms used included, but were not limited to: productivity, ecological sensitivity, flexibility (and lock-
 15 ins), set-aside, cultural landscape, red/green tape (paperwork), animal welfare, health, social equity,
 16 market liberalization.

17 Oral history interviews with 26 upland pastoralists in the Yorkshire Dales were conducted in 2015-16.
 18 Timelines of farm changes were constructed with participants, each bounded by participants' own
 19 experience and recall and focused predominantly on identifying significant changes in activity on the
 20 farm (e.g. entering into new production systems, buying/selling land, new contracts/markets) and the
 21 main drivers of those changes (markets/prices, environmental/disease-related, regulations/policy
 22 opportunities, etc.) (See figure 1).

23 Basic regression analysis was used to examine evidence about the vulnerability of dairy farms to
 24 market price changes based on farm-gate milk price and agricultural input cost, and time series
 25 information on sector structure, from the annual DEFRA June agricultural survey and the Agriculture
 26 and Horticulture Development Board.

Information sources	Description
Policy/strategy documents	UK government department white papers and outline strategy documents, and European Commission proposal and consultation documents (e.g. the European Commission Legal proposals for the CAP after 2013) – initially identified from search of media reports and subsequent snowball sampling (n = 18)
Media reports/press statements	Archived copies of Farmers Weekly, Farmers Guardian, and Farm Industry News journal articles archived by Nexis®, for the period 1995-2016, searched using key terms in the Nexis search engine (n ≈ 3800)
Campaign literature	Reports developed by non-governmental organisations such as the RSPB and the NFU as well as short information pieces by campaign groups – initially identified from search of media reports and accessed online. (n = 28)

27

28

[Table 1: Descriptions of information sources used in the policy analysis]

1 **Results**

2 Insights from this interdisciplinary study are organised here into three main themes reflected in the
3 recent history of UK agricultural change, and that are analogous to or precursors of, and therefore
4 hold lessons for, potential policy directions in the post-Brexit era – market liberalisation, the
5 decoupling of agricultural subsidies from production, and the directing of payments towards rural
6 development and agri-environment schemes.

7 Market Liberalisation

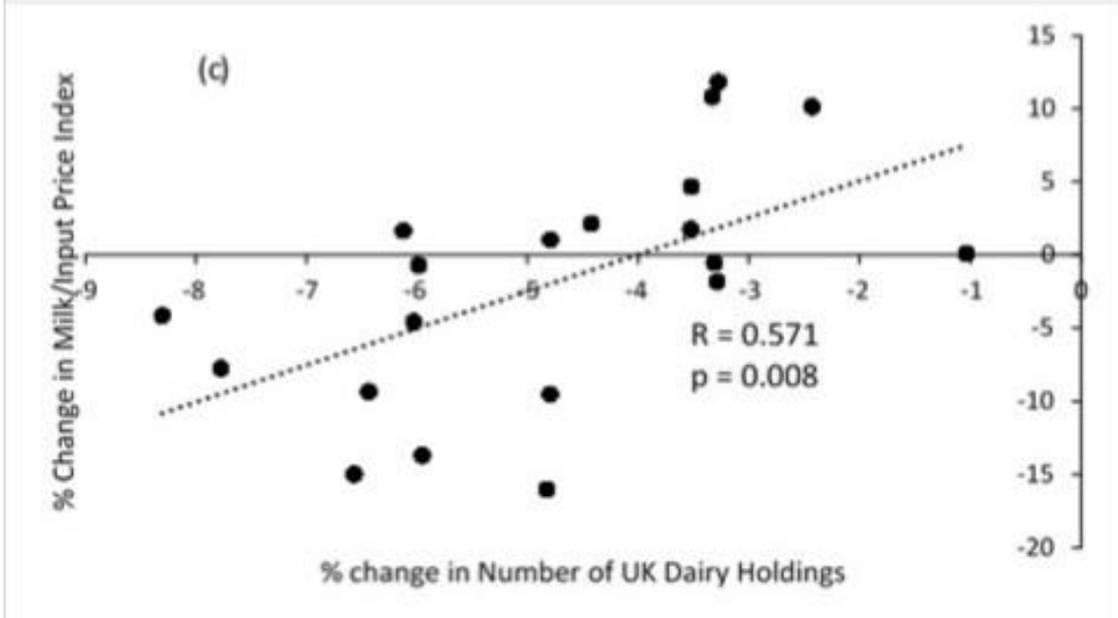
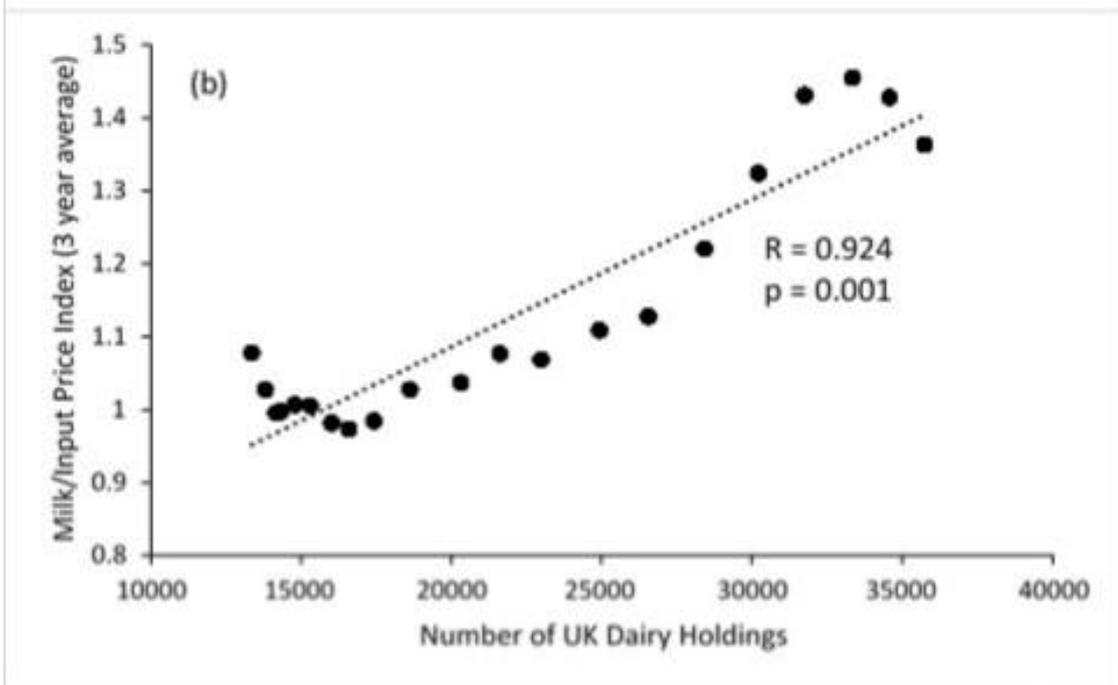
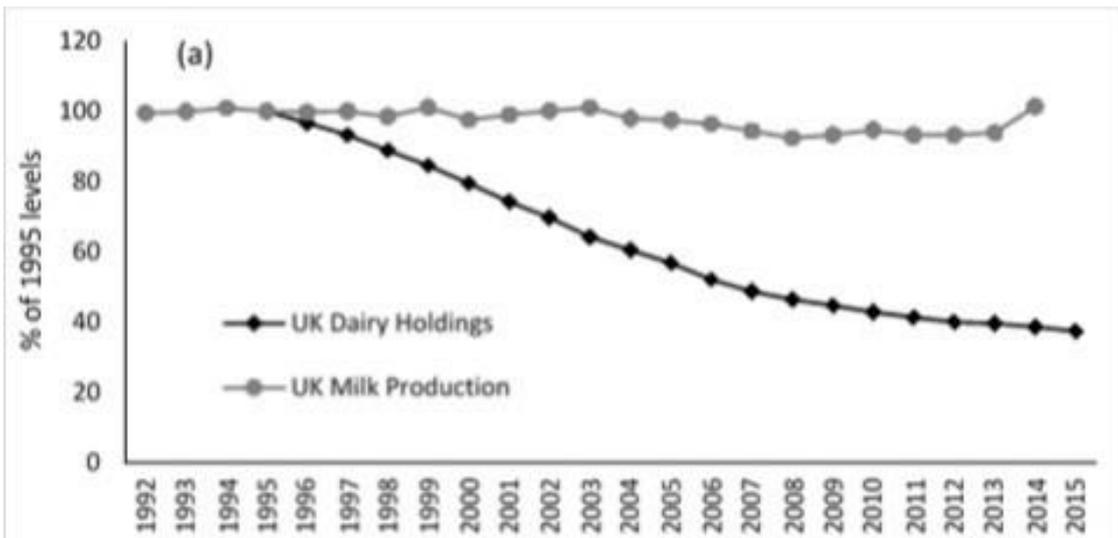
8 Through the Uruguay Round of the GATT, which began in 1986, increasing pressure was exerted on
9 the EU to implement reform of its protectionist policies and subsidies that were seen to be distorting
10 and destabilising global markets. This lengthy round of negotiations reached a conclusion in 1994 as
11 the Council of Agricultural Ministers submitted to these pressures and instigated the MacSharry
12 reforms of the CAP in 1992, which represented a commitment towards liberalization and the
13 redirecting of payments, for example, towards set-aside land. In the UK, this represented a catalyst
14 for the long-discussed redressing of some of the national market structures that predated its EU
15 membership, the Milk Marketing Board representing a well-documented example of change.

16 The Milk Marketing Board of England and Wales (MMBEW) was established in the 1930s at the
17 majority vote of the membership of the National Farmers Union in response to volatility and price
18 collapse after 1930, and in addition to providing price stabilization it acted as a driver of modernisation
19 and improved standards in dairy production systems. Whilst the push for improved standards and
20 moves towards bulk collection arguably drove the premature selling off of some small family farms,
21 who couldn't justify needed investment in their farm infrastructure, the MMBEW largely acted to
22 protect smaller and more geographically isolated producers owing to its commitment to the collection
23 of milk at standardized prices, i.e. not penalising those from whom collection is less efficient (Winter,
24 1984).

25 When the MMBEW was disbanded in 1994 into a number of voluntary cooperatives, many small
26 farmers initially volunteered themselves into the Milk Marque quota-holding producers' cooperative,
27 in spite of competitive contracts from private dairy processors. Whilst larger commercial farm could
28 negotiate a premium with these private contracts, smaller farms remained somewhat protected from
29 market variance through Milk Marque (Franks, 2001). But as the cooperative itself lost large producers
30 it became less competitive in a freer market and gradually Milk Marque prices slipped relative to other
31 contracts.

32 Liberalization of UK markets, although clearly not complete as CAP subsidies have continued to
33 represent a significant intervention, has exposed farmers to market fluctuation. This has been felt
34 particularly acutely in farm gate milk prices. These prices have largely displayed a consistent rising
35 trend since 2000, but experienced a dramatic downturn in 2014 owing in large part to the market
36 shock that the Russian import ban on EU products represented; a market crisis that has been
37 highlighted by the NFU and campaign groups such as Farmers for Action. This exposure to market price
38 represents to many a driver for improving efficiency and reducing input costs, but abilities to ride
39 waves of price change are inevitably uneven, and those with limited disposable capital (i.e. livestock)
40 and limited access to credit, which are predominantly characteristic of small family farms, face
41 particular challenges in coping during times of price troughs.

1 Figure 1a shows a consistent downward trend in the number of dairy smallholdings over the period
2 1995- 2015, which has not been reflected in a downward trend in total milk production, illustrating
3 the growth in average farm size over this period. The number of dairy holdings over this period has
4 been correlated with the milk/input price ratio (figure 1b), which has shown a similar, but less even
5 decline over the period. In fact, a close correlation between the annual change in UK dairy holdings
6 and the change in the milk/input price index experienced in the previous year (figure 1c), suggests a
7 particular responsiveness in dairy holdings to market change. Across the farming sector, the loss of
8 small farms has constituted a disproportionately high proportion of the overall decline in households.



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[Figure 1: (a) Trends in total dairy production and number of UK dairy holdings, as a percentage of 1995 levels over the period 1992-2015 (Data sources: DEFRA Statistics); (b) Plot of the number of UK dairy holdings against a 3-year average milk price/input cost ratio (centred on the year previous to that represented by the dairy holdings number. Data derived from DEFRA statistics and the AHDB for the period 1992-2015; (c) Plot of the annual change in the number of UK dairy holdings against the % change in the milk price/input cost ratio (from the average of the previous three years) experienced in previous year.]

A sustained increase in the cost of farm inputs since the mid-1980s is consistent with the profitability challenges that a number of interviewed Dales farmers identified over this period, and since 2013, the rapid drop in farm gate milk prices has been more severe than the associated reduction in farm input costs. The sentiment of farmers in the Yorkshire Dales, elicited at a time of a particular steep downward trend in milk prices (from a peak in November 2013 through to a trough in November 2016), reflected a concern over the particular vulnerability of small dairy farms exposed to the fluctuations of milk and input costs. Many expressed discontent with the impacts of market liberalization and a keenness for a return to price protection, that some felt that Brexit may have the potential to deliver:

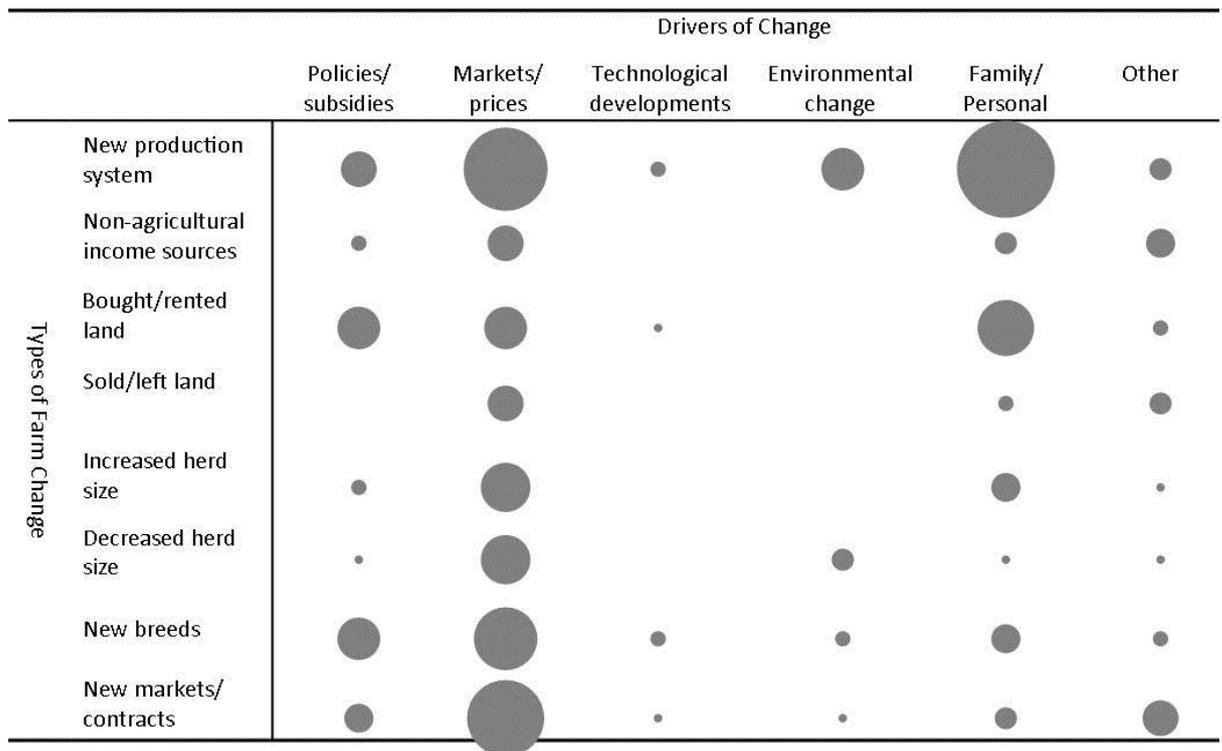
“It was a huge boom or bust cycle in the dairy industry in the 1930s, that’s why they made the Milk Marketing Board, they’ll need to reinvent it or there’ll be no dairying left, or there’ll be one farm with 2 million cows”

Many farmers point to volatility in the milk market and the economics of production as a direct driver of change in the recent history of their farm, and this was most commonly associated with a change in production system, often from dairy to beef and/or sheep farming and the seeking of new, and often, as one participant described them, “[not] better, but less bad” production contracts (e.g. with commercial dairies) (Figure 2). In this context of market liberalisation, innovation and increased efficiency of production can be stimulated, but for small producers in more marginal production environments (typically family farms in the UK), and often with less capacity to invest in farm infrastructure, staying competitive and resilient to market change has proved challenging.

There are however some examples of cases where contractual arrangements with retailers or processors in supply chains that commit buyers to fair prices have been a catalyst for investment and increased efficiency in production that have sustained the competitiveness of dairy on family farms.

“The [fair milk] contract has given us the confidence to progress, not to produce more, but to become more efficient”

Such arrangements, as in the case that this quote refers to of a producer contract with a northwest retailer, may be born out a social responsibility a commitment of the retailer to supporting the local rural economy. Such localised supply chains may offer some protection from the fluctuations of global market.



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3 [Figure 2: Representation of the changes and associated drivers of change indicated by farmers
 4 across oral history interviews. The size of circles indicates relative frequency of the coupled
 5 response.]

6 De-Coupling of Subsidies and the Single Farm Payment

7 It was a mid-term Review of the Agenda in 2002 that instigated a more fundamental decoupling of
 8 subsidies from agricultural production, as this reform had been stalled in the process of developing
 9 Agenda 2000 itself, largely due to budgetary concerns by finance ministers and heads of government.
 10 The package of reforms put forward by Commissioner Fischler that resulted from the mid-term review,
 11 outlined that decoupling strategies would be nationally designed and determined, and it was argued
 12 that such change would allow ‘farmers to fully benefit from market opportunities in supplying the
 13 products that consumers demand’ (EC, IP/02/1026, 2002). In the UK, the Single Farm Payment
 14 replaced livestock ‘headage’ payments in 2003. The reform was perhaps the most fundamental in the
 15 history of the UK’s involvement in CAP to that point, and its unprecedented nature meant that it was
 16 associated with some uncertainty about the sectoral response and concerns about the potential for
 17 an exodus from farming and the abandonment of marginal land (Swinbank and Daugbjerg, 2006,
 18 Tranter et al., 2007, Lobley and Butler, 2010). Based on their own survey of farmers in SW England,
 19 Lobley and Butler (2010) argue that “market signals may become a more powerful driver of farmer
 20 behaviour than CAP instruments, in which case the 2003 reforms will have proved successful in
 21 providing farmers the freedom to farm without coupled subsidies... though, only a minority of farmers
 22 seem both well placed and well-disposed to exploit such opportunities.” (p. 347)

23

1 For tenant farmers and those that relied on sending their stock to wintering land owned by others,
2 this change in subsidy structure presented particular challenges, as one Dales beef and sheep farmer
3 explained:

4
5 *“It probably altered our business structure big time because we were playing a numbers game*
6 *with sheep, we were sending them to these other parcels of land on to wintering land and*
7 *drawing subsidy on 1200 sheep at £20 apiece, whatever that works out at, we suddenly went*
8 *to area payment where the guy who owned the wintering land, the subsidy went to him, so he*
9 *had no incentive to keep the wintering sheep, the people with the other land cottoned on to*
10 *the idea that, ‘hang on we don’t need to do any work here, we can have the money for just*
11 *filling the form in’, and so our income stream from subsidies declined big time. Probably*
12 *halved. We always said in 2001 that we’d never have any money again.”*

13 Significantly for some in the livestock sector, the reform of subsidies coincided with the Foot and
14 Mouth disease (FMD) outbreak in 2001, which resulted in complete loss of stock for many farmers in
15 the Yorkshire Dales, as it did across the UK. It was seen by some as an almost convenient coincidence
16 that allowed for the kind of destocking that been much discussed around Agenda 2000:

17 *“They had talked about reducing stock before Foot and Mouth, and I think Foot and Mouth*
18 *was seen as an opportunity to change the way that British farming was done really”*

19 For those that remained with stock, the restrictions on trade that came into force and persisted
20 beyond the Foot and Mouth epidemic, left farmers struggling to manage stock numbers and highly
21 exposed once trading began again, owing to their urgent need to destock.

22 *“We weren’t in a position to demand a higher price. It was coming in to winter, we couldn’t*
23 *keep them. There were no markets open so you were just at the mercy of whoever turned up*
24 *and whatever they wanted to pay. People would come saying they wanted them and then*
25 *suddenly turn around and say they didn’t. Because they had found them cheaper somewhere*
26 *else.”*

27 Although change in subsidy does not emerge as a dominant driver of change in practice amongst the
28 participants in the Dales (figure 1), for some, the combined effect of a decoupling that exposed
29 farmers to the potential for market shocks in stock price, and the low price and market volatility that
30 accompanied the Foot and Mouth outbreak, instigated a move to a change in production systems:

31 *“The change in subsidies was probably the turning point with going from sheep numbers,*
32 *because although the sheep weren’t making the profit in their own right, as breeding animals,*
33 *we were still able to claim the £30-£40 per sheep, which was the profit in them effectively, so*
34 *now we are in a scenario where you don’t want that density of stocking of sheep, we’re*
35 *learning all the time that the more extensively we farm them the more profitable they were ...*
36 *although it looks like the lamb price is going to drop by 20 quid, it looks like we are going to*
37 *make a profit on them, the business has become more resilient by reducing input costs and*
38 *stocks.”*

39
40 Rural development and agri-environment schemes

1 Under the RDR, member states were to draw up geographically appropriate rural development plans
2 for ‘improving the competitiveness of farming and forestry’; ‘improving the environment and
3 countryside’; and ‘diversifying the rural economy and improving the quality of life’, the three principles
4 of the new Pillar 2 of the CAP. These would incorporate existing stewardship schemes and new rural
5 development funds, voluntarily modulated from Pillar 1. The original Environmentally Sensitive Areas
6 (ESA) schemes of 1987 were applicable to farmers and land owners in designated regions of the UK
7 where it was felt that a concerted effort was needed to prevent the degradation of landscape
8 character (Morris and Potter, 1995, Lobley and Potter, 1998). The addition of the Countryside
9 Stewardship Scheme (CSS) in 1991 had extended the reach of incentives to improve the ecological
10 sensitivity of agricultural practices beyond these particularly high value locations. With the
11 restructuring of CAP subsidies through Pillar 2 the UK Environmental Stewardship Scheme was
12 introduced which, through its Entry, Organic, and Higher-level routes, compensates farmers for
13 implementing a variety of environmental best practices, such as managing hedgerow, maintaining
14 permanent grassland, retaining water course buffer strips, conserving skylark nesting sites, and much
15 more, on the condition of meeting the requirements of a flexible points-based model.

16 Additionally, in the first Rural Development Programme for England (RDPE) established under the
17 Ministry for Agriculture, Fisheries and Food (MAFF), which covered the period 2000 to 2006, new
18 schemes to support sustainable agricultural use of upland and less favoured areas, and promote rural
19 enterprise were introduced. The Rural Enterprise Scheme was designed to “encourage farmers to
20 diversify their farm businesses in order to improve their economic viability, particularly in rural areas
21 which have experienced most difficulty in adjusting to agriculture’s decline” (MAFF, 2000), with a
22 focus on entering diverse product and production markets, such as keeping sheep and goats for milk
23 and cheese, or livestock such as wild boar or alpacas. The LEADER (Liaison Entre Actions de
24 Développement de l’Économie Rurale) programme, which had existed since the early 1990s as a way
25 of channelling rural development funding through bottom-up, local area based mechanisms, became
26 incorporated within the second phase of the RDPE. In the Yorkshire Dales, LEADER is managed by a
27 Local Action Group directed by the Yorkshire Dales Millennium Trust and has the specified aim of
28 “build[ing] a sustainable community and economy that capitalises on the area’s environment,
29 landscape, culture and heritage”. In some cases these funds have been directed towards supporting
30 and modernising family farm operations (one interviewee had received funds to purchase a weed
31 wiper and soil aerator equipment for example), and in others they have integrated agriculture and
32 agricultural heritage within tourism and education projects, supporting farmers to diversify and utilise
33 their land for these purposes.

34 The impact of agri-environment schemes in the UK to date have been inconclusive. Whilst some
35 studies suggest positive associations between farmland biodiversity, most often measured by bird
36 species populations, and boundary management activities, including in Yorkshire and the North West
37 (Davey et al., 2010a), these have not been universal. Whilst there have been positive indicators for
38 Corn Bunting and Common Starling nationwide (Perkins et al., 2011, Davey et al., 2010b), this hasn’t
39 been the case for other species (Davey et al., 2010b, Baker et al., 2012). Interviewed farmers had had
40 mixed experiences of the entry, higher-level, and countryside stewardship schemes:

41 *“On the allotment it [countryside stewardship] didn’t work too well for us. The stocking rules*
42 *were too restrictive. In fact at the start of the scheme we had lapwings and curlews nesting up*

1 *there, and by the end they weren't there anymore. The curlews were still there but the lapwings*
2 *had disappeared"*

3 There has been some criticism that entry-level stewardship schemes have done little to encourage
4 sustainable intensification (Kassam et al., 2011) or significant change in practice (Whittingham, 2007),
5 with farmers pursuing stewardship options that are most achievable or require least adjustment of
6 status quo practice , and that are 'not ideal for achieving the desired outcomes' (Natural England,
7 2009: 6). However, there was evidence of Dales farmers having not only reoriented their practices
8 (particularly those qualifying for higher level stewardship), but having pursued stewardship actions
9 above and beyond funding requirements:

10 *"What I do here in terms of my species richness, and that includes the meadows, I do more*
11 *than what is required, firstly, because I think that in the event, which is going to happen, of*
12 *these [stewardship] schemes becoming more competitive, I want to have a resource that is*
13 *attractive, secondly because it is something that I find interesting and, thirdly, because I am a*
14 *small farm and I have to do something different... it might not be politically valued at the*
15 *moment, but five years down the line the politics might change."*

16 However, frustration over the bureaucratic aspects of funding and the complexity, incompatibilities,
17 and propensity for change in the varied funding sources and schemes was expressed:

18 *"The Countryside Stewardship Scheme ran until 2013 and I felt comfortable with that, I thought*
19 *we were achieving something. It was bringing me an income from the less productive parts of*
20 *the farm... We had someone from Natural England come to look at the hay meadows, and he*
21 *invited us to join the higher level stewardship scheme. So we went through all the process of*
22 *putting an application in, and they did a soil sample, and found the phosphate levels were too*
23 *high... they wouldn't allow people in to higher level stewardship if their phosphate indexes*
24 *were high so... so we're in limbo with this now. Our most environmentally sound land we don't*
25 *get any payments on it, we didn't get into the entry level scheme because it was too late. They*
26 *weren't taking any more applications."*

27 *"I have been told I must forego nearly one year's Natural England funding to qualify for the*
28 *new Countryside Stewardship Scheme on the 1st of January 2018... purely for technical*
29 *administrative reasons due to the 1st of January Start Date for the new Countryside*
30 *Stewardship Scheme... During the 11 month break period, I will be disqualified from Natural*
31 *England management funding, capital grants and Educational Access funding."*

32 Whilst the LEADER methodology for funding represents a strong commitment towards bottom-up
33 design and planning of rural development, the extent to which such programmes have drawn on local
34 knowledge in their conception and delivery has in some cases been limited. One farmer described the
35 developing plans for creating a wetland habitat via the removal of flood banks on the river that ran
36 through land that he owned. He described a consultancy meeting about the proposal, in which it
37 became clear that the proposed actions were founded on misunderstandings about local hydrology
38 and drainage, as well as the use and value of the land:

1 *'The consultant told us 'it'll probably only flood once every one to one and half years', at this*
2 *point, [anonymous] who farms opposite, who I've known since we were both in nappies said ' I*
3 *had a hole in the banking on my land and it went through it five times between November and*
4 *March'... If he'd taken time to speak to farmers who are getting their feet wet down there on a*
5 *daily basis, they could have given loads and loads of local knowledge about how it worked and*
6 *when it was wet and when it wasn't and how quickly the water went down... they had*
7 *fundamentally misunderstood how it works'*

8

9 **Discussion**

10 The description of agricultural market liberalization, the decoupling of subsidies from production, and
11 the directing of funds towards a broad package of rural development presented above, draws in
12 particular on experience of these changes within the context of the Yorkshire Dales; a location in which
13 there is a framed landscape of significant heritage value a range of production systems, tenure
14 agreements, and farm sizes. In doing so, it reveals some of the potential for differing resilience to
15 market fluctuation and differing opportunities for taking advantage of rural payment schemes across
16 farming households and situations. The impacts of agricultural policy change have been felt unevenly
17 across sectors and geographies (as shown by the impact of liberalization on small dairy farms) and
18 generic approaches may be ineffective in achieving targeted functions for the landscape (as shown by
19 the impact of agri-environment schemes on farmland birds).

20 In the post-Brexit era, further market liberalization and a shift in subsidies towards green
21 conditionality and broader rural development, are trends most analysts suggest are likely to continue,
22 but the design and process around this rural development funding, and the place of environmental
23 stewardship schemes within it, in particular, remains uncertain. The opportunity that a restructuring
24 of agriculture and rural development support represents for learning from the experiences of the past
25 is significant. We draw out some interrelated lessons from the experience of the Yorkshire Dales here.

26 The first is the importance of tailoring policy around agricultural system priorities, and that these
27 priorities may derive from a variety of geographically dispersed stakeholders. Family farming may be
28 a valued part of landscape heritage; particular species or land covers may perform particular
29 ecosystem functions in different locations; market resilience and economic prosperity may be
30 associated with different metrics and thresholds for different enterprises; different production
31 systems require different degrees of flexibility in access to land and mobilisation of stock; land sparing
32 and land sharing may be differently appropriate in different landscapes; and bureaucracy and
33 paperwork burdens may be less sustainable for some households and businesses than others. Systems
34 approaches to the conceptualisation of agricultural activity (Collinson, 1987, Dixon, 2000, Darnhofer
35 et al., 2012) and the multi-faceted role of agriculture within rural environments (Smit and Brklacich,
36 1989, Bowler et al., 2002, Robinson, 2008) recognise the contextual and multiple interactions that
37 take place between socio-economic and environmental processes, from farm inputs and land
38 management decisions to natural resource extractions and commodity flows. Such approaches have
39 served to highlight system complexity and the varied and dispersed nature of stakes in and priorities
40 for agricultural systems.

1 Defining sustainability priorities for an agricultural system is complicated, as debates around a
2 changing CAP have highlighted. Definitions of who and what agriculture is for have been at the centre
3 of debate, a contest of multiple sustainabilities that have been framed in opposition to each other.
4 Questions about the economic sustainability of direct subsidies are inextricable from the priorities of
5 securing food access and availability and safeguarding the livelihoods of family farmers. The
6 environmental sustainability of food production has been called into question by the reports (and the
7 scientific evidence base that underpins them) and campaigns of organisations, such as the RSPB, who
8 have highlighted the decline of farmland bird populations, with significant policy impact. Subsequent
9 recommendations around the setting aside of ecologically sensitive areas have been particularly
10 contested because of their inevitable association with direct production trade-offs. Recognising and
11 engaging with trade-offs in the multiple priorities that exist for agriculture and rural development is
12 an important challenge, in the UK as it is in complex agri-food systems around the world. This
13 complexity is only exacerbated by the combined impacts of changing climates, population pressures,
14 land and water scarcity, biodiversity loss, and changing diets (Godfray et al., 2010, Poppy et al., 2014).
15 Multiple wins concepts such as sustainable intensification can act to mask the reality that agricultural
16 and rural development strategies, even where they are developed at local scales, can be associated
17 with winners and losers (Whitfield et al., 2015) – a point that has been more broadly in relation to
18 international sustainable development strategies (Raworth, 2012, Stafford-Smith et al., 2016). A
19 sustainable strategy may be one in which trade-offs are managed and unacceptable levels of
20 compromise avoided, rather than win-win solutions implemented.

21 The second lesson relates to the important role to be played by evidence – information on processes
22 of change, systematically collected and analysed that can inform values and debate – in addressing
23 trade-offs. Data on trends in farmland bird populations and interrogation of hypothesised drivers of
24 change through statistical analysis and trial site observations, represent an important means to
25 informing and validating campaigns for agricultural change and evaluating appropriate policy
26 responses. Analysis of the effectiveness of agri-environment schemes in bringing about sustainable
27 land use, as set out in the Foresight report on land use futures (Foresight, 2010), have been a driver
28 of reorienting of schemes towards more competitive schemes and the suite of more localised rural
29 development schemes. Cases of politicised evidence are not uncommon in contested agriculture. In a
30 review of bovine tuberculosis control, David King, Chief Science advisor to UK Government, in 2007,
31 recommended the removal of badgers as part of a strategy to control the disease. Dispute over the
32 academic integrity of the report played out across articles published in *Nature* in November 2007 in
33 which the recommendations of the King report were described as ‘likely to encourage speculation that
34 his report was written to please the farmers’ (*Nature*, 2007). Others controversies in UK agriculture –
35 the use of neonicotinoid pesticides, GM crops, the BSE crisis – have been similarly associated with
36 claims of political bias within contested policy debate. Policy controversies may be particularly
37 problematic in cases where policy narratives are supported and legitimized by evidence that is
38 presented in a ‘disembodied way, without reference to the associated contextual particularities and
39 conditions’ (Stirling and Scoones, 2009: 5).

40 ‘Opening up’ (Stirling, 2008) deliberative processes of rural development planning to multiple
41 perspectives will, in many cases, require research that is carefully designed to elicit the voices of less-
42 often-heard stakeholders, of which small family farmers have been a prime example. Drawing on local
43 knowledge in defining and implementing agricultural development can be complicated (Pretty, 2011),
44 but highly valuable. Farming systems research, for this reason, has become synonymous with

1 participatory research (Chambers, 1994, Sands, 1986, Scoones and Thompson, 1994). In the case of
2 the wetlands project mentioned above, through the consultation process, and the input of local
3 farmers and land managers, the plans for creating the wetland bird habitat were fundamentally
4 changed, and a more heterogeneous and geographically sensitive strategy of converting smaller
5 patches of less productive land into habitats was co-developed.

6 Whilst recognising the challenges that the UK exit from the EU and the common agricultural market
7 represents, we acknowledge too the opportunity for agricultural policy to be further oriented around
8 achieving multifaceted and locally appropriate sustainability objectives – the potential to pursue
9 market strategies that will help small family farms to become more resilient to market fluctuations in
10 those locations where they represent an integral part of the landscape heritage, increasing land
11 security for tenant farmers, investing in targeted rural services, designing agri-environment schemes
12 that reflect localised ecosystem properties and functions, and reducing administrative burdens – in a
13 post-Brexit era. We recognise too that achieving sustainable agricultural and rural development
14 futures may involve engagement with trade-offs, seeking out the perspectives and priorities of those
15 less often heard voices and those that might lose out as a result of policy change, and implemented
16 safeguards against unacceptable levels of compromise. In this respect, a trend towards
17 decentralization and bottom-up approaches to developing and delivering rural and agricultural
18 development in the UK should be a central principle of future policy reform, and the evidence to
19 underpin decentralised change should be interdisciplinary, drawing on multiple perspectives and local
20 knowledges, the value of which, the research presented here as attempted to demonstrate.

21

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