



Advising on a net-zero economy that is fair for all

Just Transition Commission
Agriculture and Land Use Consolidated Papers

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Advising on a net-zero economy that is fair for all

Scotland's Just Transition Commission Agriculture and Land Use

26 November, 10:00 – 16:00

Ormiston Institute , Melrose (google maps [link](#))

AGENDA

No.	Time	Item	Paper
1.	10:00	Welcome & Prep for first session <ul style="list-style-type: none">• Overview of papers (provided as background for information gathering sessions)• Preparation for first information gathering session	5/1 5/2
2.	10:30	Information gathering session 1: Agriculture <ul style="list-style-type: none">• Jonathan Hall, Director of Policy, National Farmers Union for Scotland• Jane Slater, Head of Environment Policy, Agricultural Industries Confederation• Steven Thomson, Senior Agricultural Economist, SRUC	5/2
	12:00	Lunch	
4.	12:30	Prep for second session	5/1 5/3
5.	13:00	Information gathering session 2: Land Use <ul style="list-style-type: none">• Vicki Swales, Head of Land Use Policy, RSPB Scotland• Hamish Trench, Chief Executive, Scottish Land Commission• Stephen Young, Head of Policy, Scottish Land and Estates• Eleanor Harris, Policy Researcher, Confor	5/3
6.	14:30	Review of information gathering sessions and stock-take	5/4 5/5
7.	16:00	End	

Papers

5/1 Agriculture and Land Use overview

5/2 Background information session 1

5/3 Background information session 2

5/4 NHS Health Scotland proposal

5/5 Work Plan

Paper 5/1 – Agriculture and Land Use background information

For information

1. Purpose

1.1 This paper provides Commissioners with background information on agriculture and land use in Scotland. Scottish Government officials have provided the information in this paper, at the request of the secretariat.

2. Background

1.2 The paper summarises a range of evidence that is drawn from Scottish Government analysis, published statistics and research projects.

1.3 The first four sections present evidence around key themes identified by the Scottish Government's agriculture champions¹:

1. Financial sustainability
2. Public value
3. Agri-food supply chain
4. Education and new entrants

1.4 Additional Policy Briefings cover the following topics:

5. Land use in Scotland
6. Agriculture and Climate Change
7. Rural Economy
8. Bioenergy
9. Forestry

¹ <https://news.gov.scot/news/agriculture-champions-announced>

1. Short Knowledge Account – Financial sustainability

Introduction

1.1 As with any sector of the economy, ensuring financial sustainability is essential if the sector is to thrive going forward. Although income from farming accounts for less than 1% of Scotland's GDP², it helps support the broader food and drink supply chain which accounts for around 9.5% of the Scottish onshore economy.³

1.2 8% of Scotland's agricultural land is suitable for arable farming, with around half deemed of severely limited agricultural use (rough grazing).⁴ Therefore agricultural output in Scotland is heavily dependent on beef and dairy, accounting for around 50% of output.⁵

1.3 Despite around 10% of Scottish agricultural land being used to grow cereals, fruit and vegetable, they generate approximately a third of the total value of agricultural output. Barley is the main crop grown in Scotland, accounting for around 50% of the area of land used to grow crops.

1.4 This short knowledge account examines the financial performance of the Scottish agriculture sector, covering profitability, productivity and competitiveness, innovation and the diversification of Scottish farming.

Recent trends

1.5 Since the turn of the century there has been a steady upward trend in the total net income from farming. Total income from farming⁶ was provisionally estimated to be £729m in 2017, up 53% since 2003,⁷ 70% of this income is farm support payments.

1.6 There is significant volatility in farm income in Scotland, partly due to exchange rate movements which means that farmers have had to manage significant swings in the income earned each year. For example, in between 2012 and 2017, the annual change in total income from farming has been within the range of +32% to -28%.⁸

1.7 While the sizeable amount of farm support received by the Scottish farming sector has helped to insulate the sector from adverse weather and poor trading conditions, the annual changes in the amount of farm support has also contributed to the volatility in farm income. For

² Scotland's GDP, Q1 2019 <https://www2.gov.scot/Resource/0054/00547635.pdf>

³ Scottish Annual Business Survey and Quarterly National Accounts (2015)

⁴ Land Capability for Agriculture in Scotland, http://www.hutton.ac.uk/sites/default/files/files/soils/lca_leaflet_hutton.pdf

⁵ <https://www.gov.scot/publications/total-income-farming-estimates-scotland-2016-18/pages/1/>

⁶ Income & subsidies less expenditure

⁷ Economic Report on Scottish Agriculture, 2017 <http://www.gov.scot/Topics/Statistics/Browse/Agriculture-Fisheries/PubEconomicReport/2017docs>

⁸ <https://www.gov.scot/publications/total-income-farming-estimates-scotland-2016-18/>

example, the depreciation in Sterling following the financial crisis in 2008 contributed to a 10% increase in the farm support payments Scottish farmers received in 2009.⁹

1.8 Research has found that two-thirds of Scottish farms are viable with farm support in the short and long-term (where farm income exceeds farm costs). This has increased since 2001 from around half of Scottish farms.¹⁰ However, between 12% and 20% of Scottish farms were unviable between 2001 and 2010 (i.e. suffered recurring annual losses) despite farms support. The unique nature of agriculture (family home is usually on the farm) and the substantial net worth of many farms (£1.3 million on average), may explain why such farms remain in business despite on-going losses.

1.9 The average farm business income in 2017-18 was estimated at £35,400, although without farm support the average farm is estimated to make a loss of £7,400. Indeed farm businesses made an average loss from agricultural activities of £14,600 and around 40% of farm businesses do not generate enough to pay the farmer the minimum agricultural wage.¹¹

1.10 The average farm business income masks significant differences across parts of the Scottish agriculture sector. Sheep farms and beef farms in less favoured areas have the lowest income and have been historically low compared to other farm types. For example, sheep farms in less favoured areas had an average income of £18,200 in 2017-18. Dairy farms had the highest average income by farm type in 2017-18, with an average income of £73,100.

1.11 There are also significant differences in farm income within sectors. For example, in dairy farming, low performing farms are losing on average £31,800 while the high performers have an average income around £181,800.¹²

1.12 There is significant amount of cross-subsidisation from off-farm income (e.g. second jobs) which is equivalent to around 36% of average farm business income.¹³

1.13 The productivity growth of the Scottish agriculture sector has been generally positive and ranks well against comparator countries over the period 2000 to 2015, with productivity growth increasing at a higher rate since 2010. There is significant divergence of performance both across farm types and also within farm types, with lowland grazing and dairy farms performing well and

⁹ Farmers can choose to receive CAP payments in euros or sterling.

¹⁰ Barnes, A.P., Hansson, H., Manevska-Tasevska, G., Shrestha, S. and Thomson, S.G. (2015) The influence of diversification on longterm viability of the agricultural sector
<http://openaccess.sruc.ac.uk/bitstream/handle/11262/10845/10845.pdf?sequence=2&isAllowed=y>

¹¹ Scottish Farm Business Statistics, 2017-18
<https://www.gov.scot/publications/scottish-farm-business-income-estimates-2017-18/>

¹² Scottish Farm Business Income, 2017-18
<https://www.gov.scot/publications/scottish-farm-business-income-estimates-2017-18/>

¹³ Scottish Farm Business Income, 2017-18
<https://www.gov.scot/publications/scottish-farm-business-income-estimates-2017-18/>

the greatest variances in productivity performance were for livestock farms in less favoured areas.¹⁴

1.14 There is anecdotal evidence that a lot of Scottish farmers do not closely monitor their finances or engage in benchmarking their performance. However, evidence does exist for English farmers where 1 in 3 farms regularly produce budgets, gross margins and cash flows, or carry out in depth analysis of their profits and losses. Within the top 25% of performing farms in England, 26% engage in farm management practices such as calculating their balance sheet and benchmarking their performance.¹⁵ Agricultural output in Scotland is heavily dependent on beef and dairy, together accounting for around 35% of output in 2017. The beef sector is the most dependent on subsidy, with evidence that around 38% of producers have positive margins.¹⁶

1.15 The average net worth of farm businesses in Scotland was £1.3 million in 2017-18, with owner occupied farm businesses worth £1.54 million and tenant farm businesses worth around £373,000. The increased capitalisation of Scottish farms and the substantial rise in land prices have contributed to the increase in net worth.

Past drivers of change

1.16 Changes in input prices and commodity prices were the top two reasons for past changes in farm management practices in Scotland, with 70% of farmers reporting that CAP reform has had no impact.¹⁷ Commodity price volatility has increased since 2000, creating greater uncertainty for farmers over the income they receive for their produce.

1.17 The CAP has been a main driver for what Scottish farmers have historically produced. There is significant research which highlights that CAP has shielded the Scottish agriculture sector from market forces which in turn has meant that the sector has not needed to innovate and become more productive in order to compete with other countries.

1.18 The substantial rise in seasonal lets, which increased particularly in the South West, Central Highlands and Wester Ross, was mainly for rough grazing land. This was almost certainly an artefact of the 2005-13 CAP as farmers sought land to active purchases of CAP entitlements or active farmers seeking a safety net for CAP inspections.

1.19 Relatively poor educational attainment, with 28% of Scotland's farmers have agricultural training¹⁸, is likely to have had an influence on the productivity performance of Scottish farmers.

¹⁴ Boosting Productivity Growth in Scottish Agriculture, SRUC – forthcoming publication

¹⁵ Future Farming and the Environment: evidence compendium, Defra, 2018

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/683972/future-farming-environment-evidence.pdf

¹⁶ https://www.gmscotland.co.uk/sites/default/files/gms_cattlesheep_2016_1.pdf

¹⁷ SRUC & JHI – farmer intentions survey

¹⁸ Scottish Survey of Farm Structure and Methods, 2016

Further, the high average age of Scottish farmers might also be a factor, with research in the US and the Netherlands showing that younger farmers tend to drive innovative practices.

1.20 Land market distortions, which have been influenced by the tax and farm support regime regime, have contributed to the difficulty in accessing affordable farmland. This not only affects new entrants, but successful farm businesses looking to expand.

1.21 There are regulatory and legal impediments to structural adjustment within the farming sector. For example, succession laws and inheritance tax arrangements.

Future drivers of change

1.22 The OECD identify that the main future drivers of growth in the agriculture sector are technical progress, economies of scale and best practice diffusion. However there is limited evidence that the efficiency of livestock farms is influenced by their size.

1.23 The UK Government's decision to leave the EU will affect the Scottish agriculture sector through three main routes: the subsidies farmers receive as the UK leaves CAP; future trade agreements with the EU and other countries; and the impact of EU seasonal migrant labour. Furthermore, following the referendum result the value of Sterling depreciated around 15% against the Euro, affecting the value of the goods and services the Scottish farming sector trades with the Euro Area.

1.24 Changes in consumer preferences will also influence what Scottish farmers produce.

1.25 Technological advances and innovations could have a major impact on Scottish farming, such as the recent attention on the potential for vertical farming.

2. Short Knowledge Account – Public value from agriculture

Introduction

2.1 Scottish agriculture provides a range of public benefits such as managing the natural environment, contribution to climate change, preserving landscapes and contributing towards food security. These public benefits are not captured within the price the farmer receives for their produce and therefore are often underestimated.

2.2 Furthermore, agriculture is an integrated part of the rural economy providing direct employment and buying goods and services from other rural businesses (e.g. veterinary services).

2.3 However, farming can have a harmful impact on the environment, such as air and water quality, biodiversity and landscape.

2.4 This short knowledge account summaries the existing evidence on these public benefits from the Scottish agriculture sector and considers the overall importance of the sector to rural communities and the rural economy.

Recent trends

2.5 Scotland's rural economy is often equated with 'Agriculture, Fishing and Forestry', this sector accounts for about 1% of output for Scottish economy. Nearly 70% of the output from the sector is generated in Mainly Rural and Islands and Remote areas. However, in some local authority areas, the importance of the agriculture, fishing and forestry sector reaches as high as 8% of output, such as in Angus and Orkney.¹⁹

2.6 The agriculture sector is clearly interconnected with other sectors of the economy, particularly accommodation and food services, which together account for around 8% of output in Mainly Rural parts of Scotland.²⁰

2.7 A range of indicators of farmland biodiversity are declining. For example, although the abundance of terrestrial breeding birds experienced a long-term increase between 1994 to 2008, it has since fallen back and is now 17% lower than the 2008 peak and 3% lower than the 2006 baseline.²¹ There has, however, been a long-term increase among the species which contribute to the farmland bird indicator.²²

¹⁹ Understanding the Scottish Rural Economy, 2018, <http://www.gov.scot/Publications/2018/02/3310/3>

²⁰ Understanding the Scottish Rural Economy, 2018 <http://www.gov.scot/Publications/2018/02/3310/3>

²¹ Scotland Performs, <http://www.gov.scot/About/Performance/scotPerforms/indicator/biodiversity>

²² Index of Abundance in Terrestrial Breeding Birds, SNH, <https://www.nature.scot/sites/default/files/2018-02/Official%20Statistics%20-%20Terrestrial%20Breeding%20Birds%20-%20Index%20of%20abundance%201994-2016.pdf>

2.8 Water quality is adversely affected by farming through run-off of fertilisers, pesticides and slurry, and through the erosion of soil which is washed off farmland. Diffuse pollution from agriculture is recognised as a key pressure on water quality, with 252 rivers and lochs in Scotland affected by diffuse pollution pressures.

2.9 Soil testing and nutrient management can help maximise productivity and minimise the need for expensive inputs, while reducing GHG emissions. In 2016 17% of holdings with grassland had carried out a nutrient management plan on their grassland, and 42% of holdings had carried out a nutrient management plan on their other land (up from 36% in 2013).²³

2.10 Furthermore, 30% of holdings with grassland had carried out soil testing, while 64% of holdings had carried out pH testing on their other land. While larger farms are more likely to employ nitrogen management measures, they still comprise the majority of agricultural emissions.

2.11 High Nature Value (HNV) farming and forestry indicator demonstrates how much of our farmland and forestry is rich in biodiversity and monitors how the character of this resource is changing over time. The features of this type of farming and forestry, such as semi-natural grassland and native woodland, have landscape and cultural values as well as supporting traditional breeds of farm animals and crop varieties. The total area under HNV farming was estimated at 2,432,000 hectares (44% of the utilised agricultural area), with the Highlands made up the largest area for HNV farming.²⁴

2.12 Around £4 billion worth of environmental benefits from farmland, forestry, woodland and trees are generated each year in the UK. This includes the value of educational visits to farmland in the UK.²⁵ A similar figure for Scotland has not been estimated, but this could be in the region of around £800m per annum based on the share of Scottish farming and forestry within the UK.

2.13 Past research estimated that the Scottish agriculture sector benefit to the environment from Scottish farming outweighed the cost, with a net benefit of between £200m to £260m per annum (in 2009 prices) between 2000 and 2007.²⁶

2.14 Estimates for the Environmental Land Management scheme in England indicates that it generates at least £3.20 of public goods returned for every £1 invested, with support for forestry management estimated to generate £5.60 for every £1 invested.

²³ Scottish Survey of farm structure and methods, 2016 <http://www.gov.scot/Publications/2016/11/4283/0>

²⁴ High Nature Value Farming and Forestry, 2015
<http://www.gov.scot/Topics/Environment/Countryside/Landusestrategy/Monitoring/Indicator4>

²⁵ The Future of Food, Farming and the environment, Defra, 2018 <https://www.gov.uk/government/consultations/the-future-for-food-farming-and-the-environment>

²⁶ A Review of Literature on the Value of Public Goods from Agriculture and the Production Impacts of the Single Farm Payment Scheme, SAC, 2009
<http://www.oecd.org/agriculture/44733980.pdf>

Past drivers

2.15 The role of agriculture and forestry in shaping landscapes and terrestrial ecosystems is important as they affect a large proportion of Scotland's land area (c.70% and c.18% respectively). In particular, agriculture has had a major influence on Scotland's ecosystems over the past 70 years which, in part, has been influenced by changes in global food consumption, the post-World War II drive for increased food production and innovations in farm technology.

2.16 Between 1992 and 2014 the area of Scotland under higher-level agri-environment schemes (Environment Sensitive Areas, Countryside Premium, Rural Stewardship, Rural Priorities) has increased from 0.12 to 1.21 million hectares, equivalent to around a fifth of agricultural land in Scotland.

2.17 Landscape simplification is considered to be a key overarching driver of biodiversity loss, characterised by increase homogeneity of habitats at a variety of scales: between regions and farms, between fields and within fields.

2.18 Increased automation within farming has contributed to a decline in employment within the sector, with the total number of people employed in the sector falling by around 30% since 1982.²⁷

Future drivers

2.19 Future support for the agriculture sector following the UK Government's decision to leave the EU, including the payment to farmers for delivering public goods.

2.20 Future trade arrangements the UK has post-Brexit will impact different parts of the Scottish agriculture sector and will potentially have knock-on implications for the public goods generated from the sector.

2.21 The adoption of technologies, such as those which assist precision farming, have the potential to not only increase the profitability of Scottish farming, but also mitigate some of the negative environmental impacts (e.g. from over-use of fertilisers).

2.22 Greater demand from consumers of evidence of the environmental impact of the food and drink they consume. This could drive new methods for accrediting the environmental impact of agricultural produce (in addition to carbon accounting).

²⁷ Abstract of Scottish Agricultural Statistics, <http://www.gov.scot/Topics/Statistics/Browse/Agriculture-Fisheries/PubAbstract/AbstractPub?refres h=0.4200934689341132>

3. Short Knowledge Account – Agri-food supply chain

Introduction

3.1 Scottish agriculture plays a key role in the wider agri-food supply chain by providing the primary produce which is then processed, packaged, distributed and sold for us to consume in our homes or in restaurants.

3.2 The strength and resilience of the supply chain will have a significant impact on Scottish farming, in terms of providing a clear customer for the output produced and providing confidence to enable the agriculture sector to undertake investment. Co-operation, both horizontally (between farmers) and vertically (between farmers, processors and retailers), increases the resilience of agri-food supply chains.

3.3 This short knowledge account summarises the current evidence on the agri-food supply chain in Scotland.

Recent Trends

3.4 The food and drink supply chain, stretching from farmer to restaurateur, accounts for nearly 10% of Scottish output and 1 in 7 jobs in Scotland (around 215,000).

3.5 Around 40% of Scottish agricultural output (£1.1 billion) is processed in Scotland, with 31% exported (3/4 of which are to the Rest of the UK) and 28% sold directly to Scottish households.²⁸

3.6 The red meat sector plays a key role, accounting for around 45% of the value of output from the Scottish agriculture sector and its wider supply chain is estimated to generate £2,429m in output and £733m in GVA.²⁹

3.7 Throughput from primary (abattoirs) and secondary (cutting plants) meat processing in Scotland is highly concentrated, with a few large abattoirs accounting for the bulk of animals (72% for cattle, 88% for sheep and 93% for pigs).³⁰

3.8 A significant proportion of finished Scottish livestock are slaughtered outwith Scotland (around 8% of cattle and around 40% for pigs and sheep). In addition, a smaller number of animals are also finished outwith Scotland. Nearly all the cull ewes from the Scottish flock are exported live to abattoirs outside Scotland despite existing plants having the capacity to handle significantly more sheep.³¹

²⁸ Scottish Input Output Tables, 2014

<http://www.gov.scot/Topics/Statistics/Browse/Economy/Input-Output>

²⁹ <http://www.qmscotland.co.uk/sites/default/files/economic-contribution-of-scotlands-red-meat-supply-chain.pdf>

³⁰ <http://www.qmscotland.co.uk/sites/default/files/economic-contribution-of-scotlands-red-meat-supply-chain.pdf>

³¹ <https://www2.gov.scot/Resource/0050/00504964.pdf>

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3.9 The beef and lamb supply chains are constrained by their fragmented structure which make co-ordination between a large number of firms challenging. There is scope for greater integration³² and co-operation between producer, with the UK having the lowest share of agricultural produce from farmer co-operatives compared to the biggest EU farming countries.

3.10 There is a clear need to improve communication and understanding of the various issues within the lamb supply chain. Evidence that a lot of the individual businesses were using lean principles to drive efficiencies at their own level but they were missing the opportunities to link up with others in the chain to drive overall chain improvement.³³

3.11 Furthermore, there is scope for better communication between all stages of the production chain through meetings that encourage a two way flow of information and understanding of each other's issues. Better communication of lamb results fed back to producers in a way that Food Standards Scotland or farmers can easily analyse and benchmark their data. ³⁴

Past Drivers

3.12 The food supply chain is subject to economic and environmental events, such as the Russian import ban on certain food imports from the EU and adverse weather affecting harvests.

3.13 The increased presence of supermarkets over the past few decades has meant a consolidation of the number of buyers of agricultural produce.

3.14 Behaviour of supermarkets and their influence on the entire supply chain, with evidence that supermarkets are able to 'transfer excessive risk and unexpected costs' to food suppliers through the exercise of buying power in the supply chain – in particular through retrospective adjustments to the terms of supply.³⁵ The practices of the big supermarkets encourage and enforce imitation by other actors up and down the chain but supermarkets are the only ones powerful enough to make a financial success of it. ³⁶

3.15 While information on farm gate prices is freely available, there is much less information on prices applied at the downstream stages of the groceries supply chain – in particular in the

³² Modernising Scottish Agriculture, 2014

<http://www.gov.scot/Resource/0044/00440027.PDF>

³³ Adding Value to the Scottish Sheep Sector: Farm Stock Scotland Pilot Study, 2013,

http://www.qmscotland.co.uk/sites/default/files/Lamb%20Supply%20Chain%20Report%20corrected%20final%20version%201%20Nov%202013_0.pdf

³⁴ Adding Value to the Scottish Sheep Sector: Farm Stock Scotland Pilot Study, 2013,

http://www.qmscotland.co.uk/sites/default/files/Lamb%20Supply%20Chain%20Report%20corrected%20final%20version%201%20Nov%202013_0.pdf

³⁵ "The supply of groceries in the UK market investigation", Competition Commission, 2008,

http://web.archive.nationalarchives.gov.uk/20140402235418/http://www.competition-commission.org.uk/assets/competitioncommission/docs/pdf/non-inquiry/rep_pub/reports/2008/fulltext/538.pdf

³⁶ <http://hummedia.manchester.ac.uk/institutes/cresc/sites/default/files/Bringing%20home%20the%20bacon.pdf>

manufacturing, processing and food service sectors. This contributes to the weak position of farmers and other small suppliers in the chain and hampers their ability to take well-informed production and marketing decisions.³⁷

3.16 Both domestically and internationally, red meat production has been characterised by independent firms interacting through short-term commercial transactions. This led to the prevalence of large numbers of small firms, the central role of auction marts in selling live animals and the dominance of spot markets for commodity meat. This structure maintains individual firms' flexibility and the opportunity to seek the best prices on any given day, but also incurs exposure to supply and demand uncertainty which can hamper business planning and divert resources to risk management rather than productive uses.³⁸

3.17 Recognition of the effects of volatility and risk on overall performance have led to greater interest in closer interactions between different parts of the supply chain to identify where costs can be reduced, risks managed better and value added by better meeting market needs.

3.18 The seasonal nature of lamb production creates peaks and troughs throughout the year which leads to an imbalance between demand and supply. This results in stock moving outside the optimum weights, with obvious consequence for producer prices.³⁹

3.19 The reliance on spot markets rather than forward contracts or vertical integration means that processors are not guaranteed their desired volume of throughput on any given day and often have to devote time and effort to sourcing additional supplies and/or holding larger than desired inventory stocks. Equally, farmers' overall financial performance can be highly dependent on prices achieved on only a few discrete occasions throughout the year, again hindering budget planning and increasing exposure to risk.

Future drivers of change

3.20 Changes in the grocery sector, such as increased competition from discounters, the growth of internet shopping and new entrants such as Amazon.

3.21 Greater need for the traceability of products following past scandals (e.g. horse meat).

3.22 New technologies including "smart" devices which have the potential to influence the way people shop and their demand for certain products.

³⁷ Groceries Code Adjudicator Review: Part 2, Government response to the Call for Evidence on the case for extending the Groceries Code Adjudicator's remit in the UK groceries supply chain

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/681882/groceries-adjudicator-consult-summary-of-responses-180216.pdf

³⁸ <http://www.qmscotland.co.uk/sites/default/files/economic-contribution-of-scotlands-red-meat-supply-chain.pdf>

³⁹ <http://www.gov.scot/Resource/0050/00504964.pdf>

3.23 Future trade arrangements post-Brexit have the potential to impact the Scottish agri-food supply chain through a number of different channels. For example, it could affect the amount of food we export (if our products face tariffs) and therefore may increase the proportion of agricultural produce which is processed in the UK. The complexity of food supply chains is such that animals, food and food ingredients frequently pass back and forth between different countries on numerous occasions on the journey from primary production to retail sale.⁴⁰

3.24 Previous work identified the following key vulnerabilities facing the Scottish food supply chain: a pandemic; land contamination; coastal flooding; food scare; extreme temperature (including Heavy Snow); demonstrations; and industrial action.⁴¹

⁴⁰ <https://www.parliament.uk/documents/commons-library/Brexit-UK-agriculture-policy-CBP-8218.pdf>

⁴¹ Mapping and Analysis of the Resilience of the Food Supply Chain in Scotland, 2009, <http://www.gov.scot/Publications/2009/07/15103034/0>

4. Short Knowledge Account – Education and new entrants

Introduction

4.1 The skills a farmer has will influence their ability to adopt best practices, introduce innovations and ultimately improve the performance of their farm business. This includes the skills of those entering farming and the continued professional development (CPD) of those already within the sector.

4.2 Having a steady inflow of skilled people is crucial to the sustainability of any sector within the economy. Agriculture is no different although new entrants face particular challenges given the high capital requirements and the limited availability of farmland.

4.3 This short knowledge account examines the level of skills and education of the Scottish agriculture sector and the particular challenges facing new entrants.

Recent Trends

4.4 In 2016 28% of farmers had formal agricultural training, with 18% having completed a full agricultural training course of two years or more, and 10% having completed a basic course of less than two years. This remained broadly unchanged from 2013. The remaining 72% of farmers have only practical agricultural experience.⁴²

4.5 Although this is consistent with the picture for the UK as a whole, it is in contrast to many other EU countries. For example, around 70% of farmers in Germany and the Netherlands, and around 60% in France have undertaken some formal training in 2013.⁴³

4.6 Overall, a higher percentage of people working in agriculture, forestry and fishing sector have no formal qualifications compared with those in other sectors of the UK economy.⁴⁴

4.7 In terms of CPD, just over 1% of those managing farms in Scotland in 2016 said that they had undergone some vocational training in the last 12 months.⁴⁵ At the UK level, around 53% of sector employers provided some form of on- or off-the-job training in 2011, compared with 59 per cent across the whole economy. This represents the third lowest sector, out of 15, in the UK economy.⁴⁶

⁴² Scottish Survey of Farm Structure and Methods, 2016 <http://www.gov.scot/Publications/2016/11/4283/0>

⁴³ AHDB Horizon, Driving productivity growth together
https://ahdb.org.uk/documents/Horizon_Driving%20Productivity_Jan2018.pdf

⁴⁴ Agriculture, Forestry and Fishing: Sector Skills Assessment, UK Commission for Skills & Employment, 2012
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/312548/briefing-paper-ssa12-agriculture.pdf

⁴⁵ Scottish Survey of Farm Structure and Methods, 2016 <http://www.gov.scot/Publications/2016/11/4283/0>

⁴⁶ Agriculture, Forestry and Fishing: Sector Skills Assessment, UK Commission for Skills & Employment, 2012

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4.8 International studies have identified that high educational attainment tends to be associated with highly performing farms.⁴⁷ Research in England found that although education was not a significant determinant of the performance of farms, the top performing groups for cereals, general cropping and less favoured areas grazing livestock farms contained a greater proportion of farmers with college or university level qualifications.⁴⁸ There is some evidence that high educational attainment is associated with farmers more willing to take-up agri-environment options and to diversify into non-farming activities.⁴⁹

4.9 The average age of a Scottish farmer is around 60 years old, with around 9% of Scottish farmers under the age of 41 compared to 34% who are over 64. Although this is similar to the average age of rural business owners, given the physically demanding nature of farming, significant attention has been given to encouraging new entrants into farming.

4.10 A significant barrier for new entrants into Scottish agriculture is access to land.⁵⁰ The price of agricultural land increased significantly over the past two decades, and there has also been a reduction in the availability of tenanted farmland which has traditionally been the main route into the sector. Over the last 30 years the area of agricultural land rented under a tenancy of 1 year or more has declined from around 40% to 22%.⁵¹ At the same time, there has been a sharp rise in seasonal lets, which have increased by 50% since 2005 and now account for 1 in 7 hectares rented in Scotland. The constrained availability of land will also make it more difficult for successful farms to expand, and could therefore constrain the growth of their business.

4.11 A survey in 2014 of landlords highlighted the issue of farmland available for rent, with around 40% of respondents indicating that for land currently rented out under a Secure 1991 tenancy which was due to become vacant in the near future, around 40% said they would take the land in-hand to expand. A similar proportion also said that they would use it to facilitate new entrants.⁵²

4.12 A further driver to increase the number of new entrants into farming is that around three quarters of tenant farmers have an eligible successor in place, of which two-thirds were willing to

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/312548/briefing-paper-ssa12-agriculture.pdf

⁴⁷ Kimura, S. and C. Le Thi (2013), "Cross Country Analysis of Farm Economic Performance", OECD Food, Agriculture and Fisheries Papers, No. 60, OECD Publishing, Paris. <http://dx.doi.org/10.1787/5k46ds9lixkj-en>

⁴⁸ Farm Level Performance: Identifying Common Factors Determining Levels of Performance http://randd.defra.gov.uk/Document.aspx?Document=10520_Farm_Level_Performance_2012.pdf

⁴⁹ Agri-environmental diversification: Linking environmental, forestry and renewable energy engagement on Scottish farms, Lee-Ann Sutherland et al (2016)

<https://www.sciencedirect.com/science/article/pii/S0743016716301437>

⁵⁰ Barriers to new entrants to Scottish farming – a new perspective on an old problem, 2008

http://www.tenantfarmingforum.org.uk/eblock/services/resources.ashx/000/244/597/58_final_report_from_contractors.pdf

⁵¹ Scottish Agricultural Tenure Review, <http://www.gov.scot/Resource/0045/00454210.pdf>

⁵² Renting out agricultural land in Scotland, 2014 <http://www.gov.scot/Publications/2014/06/1339/downloads>

take on all of their tenancy or tenancies.⁵³ In addition, 66% of agricultural landlords said they had a successor (nearly all of whom was a family member) with 17% reporting they had no successor.⁵⁴

Past drivers of change

4.13 To some degree, the under-investment in skills and training reflects low levels of demand by producers that could be unlocked by generational change.⁵⁵

4.14 The relatively low levels of training can be explained by the high capital intensity and simple product market strategy, as well as high levels of risk and uncertainty, high variability of income, regulatory and legislative requirements, high travel costs due to geographic remoteness and lack of ICT infrastructure.⁵⁶

4.15 Taxation rules may be a barrier to new entrants. Under existing inheritance tax rules, no tax is charged on lifetime gifts to individuals but should the donor die within 7 years of making the gift then the transfer is taxed on the value of the farm at transfer. However, if the transfer is made after death, then it may qualify for 100% relief and therefore can dissuade farmers from passing on assets to the next generation.

4.16 Very often economies of scale mean existing farming businesses, with security and assets, attain additional land to spread fixed costs and increase returns.

4.17 The splitting of farms in commuting distance of major urban centres has also become common practice as sellers try and maximise their overall sale value. This has meant that many farms have become fragmented to capture the residential value of farmhouses and cottages and the development value of traditional steadings from lifestyle purchasers and developers.

4.18 Fiscal measures have a major bearing on the Scottish land market. Being classed as an active farmer gives a range of tax benefits, both in terms of allowable costs for income tax and relief on inheritance and capital gains taxes. This can make letting a poor option for many landowners.

⁵³ Survey of Agricultural Tenant Farmers, 2014 <http://www.gov.scot/Publications/2014/06/5177/1>

⁵⁴ Renting out agricultural land in Scotland, 2014 <http://www.gov.scot/Publications/2014/06/1339/downloads>

⁵⁵ AHDB Horizon, Driving productivity growth together
https://ahdb.org.uk/documents/Horizon_Driving%20Productivity_Jan2018.pdf

⁵⁶ Agriculture, Forestry and Fishing: Sector Skills Assessment, UK Commission for Skills & Employment, 2012
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/312548/briefing-paper-ssa12-agriculture.pdf

4.19 The combination of low incomes, high prices for land, declining supply of traditional tenancies, taxation factors and a strong demand for amenity land, has made traditional entry to the industry difficult.⁵⁷

4.20 The affordability of farmland is part of the challenge facing new entrants. Although there are no official statistics, the Valuation Office Agency reported that Scottish agricultural land increased in value by around 150% between 2001 and 2009 and Knight Frank report an increase of 223% between 2004 and 2014. The CAP has acted to distort the market for farmland, pushing up rents, capital values and provides what appear to be a pension for those occupying the land.

4.21 A pilot programme, “Exchange Programmes for Young Farmers”, financed by the EU in 2015 to provide a comprehensive assessment of the specific needs of young farmers across the EU showed that young farmers in the UK perceive the availability of land, credit, subsidies and useful training as more problematic than other young farmers in the EU.⁵⁸

Future drivers of change

4.22 The aging workforce risks tacit skills being lost and raises the importance of career progression and CPD for the existing workforce. A growing global population and concerns over food security are increasingly important policy issues which place additional importance on the sector.⁵⁹

4.23 The sector is likely to be more focused on science and technology due to the pressures of climate change, food security and demographics as precision agriculture and sustainable intensification are implemented.⁶⁰

4.24 Knowledge and appreciation of the sciences and application of ICT are key future skills needed to deliver sustainable intensification and precision farming.

4.25 Various studies have predicted that following the UK Government’s planned departure from the EU, the price of agricultural land will decline as a result of the expectation of lower levels of farm support for the agriculture sector.⁶¹

⁵⁷ Barriers to new entrants to Scottish farming – a new perspective on an old problem, 2008

http://www.tenantfarmingforum.org.uk/eblock/services/resources.ashx/000/244/597/58_final_report_from_contractors.pdf

⁵⁸ Pilot project: Exchange programmes for young farmers

https://ec.europa.eu/agriculture/external-studies/young-farmers_en

⁵⁹ Agriculture, Forestry and Fishing: Sector Skills Assessment, UK Commission for Skills & Employment, 2012

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/312548/briefing-paper-ssa12-agriculture.pdf

⁶⁰ Agriculture, Forestry and Fishing: Sector Skills Assessment, UK Commission for Skills & Employment, 2012

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/312548/briefing-paper-ssa12-agriculture.pdf

⁶¹ <http://www.hutton.ac.uk/blogs/how-will-brexite-affect-uk-agricultural-land-values-and-why-does-it-matter>



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4.26 The advent of vertical farming potentially removes or at least challenges the assumption that land is fixed in supply and will alter the relative importance of factors such as land quality and location.⁶²

⁶² <http://www.hutton.ac.uk/blogs/how-will-brex-it-affect-uk-agricultural-land-values-and-why-does-it-matter>

5. Short Knowledge Account – Land use in Scotland

Introduction

5.1 Scotland's land provides a wealth of benefits, such as food, timber, clean water, energy, and a space for recreation. Over centuries, land use has significantly influenced the production of food, wood, energy, recreation, a wide range of amenities, and the character of our landscape.

5.2 The term 'land use' covers all forms of land (and water) management. Farming, forestry, renewable energy, housing developments and recreation are just a few of the major land uses in Scotland. Practically every hectare of Scotland is used in at least one way, although a few remote coastal cliffs and mountain tops are free from such uses.

5.3 The land provides places to live, work and enjoy. Land use is the physical basis of our communities, and it is also a core component of our identity. Scotland's land and its communities depend on each other.⁶³

5.4 Everyone has an opportunity to influence how land is used and managed in Scotland. While land owners and managers make most direct decisions about land use, public influence strongly affects their decisions.⁶⁴ Often the impact of decisions taken about land use or land management will be experienced many miles away in urban areas, for example flood attenuation by tree planting to slow the flow of flood water.⁶⁵

5.5 There has been significant land use change in Scotland over the last 50 years, through both the intensification and the abandonment of management.

Recent Trends

5.6 Agriculture and forestry are the most dominant land uses in Scotland, accounting for around 70% and 19%⁶⁶ of land use in Scotland respectively. However, the extent of their dominance has fluctuated over the past century. For example, agriculture accounts for around the same share of land use today as it did back in 1911, however it rose in the post-WWII era to a high of around 87.5% of total land use in Scotland in 1962.⁶⁷

⁶³ <https://www.gov.scot/Publications/2011/03/17091927/3>

⁶⁴ <https://www.gov.scot/Publications/2011/03/17091927/3>

⁶⁵ <https://www.gov.scot/Resource/0050/00505253.pdf>

⁶⁶ Results from the June 2017 Scottish Agricultural Census, Scottish Government,

<http://www.gov.scot/Publications/2017/10/9554/0>

Forestry statistics 2017, Forestry Commission,

[https://www.forestry.gov.uk/pdf/Ch1_Woodland_FS2017.pdf/\\$FILE/Ch1_Woodland_FS2017.pdf](https://www.forestry.gov.uk/pdf/Ch1_Woodland_FS2017.pdf/$FILE/Ch1_Woodland_FS2017.pdf)

⁶⁷ Historical Agricultural Statistics

<https://www.gov.scot/Topics/Statistics/Browse/Agriculture-Fisheries/Publications/histagstats/CSV>

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5.7 The area of land used for forestry in Scotland has steadily increased from around 4.5% in 1905 to 18.5% in 2018. Despite this rise, it is still some way below the EU average of 43%.

5.8 The total area of derelict land in Scotland has remained around 10,000 hectares since 2011⁶⁸, equivalent to around 0.1% of Scotland's land area.

5.9 Over much of Scotland there are strongly competing interests. In the uplands for instance, neighbouring interests may favour using the land for sheep farming, grouse shooting, forestry, wind farms or leaving areas wild for nature or natural flood management. In some places all of these uses can be accommodated, but in others some may act against others.

5.10 Despite accounting for nearly 90% of land use in Scotland, the agriculture and forestry sectors account for around 1% of output in the Scottish economy.⁶⁹ However, they provide jobs and incomes, often in areas where other commercial opportunities are limited, and they support other industries which further contribute to the Scottish economy (e.g. tourism and food and drink sector).⁷⁰

5.11 Some types of land have particular value in delivering benefits of key strategic importance, helping to ensure our long-term needs are met. For example, in support of food security, we continue to ensure that prime agricultural land retains its capacity for food production.⁷¹

5.12 Although our land area is fixed, that does not mean the level of benefits it delivers is fixed. Many land managers are already delivering multiple economic, environmental and social benefits from their land. However, others are not taking the opportunities to broaden their focus and benefit accordingly.⁷²

5.13 The capacity of land to help manage water resources is increasingly valued as the climate changes and extreme weather events become more frequent. We are increasingly recognising that human interventions have affected flood risk, and that reinstating natural features in the landscape such as river meanders, flood plains, wetlands and forests can help to restore run-off patterns and reduce flooding. Restoring these natural features can also provide a wide range of coincident benefits, including improved biodiversity, greater carbon sequestration, and increased amenity and recreational opportunities.⁷³

5.14 Within the agriculture sector there have been structural changes which have had a knock-on impact on land use. For example, the amount of agricultural land let in Scotland has fallen from around 41% in 1982 to around 22% in 2018. Much of this trend can be attributed to changes in

⁶⁸ Scotland's Vacant and Derelict Land Survey, 2017 <https://www.gov.scot/Publications/2018/06/8465/0>

⁶⁹ Quarterly Scottish GDP <https://www.gov.scot/Topics/Statistics/Browse/Economy/GDP>

⁷⁰ <https://www.gov.scot/Publications/2011/03/17091927/3>

⁷¹ <https://www.gov.scot/Publications/2011/03/17091927/3>

⁷² <https://www.gov.scot/Publications/2011/03/17091927/3>

⁷³ <https://www.gov.scot/Publications/2011/03/17091927/3>

agricultural holdings legislation and reform in the Common Agricultural Policy (CAP). The increased decoupling of CAP support since 1992 (arable aid payments were made on a per hectare basis as was set-aside) played a part in incentivising greater control over farmland in order to benefit from CAP support payments. This incentive is likely to have increased since 2005 given the introduction of the Single Farm Payment which required the farmer to comply with statutory management requirements rather than actively farm the land.⁷⁴

5.15 The ownership and management of land are fundamental to society, and impact on most aspects of rural life, influencing social, economic and environmental development.⁷⁵ It is now estimated that 432 landowners account for 50% of the privately owned land in Scotland. Additionally, it is estimated that 1,125 "estates" controlled about 70% of privately owned land in Scotland.⁷⁶

5.16 Around 200 community groups own and manage forests and woodlands in Scotland.⁷⁷ Between 2003 and 2017, almost 7,000 ha of the National Forest Estate (owned by the Scottish Ministers on behalf of the nation) was transferred to communities, NGOs and social landlords.

5.17 Land use is also closely bound up with other dimensions that sustain communities. For example, the long-term viability of many rural communities is heavily dependent upon the ability of people to find work and a place to live. However, in many rural communities there remains a lack of affordable housing. This often has a knock-on effect on schools and other community facilities, compromising the demand for and provision of services and infrastructure.⁷⁸

Past Drivers

5.18 Rural land use is driven by a range of factors which can be broadly classified as: environmental (including climate change); demographic; economic; technological factors; policy and institutional factors; and cultural and social factors.⁷⁹

5.19 Land tenure is recognised as a significant cause and constraint to decisions on land-use change.⁸⁰

5.20 Global drivers often affect land use through related policy, market and technological developments at international and national level, which either lead to a direct response from land

⁷⁴ <https://www.gov.scot/Publications/2014/06/9792/4>

⁷⁵ <https://www.gov.scot/Publications/2016/07/1094/7>

⁷⁶ <https://www.gov.scot/Publications/2016/07/1094/7>

⁷⁷ Stewart, A. & Edwards (2012) Number of community groups involved in managing woodland. Forest Research

⁷⁸ <https://www.gov.scot/Publications/2011/03/17091927/3>

⁷⁹ <https://www.gov.scot/Publications/2010/01/06100615/5>

⁸⁰ <https://www.gov.scot/Publications/2010/01/06100615/5>

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managers or lead to the introduction of a set of different policy instruments which provoke a response from land managers.⁸¹

5.21 Land use is driven by a wide range of considerations and change tends to happen slowly and for the longer term. The drivers of change include the priorities of those who manage the land, market influences, the incentives and regulations which impact upon particular areas and the capacity of the local area.⁸²

5.22 Many of our land-based businesses are intimately tied into the system of incentives set by the European Common Agricultural Policy (CAP).⁸³ For example, after the UK entered the CAP there was a rapid fall in beef cattle as farms on the East of Scotland substituted beef production with arable production in response to higher support payments for crops offered through CAP.⁸⁴

5.23 Furthermore, the headage payments introduced in the 1980s for sheep and livestock in Less Favoured Areas dramatically drove up the number of sheep (and to a lesser extent cattle) in the hill and upland farming areas. More recently, the late 1990s saw poor returns to beef and sheep and the 2001 Foot and Mouth crisis led to a large reduction of the Scottish sheep flock. In 2005 the introduction of decoupled CAP support payments (with the exception the Scottish Beef Calf Scheme) stimulated further restructuring within the industry and sheep numbers continued to decline quite rapidly to the extent that by 2011 the number of Scottish breeding ewes was at the lowest level in over a century.⁸⁵

5.24 As Scotland's population has grown over past centuries, more wood from forests has been harvested and many forests disappeared, making space for agriculture, people's homes and infrastructure. The chronic lack of trees and timber was recognised as a strategic problem for the UK and the UK Forestry Act of 1919 was introduced to address the issue. Given this strategic need to grow more timber, the forests planted in Scotland during the following 100 years were primarily, but not exclusively, designed to optimise timber production, using species that could thrive in Scotland's relatively favourable growing conditions.

5.25 Favourable tax relief encouraged the private purchase of significant areas of land in Scotland for forestry up until the tax reforms in the late 1980s.

5.26 A number of historical factors have contributed to Scotland having the most concentrated pattern of private landownership in Europe (e.g. feudalism, succession laws, fiscal policies, agricultural support).⁸⁶

⁸¹ <https://www.gov.scot/Publications/2010/01/06100615/5>

⁸² <https://www.gov.scot/Resource/0050/00505253.pdf>

⁸³ <https://www.gov.scot/Resource/0050/00505253.pdf>

⁸⁴ [https://www.sruc.ac.uk/downloads/file/57/response from the hills business as usual or a turning point](https://www.sruc.ac.uk/downloads/file/57/response%20from%20the%20hills%20business%20as%20usual%20or%20a%20turning%20point)

⁸⁵ [https://www.sruc.ac.uk/downloads/file/57/response from the hills business as usual or a turning point](https://www.sruc.ac.uk/downloads/file/57/response%20from%20the%20hills%20business%20as%20usual%20or%20a%20turning%20point)

⁸⁶ <https://www.gov.scot/Publications/2016/07/1094/7>

5.27 The ownership and structure of Scotland's estates shows a degree of continuity across the centuries with over a quarter of Scottish landowning families able to trace their landowning ancestry back to at least the 16th century.⁸⁷ However, deteriorating economic conditions led to increased number of land sales and fragmentation of many large estates, particularly during the depression of the 1920s.⁸⁸

Future Drivers

5.28 The broad categories identified as past drivers for change are still relevant going forward, namely: environmental (including climate change); demographic; economic; technological factors; policy and institutional factors; and cultural and social factors.

5.29 Specifically, post-Brexit support measures introduced for rural land management in Scotland will impact future land use.

5.30 The increase in community land ownership will continue to shape and influence future land use in Scotland.

5.31 The Planning (Scotland) Bill sets out a package of measures intended to strengthen the planning system's contribution to inclusive growth and empowering communities. The Bill sets out proposed high level changes to the overall framework under which planning operates; the detail of how the new provisions will work in practice will be contained within secondary legislation and guidance.

5.32 The Climate Change Plan (currently in the process of being updated) sets out the aim of increasing woodland cover from around 18% to 21% by 2032 and restoring 40% (250,000 hectares) of Scotland's peatland by 2030.

⁸⁷ <https://www.gov.scot/Publications/2016/07/1094/7>

⁸⁸ <https://www.gov.scot/Publications/2016/07/1094/7>

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6. Scottish Government Policy: Agriculture and Climate Change

6.1 The SG supports Agricultural Climate Change through Pillar 1 & 2 of the Common Agricultural Policy (CAP).

6.2 **Pillar 1** supports and delivers the Greening requirements. Applicants of the Basic Payment Scheme under CAP must comply with specific requirements (where relevant) on their land to enable an additional Greening payment to be made.

6.3 These requirements cover: **permanent grassland** (protecting permanent grassland designated as environmentally sensitive), **crop diversification** (growing different crops to enhance biodiversity and soil organic matter), and **Ecological Focus Areas** (where farming practices good for the climate and environment are undertaken).

6.4 **Pillar 2** supports/delivers the Scottish Rural Development Programme (SRDP), which includes:

- **Farm Advisory Service (FAS)** - activities include providing events, case studies, guidance notes, free carbon audits and integrated land management plans.
- **Agri-environment and Climate Scheme** - promotes land management practices which protect and enhance Scotland's natural heritage.
- **Knowledge Transfer & Innovation Fund (KTIF)** - supports projects that provide vocational training, skills development and knowledge transfer projects focused on agriculture.
- **Beef Efficiency Scheme (BES)** – aims to establish a superior genetic and more productive national herd whilst reducing GHG emissions.

6.5 Government also provides support out with the Common Agricultural Policy described above. The Climate Change Plan 2018 – 2032 sets out our approach to raise awareness, reduce GHG emissions, improve our carbon sink and reduce our agricultural products emissions intensity. This plan is currently in the process of being updated.

6.6 Examples of current action and support available outside of CAP include:

- **Farming for a Better Climate** (soil regenerative agriculture) – A group of farmers that work collaboratively focusing on issues relating to soil regenerative agriculture, including soil, fertiliser, manure management, carbon sequestration and more. They will be looking for practical solutions that can then be disseminated to the wider agriculture community.
- **Agricultural Technology Group** – this Group will share, disseminate and encourage adoption of advances in agricultural science and technology as widely as possible.

- **Young farmer climate change champions** – a group of young farmers and crofters have been appointed as Scottish Government agricultural climate change champions. They will champion a cultural and behavioural through peer to peer learning to shift towards low-carbon, environmentally sustainable farming in Scotland.

6.7 In addition to the above support, Programme for Government 2019 contained a number new commitments to help increase the speed of change in our agriculture sector. These include development of a new Agriculture Transformation Programme for our farming and food production focused on sustainability, simplicity, profitability, innovation, inclusion, productivity and reducing emissions. Work will begin this year to:

- develop pilot schemes to reduce greenhouse gas emissions from agriculture
- encourage more tree planting across Scotland including woodland integration and agro-forestry on Scottish farms
- promote the multiple benefits of good grassland management to more livestock farmers
- encourage more farmers to invest in renewable energy, including bio-energy, to meet their energy needs
- support an evidence-based approach to crop production and selection and strategic development of organic farming
- explore the development of models to demonstrate and promote carbon neutral farms

7. Rural Economy

7.1 Scotland's rural economy is diverse. It is rich in natural assets that define Scotland's image and reputation around the world. It accounts for 98% of Scotland's land mass with nearly 20% of our population living in rural areas. The rural economy also contributes over a quarter of Scotland's Gross Value Added. It is equivalent to the combined output of Edinburgh and Glasgow.

7.2 Rural Scotland has countless natural resources, well-placed to help us address the climate emergency and further our aims of making Scotland a net-zero society.

7.3 **Depopulation** - The rural economy is facing challenging times; our population is aging and will need care; our working age population is in decline and projections see this trend escalating. The effects of leaving the EU will be compounded in many parts of rural Scotland leaving them most vulnerable.

7.4 The Rural Economy Action Plan set a goal to increase the number of people living and working in rural Scotland. In September 2019 'Protecting Scotland's Future', was unveiled as part of the Government's Programme for Scotland 2019-20. It contains a commitment to 'develop an action plan supporting repopulation of our rural and island communities'

7.5 Support for the Rural Economy

7.6 Our Rural Economy is tightly integrated to the Scottish economy, however rural areas and businesses face different challenges.

7.7 We provide support to rural enterprises through our existing economic development agencies, Business Gateway and previous funding to GrowBiz. In addition we are establishing a new economic development agency in the South of Scotland. Our Economic Action Plan takes forward specific actions that enhance businesses, places and the lives of people in rural Scotland.

7.8 Our latest Programme for Government includes a pilot to test a new place-based approach to integrated business support for rural micro-enterprises.

7.9 Mainstreaming Rural Policy

7.10 The independent National Council of Rural Advisers published their report a [New blueprint for Scotland's rural economy: recommendations to Scottish Ministers](#) last year and more than 90% of the recommendations made are now being delivered through national programmes of work.

7.11 An important recommendation was the establishment of a Rural Economy Action Group (REAG) which met for the first time in Oct 2019. They will be responsible for driving forward change and ensuring the delivery of the NCRA recommendations - effectively mainstreaming rural policy throughout Scottish Government's areas of responsibility.

8. Bioenergy

8.1 The Scottish Government recognises bioenergy could play an important role in the decarbonisation of Scotland's energy system and the sequestration of emissions from the atmosphere. Bioenergy already contributes to energy supply in Scotland, meeting an estimated 4.4% of final energy demand in 2016 (Ricardo).

8.2 However, bioenergy resources are limited and must be managed sustainably and equitably. While there is potential to double bioenergy production from domestic feedstock from the current 6.7 TWh to 14.1 TWh per year by 2030, there are a number of constraints and challenges.

8.3 **Bioenergy action plan (BAP)** – The Scottish Government have committed to investigating the potential scope for bioenergy in Scotland. This includes developing understanding of competing feedstock uses, and long term availability of supply and will work with stakeholders to produce a draft Bioenergy Action Plan (BAP) by the end of 2019.

8.4 The guiding principles of the BAP will be:

- Policies to support bioenergy are consistent with the ambitions laid out in the Energy Strategy, Scotland's Climate Change Plan and Scotland's Land Use Strategy.
- Bioenergy schemes that deliver greenhouse gas emission reductions to help meet Scotland's climate change targets.
- Bioenergy schemes that represent good value for money, deliver benefits for communities, and help tackle fuel poverty.
- Biomass is produced and managed in a sustainable way, and should be used in heat-only or combined heat and power schemes to exploit available heat and local supply.

Demands on land for food, energy crops and other non-food crops are managed equitably.

8.5 We plan to engage with stakeholders across sectors prior to publishing a draft plan by the end of 2019 and publish the final plan by May 2020.

9. Forestry

9.1 Scotland's forests are a powerful carbon sink, absorbing the equivalent of 9.5 million tonnes of carbon dioxide in 2017.

9.2 The Scottish Government has ambitious woodland creation targets to support this. They are set out in its climate change plan:

- increase forest cover from 18% to 21% of the total area of Scotland by 2032.
- increase annual planting targets: 10,000 hectares per year until 2019-20, 12,000 hectares from 2020-21, 14,000ha from 2022-2023, 15,000ha from 2024-25.
- increase use of Scottish wood products from 2.2 million m³ to 3.0m by 2031-32.

9.3 In 2018-19 Scotland exceeded the woodland creation target in the climate change plan, creating 11,210 hectares, roughly 22 million trees, against a target of 10,000 hectares. This was 84% of all the new woodland in the UK in 2018-19.

9.4 The 2019 Programme for Government announced an additional £5 million for 2019-20 and set out the Government's ambition to:

- go beyond the Climate Change Plan target by planting 12,000 ha in 2019-20.
- accelerate progress and set increased annual targets beyond 2021.

9.5 The Scottish Government supports woodland creation with grants from the Scottish Rural Development Programme. Scottish Government funding is matched by the EU, coming to a total of £46 million of incentives supporting all types of woodland creation.

9.6 Over 80% of approved applications for forestry grants come from farmers and crofters with small and medium sized forestry projects.

9.7 Forestry supports 25,000 jobs and contributes £1bn annually to Scotland's economy. The Scottish timber harvest is approx 7 million tonnes - around 60% of the UK harvest.

9.8 Since 1 April 2019, forestry in Scotland has been fully devolved. Two new SG agencies have been created: Scottish Forestry (policy, regulation, sector support) and Forestry and Land Scotland (manages national forests and land for Scottish Ministers).

9.9 470,000 hectares of Scotland's national forests and land are owned by Scottish Ministers on behalf of the nation. This:

- contributes over £1m per day to the economy and supports 10,255 FTE jobs
- hosts 90 community and partnership projects and nine starter farms
- welcomes 10.6 million visitors a year
- hosts enough renewable energy infrastructure to power 600,000 homes

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9.10 In February 2019 the Scottish Government published a new forestry strategy setting out a 50-year vision for Scotland to have more forests and woodlands. The Strategy aims to:

- Increase contribution of forests and woodlands to sustainable and inclusive economic growth.
- Improve resilience of forests and woodlands and increase contribution to healthy and high quality environment.
- Increase use of forest and woodland resources to enable more people to improve health, well-being and life chances.



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Paper 5/2 Agriculture session **For information**

1. Purpose

- a. To provide Commissioners with background information on agenda item 2, an information gathering session exploring the agriculture sector.

2. Background

- a. This note provides detail of the participants who have been invited to give evidence as part of this session along with a list of suggested questions. Further background information is also included in the Annex to help inform the session.

What	Agenda item 2: Agriculture information gathering session
Who	<p>Ruth Taylor, Policy Manager, National Farmers Union of Scotland</p> <p>Jane Slater, Head of Environment Policy, Agricultural Industries Confederation</p> <p>Steven Thomson, Senior Agricultural Economist, SRUC</p>
Why	<p>An opportunity to examine the opportunities and challenges for the agriculture sector relating to the move to a net-zero economy.</p> <p>Participants have background and knowledge across a wide-range of the sector, including front-line farmers in various sub-sectors, the agriculture supply chain and rural communities.</p> <p>A selection of possible questions are included below:</p> <ul style="list-style-type: none"> • Do you see positive examples of the industry developing lower-emissions ways of farming? What are the lessons? • Is there an economic opportunity for Scotland in being a pioneer of low-carbon farming? • What would the impact of an unmanaged transition for the sector be? For example, imposing targets but without providing required support. • Is there an opportunity to boost resilience of farmers and rural communities by supporting diversification? (such as promotion of agroforestry) • How might the transition to reduce emissions affect different sub-sectors of agriculture differently around the country? • What skills do farmers need to adapt to lower-emissions practices? How can they be supported? • What impact might new innovative methods of farming have on the labour market and wider industry? (such as vertical farming)

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	<ul style="list-style-type: none"> • Could a shift toward more sustainable local systems of agriculture help tackle food insecurity at the same time as reducing emissions? • Are there social/cultural factors that may impact whether farmers are willing to adopt new practices? (security of tenancy, attachment to way of doing things etc). How can they be overcome?
<p><i>Additional background information</i></p>	<ul style="list-style-type: none"> • Annex A: submission from AIC Scotland • Annex B: submission from SRUC • Annex C: submission from Nourish • Annex D: submission from SAOS



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Annex A – submission from AIC

The Agricultural Industries Confederation (AIC) of which AIC Scotland is a part, represents over 95% of the UK's agricultural inputs: fertilisers, feeds, seeds, crop marketing, integrated crop protection solutions and in addition, professional accredited advice to UK farms.

The value of the Agri-supply chain we represent is approximately £9 billion and integral to the £120 billion food and drink industry in terms of supply of goods and services which support the stable, safe and traceable provision of UK foods etc.

We are committed in our contributions to helping the UK meet Net Zero commitments seeing this as compatible with our members' existing and longstanding goals to become more sustainable: environmentally, socially and commercially. Considerable progress has been made in energy, and input use optimisation across our sector and we are continually building on our investment and efforts.

Our response is framed under the three questions raised by the Commission:

1. What are the main economic opportunities and challenges for the agriculture sector associated with meeting the 2045 net-zero target?

We have identified the following economic opportunities:

i. To position Scotland as a global leader in farming the landscape in synergy with its natural assets, geography and climate. COP26 In Glasgow next year presents a timely opportunity for Scottish Government and Industry to work in collaboration to tell Scotland's story and to shape the future vision in real terms.

We believe it is important to provide leadership, incentives and the business transition funds to help farm businesses adapt quickly and confidently to grow income from all their farm assets: excellence in food/ bioenergy production alongside carbon capture and other environmental goods.

The key to success is identifying and promoting win-win changes in farm practice which will deliver productivity growth, farm performance and profitability while also meeting the 25 year environment plan goals and the three pillars for achieving net zero:

- 1) Boosting productivity and farm efficiencies and thus reducing agriculture's greenhouse emissions
- 2) growing farmland carbon storage in hedges and trees, and other environmental goods and
- 3) coupling bioenergy to carbon capture, utilisation and storage.

Efficient and productive farms tend to be the most environmentally sustainable ones and this integration between high performance and environmental good is well understood. In this knowledge lies the opportunity to grow the rural economy and jobs.

Experience reliably informs us that integrated Farm Management Plans, created by farmers and/or with professional farm advisers work in practice and are a recipe for success in delivering for agriculture, the environment and hence net zero. The benefit lies in the principles of creating a learning, dynamic process for change – maximising outputs and minimising impacts based on a holistic attitude to land management. Once farmers can see the value in taking a proactive/ self-audit approach to benchmarking what they are doing, taking the next step to have performance verified, is less of a barrier. Building on carbon reduction planning and reporting would be a logical step. Many existing farm auditing tools either include carbon auditing or are being adapted. (See annex, for existing measurement/benchmarking tools).

ii) The net zero commitment provides an opportunity to draw investment into the rural landscape to secure the supply of a diverse range of farm goods: crop and animal proteins, bioenergy, carbon sinks in natural habitats, biodiversity and landscape benefits.

The creation of a resilient and confident farming sector, which is equipped to adapt is vital. This will require annual investment in business adaptation productivity programmes, alongside land use management programmes so that the synergies can be fully explored.

Joined-up strategies from Scottish Government are required – enabling business to adopt best practice and innovation to realise production and carbon net zero goals in tandem.

Government will need to use practical support mechanisms, professional influences (farm advisers) and fiscal levers to change the farming mindset from annual costing cycles to longer term income from farming and new carbon, bioenergy and biodiversity markets.

Early adopters in the Integrated food and drink supply chains and also landowners, are already changing their business models to capture the total value in the farmed landscape, not only in the stable provision of safe, reliable foodstuffs but in selling the wider benefits of good landscape management to investors, including carbon capture in farm woodlands and hedges and biomass crops in less favoured areas.

iii. Tapping into the knowledge and skills of private professional sector advice, to complement that of Scotland's Rural College etc. in supporting for farming business to adapt

Government's open recognition and support for industry led advice services would be extremely beneficial in unlocking the knowledge, for example, held by crop agronomists and animal feed advisers. From the basic level uptake of sound crop nutrient and feed plans to the complexities of delivering fully integrated farm plans linked to soil and animal health, to wider and land use planning, these advisers have a range of skills to assist farmers to

reduce their carbon emissions, and create carbon storage opportunities (e.g. in biomass cropping, coppice, hedges, tree corridors and woodlands).

The training that is required to enable farm advisers to practice at professional level standards, has been designed to assist farmers to make the incremental changes necessary to reduce their production emissions. Existing training programmes overseen by independent schemes (Feed Adviser Register (FAR) and FACTS for crop nutritionists) specifically cover the policy rationale for change and the economic & technical rationale for reducing nitrous oxide and methane emissions. Furthermore, advisers are assessed on the status of the knowledge in order to maintain their professional status and are required to keep their knowledge and skills continually up to date. The Continuing Professional Development approach which exists creates an opportunity for bolting on new training in farm carbon management to fill knowledge gaps as they are identified.

Farmers need to be incentivised to be more professional, to be the best that they can be and take the best advice available as required. This incentivisation should be integrated into the state financial support.

iv. Accelerate adoption of best practice, new genetics and innovation

There is untapped potential in average performing farmers adopting the best practices of the top performing businesses and in so doing reduce farm greenhouse gas emissions by 25%. (Defra modelling, 2018). Good farm nutrient and Integrated Pest Management (IPM) agronomy plans are key drivers in delivering multiple production and environmental goals and there is evidence that there is a relationship between knowledge and advice and positive changes in farming practice (P97)

Further opportunities exist for integrating soil health and crop nutrition with animal nutrition and health to achieve greater levels of resource efficiencies and to bolster crop resilience to stress and disease.

A focus on managing new crop, and grass varieties to a level of performance more closely linked to genetic potential, similarly so for breeds of livestock, is required through greater attention to optimising conditions for growth and disease resistance.

Support for new plant breeding techniques which create new varieties, or crops (for food or biomass) which are more resilient to climate change, are higher yielding and more resource efficiency, will be necessary.

Farmers will need further support in selecting the right fertilisers, feeds, combinations and treatments and precision techniques to reduce GHG emissions - Scottish Government can support this process by signposting farmers to tools which report the emission factors for different materials.

vi. Develop domestic and export markets based on audited environmental accounts

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This can be done (using aggregated farm data, presented by sector or region. A good indicator of carbon production efficiency is in Nitrogen Use Efficiency <http://www.eunep.com/> or Nitrogen Utilisation Efficiency in livestock. Other sustainability metrics exist (Sustainable Farming Trust, LEAF, Cool Farm tool etc). It is important that action to achieve the net zero outcomes complement the delivery of wider sustainability goals.

We have identified the following economic challenges:

i) The need to avoid exporting our carbon burden:

Open trade allows importation of lower cost food potentially carrying a higher carbon footprint (2-5x higher than UK produced food e.g. for beef). A future taxation system needs to reflect the environmental standards of imported foods allowing a level playing field for Scottish producers.

ii) Current EU Emission Trading Scheme rules place the last two remaining UK production facilities of Nitrogen (Ammonium Nitrate) fertiliser at risk until such time as the process of production can be fully decarbonised by carbon underground carbon storage. Similarly, other European Nitrogen production facilities face the same uncertainty.

It is therefore essential that sustainable production and consumption policies are joined up and carbon accounting is considered in full life cycle terms. UK mineral nitrogen is amongst the lowest in the world and it is strategically important that Scottish Government supports fiscal interventions or allowances necessary to prevent displacement of UK production at the expense of imported materials which cannot claim similar carbon footprints.

ii) There are still challenges in quantifying enhanced carbon storage potential in soils

However, this challenge should not be confused with the production benefits of well-structured soils enhanced by organic matter which can support stepped changes in improving input use efficiencies and therefore reducing farm greenhouse gas emissions.

iii) Competing policy priorities can be a challenge: Renewable energy policies which create unintended consequences/imbances (as has been the case in Germany with AD)

The focus should be on decarbonising technologies which don't solve one problem and replace it with other e.g. compete for resources i.e. diverting material from animal feed to energy plants

2) What are the likely wider social (health, community etc.) opportunities and challenges associated with meeting this target?

The solutions to achieving the net zero goal lie in the balance between the carbon emitted when food is produced and as a result of food consumed (in human respiration) and that which is possible to reduce and offset in above or below ground carbon storage.

Simple messages and one-track thinking which are easy for society to pick up on usually fail to explain the bigger picture or inform the populace and can hinder finding the right balance, as single interest parties rush to score points/moral high ground.

There is an opportunity for Government to educate and communicate the value of a balanced diet lifestyle which depends on a balanced ecosystem. There will be challenges to face as society pitches livestock protein v crop protein – however, not one solution is the right one in isolation and there is merit in considering how to educate communities on what the concept of balance means in our culture.

3) What actions do you think Government should take to manage the opportunities and challenges mentioned above?

Within the framework for rural funding, allocate specific support for farmers to develop whole farm adaptation plans in the short, medium and long term – assisting an incremental improvement from subsidy to market and public goods (including activities which move towards a zero carbon situation).

In addition to the actions we have covered above, in realising opportunities and overcoming challenges, we recommend that a proportion of state funding is allocated to facilitate the bringing together of knowledge on farm (funding the time for the farmer, agronomist, animal feed, wildlife, woodland advisers etc. to work together to form the collective farm goals and plans). This would mean that all experience and knowledge could be combined for the benefit of rural businesses for the long term with the intention of making them more resilient.

It could be envisaged that the whole farm business plans point to the technical investment/innovative solutions required.

Annex: References – farm carbon accounting:

The LEAF whole farm audit is a good start (under continual development to account for all farm assets. Also: see:

Cool Farm tool

<https://www.farmcarbontoolkit.org.uk/>

<https://woodlandcarboncode.org.uk/>

A GLFI (Global Metrics for Sustainable Feed) database is also available for animal feeds which will shortly be more user-friendly when the Product Environmental Footprint calculator is available.

<https://www.fertilizerseurope.com/initiatives/carbon-footprint-calculator/>

There is also a clear link between biodiversity net gain and contributions to net zero carbon.



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Note: Carbon trading already exists: Ref: The Environment Bank
<https://www.environmentbank.com/> Worth talking with the CLA Scottish Association of landlords

Annex C – Submission from Nourish

About Nourish Scotland

We are an NGO campaigning on food justice issues in Scotland. We believe tasty and nutritious food should be accessible to everyone, be sustainable, and be produced, processed, sold and served in a way that values and respects workers. We campaign for solutions that work across the board: we take a systems approach toward food and health, poverty, fairness, workers' rights, rural economy, environment, climate change, land use, and waste. Nourish is a member of the Scottish Food Coalition, Stop Climate Chaos Scotland, and Scottish Environment Link. Nourish is also a co-sponsor of the Farming for 1.5°C Enquiry. This response is however from Nourish, not from Farming 1.5.

Thank you very much for the opportunity to provide evidence to the Transition Commission. Please find our responses to your questions below.

1. What are the main economic opportunities and challenges for the agriculture sector associated with meeting the 2045 net-zero target?

There is potential for an increase in productivity across Scotland to improve the GHG emissions per kg of product or per calorie of nutritional intake. This is through a variety of technical measures, many of which will save farmers money. For example: better nutrient management – half of Scotland's fertiliser use is wasted at present and better slurry management can improve the product and uptake on field. Better attention to animal health will improve the productivity of a herd. Further suggestions can be found in the paper by V. Eory and colleagues⁸⁹.

However few of these technical fixes are new and are still not taken up by many farmers outside the pig and poultry sectors. Maximising profitability is assumed to be a major motivator but farmers and farming businesses are more complex than that. Lessons need to be taken from this in order to ensure change is seen as positive.

However merely concentrating on improving productivity misses the larger issue as those farmers who are motivated by greater productivity will simply produce more rather than the same amount more efficiently.

The economic opportunities of shortening supply chains and making the industry as a whole more resilient are huge. By properly recognising and internalising the risks of inaction, it is easier to see how the economic opportunities exist.

⁸⁹ https://www.theccc.org.uk/wp-content/uploads/2016/02/MACCCUpdate2015_FinalReport-16Dec2015.pdf

It is an opportunity to explore new varieties and types of crops, vegetables and fruit. At the moment the average person in Scotland eats only 3 portions of fruit and vegetables a day⁹⁰. A switch to the Eatwell Guide – which includes more veg and less meat and dairy would cut the UK's food related emissions by 17%. Currently the UK produces 54% of our veg supply with only 3.3% of Scotland's arable land used to grow veg. If we are serious about meeting a 2045 net-zero target and peoples diet's change to reflect this, Scotland will have a huge opportunity to meet this higher demand for vegetables, fruit and pulses. The last decade has seen a resurgence of market gardening without a lot of support. This could be massively stimulated with the right policies and attitudes to what agriculture is in Scotland.

It is crucial however that reducing consumption is part of the same conversation as discussing reductions in livestock production as otherwise we will simply increase imports and push our greenhouse gas emissions somewhere else. This is not just for the communities we will be exploiting, nor for the people and ecosystems of Scotland as the impacts of climate change will continue to be felt. This cannot just be a superficial accounting exercise, it needs to consider the other impacts.

Yet there is a further complexity. QMS estimates from abattoir figures that we produce 144.5% of our beef needs and 193% of our sheep meat⁹¹ and consume 2.2kg/yr/person. According to the Economic Report on Scottish Agriculture 2018 we produce 60 000t of sheep meat in Scotland or 11kgs per person – that's 500% of our sheep meat requirements. Much of this production is labour intensive, poorly paid, isolated and dangerous. Could there be farmers who don't want to do what they do but feel there is no option? Could we help them transition to what they would like to do? Or at a lower level of production? But the decision to reduce our food and drink exports from Scotland would have major implications on current policy and funding as Scot Food and Drink's ambition is to double the size of their industry to £30 billion by 2030⁹².

Another element of reaching these targets is the need to reduce food waste in all parts of the system, but first these all need to be accounted for including on farm. Field veg is a particularly wasteful production as farmers will plough their crops back into the ground if the price isn't right. Certainly this adds extra nutrients in to the soil in a positive sense, but the waste of the inputs for that crop is massive and needs to be accounted for as most than just a financial loss. The GHG emissions of the fertilisers, pesticides, fuel and more need to be remembered as impacts on all of us, not just the farmer.

A major opportunity of meeting the 2045 target is that soil becomes the heart of the solutions and farming in Scotland. Investing in the health and carbon levels of our soils can lead to increased productivity as soils are able to retain more nutrients thus needing fewer inorganic inputs, reducing farmers' inputs bills and their reliance on worldwide supply chains. According to Climatexchange

⁹⁰ Scottish Government (2016), Scottish Health Survey- Main Report & Supplementary tables

⁹¹ <https://www2.gov.scot/Topics/Statistics/Browse/Agriculture-Fisheries/PubEconomicReport/ERSA2018>

⁹² <https://news.gov.scot/news/food-and-drink-exports>

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there is broad agreement across the evidence studied that some opportunities exist to use agricultural management to increase carbon storage in agricultural soils of around 174 Mt C⁹³.

Soil and resource use is at the heart of organic farming methods thus both saving GHG emissions and sequestering carbon. As such, an increase in land under organic farming in Scotland would greatly assist reaching our targets. It is also a vehicle to lower production intensity for those farmers who would like to continue farming livestock while maintaining the biodiversity benefits of having livestock in the food system.

Agroforestry is another tool that can be used to sequester carbon while still having land available for grazing. Studies⁹⁴ have shown that animal health and welfare increases in systems using agroforestry because of nutrient diversity and cover from inclement weather. Land management comparison shows that large proportions of grassland would need to be converted to woodland to provide similar carbon benefits as the integrative silvopastoral system⁹⁵. Recognising the importance of agroforestry because of climate change benefits can have many other benefits that have positive economic consequences. This is before counting the economic production potential of the additional crops such as fruit, forage and fuel, or the biodiversity potential of the mixed habitats.

The challenges of meeting the targets is that there will have to be a reduction in the number of livestock being produced in Scotland and without suitable transition structures in place, current livestock and highly intensive arable farmers will have a challenge changing their mindsets and culture. This would have knock on implications to agricultural supply businesses and the people working in them.

2. What are the likely wider social (health, community etc.) opportunities and challenges associated with meeting this target?

If we meet the target in a just and holistic way, the opportunities are huge as we will be setting an example for the world in how to make rapid and major change so that we can all together transition to a cleaner, greener world.

In the shorter timeframe, meeting this target will mean we have cleaner air and water as agricultural inputs are reduced reducing nitrous oxide and ammonia emissions. This will have major positive implications for people with respiratory diseases who live in both our urban and rural areas. This will also reduce the weight on the NHS, the economic burden of asthma and COPD on NHS Scotland is estimated to be £266 million a year⁹⁶. Air pollution plays a major role in these diseases so cleaner air will help reduce this burden and make living with the diseases easier. Many of those suffering are from deprived communities, so this may be a positive move for

⁹³ <https://www.climateexchange.org.uk/media/3046/soil-carbon-and-land-use-in-scotland.pdf>

⁹⁴ <https://www.agricology.co.uk/resources/agroforestry-livestock-systems>

⁹⁵ Beckert, M.R., Smith, P., Lilly, A. et al. *Agroforest Syst* (2016) 90: 371. <https://doi.org/10.1007/s10457-015-9860-4>

⁹⁶ <https://www.gov.scot/publications/scottish-health-survey-2016-volume-1-main-report/pages/87/>

those communities. This will also have positive implications for biodiversity as toxins are taken out of habitats.

Researchers are demonstrating that certain phytochemicals in fruits and vegetables can help prevent type 2 diabetes, cardiovascular disease and cancer. Further they are an important source of dietary fibre and provide all the micronutrients our body needs to function well. Dietary fibre is essential for health-promoting gut bacteria to thrive. If Scotland's population ate more vegetables there are positive health implications in reducing obesity and chronic disease. Many of those from disadvantaged areas have the least access to fresh fruit and veg. If their intake improved this would again be an opportunity for Climate Justice in Scotland.

Making soil the heart of the debate will not just have economic advantages. In 2015/16 in a survey of catchment areas, 1/5 of top soils showed degradation. This reduces their capacity to store water thus increasing the risk of erosion and flooding⁹⁷. As climate change increases the intensity of frequency of high precipitation events, managing flood risk is of great importance to the health and safety of people, land and property across Scotland.

3. What actions do you think Government should take to manage the opportunities and challenges mentioned above?

We would recommend the following policies:

- All farms develop and implement 5 year soil plans as part of their eligibility for agricultural subsidies.
- Advisory services and agricultural teaching programmes adopt a soil first approach to their work, ensuring existing and new farmers understand the importance of soils and keep abreast of new expertise and best practice.
- Advisory services and agricultural teaching programmes prioritise productivity over production, with the culture of better meaning more animals and bigger machinery as replaced with more profit and healthy soils.
- Targets are set for 20% of Scottish arable land to be organic
- A redundancy type programme is set up for farmers and farm workers who no longer want to stay in farming but are at a loss as to how to transition to an alternative employment, lifestyle and potentially culture. Transition in this fashion can be particularly difficult for people who are self-employed. There are many examples where this has been done in industry for the closure of factories where each individual's needs and experience is taken into account.
- A legal duty is on those responsible for livestock to promote positive animal welfare and high levels of health. This should be matched with easily accessible and affordable personalised veterinary services for all scales of farmer.
- Note must be taken of the outputs of the Woodland Expansion Advisory Group in 2009 – which advocated greater support and finance for agroforestry expansion in Scotland. Since that report not one system has been funded. Identifying the barriers to agroforestry is required.

⁹⁷ Scotland's Centre of Expertise for Waters (2016) Effect of Soil structure and field drainage on water quality and flood risk.



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Paper 5/3 Land use session **For information**

3. Purpose

- a. To provide Commissioners with background information on agenda item 5, an information gathering session exploring land use changes.

4. Background

- a. This note provides detail of the participants who have been invited to give evidence as part of this session along with a list of suggested questions. Further background information is also included in the Annex to help inform the session.

What	Agenda item 5: Land Use information gathering session
Who	<p>Vicki Swales, Head of Land Use Policy, RSPB</p> <p>Hamish Trench, Chief Executive, Scottish Land Commission</p> <p>Stephen Young, Head of Policy, Scottish Land and Estates</p> <p>Eleanor Harris, Policy Researcher, Confor</p>
Why	<p>An opportunity to examine the opportunities and challenges relating to the change in land use required to meet the 2045 net-zero target.</p> <p>Participants have background in land use policy, management of land and governance structures relating to land use.</p> <p>A selection of possible questions are included below:</p> <ul style="list-style-type: none"> • How can communities be involved in decisions around land use changes that affect them? • Can you point to some examples of good land management around the country that could be built on going forward (or bad examples that should be avoided)? • How can we make sure communities benefit from changing patterns of land use? • How should competing interests for land uses be managed? • What skills do land managers need to support changes to the way land is used and managed in Scotland? How can they be supported? • Is the current ownership structure of Scotland's land an enabler or barrier to changing land use? • How can changing patterns of land use deliver economic benefit at the same time as offsetting emissions • Does changing patterns of land use present opportunities to improve resilience among marginalised/vulnerable rural communities?

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<p><i>Additional background information</i></p>	<ul style="list-style-type: none"> • Annex A: submission from RSPB Scotland • Annex B: submission from Scottish Land Commission • Annex C: submission from Confor • Annex D: submission from Forest Policy Group • Annex E: submission from Scottish Natural Heritage • Annex F: submission from Tweed Forum • Annex G: submission from SCCS • Annex H: submission from Scottish Land and Estates

Annex A: submission from RSPB Scotland

1. Introduction

There is now widespread recognition and understanding that we face a climate emergency. Perhaps less widely recognised is the crisis facing biodiversity. Thankfully, this too is now on the political and public radar thanks to a number of assessments such as that by the UN Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services⁹⁸, the recent State of Nature⁹⁹ report and popular TV programmes. The climate and nature crises are intertwined, each exacerbating the other and with many of the same underlying causes and drivers; equally, the solutions are inter-twined. This relationship is acknowledged by the Scottish Government in its most recent Programme for Government¹⁰⁰ where it states:

'We recognise the importance of biodiversity and the complexities and challenges that tackling its loss presents. Biodiversity loss and the climate emergency are intimately bound together: nature plays a key role in defining and regulating our climate and climate is key in shaping the state of nature.'

Adopting nature based-solutions to climate change must be a core part of any overall climate strategy. What this means in practice and what policies and measures are required to achieve it are explored in more detail in the following sections.

There is a third crisis that should be recognised when considering our response to the climate and nature crises and to issues around just transition – that of health. Some aspects of physical and mental ill health have links to our food system and the natural environment in which we live and therefore to land use more broadly. For example, diet related ill health such as diabetes and heart disease which are factors of rising overweight and obesity and respiratory diseases linked to air pollution. Meanwhile, access to greenspace or lack of it and the quality of the natural environment in which we live can affect mental health and wellbeing. Choosing the right strategies to deal with climate change and biodiversity loss could also be of huge benefit to physical and mental well-being through, for example, the adoption of more sustainable food systems, reducing pollution and the creation of greenspace.

⁹⁸ IPBES. 2019. Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. S. Díaz, J. Settele, E. S. Brondizio E.S., H. T. Ngo, M. Guèze, J. Agard, A. Arneeth, P. Balvanera, K. A. Brauman, S. H. M. Butchart, K. M. A. Chan, L. A. Garibaldi, K. Ichii, J. Liu, S. M. Subramanian, G. F. Midgley, P. Miloslavich, Z. Molnár, D. Obura, A. Pfaff, S. Polasky, A. Purvis, J. Razaque, B. Reyers, R. Roy Chowdhury, Y. J. Shin, I. J. Visseren-Hamakers, K. J. Willis, and C. N. Zayas (eds.). IPBESsecretariat, Bonn, Germany.

⁹⁹ Hayhow DB, Eaton MA, Stanbury AJ, Burns F, Kirby WB, Bailey N, Beckmann B, Bedford J, Boersch-Supan PH, Coomber F, Dennis EB, Dolman SJ, Dunn E, Hall J, Harrower C, Hatfield JH, Hawley J, Haysom K, Hughes J, Johns DG, Mathews F, McQuatters-Gollop A, Noble DG, Outhwaite CL, Pearce-Higgins JW, Pescott OL, Powney GD and Symes N (2019) The State of Nature 2019. The State of Nature partnership.

¹⁰⁰ Scottish Government 2019 'Protecting Scotland's Future: The Government's Programme for Scotland 2019-2020. The Scottish Government.

How we use and manage land now, and in the future, will have a major bearing on how successful or not we are in dealing with these crises. The main focus of this submission is on rural land use and the primary sectors of farming and forestry given that together they occupy the majority of Scotland's land area. But we also discuss the wider food system and how legislative and policy reform could drive progress. We touch on sporting land use e.g. grouse shooting and deer stalking which frequently overlaps with other land uses, especially farming. We also refer briefly to land use in urban areas – in our towns and cities – and the contribution this can make to responding to the climate, nature and health crises.

Evidence suggests that how we currently use and manage much of Scotland's land, both rural and urban, is not sustainable. If we are to achieve net zero emissions by 2045, halt the loss of nature and aid its recovery and take action to improve health, we need transformational change in land use and management. Business as usual is not an option. RSPB Scotland believes that the changes required present significant opportunities and have the potential to create substantive benefits in terms of jobs created, income generated and costs avoided. But we also recognise that some changes could threaten the livelihoods and prospects of some of those who currently live on and work the land and those of the rural communities of which they are part. Ensuring a just transition to environmentally sustainable economies and societies is therefore necessary.

2. Transforming land use in Scotland: what needs to happen and how do we get there?

In order to consider how to move forward, it is helpful to start with an understanding of the current socio-economic and environmental situation in Scotland's rural areas. Scotland's Rural College (SRUC) biennial series of reports 'Rural Scotland in Focus' provide helpful analysis and we refer the Commission to these as a source of relevant data alongside the earlier cited State of Nature report and data contained on Scotland's Environment Web. Rural Scotland in Focus 2016 offers a detailed overview of the farming and forestry sectors and includes information on estates (including those with sporting interests) as well as NGO land ownership and the wider rural economy. It highlights that the rural land use sectors are significant employers in rural areas and contribute to our economy but it also illustrates the dependency on subsidy and public support and a number of negative trends such as declines in the labour force and an ageing farming population.

The socio-economic challenges facing Scotland's rural land use sectors, and the rural economy more widely, have been explored more recently by a number of advisory fora and working groups established by government. The most recent include the Agriculture Champions¹⁰¹ and the National Council of Rural Advisors¹⁰². Their reports present helpful analyses of many of the problems and challenges facing rural areas, identify some solutions and make some useful recommendations which the Just Transition Commission will, no doubt, consider as part of its deliberations.

¹⁰¹ Agriculture Champions 2018, A Future Strategy for Scottish Agriculture. The Scottish Government.

¹⁰² National Council of Rural Advisors 2018, A New Blueprint for Scotland's Rural Economy: Recommendations to Ministers.

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The climate and biodiversity crises bring a new imperative to deliberations about the future of key sectors such as farming and forestry and Scotland's rural economy and have, in our view – so far – been insufficiently factored in. Going forward, we need rural policy – and related public funding - to put the climate and nature challenges centre stage and to seek to deliver genuinely sustainable rural development. This means creating a more mixed economy with traditional land uses and businesses operating alongside new and innovative businesses, building on growing sectors such as nature-based tourism and the demand for artisan and high-quality food and drink products, ensuring supporting infrastructure is in place e.g. broadband and doing all this in carbon neutral and nature positive ways. Land based businesses are, in our view, well placed to benefit from a refreshed rural development approach.

In the following sections, we identify some of the key policy and legislative developments that are needed to transform rural land use and respond to the climate and nature crises whilst also providing benefits for health and well-being. Delivered in the right way, it is possible for these to facilitate change in ways that maximise opportunities and minimise risk for individuals and communities, involve them in decision making and ultimately make us and the world we live in more resilient and adaptable.

2.1 Build on the existing Land Use Strategy and make better choices about future land use

The requirement to produce a Land Use Strategy – to be revised every 5 years - was contained in the Climate Change (Scotland) Act 2009 for the purpose of establishing how land use could help address climate change and contribute to sustainable development. The first Strategy was laid before Parliament in April 2011¹⁰³ and a revised version laid in 2016¹⁰⁴. The original Strategy set some very welcome high level objectives and principles for land use in Scotland including the following vision:

'A Scotland where we fully recognise, understand and value the importance of our land resources, and where our plans and decisions about land use deliver improved and enduring benefits, enhancing the wellbeing of our nation.'

The 2016 Strategy recognised the challenges of climate change and biodiversity loss and sought to build on two regional land use pilots that had been undertaken in the Borders and Aberdeenshire during the life of the first Strategy. These pilots set out to test how to work with local stakeholders to develop land use frameworks which could be used to inform local decision making and to understand the wider implications of specific decisions. As such they provided valuable lessons about this kind of approach.

The 2016-2021 Strategy included the following policy and a proposal:

¹⁰³ The Scottish Government 2011, Getting the Best from Our Land: A Land Use Strategy for Scotland 2011-16. The Scottish Government.

¹⁰⁴ The Scottish Government 2016, Getting the Best from Our Land: A Land Use Strategy for Scotland 2016-2021. The Scottish Government.

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‘Policy 7 - We will encourage the establishment of regional land use partnerships.’

In explanation, the Strategy states:

‘In order to progress better integration of land uses and better understanding of land use and climate change issues there is clear value in bringing together local people, land users and managers into regional or local partnerships.....land use partnerships have the potential to focus effort on climate change objectives where appropriate. They could assist local communities in building community resilience to climate change issues and addressing particular mitigation or adaptation issues...the area where they can have a significant role and impact is in leading or being closely involved in work to develop regional land use frameworks (see Proposal 1 below). The use of a regional land use partnership to take forward this work gives a clear remit and also provides a mechanism to begin to discuss and address issues around future land uses for an area within the context of better understanding the interactions, the opportunities and the aspirations of local communities.’

‘Proposal 1 - We will further explore the development of regional land use frameworks for rural areas of Scotland.’

In explanation, the Strategy states:

‘The independent evaluation and the feedback from the pilot projects themselves show that such frameworks have the potential to:

- Assist in the assessment of how changes in land use and land management may impact on a broad range of ecosystem services;*
- Bring stakeholders together and build understanding about competing interests;*
- Involve local communities in decisions about their local area;*
- Provide context and wider input to a range of local authority responsibilities such as development planning and flood risk planning; and,*
- Assist in targeting the use of finite financial resources to where they may have most impact.’*

RSPB Scotland and Scottish Environment LINK have been strong advocates of Regional Partnerships (RPs) and Regional Land Use Frameworks (RLUFs) but progress has stalled and neither are yet in place. However, there is now a requirement in the new Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 to revise the current Climate Change Plan and, in that, set out how Regional Partnerships will be established by 2021 in order to complete RLUFs by 2023. This is very welcome and we understand that the Scottish Land Commission has now been tasked with considering how best to take these forward.

In our view, RLUFs should: help to identify the current situation in relation to land use and management activities and the environmental, social and economic trends arising from these in a region; scope alternative land use scenarios and assess the opportunities and risks associated with these; and, identify priorities for action and funding. Local authorities have a key role to play in

leading RPs and the development of RLUFs, working with local communities and relevant stakeholders. Together, RPs and RLUFs can help us make better, more strategic decisions about land use and ensure we address the climate and biodiversity crises whilst responding to socio-economic needs. In turn, this should enable the Scottish Government to improve the allocation and targeting of public funding to serve this purpose.

2.2 Radically overhaul the current farming and land management subsidy system

For very many years, RSPB Scotland and Scottish Environment LINK have called for radical overhaul of the Common Agricultural Policy (CAP) and the funding streams associated with it in order to address environmental concerns. If we leave the EU, we will also leave behind the CAP and will need to develop new farming and rural policy for Scotland. The Scottish Government is proposing a period of ‘Stability and Simplicity’ between now and 2023/4 during which it will seek to largely maintain CAP payments as well as piloting some new approaches. From 2024 it proposes a ‘new rural policy’ but there are, as yet, no suggestions as to what this might look like or the kind of financial support it might encompass. The Food and Farm Production Future Policy Group - set up to advise Scottish Ministers – will, we hope help to identify a way forward that we can all unite behind.

In terms of what RSPB Scotland would like to see next, our views are as set out in the LINK paper ‘Renewing Scotland’s Rural Areas’¹⁰⁵ which we co-authored. In summary, we argue the need to:

- **Retain... current levels of public investment in our rural areas.** If we leave the CAP behind, this must not be used as an excuse to lower the level of public expenditure in the rural sector. The challenges facing farming, crofting and other rural land use businesses and the environment are too great to ignore. Without public investment, these challenges will not be met and opportunities will be missed.
- **Reshape... how we spend public money**, allocating resources in three main ways:
 - **public money for public goods** with the lion’s share of resources focused on this. This means providing financial incentives to land managers to maintain or encourage the production of environmental and social goods and services provided by agriculture and forestry that are not rewarded through the market. These public goods include biodiversity, cultural landscapes, high quality water, air and soil, a stable climate and resilience to flooding.
 - **investments to facilitate change** such as helping farming, crofting, forestry and other rural businesses adapt and develop, improve business efficiency and explore market opportunities; and,
 - **investments in supporting activities** including research, knowledge transfer, advice and training.
- **Renew... our rural areas for the benefit of all of us:** rewarding farmers, foresters and other land managers for the full range of goods and services they provide and helping rural

¹⁰⁵ Scottish Environment LINK 2017 Renewing Scotland’s Rural Areas: A Role for Future Farming and Rural Land Use Policy. SEL, Edinburgh and Perth. http://www.scotlink.org/wp/files/LINK-Future-of-Farming-and-Rural-Land-Management_March2017.pdf

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businesses become more profitable and sustainable; protecting and enhancing the environment and the natural resources that underpin economic activity; and, spending taxpayers' money effectively, helping to create good livelihoods and jobs and contributing to our health and wellbeing.

The analyses and proposals set out in this LINK paper are, we believe, consistent with the principles of just transition and offer a way forward for achieving an environmentally sustainable rural economy in ways that benefit those who work and manage the land as well as the wider rural community. We have therefore submitted this paper alongside this briefing prepared for the Commission for its session on land use in Melrose.

2.3 Adopt nature-based solutions to climate change

A key component of the approach set out above by LINK is that of targeted agri-environment payments. Such payments are needed to conserve priority species and habitats, to ensure the appropriate management and condition of designated nature conservation sites and to support habitat recreation and restoration e.g. peatlands and saltmarsh. Woodland grants should also support both the management of existing woodland resources and new tree planting in appropriate locations.

Peatlands, coastal habitats such as saltmarsh, native woodlands and forests are some of the most important places for wildlife in Scotland. These nature areas also hold vast stores of carbon, adding up to more than 33 times Scotland's annual carbon emissions. This carbon needs to be kept locked away, and more carbon sequestered and stored through habitat protection, restoration and expansion, helping us to meet our emissions reduction targets and avoid dangerous climate heating. The UK Committee on Climate Change (CCC) recommendations for Scotland's new target of achieving net-zero GHG emissions by 2045 was explained as feasible in part because of Scotland's 'greater potential for emissions removal', given its capacity for nature-based carbon sequestration through peatland restoration, and afforestation.

The RSPB recently produced Carbon in Nature Maps¹⁰⁶ to show how much carbon is already stored in the UK's nature areas on land in our soils and vegetation, for instance in our peatlands, woodlands and forests, but also important coastal habitats like saltmarsh. By identifying these areas, recognising their value and funding their protection and restoration Scotland can take some of the urgent action needed to meet our climate targets.

We used the Land Classification Map (LCM) 2015 to identify Scotland's key nature areas and the World Soils Map and standard figures for information on the amount of carbon stored in soils and vegetation in these nature areas. The new maps show carbon stored in soil up to a depth of 30cms. This is a limitation of the project, as peat soils are in many places in Scotland much deeper than this and therefore hold much more carbon. However, the top 30cms of soil are most

¹⁰⁶ <https://rspb.maps.arcgis.com/apps/Cascade/index.html?appid=2b383eee459f4de18026002ae648f7b7>

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at risk from degradation through poor land management and loss of the carbon to the atmosphere and have therefore been the focus of this mapping.

The maps do not tell us about the condition of these areas of high carbon and nature value, and hence how good they are for wildlife or the climate. We know that not all of these important nature areas are in good condition. For example, estimates show that 80% of Scotland's peatlands are in a damaged state or poor condition¹⁰⁷, releasing carbon rather than storing it and cannot support many of the species which make healthy peatlands such a nature-rich habitat.

The results of this mapping work can be summarised as follows:

- Analysis shows around 2 GtCO₂ are stored in the UK's carbon and nature rich areas, around four times the UK's annual emissions.
- The maps show that the majority of this carbon (1.26 GtCO₂) is found in Scotland's nature rich areas – 65% of the UK total.
- The carbon stored in the top 30cms and in vegetation in these areas is 33 times greater than the amount of greenhouse gas emissions from the whole of Scotland in 2016.
- This vulnerable top layer of soil and vegetation must be protected and restored where damaged to prevent huge and catastrophic carbon loss.
- 63% of this huge amount of carbon is in an area of land which is not designated for its nature value and therefore not protected.

Significant work is already underway to restore Scotland's degraded peatland but much more remains to be done. The UK Biodiversity Action Plan (UK BAP) has a target for blanket bog restoration, of which Scotland's share is around 600,000 hectares. The Scottish Government's own target for peatland restoration is 250,000 ha by 2030 which would leave significant areas of peatland in a degraded state. Publicly funding activities such as managed realignment and saltmarsh recreation at our coasts, wetland creation, native woodland expansion and increasing the area of non-farmed habitats (field margins, hedgerows, copses) on farms across Scotland would all deliver nature and carbon benefits. These activities have the potential to employ significant numbers of people and create livelihoods, in some cases for those currently employed in the farming and forestry or other rural land use sectors.

2.4 Manage, protect and expand trees, woods and forests

As highlighted above, trees, woods and forests should be key components of nature-based solutions to climate change. Much needs to be done to protect and manage our existing woods and forests – such as our Atlantic Oak woods and Caledonian Pine forests - to ensure they are in the best condition for nature and helping to sequester and store carbon. The invasion of non-native species such as rhododendron and Himalayan Balsam as well as the increasing threat from pests and diseases (some of them linked to climate change) means that many of our existing trees, woods and forests already face challenges that need addressing. But attention is

¹⁰⁷ <https://soils.environment.gov.scot/resources/peatland-restoration/>

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increasingly turning to woodland and forest expansion as part of our response to the climate emergency.

The area of woodland in Scotland has expanded over the past 90 years, from around 5% cover just after the First World War, to 18% today but this has happened at the cost of important open upland and grassland habitats. Between the 1940s and 1980s, expansion of commercial forestry and associated drainage resulted in the loss of 44% of Scotland's blanket peat bog. Lowland raised mires were lost at a similar rate. During the same period and despite an overall increase in tree cover, the area of broadleaved and mixed woodland fell by 23% and 37% respectively, and native Caledonian pine forests remain in just over 6% of their original range. Much woodland expansion has instead favoured commercial conifer plantations of non-native species.

Today 18% of Scotland's land area is currently covered with forests and woodlands, of which 74% is coniferous and 26% is broadleaf. A quarter of woodland in Scotland is publicly owned. Forestry is the only industry which currently acts as a net carbon sink, absorbing more carbon than is emitted, so woodland expansion has been highlighted as a key climate mitigation measure. For this reason, Scotland's current Climate Change Plan set out ambitious woodland expansion targets stating: woodland cover will increase from 18% to 21% by 2032 with annual tree planting targets increasing over time to 15,000ha per year in 2024-2025. The Programme for Government 2019-2020 has however committed to a planting target of 12,000 ha this year and promised to accelerate planting targets from 2021. The UK Committee on Climate Change also proposed significant afforestation of 30,000 ha of planting per annum under a high ambition scenario in its recent net-zero assessment¹⁰⁸.

RSPB Scotland supports sustainable woodland expansion and we recognise the wide range of environmental, social and economic benefits that sustainably managed native woodlands and commercial forestry can deliver. Achieving a significant level of new planting requires a strategic approach and direction to ensure that it maximises delivery of sustainable, integrated woodland and contributes to climate change mitigation but without impacting biodiversity and other ecosystem services. Such woodland expansion should not be considered in isolation but taken forward as part of wider land use considerations through the LUS and completion of RLUFs. Expansion should not compromise the conservation of existing priority habitats and species. In this context that means those species which are dependent upon native woodland habitats or would be affected by the loss of open habitats, such as certain types of grasslands and peatland, due to woodland expansion.

With climate change already occurring, new planting should aim to deliver genetically diverse mixed woodlands, including native species of local and diverse genotypes, which are likely to be more resilient to climate change, pests and disease and adapted to local soils and climate. We want to see woodland expansion integrated with other land uses, delivering multiple benefits, such as appropriate riparian planting (avoiding valuable wet grassland habitat, fen, mire etc. which is

¹⁰⁸ Committee on Climate Change May 2019 Net Zero The UK's Contribution to Stopping Global Warming. Committee on Climate Change, London.

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important for breeding waders and other wildlife) and catchment-scale planting schemes that filter pollutants, stabilise sediment, provide shade, slow water flow and reduce flood risk downstream.

Sustainable deer management will also be required if woodland establishment is to be achieved without recourse to deer fencing. There are also significant opportunities in Scotland to deliver urban greenspace and new generations of trees outside woodlands, such as hedgerow trees and in-field trees (where appropriate), wood-pasture, parkland and orchards, that sit within and complement a wider ecological network.

Public access to our woods and forests and interpretation should be facilitated, supporting recreational use, tourism and delivery of health and well-being benefits. On our own RSPB nature reserves where native woodlands are an important feature, we will seek, where appropriate, to expand the areas of nationally important and scarce types of native woodland as a demonstration of best practice. And, we will also continue to work with partners to make these areas of native woodland larger, and better connected; for example the Great Trossachs Forest Project and Cairngorm Connect.

Investment in the management and expansion of Scotland's trees, woods and forests has – similar to new kinds of investments in the farming sector - great potential to support good jobs and livelihoods and utilise the strengths of the existing land-based workforce.

2.5 Transform Scotland's food system through Good Food Nation legislation

Our food system, both here in Scotland and globally, is being impacted by climate change and biodiversity loss but itself is a key driver of these crises giving rise to significant greenhouse gas emissions and causing habitat loss and degradation. We need nothing less than a transformation of our whole food system to address these challenges and whilst Scotland can't necessarily change the global system, there is much that can be done domestically to drive progress.

RSPB Scotland is working as part of the Scottish Food Coalition to highlight the challenges we face and calling for policy reform and solutions to address these. The SFC's hope and expectation for the future as set out at Chapter 2 of 'Plenty'¹⁰⁹ states:

'Our food production systems work with nature, not against it; farming, fishing, processing, transportation and storage of food all maintain and enhance our environment, at home in Scotland and in those countries we import from. The agroecology approach to producing food, including certified organic production, conserves our soils and seas, mitigates climate change, and protects our wildlife, genetic diversity, landscapes and cultural heritage.'

¹⁰⁹ Scottish Food Coalition March 2016, Plenty: Food, Farming and Health in a New Scotland. Scottish Food Coalition.

The report identifies four key steps to making progress on the environmental front as follows:

- Establish agroecology as the underlying principle of farming in Scotland, and set out a programme to transform farmer education, training, advice and research accordingly.
- Champion a reform of the Common Agricultural Policy that supports and develops truly sustainable production, directing money to where it delivers most for Scottish citizens in terms of our environment and the food we eat.
- Ensure more effective implementation and enforcement of existing environmental legislation throughout the food supply chain in order to reduce impacts.
- Take a whole system approach to reducing the impact of our food on the climate, measuring consumption as well as production emissions and setting ambitious targets for reducing them.

Overall, ‘Plenty’ called for a number of things to happen to respond to food system challenges including: greater policy co-ordination and coherence; Government, its agencies and all public bodies to drive up standards, ‘demonstrate by doing’ and lead the way to better food systems; a more democratic and inclusive food system; a new ‘sustainable development’ approach throughout the food chain; people with knowledge and resources (financial and otherwise) able to make good food choices; and, leading the way and learning from best practice, beyond our borders.

The SFC has campaigned for Good Food Nation legislation to be introduced and after making a number of commitments that were never followed through, the Scottish Government has again committed to bringing forward draft legislation – a Good Food Nation Bill - within the next year. The SCF has 5 key asks¹¹⁰ for this legislation including setting a requirement for Government to produce a National Food Plan setting out the policies and proposals that will tackle problems such as food poverty, diet related ill health, conditions for food workers, and the climate and nature crises. We are also calling for ambitious targets for reducing the use of chemicals and preventing obesity and demanding the establishment of a formally recognised Scottish Food Commission to provide independent scrutiny of our food system and drive progress.

Transforming our food system has the potential to not only provide a response to climate change and biodiversity loss but to deliver significant socio-economic benefits. As argued in ‘Plenty’,

‘Our current models of food production, distribution and supply are increasingly large scale and industrialised. Fewer and fewer individuals benefit economically from this system while many of us bear its social and environmental costs. Increasingly, we lack connection to our food. Relatively few people are engaged directly in producing or harvesting food and the majority of us are largely ignorant of the practices and processes by which food comes to our plate. Our food system could be very different with significant benefits for all.’

¹¹⁰ <http://www.foodcoalition.scot/good-food-nation-bill.html>

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Diversifying food production, identifying and developing new markets and shortening supply chains should be part of any future food strategy. More effort is needed to help farmers identify new or alternative markets, diversify what they produce and, ultimately, become less dependent on income support payments. Very few farm businesses in Scotland (c. 2-3%) process and add value to the raw materials they produce, opting to sell their produce on to others in the food supply chain. This has a number of impacts, not least if which is to ensure that farmers receive a low share of the final consumer pound spent on food. It also means that the majority of farmers are disconnected from the consumers of what they produce and poorly understand consumer requirements. More farmers need to be encouraged, supported and up-skilled to process, add-value and directly sell their produce, with an emphasis on supplying local and domestic markets. As well as having the potential to improve farm viability, we also believe greater progress in this area could have social and environmental benefits, helping to connect people to what they eat, where it comes from and how it is produced and reducing food transportation. We consider there is great potential for those farmers producing food in environmentally friendly ways to use this in their marketing and branding.

Much of the food produced in Scotland is sold as raw commodities to businesses located elsewhere, often outside of Scotland, which process and add-value to it. This means lost revenue for Scotland's economy and fewer jobs in the food sector than might otherwise be the case. Greater investment in infrastructure such as abattoirs, grain mills, creameries and other processing facilities is required to build capacity and retain more of the value-added from what we produce. This should contribute to shorter supply chains, less waste and less food transportation resulting in further environmental improvements as well as economic gains.

2.6 Put greater emphasis on knowledge transfer, advice and training to encourage and promote uptake of best environmental practice.

One issue raised in the earlier cited Scottish Environment LINK paper to which it is worth drawing particular attention in the context of achieving just transition in the rural sphere is the need for greater emphasis on supporting activities including ***knowledge transfer, advice and training***. The paper states:

'This should build on the significant investment of public funds in agricultural, forest and other land use research and do more to ensure the results of this reaches those who could benefit most from it. Low levels of formal education and training in the land use sectors need to be addressed.'

We see a particular need to strengthen knowledge transfer, advice and training with respect to farming and the environment. Funding for knowledge transfer programmes that can bring together land managers, researchers, specialists, and policy makers must continue. Such programmes must have an emphasis on sustainable farm practices rooted in agroecological principles that contribute to climate change mitigation, reductions in diffuse pollution, and reverse biodiversity decline. Whilst there are a number of existing mechanisms and initiatives designed to provide information and advice to farmers, too few have an explicit environmental remit. The Farming for a Better Climate initiative is one positive example but the number of farmers reached by it is small. Monitor Farms

have also proved a successful mechanism for knowledge exchange but again, reach a relatively small proportion of the farming population and, to date, have been limited in terms of the environmental issues they explore. Where environmental issues have been considered these have tended to be in relation to climate change and renewable energy with little focus on biodiversity or water quality. Existing measures for knowledge transfer and advice under the current Scotland Rural Development Programme may help to address the environmental challenge but more is likely to be needed in future if faster progress is to be made.

Currently only 27% of farmers in Scotland have any formal agricultural training (Scottish Government, 2015). This seems very low for a sector that needs increasingly to embrace innovation and new technologies, be more market orientated and adopt greener farming methods. Much higher rates are likely to be required if the sector as a whole is to undergo transformational change. It is also vital that land management courses at Further and Higher Education level include environmental content and promote agroecological principles within all modules rather than as optional dedicated modules. Continuing Professional Development should become the norm for those working in the farming, forestry and land use sectors and be a requirement for receiving public money.'

2.7 Put some aspects of sport shooting and related activities onto a statutory footing

Grouse and pheasant shooting and deer stalking are significant land use activities in Scotland's rural areas providing jobs and bringing money into local economies. But some aspects of these activities and their land management regimes have come under scrutiny in recent times and are under review or have previously been legislated for. In the context of responding to the climate and nature crises, we highlight the following issues:

A Review of Grouse Moor Management is currently being undertaken by Professor Alan Werrity and due to report soon. In submitting evidence to this Review RSPB Scotland – amongst other things- called for:

- Recognised best practice to be linked to an effective statutory licensing system for driven grouse shooting with this being subject to periodic updating to take account of the findings of new research, legal requirements and public standards.
- Compliance with the muirburn code to be a statutory requirement. Muirburn can damage peatlands as well as releasing significant amounts of CO₂ into the atmosphere. As springs have become drier in recent years due to climate change, the risks from prescribed muirburn for both game management and agricultural purposes, becoming wildfires have become significantly larger, and with commensurate additional costs to the taxpayer through the work of the Scottish Fire Service. The current primary legislation regulating muirburn is the Hill Farming Act 1946, which was set at a time when converting hill land to productive agriculture in the post WWII era was a primary concern. Times and requirements have changed. This legislation should be reformed, updated and have primary regard to muirburn's context in tackling climate change.

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High populations of deer in many parts of Scotland are a cause of significant damage to protected areas, native woodlands, and peatlands, through browsing and trampling. Deer damage to public interests is a major impediment to Scottish Government in relation to a number of public policy targets for improvements to protected nature conservation areas; woodland expansion; and tackling climate change. Tackling the issue of unsustainable deer management is also important in meeting Aichi and Scottish Biodiversity Strategy 2020 targets. In the absence of natural predators of deer, effective management measures need to be in place to keep deer populations at sustainable levels. At the moment, an undue burden of deer management falls on Forest and Land Scotland (and therefore the public) as they take one third of the national deer cull each year. There are also other costs to the public from high deer numbers including deer fencing, vehicle collisions, and impacts on agricultural crops and private gardens.

Whilst we recognise the sporting interest in deer, tackling the problems caused by high populations requires more private landowners to help by maintaining deer populations at sustainable levels. Whilst some progress has been made with improvements to deer management planning, there is still a substantial amount of work to do to ensure that these plans are implemented, and that gaps in the voluntary deer management network are filled, particularly in lowland areas. Scotland is still some way off having a modern, evidence-based management system of wild deer fit for the 21st century, capable of responding to the changing environment and growing challenges, including the need for woodland and forest expansion.

2.8 Green our towns and cities

Much of the discussion of land use and its role in addressing the climate and biodiversity crises centres on rural areas and traditional sectors of farming and forestry. But how we use land in our towns and cities - beyond that used for housing, development and infrastructure - can deliver significant environmental and public health benefits, generate economic activity and has the potential to help address problems of inequality. Some areas worthy of further consideration include:

- Creating more wildlife habitat in our public parks, gardens and greenspaces to benefit nature and store carbon
- Planting more trees in towns and cities to provide shade and cooling benefits, store carbon and help reduce flood risk
- Using vacant and derelict land to create more greenspace and community growing areas
- Providing more land for allotments and community growing space, especially in cities and areas with high demand
- Expanding innovative food production methods and technologies such as vertical greenhouses which can utilise renewable energy, have minimal land requirements and the products of which require access to distribution networks.

Much of this could already be achieved under national and local planning and development policy with appropriate funding and investments for local authorities and the support of relevant agencies.



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Annex B: submission from Scottish Land Commission

The [Scottish Land Commission](#) is an NDPB established in 2017. Our role is to stimulate fresh thinking about the ways Scotland's land is owned and used. We advise Scottish Government on a programme of land reform spanning urban and rural Scotland, and support good practice and culture change on the ground.

The Commission's work seeks to improve:

- Productivity – in the broad sense of public value from land embracing social, economic and environmental benefit;
- Diversity – in the ownership of land and the spread of benefits from land;
- Accountability – in the way decisions about land are taken.

The Commission's current work focuses on:

- a) Land for housing and development – unlocking opportunities for public value including land assembly, land value capture, vacant and derelict land, housing land supply;
- b) Modernising land ownership – addressing the concentrated pattern of land ownership, normalising community ownership, reforming common good ownership and exploring new governance models for land;
- c) Land use decision making – supporting good practice in land rights and responsibilities, community engagement, tax and fiscal influences, regional land use partnerships;
- d) Agricultural holdings – supporting the Tenant Farming Commissioner in improving agricultural landlord/tenant relationships, addressing availability of land for farming, new entrants/land matching service.

Following the 2019 Programme for Government, the Scottish Government has asked the Land Commission to advise on developing proposals to establish Regional Land Use Partnerships, and on policy improvements to the Land Use Strategy and Land Rights and Responsibilities Statement to support climate action.

Key themes and connections emerging from current work

Land use is a key sector in delivering climate action and the next few years will see significant changes and decisions to be made in relation to land use change. How these changes are navigated in a fair and productive way will be important. We see the following connections between the work of the Land Commission and the issues the Just Transition Commission are considering.

Land Use Decision-Making & Engagement

[Scotland's Land Rights and Responsibilities Statement](#) provides a clear framework for the relationship between land and people, principles and expectations of good practice. The Land Commission supports practical implementation of land rights and responsibilities through a programme of guidance, protocols and casework – for example in relation to improving community engagement in decisions about land. Through the Land Reform Act 2016, and the Government's [Guidance on Engaging Communities in Decisions About](#)

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[Land](#), there is a clear expectation of a step change in the way people are able to be engaged in decisions. This is not just about being able to influence, but also able to benefit from decisions about land.

The responses to a public call for evidence on the impacts associated with concentrated land ownership indicated twin issues of power and participation. Our recommendations to government included the need for better and more accountable mechanisms to enable communities to benefit from decisions about land use change.

Land Use Strategy - Regional Land Use Partnerships & Frameworks

The commitment in the Programme for Government to establish regional land use partnerships and frameworks, 'to maximise the potential of every part of Scotland's land to contribute to the fight against climate change', provides the opportunity to establish effective and accountable mechanisms to drive delivery and consider the opportunities, priorities and trade-offs inevitable in future decisions about land use change.

We see the key issues to consider being principally around governance – how to establish partnerships that will be able to deliver at the pace and scale required, and do so in a fair and productive way. The rural-urban connection will be important to consider, as will the strategic fit in relation to Regional Spatial Strategies and Regional Economic Partnerships. The balance between 'top-down' co-ordination and empowering local action will also be a key consideration.

The Land Commission intends to publish a scoping paper early in 2020 to begin stakeholder engagement in considering these issues.

Land Ownership

The Land Commission published a [report](#) on scale and concentration of land ownership in 2019, which found the core issues relate not simply to scale of ownership, but to the concentration of power of decision making. Our research found that most of the benefits associated with the current pattern of ownership relate to economies of scale, while the disadvantages relate to deficits in power and participation.

In relation to management for environmental benefit, it is sometimes claimed that large scale ownership delivers better management for climate or environment action. Large scale and concentrated ownership can undoubtedly create ease of administration, but there is no evidence it necessarily leads to better environmental outcomes. The power inherent in concentrated ownership can be used in ways that either support or act against the public interest. Our recommendations focus on ensuring there is sufficient public interest framework to address these risks, as well as working towards a more diverse pattern of ownership.

There are many examples of landscape scale collaboration across land ownership boundaries, implying that ownership need not be a determining factor in the ability to deliver large scale environmental enhancement. However, it seems clear that policy and support mechanisms enabling collaborative action need to be more comprehensive and simpler to implement.

Agriculture

The role of the Land Commission in relation to agriculture, and specifically the Tenant Farming Commissioner, is principally on agricultural tenure. We seek to improve relationships between agricultural



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landlords and tenants, and promote better ways of making land available to farm in order to support dynamism and innovation in the sector (eg joint ventures, land matching service).

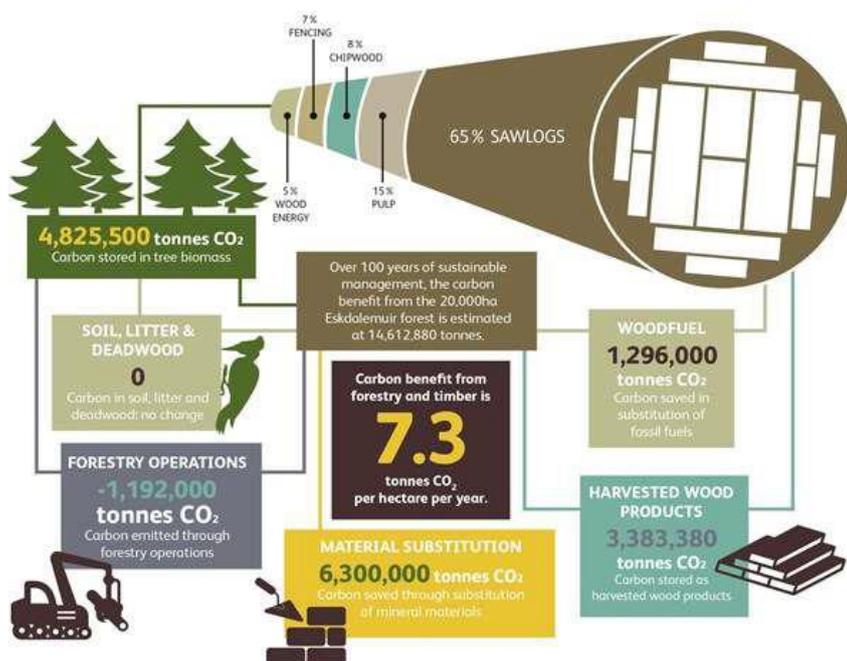
The Tenant Farming Commissioner publishes [Codes of Practice](#) (which have a statutory basis), and Guidance, and has a 'casework' role to help broker good solutions where there is a dispute or an alleged breach of a Code.

Annex C – Submission from Confor

1. What are the main economic opportunities and challenges related to the change in land use required to meet the net-zero 2045 target?

Forestry represents a major economic opportunity to align economic growth and decarbonisation, resolving many of the issues faced when they are regarded as opposing forces.

Forestry and timber are the only proven large-scale carbon capture and storage (CCS) technology at our immediate disposal; and unlike other CCS alternatives, it can simultaneously decarbonise our economy itself. Commercial forests can transform around 16 to 24 tonnes of atmospheric carbon dioxide per hectare per year into useable wood products. The retention of carbon in timber products for various lengths of time means that the forest's total store of carbon at any given time is almost doubled. Yet it is material substitution – the avoidance of cement, steel, oil and plastic – where the enormous carbon gains are almost doubled again. Over the long term, although eventually the carbon returns to the atmosphere through burning or decomposition, the growing store of wood products and the shrinking reliance on



mineral materials for construction, fencing, packaging, energy generation and high-tech materials, means that forestry is estimated to deliver a continuous carbon benefit of 7.3 tonnes per hectare per year.

Graphic from [Eskdalemuir: carbon benefit from forestry and timber](#)

The world's timber requirements are expected to treble by 2060, even with greater recycling and efficiency. Reducing mineral use would increase demand even more¹¹¹.

¹¹¹ OECD Materials Resource Outlook to 2060.

The UK, with high demand and low production, is the second biggest net importer of timber products in the world¹¹², and will struggle to retain the share of global resource it currently enjoys as other countries develop. Producing more of this valuable resource will be central to Scotland's prosperity in future, and, as there is high demand for timber at home, will multiply opportunities for economic growth through timber processing and new technologies such as offsite timber construction¹¹³.

Forestry is a renewable resource, but it is not unlimited: it relies on a finite area of land, which must also provide our food, biodiversity habitat and space for human wellbeing. However, a well-designed forest will not merely subtract land from the available resource but multiply the benefits from one area. Despite the controversies surrounding the plantation forestry of the twentieth century, comparisons of closed canopy conifer plantations with ancient woodland in Ireland¹¹⁴, and upland and lowland plantations with native woodland in England and Scotland¹¹⁵ have found that commercial forestry sustains as wide a range of biodiversity as native woodlands. Thanks to the UK Forestry Standard, based on extensive scientific research and agreed between conservationists, public sector and industry, all UK forests since 1997 have been designed to deliver environmental benefit. The Standard requires all forests to diversify 25% of their total area with alternative species, native trees and open space; to avoid planting on sensitive sites such as deep peat, SSSI grassland or stream banks; and to incorporate management measures such as diversified age structure and deadwood retention: all of these measures ensure that the forest does not cause environmental damage and quickly creates rich wildlife habitat.

2. What are the likely wider social (health, community etc.) opportunities and challenges associated with the land use change required to meet this target?

Forestry provides an opportunity to enhance access and recreation opportunities. Visiting a forest can improve mood and concentration and reduce stress¹¹⁶. Many more people can experience a sense of solitude and tranquillity in a forest than on the same area of open land, infrastructure such as car parks and tracks are hidden; there is minimal danger of dogs harming livestock or mountain-bikes causing erosion; and the climate remains more stable in windy, wet, hot or cold weather, making forests a more attractive way for more vulnerable visitors to access the outdoors such as the very young or old. Under the UK Forestry Standard, any new forest is required to maintain existing paths and access routes and take opportunities

¹¹² [Forestry Statistics](#), chapter 9 p.17

¹¹³ For more information, see the Scottish Forest and Timber Technologies Initiative.

¹¹⁴ Irwin et al, [The value of plantation forests for plant, invertebrate and bird diversity](#) (Biodiversity and Conservation, 2014).

¹¹⁵ Quine & Humphrey, Plantations of exotic tree species in Britain: irrelevant for biodiversity or novel habitat for native species? (Biodiversity and Conservation, 2010).

¹¹⁶ [Forest Visits and Mental Health](#) (Ecologist, 17 May 2019).

to enhance access.

Land use change for forestry changes patterns of land ownership and employment in the countryside. Like all economic shifts, this represents an opportunity which is often experienced as a disruptive and threatening challenge by communities in the short run, in particular by landowners and land managers who have enjoyed many years of subsidised agriculture. There is an opportunity for farmers to diversify by integrating forestry into their production: the shelter of trees results in feed costs going down and lamb survival going up, and land which is marginal for livestock can produce a valuable crop. Investment forestry brings significant new money into a rural community, often including activities such as the restoration of deserted buildings as well as the planting of trees¹¹⁷. All forestry creates jobs: around one job for every 40 hectares of mixed productive conifer. These include a wide range of professional careers and small business opportunities at local and regional level, including planting, fencing, deerstalking, forest management, harvesting, haulage, marketing and wood processing. Mills are major rural employers and rely entirely on a sustainable supply of timber from their surrounding forests. Finally, there are opportunities to diversify and localise land ownership in rural communities for example, through community forest ownership and community interest companies.

Two significant challenges of land use change for forestry should be noted. The first is the impact of forestry operations on local communities, including the visual impact of harvesting and the transport of timber on minor roads. The minor rural road network is aged and has limitations in terms of freight haulage but forestry does provide a clear economic demand for improvements which are anyway required for the wider rural economy and can provide benefits in terms of increased connectivity for remote communities. The second is the difficulty of enabling tenant farmers to participate in a form of production which may run in cycles longer than the period of their lease.

3. What actions do you think Government should take to manage the opportunities and challenges mentioned above?

Government should continue to regard forestry and timber as an industry at the heart of a just transition to a zero carbon economy, not only as a carbon-negative land use and the only carbon-negative line on the graph, but, by providing a zero-carbon material suitable for both manufacture and energy generation, as the key to decarbonising many of the other sectors and ensuring quality of life for all, in particular through the provision of warm, timber-rich zero-carbon homes.

¹¹⁷ [Forestry and Local Economy](#): case studies of Westwater and Larriston (Confor 2018).

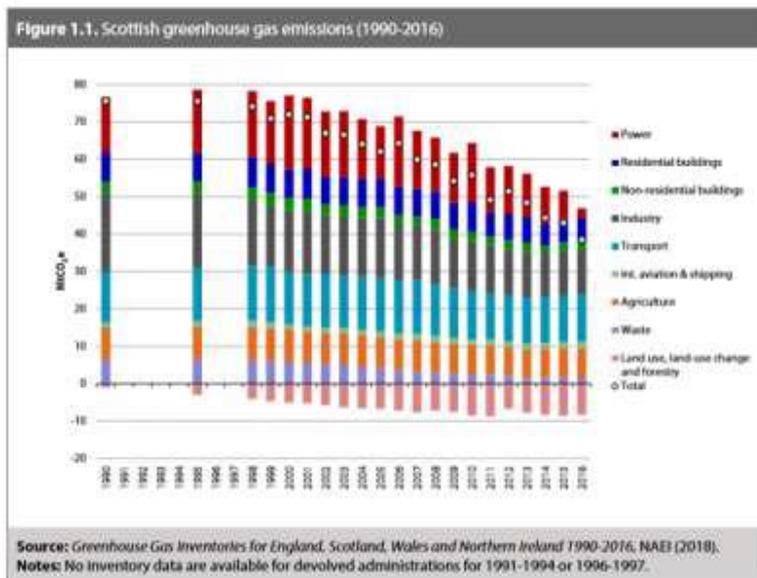
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Government should continue to ensure forestry meets the UK Forestry Standard and engage with industry to discuss where further evidence on carbon or biodiversity delivery may be required. It should be noted that any change in restrictions on forestry activity for environmental reasons should be based on sound evidence, as there is a risk that, rather than delivering the benefits intended, it will limit investment in this key industry.

Government should consider opportunities under future rural support payments to partner with forestry investors to improve access infrastructure in forests where appropriate, or to site forestry in locations of amenity benefit to communities such as near towns, where land prices would be prohibitive for investment for the market alone.

Government should continue to provide integrated advice on forestry through the farm advisory service, to ensure farmers and land managers are aware of the opportunities available through growing trees.

Government should continue to support the upgrading of timber haulage routes through the Strategic Timber Transport Fund and consider increasing investment in this vital infrastructure which provides co-benefits to remote communities. Government should work with tenants and landlords to design ways to enable tenants to engage in forestry.



Annex D – Submission from Forest Policy Group

1. What are the main economic opportunities and challenges related to the change in land use required to meet the net-zero 2045 target?

Economic Opportunities

- Expansion of forestry and timber processing in ways that increases the ownership, management and participation by “people of ordinary means” in Scotland in all aspects of forestry. This would provide economic benefits to parts of society largely excluded from forestry by the current patterns of ownership.
- Changes in timber processing so more timber is processed closer to forests, to avoid excessive haulage and to increase local employment. Focus more on jobs per log, and less on logs per job and generate ‘sticky money’ (money that recirculates within the community).
- Grow more of the type of trees which lend themselves to local processing. This measure to also include increased emphasis on reducing the number of deer to the level at which these higher value trees can be grown and to move more towards forestry systems which fit a changing climate e.g. Alternatives to Clear Fell and natural regeneration.
- Increasing focus on high quality, long lasting timber products that lock up carbon for longer periods.
- Development of novel low-carbon forestry machinery and methods of working.
- Development of agro-forestry for Scotland: enhancing shelter and keep for animals and reducing the economic costs of flooding.
- Change of land use from large sporting estates to more diverse land uses will open up opportunities for larger numbers of people. For instance, the current artificially high population of anthropogenically managed Red and Roe deer in Scotland generate some 250MtCo2e per annum. Allowing community deer stalking syndicates and clubs would produce new opportunities for local venison sales and processing.

Economic Challenges

- A high proportion of forests are owner by wealthy individuals and organisations, such that forestry is already unequally structured. A just transition to low carbon forestry will limit ownership of forests in Scotland by wealthy individuals and external investors.
- The price of forestry, sporting and farming land has been bid up by land being used as an investment vehicle by the wealthy, putting it beyond the means of most ordinary people (except in the smallest parcels).
- Subsidies and tax benefits have been capitalised in land values. Debt, especially in the agricultural sector has grown commensurately. Removing the support mechanisms will leave the sector exposed to insolvency.
- Reform of subsidies and tax regimes for all rural land use ought to be considered

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- Several forestry and timber working practices are particularly fossil fuel intensive such as intensive cultivation, timber harvesting and haulage, production of board material, and travel to and from forests by remotely located managers and contractors.
- A just transition to net zero will require a significant expansion of forest cover, supported by appropriate incentives – as being touted by political parties in the General Election campaign. Without change, existing fiscal arrangements could result in already wealthy (large landowners) becoming more so, at the expense of ordinary tax payers.
- The established industrial forestry sector has developed a convincing message around the benefits of continued support for plantations which are dominated by a single non-native species, citing carbon benefits from both growing the tree, and from substituting timber for other higher carbon materials. This message chimes well, however it is an oversimplification, and it makes discourse and action around new and innovative types of forestry difficult. Framing climate change as an economic opportunity will cause economic challenges.

2. What are the likely wider social (health, community etc.) opportunities and challenges associated with the land use change required to meet this target?

Social opportunities

- Expanding the ownership and management of forests by communities and local people will increase the resilience and capacity of those communities as they adapt to climate change.

Social challenges

- Low current participation and capacity in forestry due to historic exclusion.
- Aging sector: both agriculture and forestry are dominated by men of a certain age
- Sector tends to be conservative and resistant to change
- Forestry has focused on “lowest common denominator” type management, with every increasing specialisation and also every increasing centralisation of management responsibility. For example, FLS now discourage employees from holding a Fire Arms Certificate unless they are deer controllers, and they are now actively averse to appropriately qualified chainsaw operators using saws unless they do so on a full time basis. They have also steadily reduced the number of districts, moving instead to uber regions – this scale of State forest working means a remote and detached management culture.
- Lack of a ‘Forest culture’ means the opportunity to maximise local benefits from forests is being missed

3. What actions do you think Government should take to manage the opportunities and challenges mentioned above?

- A robust, large scale and long-lasting programme of land reform and allied fiscal incentives could make land less available and attractive to the wealthy, and so reduces the value of

land, making it more available to more people. In some instances, this could lead to less public subsidy being needed to effect land use change.

- The share of community-owned forest needs to be increased, alongside encouraging greater ownership and management of forests by people of ordinary means (farm forestry, individual small-scale private ownership).
- Local processing of timber could be strengthened by capacity building and financial support and limits placed on the transport of “green” i.e. freshly felled timber especially by road. In this respect, subsidising timber transport should cease except in specific, defined situations: at present it is often used to subsidise mainstream forestry and ‘export’ jobs from local areas
- Small scale local forestry organisations and businesses need to be better supported
- Low carbon methods of working need to be incorporated into the UK Forestry Standard, Certification and good practice guidance.
- Large scale timber processing needs to be encouraged to adopt low carbon methods of working.
- Financial incentives which are not universally available may be viewed as socially unjust and should be reviewed. An example of this is Agricultural Property Relief (for both agriculture & forestry) from Inheritance Tax
- Scottish Government needs to follow through on its commitment to ‘put public land at the heart of land reform’. This could include ensuring disposals of public land always seek to diversify ownership as a priority; and creating opportunities for individuals to lease public land (in a forestry context, via woodland crofts & woodlots)
- Greater emphasis needs to be put in UKFS on minimising ground disturbance and its associated loss of soil carbon
- In relation to the above, a move away from clearfelling to Low Impact Silvicultural Systems should be adopted.
- An emphasis needs to be placed on natural regeneration for expanding tree cover; the current focus on new planting and generous levels of grant in the Woodland Creation Grants Scheme leads to investment driven, lowest common denominator forestry. This in turn fuels Greenhouse Gas Emissions from soil disturbance – a product of low cost, traditional establishment techniques such as ploughing, mounding and draining. This effectively means that year on year tree planting in Scotland is carbon negative.

4. How can communities be involved in decisions around land use changes that affect them?

- Expanded land reform which places a greater proportion of land in the ownership of communities. SG set an ambitious target for 2020, but without increased State funding the ScotGov will not meet this target. This is in part a product of the process of Community Asset Transfer - communities are often subjected to “trial by bureaucracy” which needs to be made simpler and less onerous.
- Reforming land fiscal support to give communities a say in how public subsidy is allocated. This might involve totalling the historic subsidy payable to a catchment or sub catchment

and inviting landowners to lodge a bid with their community for a share of the support. Flood prone communities could thus make decisions around measures which increased or reduced the risk of flood management in their vicinity. Access, community supported agriculture, community woodlands generating employment in a local sawmill might also be preferred to, for example supporting “tick mop” sheep on grouse moors.

- Forestry & Land Scotland management could be made locally accountable, with greater emphasis on meaningful local engagement, and its strategic and land management plans could reflect local priorities more clearly.

5. How can we make sure communities benefit from changing patterns of land use?

- The measures above apply.
- The single most important change to land use which would benefit communities is to introduce a focus on prioritising local needs. Often, communities local to a resource, such as forests, are excluded from potentially carbon reducing activities, such as ready access to firewood, and they are subject to the consequences of centralised timber processing e.g. road hazards and the local infrastructure impacts of timber haulage.

6. How should competing interests for land uses be managed?

- By careful development of the existing Scottish Land Use Strategy
- With more emphasis on maximising public rather than private value

7. What skills do land managers need to support transformation of the way land is used in Scotland? How can they be supported?

- A complete cultural shift is required both by land managers and their support sector.
- In relation to forestry, managers need to recognise the underpinning climate change objectives of forest management and reflect this in their approach to managing forests, such as sustainable husbanding of soil carbon.

8. Is the current ownership structure of Scotland’s land an enabler or barrier to changing land use?

- The current ownership structure of Scotland’s land is a barrier to changing land use; ownership brings control and fiscal incentives may not be enough to promote land use change where money is not an issue.
- An example is country sports – particularly deer and grouse. Grouse moors and deer forests represent at least one quarter of Scotland and through der methane emissions and grouse moor burning are a significant source of rural GHG emissions. These areas of land are suitable for upland native woodland and montane scrub and could function as a stimulus to local economic expansion – through local sporting use - increase biodiversity and green tourism, and act as a net carbon sink.

Annex E: Submission from Scottish Natural Heritage

Summary

Agriculture and Related Land Use contributes 23.9% of total GHG (territorial) emissions (excl. forestry, which is a sink). Transformation in land use will be needed to reduce GHG emissions in Scottish farming if the 2045 Net Zero Emissions (NZE) target is to be reached. With over 70% of land in Scotland under some agricultural use, farmland offer significant potential for carbon sequestration.

Integrated land use is important to make best use of land to meet multiple objectives and ensure that the NZE target does not drive unforeseen adverse effects, and synergies and trade-offs are anticipated.

We believe that to address the Climate Emergency, it will be essential to simultaneously reduce GHG emissions, adapt to climate change that is already locked in and address the state of nature. This is the triple challenge of the Climate Emergency.

It is important to approach the NZE target in the context of what it can also do to address the biodiversity crisis, and for the well-being of the people of Scotland. Similarly, fulfilling the ambition to achieve Net Zero (territorial) Emissions should not result in an offshoring of GHG emissions, environmental and social impacts to third countries.

The Climate Emergency is an acute challenge for the land-based industries, because it is here that the transition to a net zero economy, adapting to the impacts of climate change that is already locked-in and the state of nature and the benefits that people derive from it, all come together.

The European Common Agricultural Policy (CAP) has had a very strong influence on the structure of farming and rural land uses in Scotland. Future agricultural/land use policy will be crucial to the delivery of the 2045 NZE target, and the associated social and economic implications.

Scottish agriculture is largely dominated by ruminant livestock on relatively poor quality land. Due to the methane emissions from ruminants, the sustainability of keeping domesticated ruminants is being questioned. Though the number of animals, as well as the area of land under livestock farming, may change, there are opportunities to improve the sustainability of pasture-fed livestock while delivering social and economic benefits, through tourism (nature-based, local food /farm tourism) and shortened food supply chains, tapping into the production of a high quality product.

In farms in the lowlands, the high quality of agricultural land precludes large-scale land use change. However improvement in sustainability can offer gains in profitability to farmers, while some carbon sequestering activities should increase landscape diversity improving the amenity value of the lowlands.

Large-scale habitat creation/restoration for peatlands, native woodlands, scrub and semi-natural grasslands can be envisaged in less productive land. This would offer great potential for sequestering carbon while creating new opportunities for nature-based tourism and recreation.

Well-designed commercial forestry in the right place, on the basis of a clear understanding of place-quality and landscape character can have positive landscape and amenity benefits. Regional land use plans should help ensure the expansion of commercial forestry is well balanced with other needs.

Many native woodlands are in poor condition mostly due to overgrazing, predominantly from wild deer. Fencing is costly and only a temporary measure. A better approach is to develop appropriate deer management with land managers and other stakeholders to reach more sustainable population levels. Some measures may carry a cost for land managers, which would need to translate into government's financial support as the reduction in deer population numbers is in the public interest.

The approach envisaged in the Land Use Strategy, through development of regional land use partnerships and regional land use frameworks could be the best way to guide the delivery of the NZE target. These could provide the basis for the Place Principle and more effective alignment of effort and resources across public and private sectors. We believe that future support schemes for farmers and other land managers need to be based on investment in natural capital, including at the landscape-scale. There are also opportunities for the development of private markets for carbon and other public goods. There could also be a role for government to encourage and facilitate these.

Background

Agriculture represents a significant share of Scotland (territorial) greenhouse gas emissions. The most recent GHG reporting by the Scottish Government showed that Agriculture and Related Land Use contributes 23.9% of total emissions¹¹⁸. This does not include land under forestry and woodlands, which is reported separately and is currently a net sink.

In the Climate Change Plan 2018-2032, a number of policies are outlined, which are concerned with awareness raising, research and direct engagement with farmers to drive change in emissions reduction and carbon sequestration. The overall approach has been based on voluntary commitments by farmers to reduce their GHG emissions.

Ambition will need to be scaled up to reduce GHG emissions in Scottish farming if the 2045 Net Zero Emissions (NZE) target is to be reached. In doing so, it has to be acknowledged that some GHG emissions are inherent to the biological processes occurring in farming and cannot be

¹¹⁸ <https://www.gov.scot/publications/scottish-greenhouse-gas-emissions-2017/pages/3/>

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eliminated entirely. Concomitantly, with over 70% of land in Scotland under some agricultural use, farmland offer significant potential for carbon sequestration, therefore providing a useful role in offsetting unavoidable GHG emissions in the farming sector but also society at large (though this should not detract from the need to continue reducing emissions).

The Climate Emergency is an acute challenge for the land-based industries, because it is here that the transition to a net zero economy, adapting to the impacts of climate change that is already locked-in and the state of nature and the benefits that people derive from it, all come together.

Transition to a net zero economy requires a transformation in how we use the land, and a transformation in the distribution of costs and benefits associated with those choices.

What are the main economic opportunities and challenges associated with meeting the 2045 net-zero target in relation to the agriculture sector and wider land use changes?

Summary: Future agricultural/land use policy follows will be crucial to the delivery of the 2045 Net Zero Emissions (NZE) target and the nature of its economic and social impacts. There is the opportunity (and need) to simultaneously reduce emissions, adapt to climate change that is already locked in and address the state of nature. Rewilding or large-scale habitat creation/restoration for peatlands, native woodlands, scrub and semi-natural grasslands would offer great potential for sequestering carbon and reducing GHG emissions from degraded land. Changes in agriculture towards more agroecological practices (alongside new technologies) combined with a degree of land use change towards habitat restoration and forestry could create new opportunities for nature-based tourism, the provision of high quality food products and local food tourism. The potential co-benefits of achieving the 2045 NZE target could help to diversify the agricultural sector and bring employment opportunities, especially in remote rural areas with poor quality agricultural land.

The European Common Agricultural Policy (CAP) has had a very strong influence on the structure of farming and rural land uses in the UK and the EU at large. The CAP which was originally designed to support increases in food production, has broadly had a negative impact in other areas, including on the environment and fair access to land and resources. The correlation between subsidies and land prices in the EU has been very high, even though some other factors have also been at play¹¹⁹. Land access is a critical barrier for new entrants to agriculture, not least in Scotland, which has faced a rapid decline in the tenanted land sector¹²⁰.

¹¹⁹ European Parliament (2013) 'Possible effects on EU land markets of EU direct payments', http://www.europarl.europa.eu/RegData/etudes/STUD/2013/495866/IPOL-AGRI_ET%282013%29495866_EN.pdf

¹²⁰ Mackee, A et al (2018) 'Increasing the Availability of Farmland for New Entrants to Agriculture in Scotland', A report for the Land Commission Scotland, the James Hutton Institute. <https://landcommission.gov.scot/wp-content/uploads/2018/05/McKee-et-al.-Final-report-to-SLC-Increasing-land-availability-for-new-entrants-2.5.2018.pdf>

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Without presuming the outcomes of the exit from the EU, whatever agricultural/land use policy follows will be crucial to the delivery of the 2045 Net Zero Emissions (NZE) target and the nature of its economic and social impacts.

Shifts in payment regimes may alter how money becomes distributed in rural areas. Any transition away from CAP should be managed very carefully in order to avoid unintended consequences and externalities of any new payment system. A report for the RSPB estimated the cost of paying farmers to deliver public goods at £729 million in Scotland¹²¹, including the costs of delivering on environmental land management priorities, protecting vulnerable high nature value farming, advice to land managers and securing long-term benefits.

A lot will have to change in the way the land is managed, through a combination of carbon sequestration and changing GHG emitting practices. Three sectors where Scotland holds a comparative advantage are in energy (including renewable), food and drink and sustainable tourism. These are all sectors that rely on rural settings and can represent opportunities for farmers. The biophysical constraints of the land have implications for the type of land use and measures that might be taken¹²².

Large-scale habitat creation/restoration for peatlands, native woodlands, scrub and semi-natural grasslands would offer great potential for sequestering carbon and reducing GHG emissions from degraded land. It would also create new opportunities for tourism, substantially adding value to the current nature-based tourism offer. Total visitor spending attributable to nature-based tourism per year (rounded and after displacement is deducted) is £1.4 billion with 39,000 associated (Full Time Equivalent) jobs. Tourist spending on nature based activities is already worth nearly 40% of all tourism spending in Scotland¹²³. Hence, we can speculate that well thought out natural carbon storage would result in a further boost to Scotland's tourism sector.

Rewilding can offer nature-based solutions for adaptation to a changing climate (contributing to more resilient landscapes) in addition to carbon storage. Rewilding approaches can be largely 'vegetation-based' or may also include the use of large grazing animals where appropriate. If the concept is taken further, the introduction of animals that are no longer found in Scotland (having been exterminated in the past), though more controversial, might also be considered. Re-introduction, which can offer very substantial ecological benefits, can also have potentially significant implications for the land-based industries, which need to be well understood and managed. There are lessons which may be drawn from the introduction of beavers in Scotland as

¹²¹ Rayment, M (2019) Paying for public goods from land management: How much will it cost and how might we pay?, A report for the RSPB, The National Trust and the Wildlife Trusts, Rayment Consulting Services.

¹²² About 80% of the agricultural land in Scotland is in Less Favoured Areas where sheep and cattle farming predominates. In the east of Scotland, arable farming covers 10% of agricultural land for circa 8% of farmers. There are also relatively smaller horticulture, pig, poultry and dairy industries, though in land area terms, dairy is more important. See: Scottish Agricultural Statistics 2019 <https://www.gov.scot/publications/agriculture-facts-figures-2019/pages/1/>

¹²³ Bryden, D.M., Westbrook, S.R., Burns, B., Taylor, W.A., and Anderson, S. (2010) Assessing the economic impacts of nature based tourism in Scotland Scottish Natural Heritage Commissioned Report No. 398. <https://www.nature.scot/snh-commissioned-report-398-assessing-value-nature-based-tourism-scotland>

well as projects across the European continent, in terms of dealing with economic costs and opportunities, and stakeholder engagement¹²⁴. For land managers to undertake such large scale habitat restoration/creation, which would deliver numerous public benefits, it is reasonable to expect public money to support such activities. Difficulties may arise if this initial funding for areas to restore then stops. A system of payments that work on a long-term horizon is therefore necessary to secure benefits.

Many native woodlands are in poor condition mostly due to overgrazing, predominantly from wild deer. There are unresolved concerns associated with the delivery of Scottish Biodiversity Strategy targets for native woodland condition and restoration. Any successful expansion or restoration of native woodlands needs low levels of grazing impact to allow regeneration or planted saplings to grow, and while this can be provided by deer fencing, this is an expensive and temporary measure. A better approach is to develop appropriate deer management with land managers and other stakeholders to reach more sustainable population levels. We will support the development of regional land use plans as set out in the Programme for Government to help address the deer issue. Some measures may carry a cost for land managers, which would need to translate into government's financial support as the measures are in the public interest.

Commercial conifer forestry on better ground is another way to sequester carbon and there is already substantial interest from investors in commercial forestry as a long-term investment. Forestry and timber processing contribute £771 million (GVA) and employ 19,555 (Full Term Equivalent) people. Long-term, woodland expansion should result in additional jobs in forestry and in related timber-based industries. However this also has implications for farming and wider rural communities. Land that is currently used for livestock is becoming afforested, either through farmers undertaking afforestation directly, or through sale of land. This may have both positive and negative effects on surrounding rural communities including through other actors in the agricultural industry and food supply chain. Regional land use plans should help inform and direct land use change.

The changing climate increases species' vulnerability to pests and diseases. This represents a risk for our woodlands. Commercial forestry is also exposed, particularly in monocultures where one species dominate, generally Sitka spruce. Introducing more ecological complexity to commercial conifer plantations is a key way to increase resilience and reduce economic risks.

Changes in consumer behaviour and technological improvements are likely to be confounding impacts. Consumer taste has begun shifting towards lower impact products, and as a result, the type, amount and impact of meat that is being consumed has and may continue to change. Sustainable products represent an opportunity for greater value added products, Ireland for example has now created a Sustainable Beef and Lamb Assurance Scheme (SBLAS). Technological advances may also change the demand for different products, meat substitutes and possibly even "lab-grown" meat may change the demand for livestock. Vertical farming – bringing

¹²⁴ See Rewilding Europe <https://rewilding-europe.com/rewilding-in-action/nature-based-economies/> and Rewilding Britain <https://www.rewilding-britain.org.uk/rewilding/rewilding-projects/>

farming into the urban environment - may also represent challenges and opportunities in the future.

Scottish agriculture is largely dominated by ruminant livestock on relatively poor quality land. Due to the methane emissions from ruminants, there is considerable debate surrounding the consumption of red meat. In the context of Scotland, and because a significant proportion of the land is not suitable for arable farming, the argument is made that grazing livestock is a suitable use of land. Of course, this results in an opportunity cost for other uses of the land that could yield other societal benefits. Another issue that needs consideration is the balance between supply and demand, so that environmental impacts are not just offshored in the drive to achieve carbon sequestration on land in Scotland. For this reason, we might assume that ruminant livestock farming will continue to an extent, though the number of animals, and husbandry may change as well as the area of land under livestock farming (i.e. there would be more commercial forestry and large-scale peatlands, native woodlands etc.). 'Agriculture, fisheries and forestry' accounts for 15% of employment in remote rural areas and 13% in accessible rural areas¹²⁵. The survival of hill farms clearly has implications for agricultural jobs that depend on them and the wider rural community.

The Scottish Government has strong ambitions for the food and drink sector. This includes flagship products such as whiskey (from barley), oatcakes, Scotch beef and Scotch lamb, cheeses and other derived products. Animal products make a significant part of the offer and a reduction in livestock farming might seem a threat to the food and drink sector. However, we could envisage changes that provide opportunities to diversify through nature-based tourism (based e.g. on high nature value farming and/or large-scale habitat restoration), the development of shorter food supply chains, as well as the provision of high quality food products and local food/farm tourism, in the context of a well branded Scottish food and drink offer.

In farms in the lowlands, the magnitude of change is likely to be less as afforestation or large scale habitat restoration are of lesser interest due to the good quality of agricultural land. Farmers on good land may achieve cost savings by improving efficiency in the use of inputs while reducing the volume of GHG emissions. The implementation of agroecological approaches can help optimise the use of resources present on farms, hence reducing the need for external inputs and nutrient loss to the environment. Other measures farmers can take include carbon sequestration e.g. shelter belts to protect from wind erosion, silvopastoral systems, hedges. Such landscape features can improve the amenity value of the lowlands. There are also opportunities for farmers to sequester carbon in soils, though this is a relatively complex issue. In doing so, farmers improve the soil health on their farms, which will provide economic benefits over the long-term. Where economic benefits are significantly delayed for the farmer, there might be need for public money to support adoption of measures initially.

Currently the environmental impacts of intensive farming and intensive grouse moor management are externalised i.e. society at large has to pay for the costs from environmental damage (e.g. cost

¹²⁵ Rural Scotland: Key Facts 2018 <https://www.gov.scot/publications/rural-scotland-key-facts-2018/pages/4/>

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of cleaning up for drinking water, flooding made worse by lack of trees in catchment). Paying land managers for the delivery of public goods while adhering to the polluter pay principle would help deliver a more equitable system for society at large.

While Scotland is on course to only generate carbon neutral electricity, delivering renewable heat is more complex to tackle and so far most heating remains based on fossil energy. Bioenergy is in theory one of the potential technologies that is appropriate for generating renewable heat. The benefits of bioenergy depends on a number of variables, and poses risks, hence the reason why legislative requirements include sustainability schemes¹²⁶. Potential issues include adverse environmental impacts particularly from the production of feedstocks. It may not be the best use of a resource for example where wood is burned which could be used in construction, i.e. where the carbon is locked rather than being released in the atmosphere, or where crops are grown specifically to feed an anaerobic digester. However, in some circumstances, there are interesting opportunities to develop sustainable local woodfuel supply chains, which can generate revenue for land managers and benefit rural communities that are off the gas grid. Sources of woodfuel can include commercial forestry but also smaller farm woodlands, as well as hedges and trees in an agroforestry system. Uses of food waste and slurry in anaerobic digestion can form part of the circular economy, with nutrients being recovered rather than lost in the environment.

What are the likely wider social (health, community etc.) opportunities and challenges associated with meeting this target, in relation to the agriculture sector and wider land use changes?

Summary: Measures that will be taken in the land-based industries to achieve the Net Zero Emissions (NZE) target will have an impact on visitors' perception and sense of place in local communities. There is evidence of the benefits nature can provide for people in terms of improved well-being and health. Hence there is potential for the NZE target to drive social improvements. Having said that, changes to the local economy can also be expected to affect the social fabric. Addressing the Climate Emergency will no doubt involve a number of challenges in balancing both threats and opportunities for local communities and economic actors. A key principle is that actions to achieve the NZE target are more likely to result in wider social benefits, if these are identified in the context of a wider set of objectives for a locale.

Among the general public, there is a high level of support for advancing environmental protection, in particular among young people¹²⁷. Investment in Natural Capital, as a result of low-carbon targets and through the restoration and improvement of habitats, will have a positive impact on the communities living nearby. These benefits are hard to capture in traditional economic markets but greatly contribute to wellbeing; those living nearby will benefit from in-situ benefits while recreation

¹²⁶ See Ofgem <https://rhi.ofgem.gov.uk>

¹²⁷ Mark Diffley Consultancy & Research, Involve (2019) Citizens' Forums and Attitudes to Agriculture, Environment and Rural Priorities, Report for the Scottish Government <https://www.gov.scot/publications/citizens-forums-attitudes-agriculture-environment-rural-priorities/>

opportunities will increase for visitors. There is a significant evidence base for the range of individual and wider social health and wellbeing benefits that can be achieved through outdoor activity and contact with nature¹²⁸. Higher quality habitats, including these unfolding through large-scale restoration, will be able to produce higher quality and larger amounts of ecosystem services, helping communities to adapt to the changing climate. A more agroecological agriculture will result in enhanced farmland biodiversity and landscape features, which can also provide well-being to local communities and visitors, as well as reduce some environmental risks such as flooding. A key principle is that actions to achieve the NZE target are more likely to result in wider social benefits, if these are identified in the context of a wider set of objectives for a locale. Productive forests are a large-scale land use, and any significant changes will have consequences for a large number of places and will impact on how tourists and others perceive Scotland as a place. Some conifer plantations are now locations successfully marketed for tourism and recreation (e.g. Galloway Forest Dark Sky Park, 7stanes mountain biking); well-designed commercial forestry in the right place, on the basis of a clear understanding of place-quality and landscape character can have positive benefits.

As discussed above, there is likely to be changes that will affect the farming economy at least in its present form. It can be argued that the sheep industry currently is part of the maintenance of the social fabric in Less Favoured Areas. However there are also opportunities for diversification and growth in other sectors that will induce changes in the social fabric. The outcome is likely to be positive or negative depending whose point of view is considered, and managing change will unsurprisingly be a balancing act.

What actions do you think Government should take to manage the opportunities and challenges mentioned above?

Summary: As a result of declaring a Climate Emergency, the Scottish Government is taking important steps to put in place the conditions through which actions can be taken. This includes the role of regional land use frameworks to foster stronger place-based interventions for rural support mechanisms, and, potentially wider land uses such as development. These could provide the basis for the Place Principle and more effective alignment of effort and resources across public and private sectors. Codes, similar to the Woodland Code, for all major habitats could help guide land use practices to deliver multiple benefits that simultaneously address mitigation, adaptation and the state of nature. In the drive to achieve the 2045 Net Zero Emissions (NZE) target, it is important not to offshore GHG emissions and environmental impacts to third countries.

The First Minister declared a Climate Emergency and the Scottish Government by setting a target of Net Zero Emissions (NZE) by 2045, including a 75% reduction in GHG emissions by 2030, has

¹²⁸ "Health benefits from the outdoors and nature" <https://www.nature.scot/sites/default/files/2019-10/Guidance%20-%20health%20benefits%20from%20green%20exercise.pdf>

set out an ambitious trajectory. Actions identified in the Climate Change Plan 2018-2032 are being reviewed to respond to the new target, and we anticipate a revised Climate Change Plan in 2020. As mentioned above, future land use policy is going to play a critical role in delivering the necessary changes in land management. For this to be achieved, we believe that support schemes for farmers and other land managers need to be based on three key principles:

- investment in natural capital, promoting good land stewardship and emphasising the delivery of public goods alongside more marketable goods, and contributing to the low-carbon economy
- investment in natural capital at a landscape scale including transformations in land use through landscape-scale restoration, expansion and connection of native woodland and other habitats.
- well-funded training and advice programmes to maintain and enhance the skills and capacity of land managers to invest in natural capital

Integrated land use is important to make best use of land to meet multiple objectives and ensure that the NZE target does not drive unforeseen adverse effects, and synergies and trade-offs are anticipated. For this reason, the approach envisaged in the Land Use Strategy, through development of regional land use partnerships and regional land use frameworks would be a good way to guide the delivery of the NZE target. This could provide the basis for the Place Principle and more effective alignment of effort and resources across public and private sectors.

There are also opportunities to change the way environmental schemes are implemented, moving away from a prescriptive approach. SNH is currently working with farmers on pilots to test the development of an outcomes-based approach, whereby farmers can decide how they will achieve specific environmental outcomes. By empowering land managers, their motivation will be greater, and the assumption is that good environmental outcomes are more likely to be achieved. Our discussions so far with farmers suggest enthusiasm for the approach.

Beyond the use of public money for public goods, there are also opportunities for the development of private markets for carbon and other public goods (e.g. water quality). There could also be a role for government to encourage and facilitate access to private markets for public goods through land management action (existing examples include Landscape Enterprise Networks, Woodland Carbon Code, Peatland Code). The potential for Environmental Net Gain approaches and the development of carbon trading for other habitats (than forestry and peatlands) could also be explored.

It is also important to remember that the NZE target is concerned with territorial emissions. Therefore all emissions embedded in products and equipment used in the land-based industries and which are imported are not taken into account. This includes for example soya meal for animal feed. It is essential not to lose sight of this so that GHG emissions are not just emitted in other countries to enable the NZE target to be reached in Scotland. This is an issue that applies to the entire economy. The Scottish Government publishes a regular report on UK consumption-based

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emissions¹²⁹; this is high level. Regular and more detailed accounting and reporting of consumption-based emissions would be very useful in parallel to the main reporting of Scotland's territorial emissions, to determine whether there is carbon leakage emerging and for what categories of goods. Supply chain analysis is an active field of research with ongoing methodological improvements, which can help determine potential environmental and social impacts.

¹²⁹ <https://www.gov.scot/publications/scotlands-carbon-footprint-2015/>

Annex F – submission from Tweed Forum

- 1. What are the main economic opportunities and challenges related to the change in land use required to meet the net-zero 2045 target?**
 - The main economic opportunities, lie in land use diversification, especially in the uplands. Delivery of nature based services will be key. The main challenges lie in creating an economic model for trading in natural capital. Mindset and behavioural change remains a huge obstacle.
 - In Southern Scotland, most potential for land use change will occur on upland livestock (principally sheep) farms. Traditionally the Southern Uplands are hill sheep country with conifer shelterbelts with significant areas of commercial conifer plantations.
 - What land uses does society value in the landscape and what do they want it to look like? How would they wish it to change? Why would they wish it to change? Integrating framing, forestry and conservation will be key.
 - The land based sector will continue to require significant government support going forward.
 - Incentives remain fundamental to land use but where do we incentivise and what do we incentivise?
 - Tweed Forum would wish future rural support to be directed to farmers and land managers who create and manage significantly more wildlife friendly habitat. Farms don't just produce food and timber. Integrated Land Use would help deliver many of society's basic needs and also provide rural land managers with regular income.
 - This could be facilitated through a tool such as the Land Use Strategy opportunity target mapping tool. Farmers could be paid for delivering more Ecosystem Services such as: Natural Flood Management, Soil carbon storage, Peatland restoration, Enhanced water quality, Reduced erosion, More wildlife habitat connectivity, More native woodland, Food production on appropriate land, Timber production on appropriate land and at the appropriate scale.
 - **Example Question 1-** Where is the incentive for farmers at the head of a valley to undertake land use change to help reduce flooding 20 miles downstream?
 - **Example Question 2-** If Salmon are being caught in the lower reaches of the river and shops and hotels are benefitting there, where is the incentive for farmers in the upper reaches (ie the hills) to implement conservation measures to ensure that habitat are suitable for returning fish to breed.

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- Regional Land Use Partnerships (RLUP's) should be established to help facilitate the debate on how to prioritise and incentivise Land Use Change.
- These RLUP's should have ring fenced budgets for their local regions. Regional Land Use Priorities and funding packages could be determined by the RLUP's. What role will these RLUP's fulfil? Will they offer Statutory & Regulatory Services or Advisory & Supporting Services? What budgets will the RLUP's have?
- Facilitators will play a key role. Advisors who have a broad range of knowledge of: agriculture, forestry, conservation, climate change and economics will be fundamental.
- Not all traditional hill farms will survive in future. Many traditional hill shepherds will adapt, some may retire and some may make way for land managers who would manage the land differently, for delivery of multiple benefits (ie delivery of nature based services/natural capital).
- Climate change mitigation and adaptation will drive most economic agendas. Creating and managing more semi-natural habitat will not just help with climate change mitigation but also help deliver Biodiversity gain, especially if undertaken at the landscape scale.
- Scale of delivery and connectivity of habitats will be important. The larger and more connected habitats are, the more effective they will be at delivering real benefits to the environment and climate.
- There is not enough public money in the system, to create and manage the scale of habitat creation required to deliver both significant climate and biodiversity gain. Private sources of funding will be essential.

2. What are the likely wider social (health, community etc.) opportunities and challenges associated with the land use change required to meet this target?

- The wider opportunities and benefits are crystal clear. It is not a question of if we need to change the way we manage landbut how quickly we can make the changes. The climate is heating up and wildlife is in steep decline. Sustainable food production and food security requires both these systems to function effectively. All of society will benefit if solutions are found.
- Mitigating against the worst effects of climate change is not just about delivering green energy projects but also about landscape scale habitat creation and management. Biodiversity enrichment will come on the back of habitat restoration for climate change. However, there needs to be a market for nature based services delivery.

3. What actions do you think Government should take to manage the opportunities and challenges mentioned above?

- As a matter of urgency, undertake a Scotland wide programme of natural capital accounting (ie; mapping all existing natural capital resources and creating land use opportunity target maps for delivery of nature based services). The wide range of nature based services include: natural flood management, soil carbon storage, peatland restoration, enhanced water quality, reduced erosion, more wildlife habitat connectivity, habitat for pollinating insects, more native woodland, food production on appropriate land & timber production on appropriate land.
- Invest more time and effort in creating a market for delivery of nature based services. In the meantime, the public money should be directed towards delivery of public goods and services...that are not otherwise 'economically attractive' to deliver at present.
- Set up Regional Land Use Partnerships to help facilitate the land use opportunity target mapping programme outlined above.
- Incentivise farmers in the areas where the most practical and cost effective nature based services can be delivered.
- Experiment with different incentivisation tools ie; reverse auctioning, payments by results, etc.
- Produce a simple and usable online mapping system that everyone can access and use. Land use data gathered at the public's expense should be made available to the public. This would help determine (quickly and easily) where the best spend could be targeted.

Annex G: submission from SCCS

1. Negative emissions

Combined with carbon capture and storage (CCS), Scotland's land and its food and drink industry have the potential to deliver 'negative emissions', helping Scotland meet its net zero greenhouse gas emissions targets.

Carbon capture and storage (CCS) is the process of separating carbon dioxide (CO₂) from the flue gases of industrial operations, transporting it, then securely storing it in geological formations deep below the seabed.

CCS is crucial to reducing emissions from industry, where there are few other options for decarbonisation. CCS can also be used to avoid emissions from gas or coal fuelled power generation (unlikely to be necessary in Scotland) and applied to store CO₂ derived from biomass combustion for power, producing credits in negative carbon. CCS can be used to remove carbon from methane to produce hydrogen for heat and transport fuels. And CCS can capture CO₂ from anaerobic digestion of biogas and CO₂ from fermentation industries, again producing credits in negative carbon.

Once it is in place, the infrastructure to transport and store CO₂ should be available to any organisation that can capture its CO₂ - this includes CO₂ from biogenic (non-fossil) sources, which are not counted in the emissions inventory and which therefore would count as 'negative emissions' if they were prevented from reaching the atmosphere, including:

- Biogas combined heat and power (including landfill and sewage treatment)
- Biomethane upgrading
- Biomethane combustion
- Biomass combustion
- Fermentation¹³⁰

Negative emissions should not be seen as a replacement for measures to avoid or reduce greenhouse gases – all parts of the economy will need to do what they can to decarbonise. Negative emissions will be needed to offset emissions that can't be avoided, and by delivering them, Scotland's land and agriculture sector can help the rest of the economy in its transition to net zero. Importantly, the negative emissions from these biosources can be provided at small energy costs, often generating energy. By contrast, negative emissions from air capture or accelerated weathering will require very large energy inputs, making them much more expensive.

¹³⁰ See Brownsort (2018) *Negative Emission Technology in Scotland: Carbon capture and storage for biogenic CO₂ emissions*: https://www.sccs.org.uk/images/expertise/reports/working-papers/WP_SCCS_2018_08_Negative_Emission_Technology_in_Scotland.pdf

2. Biogenic CO₂

As plants and trees photosynthesize, they absorb CO₂ from the air and convert it to glucose. Through this process, carbon is taken out of the atmosphere and 'locked up' in the plant. However, this carbon sequestration is not permanent, lasting only 1 to 50 years, – the CO₂ is released when the plant dies and rots or is eaten or burned. By contrast storage of CO₂ for climate purposes will be for 1,000 - 10,000 years duration. One way to keep this carbon locked up for a long time is to use timber as a building material, where it will remain inert until the end of the building's life. Another option is to capture the CO₂ when it is released – for example where wood is burnt for electricity generation or to fuel industrial processes; where organic waste is broken down in landfill or through anaerobic digestion, or where it is incinerated to create energy; or where the sugar is converted to alcohol in the production of whisky and other drinks.

3. Current opportunities for capturing biogenic CO₂ in Scotland¹³¹

Food and drink

Scotland has seven grain whisky distilleries, which account for around 0.25 MtCO₂ / year as well as hundreds of smaller distilleries and breweries. These fermenting processes give off a concentrated stream of CO₂ as yeast turns sugar to alcohol.

In most cases, it would not be practical to capture this CO₂ because of the small size of the operations - but from the distilleries which operate at an industrial scale, it would be possible and, indeed, has already been done at the North British Distillery in Edinburgh. Similar distillery scale plants appear to be accessible in cost, and could remove CO₂ to a storage hub by road tanker or rail.

Bioenergy with CCS

Bioenergy with CCS (BECCS) is the most well-developed approach to capturing biogenic emissions, and is currently being trialled at Drax power station in Yorkshire, which burns wood pellets to produce electricity.

Scotland has six major sites where biomass is burned for power generation, heat or both – they account for around 1.4 Mt CO₂/year – in addition to thousands of smaller sites. There is the potential to turn this to negative emissions using CCS.

Overall, research by SCCS found that there is the potential to capture 2.1 Mt CO₂/year of existing biogenic emissions in Scotland, from the 29 of the largest sites in the country.

¹³¹ See Brownsort (2018). This report considered existing sources of biogenic CO₂ in Scotland, including energy from waste, which is less relevant to this evidence session, but nonetheless provides an opportunity for negative emissions. Further work on the greenhouse gas removal potential for energy from waste is being done through the European NEWEST-CCUS project, in which SCCS is a partner.

4. Future opportunities for negative emissions in Scotland

BECCS

The Committee on Climate Change found that demand for harvested biomass is likely to outstrip supply, so recommends that it “will be used most effectively where it maximises the removal and minimises the release of carbon into the atmosphere”; that is:

- More timber used in buildings
- No new subsidies for large-scale biomass to power plants unless with CCS
- Use biomass to produce hydrogen, electricity or industrial products whilst sequestering carbon with CCS
- Phase out biofuels in cars and vans in the 2030s
- Plan for up to 10% of aviation fuels as biofuel produced with CCS by 2050¹³²

It has been estimated that there is the potential for dedicated short rotation coppice plantation on an area of 5,2000 km² of land which is described as “marginally suitable for food production”, and which accounts for 26.5.% of agricultural land in Scotland. This could remove 5.73-22.9 MtCO₂/year¹³³, although competition with other land uses, and for water and nutrients, means that actual deployment is likely to be less than this.

Other options

Other options for greenhouse gas removal that could be considered by the land use and agriculture sector include:

- Increasing soil carbon – including peatland restoration and expanding forestry.
- Creating biochar – fixing carbon for long term storage by charring biomass.
- Enhanced geological weathering of rock minerals – intentionally accelerating processes that convert CO₂ in the air to rock.
- Direct capture of CO₂ from the atmosphere for geological storage.¹³⁴

¹³² Committee on Climate Change (2018) *Biomass in a low-carbon economy*: <https://www.theccc.org.uk/publication/biomass-in-a-low-carbon-economy/>

¹³³ Alcalde et al (2018), cited in Haszeldine et al (2019)

¹³⁴ For more detail on these, and their potential capacity for negative emissions in Scotland, see Haszeldine et al (2019) *Greenhouse Gas Removal Technologies – approaches and implementation pathways in Scotland*: <https://www.climatechange.org.uk/media/3749/greenhouse-gas-removal-technologies.pdf>



Paper 5/4 NHS Health Scotland proposal **For discussion**

1. Purpose

- 1.1. This paper outlines support available to the Commission from NHS Health Scotland, the national Health Board with a remit to reduce health inequalities and improve population health.¹³⁵

2. Background

2.1. The Commission's remit commits it to delivering recommendations to Scottish Government that will:

- maximise the economic and social opportunities that the move to a net-zero economy by 2045 offers
- build on Scotland's existing strengths and assets
- understand and mitigate risks that could arise in relation to regional cohesion, equalities, poverty (including fuel poverty), and a sustainable and inclusive labour market

There are several areas of NHS Health Scotland expertise that are of relevance to the Commission's remit. These include areas such as the co-benefits associated with low-carbon investment (including impact on health inequalities), and tools for how these co-benefits can be factored into Government policy making.

These link to the Commission's remit above, to maximise social opportunities (first bullet) and understand and mitigate risks relating to equalities (last bullet).

3. Recommendation

- 3.1. Commissioners are invited to consider the proposed areas of support available from NHS Health Scotland in this paper and agree what would be most helpful to your work. Secretariat will lead on following up and agreeing any work resulting from this with NHS Health Scotland staff.

¹³⁵ NHS Health Scotland website ([link](#))

1. Health and Health Inequalities in Scotland

1.1 The health of the population in Scotland is amongst the worst in Europe. Life expectancy is one of the lowest in Western Europe and we have stark health inequalities. Improving the health of the population whilst reducing health inequalities is a priority for the Scottish Government.

1.2 The health of the population is determined by social, economic and environmental factors. The fundamental causes of health inequalities are inequalities in income, wealth and power and the resulting poverty. These inequalities influence the distribution of wider social and environmental factors that influence health, such the availability of good quality housing, work, transport networks and access to good quality greenspace.

1.3 The most effective policies to improve health and reduce health inequalities lie outside the health service. Discontinuing or modifying measures which widen inequalities will reduce the negative impact on health and health inequalities. This needs to be done by tackling the fundamental causes of inequality and preventing harmful social and environmental impacts though distributing the beneficial aspects of place more equitably.

2. Action to reduce emissions, reduced inequalities and improve population health and wellbeing

2.1 There is good evidence that policies and actions to reduce GHG emissions and the creation of a sustainable economy can also improve population health. For example decarbonising the transport sector through electrification, low emission zones and the development of active travel infrastructure within cities will contribute to improved health outcomes through promoting active travel and reducing air pollution. A sustainable economy can maintain and potentially increase employment opportunities with benefits to health and wellbeing.

2.2 However, the distributional effects of particular policies and actions are less clear and there is potential to both increase and reduce social and health inequalities. Electrification of the transport system may increase pricing, adversely affecting the poor unless greater subsidy or free public transport is provided and low emission zones in city centres may displace older vehicles and pollutants to more deprived areas. If new jobs are less secure or of lower quality this will have an impact health and health inequalities. It is critical therefore that emphasis is placed on creating secure and quality new jobs with adequate support and training.

2.3 The evidence about wider impacts of policies to reduce GHG emissions on health and equity is often not used to inform decision making at a national or local level. Furthermore, these wider impacts are rarely monitored, quantified or monetised. Tools to enable decision makers to

consider the wider equity and health implications are critical to ensuring the transition to net-zero achieves the triple wins of reduced emissions, reduced inequalities and improved health.

3. How NHS HS can provide support to ensure action to reduce GHG emissions does not increase social and health inequalities

3.1 NHS Health Scotland have a Health in All Policies approach. We synthesise and use the best available data and evidence to support the development, implementation and evaluation of policies and programmes across a range of sectors that are effective in achieving the dual outcomes of improved health and reduced health inequalities.

3.2 These resources and tools can be shared and developed to inform decisions about climate change actions to ensure that they maximise opportunities for equitable social and health outcomes rather than increase social and health inequalities.

3.3 Evidence briefings provide a summary of the best available evidence about public health interventions and issues. These are based on rapid reviews of the evidence. This approach could be used to synthesize the current evidence base on actions which contribute to health and equity outcomes alongside reducing emissions.

3.4 The Triple I tool is scenario-based modelling tool which has been designed to help local and national decision makers identify which actions will have the biggest impact on improving population health and reducing health inequalities. We are exploring how to incorporate modelling of impact of policies on sustainability, social, economic and health outcomes. There are different approaches to developing this tool. We would welcome discussion with the Just Transition Commission to ensure that the final tool supports policy development in this area.

3.5 The Health Inequalities Impact Assessment Tool can be used to assess the impact of a proposed, new or revised policy or practice on health inequalities. Developing an integrated impact assessment tool which considers impacts on sustainability, health, equity and health inequalities will support work to identify and mitigation potential risks to social and health inequalities.

3.6 Outcome based planning, monitoring and evaluation is used to help build an understanding of the impact of policies and programs on multiple outcomes including population health and health inequalities. This approach could be used to support the planning and evaluation of climate change actions on multiple outcomes.

3.7 The Place Standard Tool has been designed to enable communities and public agencies to modify and create places that improve health, wellbeing and quality of life. It incorporates 14 dimensions that cover the key components of place including natural spaces, work and local economy and, public transport. In December 2019 a new 3 year strategy (2020/23) will be launched that has five priority areas of focus, including "The Climate Change Emergency." An annual operational plan will outline the practical delivery of actions against each of the five priorities.

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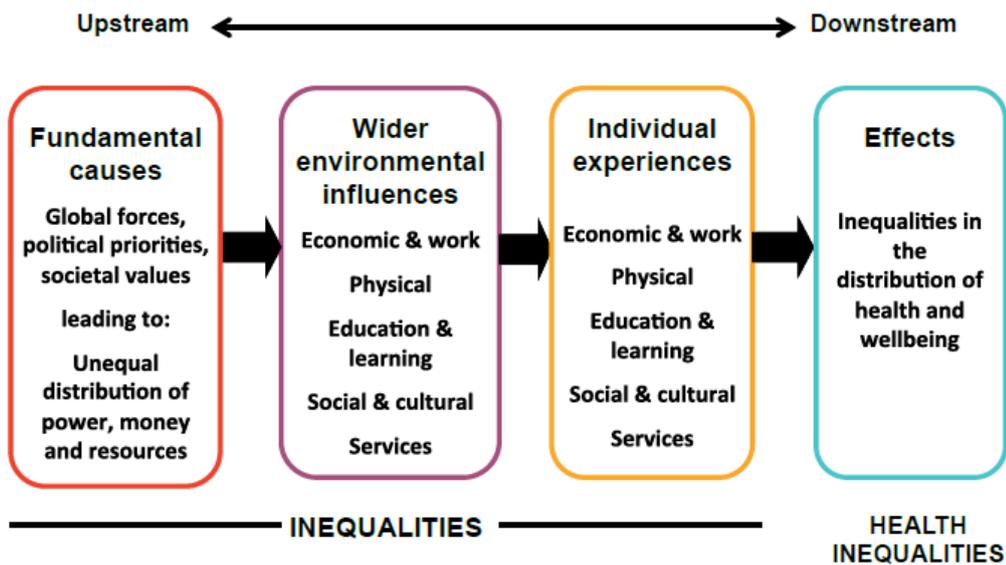
We anticipate that those particular to climate change will support a place-based approach to reducing GHG emission and adapting to the impacts of climate change.¹³⁶

3. Conclusion

The work of the Just Transition Commission is an important opportunity to ensure that the transformational change needed to achieve net zero reduces social inequalities. In doing so it can also contribute to reducing health inequalities and improving population health in Scotland.

Health Scotland would like to support the Scottish Government and the Just Transition Commission in their work. We would welcome the opportunity to discuss how we might take forward work on synthesising the evidence base and developing the tools identified in this paper to help inform decision making to help achieve a Just Transition in Scotland.

4. Appendix 1: Health inequalities: theory of causation (summary version)¹³⁷



¹³⁶ Links to these tools and examples of how they have been used can be found in appendix

¹³⁷ Further information available about health inequalities, what they are and how we reduce them [\[link\]](#)

5. Appendix 2: Examples of current use of tools

The [Triple I](#) tool has most recently included actions to [reduce income inequalities](#) such as the citizen's basic income and changes taxes. The modelling suggests that most effective income-based policies for reducing health inequalities are likely to be those that disproportionately increase incomes for those with the lowest incomes. Actions to address environmental influences such as the 20 mph limit have also been included. The modelling suggests that the majority of the health benefits of 20 mph limits were found to be due to reduced risk of road traffic accidents.

The [Health Inequalities Impact Assessment \(HIIA\)](#) tool has been used to consider the implications of [transport](#) and [housing](#) policies on health and health inequalities and implications for action.

[Outcome approaches](#) to planning, monitoring and evaluation of policies are used across a range of policy areas. We are currently leading evaluation of the [Minimum Unit Pricing policy](#) to inform the report to the Scottish Parliament on the impact of MUP after five years of operation. We have worked with partners to develop Evaluability Assessments on a number of policies and legislation including the [Community Empowerment Act](#).

[The Place Standard tool](#) supports the work across the Scottish Government to implement the Place Principles. It is widely used across Scotland including by all local authorities. We lead the national implementation of the Place Standard Tool.

Evidence briefings are used to inform policy decisions and actions. They have been produced across a wide range of issues. For example we recently published a rapid evidence review the impact of [restriction](#) of price promotions.

Just Transition Commission - Work Plan

1. Background

1.1 The Commission is required to submit a report to Scottish Ministers containing recommendations that will:

- Maximise the economic and social opportunities that the move to a net-zero economy by 2045 offers.
- Build on Scotland's existing strengths and assets.
- Understand and mitigate risks that could arise in relation to regional cohesion, equalities, poverty (including fuel poverty), and a sustainable and inclusive labour market.

1.2 To help the Commission in fulfilling its remit, this work plan will be maintained and considered at all meetings. This is intended to be a high-level document that provides structure to the Commission's work and an outline of how it will engage with others.

2. General approach

2.1 The work plan is expected to evolve as the Commission clarifies where, in its opinion, it should focus its attention and in reaction to emerging priorities.

2.2 The Commission will examine areas of interest in any way it considers to be appropriate. For example, the Commission may wish to consider approaches taken elsewhere and/or it may wish to learn lessons from past economic transitions.

2.3 The secretariat will, where appropriate, ensure that the Commission is made aware of relevant areas of interest in the wider policy landscape in Scotland.

3. Priority themes/sectors

3.1 Given the broad nature of the remit the Commission will need to gather evidence on a range of topics, ensuring that all the relevant aspects of the transition to a net-zero economy are considered. In general terms, the Commission will consider topics from the perspective of one (or all) of the following themes:

- Quality of work
- Regional Cohesion
- Social Inclusion
- Economic Development
- Lessons learned
- Communicating change to those impacted by the transition

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3.2 In order to address the Commission's remit, this work plan is structured around the following topics:

1. Power generation and distribution
2. Transport/Buildings/Public Sector
3. Oil and Gas
4. Land and agriculture
5. Energy intensive industries
6. Finance and investment/business
7. Innovation and delivery at scale
8. Skills and labour markets/Education

4. Information gathering and engagement

4.1 The remit of the Commission commits it to engaging in meaningful dialogue with workers, communities, NGO's, business and industry, in addition to specifically considering the views of young people. A separate communications plan will be maintained outlining how the Commission will engage with others in its work.

4.2 It is anticipated that several different forms of engagement will be undertaken to ensure the relevant viewpoints are heard and considered by the Commission. These are likely to include:

- Information gathering sessions at Commission meetings
- Public meetings, events, and workshops
- Some form of social research
- Online engagement

4.3 More detail of how this engagement will take place will be included in a communications plan, maintained alongside the work plan by the secretariat.

5. Work schedule

5.1 The high-level themes/sectors for consideration (from 3.2, above) are listed below with suggested sequencing. For each theme/sector, additional detail to the work plan will be added by the secretariat (as directed by the Commission). This will cover the likely points of investigation the relevant organisations and programmes of work to engage with, appropriate meeting locations and, where relevant, an outline of proposed wider engagement events.

2019

Meeting 1 – Inception meeting (Edinburgh)
January 31 st 2019
Agree terms of reference and high-level work plan Presentation on the Scottish Economy by Cambridge Policy Consultants

Meeting 2 – Power generation and distribution (Kincardine)
10 th April 2019
<u>Organisations/areas of work to consider inviting to give information</u> Coalfields regeneration trust, Fife council, GMB, Scottish Power, Scottish Renewables <u>Other activities</u> Community engagement in Kincardine – a chance to hear about the closure of Longannet directly from members of the community. Secretariat liaising with CRT to link in with local community groups. Independent work commissioned giving forward look to opportunities/challenges in the power sector

Meeting 3 – Transport/Buildings/Public Sector (Glasgow)
Commissioner lead – Norrie Kerr
5 th June 2019
<u>Organisations/areas of work to consider inviting to give information</u> Energy Savings Trust, Scottish Hydrogen and Fuel Cell Association, Existing Homes Alliance, Transform, Road Haulage Association, Freight Transport Association, CalMac, Alexander Dennis, Glasgow City Council, Scottish Borders Council, NHS National Services Scotland, Aberdeen Heat and Power, UNISON

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Other activities

Visit to Aberdeen Combined Heat and Power planned 25th.

Meeting 4 – Oil and Gas (Aberdeen)

Commissioner lead – Colette Cohen

26th September 2019

Organisations/areas of work to consider inviting to give information

UNITE, RMT, Oil and Gas UK, Wood Plc, OPITO, Skills Development Scotland, Opportunity North East, Aberdeen City Council, Scottish Carbon Capture Storage, Oil Change International/Platform

Other activities

Event held with EIYPN, 2050 Climate Group, SE Future Industry Leadership Group. Workshop planned for trade union officers in north east and possible public event later in year

Meeting 5 – Land and agriculture (Melrose)

Commissioner lead – Kate Rowell

26th November 2019

Organisations/areas of work to consider inviting to give information

NFUS, AIC, SAOS, Nourish, SRUC, RSPB, SNH, Scottish Land Commission, Confor, Scottish Land and Estates, Forest Policy Group, Tweed Forum

Other activities

Visit to Rumbletonrig farm to hear about participation in the Climate Change Focus Farm initiative. Workshop in the evening set up and facilitated by SEFARI.

2020

Meeting 6 – Energy intensive industries (Grangemouth)
Commissioner lead – Tom Shields
January 2020, week beginning 27 th (tentative)
<u>Organisations/areas of work to consider inviting to give information</u>

Meeting 7 – Finance and investment/Business
To be confirmed – Spring 2020
<u>Organisations/areas of work to consider inviting to give information</u>
<u>Other activities</u>
Workshop session for investment community, to coincide with launch of LSE Grantham Institute report in Edinburgh.

Meeting 8 – Innovation and delivery at scale
To be confirmed – Summer 2020
<u>Organisations/areas of work to consider inviting to give information</u>

Meeting 9 – Skills and labour market/Education
To be confirmed – Autumn 2020
<u>Organisations/areas of work to consider inviting to give information</u>

Meeting 10 – Finalisation of report
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Advising on a net-zero economy that is fair for all

To be confirmed – 2020/21
<u>Organisations/areas of work to consider inviting to give information</u>