Main actors in the case study area, concerned by the services and dysservices provided by local dairy farming

Policy makers

- Scottish Government
- SEPA – Scottish Environmental Protection Agency
- NFUS – National Farmers Union of Scotland
- Scottish Water
- SNH – Scottish Natural Heritage
- DEFRA – Department of Environment, Food and Rural Affairs
- FAOS – Scottish Agricultural Organisation Society
- FSAS – Food Standards Agency Scotland
- Health and Safety Executive
- Farm Assurance, Red Tractor
- Milk Processors and retailers
- SSPCA – Scottish Society for the Prevention of Cruelty to Animals
- QMS – Quality Meat Scotland
- Dumfries and Galloway Council
- South Lanarkshire council
- East Ayrshire Council
- South Ayrshire Council
- North Ayrshire Council
- Scottish Borders Council

Farmer organizations

- SAYFC – Scottish Association of Young Famers Clubs
- Dumfries and Galloway Women in Dairy Network
- Retired Farmers Group, Dumfries and Galloway
- NFUS – National Farmers Union of Scotland
- 1000 cow Club
- Maize Growers Association Scotland

AKIS organisations

- Scottish Dairy Hub – NFUS
- NFUS – National Farmers Union of Scotland
- Feed companies
- Seed companies
- SRUC Research – Scotland's Rural College
- SAC Consulting – Scotland's Rural College
- RHET – Royal Highland Education Trust
- AHDB extension officers
- Veterinary Surgeons
- Farming for a Better Climate
- Soil Association Scotland
- Farming and Water Scotland
- Local and national farming press – e.g. Scottish Farmer, Farmers Weekly
- Ringlink Scotland

Food chain organisations and milk processing industry

- Supermarkets
- CIS – Cattle Information Services
- NMR – National Milk Recording
- Processors – Arla, First Milk, Grahams, Lactalis, Muller
- Local self-processors

Territory, or environmental actors

- SEPA – Scottish Environmental Protection Agency
- Scottish Water

Other relevant actors (universities, NGO, consumers, retailors, tourism sector, hunting, fishing and other outdoor activities,…)

- SRUC – Scotland's Rural College
- University of Glasgow
- University of Edinburgh
- University of the West of Scotland
- University of Aberdeen
- University of Strathclyde

Agri-tourism businesses Description and key figures

South West Scotland is a broad term which encompasses several areas, including Ayrshire, Galloway, Dumfriesshire, the Stewartry of Kirkcudbright, Lanarkshire and Renfrewshire. For this report and the workshop/SWOT analysis results, the area discussed falls under the revised NUTS 2 region UKM9, Southern Scotland; encompassing NUTS 3 regions UKM24 Scottish Borders, UKM32 Dumfries and Galloway, UKM33 East Ayrshire and North Ayrshire Mainland, UKM37 South Ayrshire and UKM38 South Lanarkshire.

As shown in figure 1, in the southern part of UKM9 (Dumfries and Galloway, Borders), the soil type is primarily brown earth soils with a small amount of alluvial soil found near rivers and water courses. The northern part of UKM9 (Ayrshire, South Lanarkshire) is primarily mineral gleys. The upland regions (Galloway upland hills, Newton Stewart) are primarly peat, peaty gleys and peaty podzols.

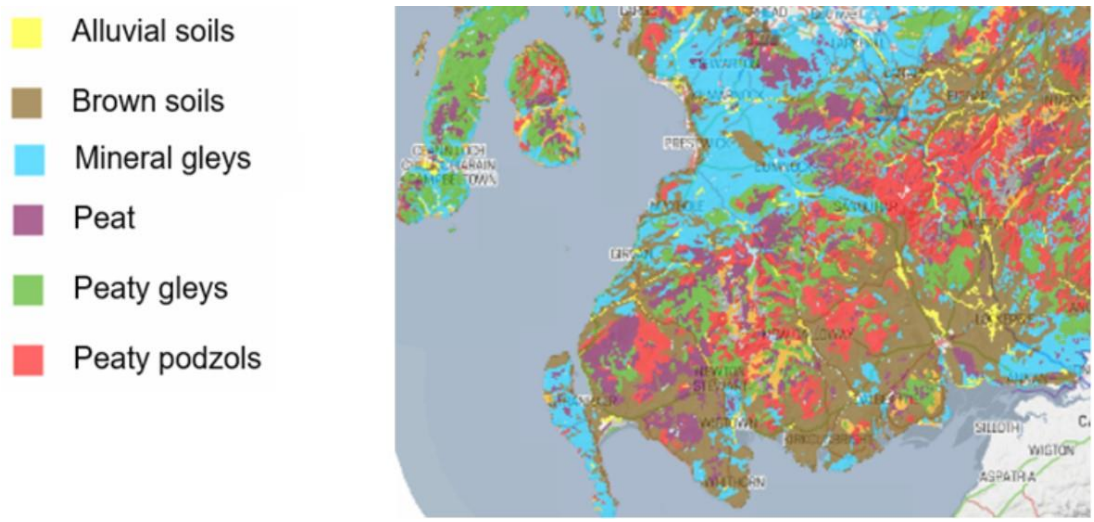

Figure 1 : Soil type in UKM9, Southern Scotland (Scottish Borders ; Dumfries and Galloway ; East, North and South Ayrshire ; South Lanarkshire).

Southern Scotland, and in particular the South West of Scotland, has a predominantly mild windy oceanic climate, typical of west coasts. The mild weather conditions in Southern Scotland, relative to other land at similar altitudes in the northern hemisphere, is partly due to the current known as the North Atlantic Current (part of the sub-tropical gyre circulation and sometimes called the North Atlantic Drift - an extension of the Gulf Stream drift). As a result of this gyre, there are milder conditions in Southern Scotland and warmer and drier conditions in the lowlands of the region (particularly Wigtownshire, Ayrshire and the Clyde valley) than in the Southern Uplands (including areas of the Scottish Borders and Dumfries and Galloway).

Air movement upwards over the hills of Argyll and the Southern Uplands increases the intensity and duration of rainfall, which in both areas reaches 2500 millimetres (mm) per annum. Average annual precipitation less than 1000 mm is restricted to a small coastal area around Ayr and parts of the Clyde and Forth valleys, with 1000-1500 mm per annum elsewhere. Autumn and early winter are the wettest seasons of the year, with roughly 45% of the annual total precipitation falling during the months of October to January. Exposure can be an important factor in Southern Scotland, particularly the South-West, with the region lying on the western seaboard in the path of the prevailing winds and thus the wind-chill effect on livestock can have an important effect in wet weather in upland areas.

The region has a population estimated at 945,500 in 2014 (Population figures, 2014, Eurostat), approximately 26% of which live in a rural setting (SIMD 2012, Scottish Government). Population change has occurred on a much smaller level in Southern Scotland in comparison with other Scottish regions, increasing on average less than 1% (0.17%) between 2011 and 2017. In contrast, the population of West Central Scotland has increased on average 3.9% in the same period (Population change, Eurostat). The region is characterised by a relatively large population of people in older age groups and had an average age of 46.2 in 2018 (Population: Structure indicators, Eurostat). Its' settlement patterns are based on small towns and villages. In 2017, the last reported year, the number of persons per km2 was lower in Southern Scotland at 59.7 compared with Central, Eastern and North Eastern Scotland (796, 150 and 75.9 persons per km2 respectively) but higher than Highlands and Islands (11.6 persons per km2) (Population density, Eurostat).

In 2018, less than 23% of the population had achieved less than primary or primary and lower secondary education (Population by educational attainment level, Eurostat). In 2018, 44% of the population aged 25-64 had attended tertiary education, with more females attending than males (Tertiary educational attainment, Eurostat). Average annual income for Southern Scotland has fluctuated, recorded at £19,163 in 2008 before decreasing to £16,772 in 2009 and then rising to £20,674 in 2016, the last reported year (Income of households, Eurostat).

Southern Scotland has the highest percentage of gross value added productivity by industrial sector of all Scottish NUTS3 regions for agriculture, forestry and fishing; production; manufacturing; construction; distribution; transport, accommodation and food, and real estate activities. For agriculture, forestry and fishing, Southern Scotland has 2.5% gross value added productivity, compared to 0.1 – 1.3% elsewhere in Scotland.

Employment rate has been relatively stable at above 70% since 2013 and was recorded as 76.7% for ages 20-64 in 2018 (Employment Rate, Eurostat). Long term unemployment rate (over 12 months) has decreased from 3.9% in 2013 to 1.2% in 2018, the lowest rate in recent years (Long-term unemployment rate, Eurostat). Between 2014 and 2017 limited resource households (low income and cannot afford three or more out of a list of 22 basic necessities) accounted for 18.9% of households in Dumfries and Galloway, 26.5% of Ayrshire (included Arran which is now classed as Highlands and islands), 24% of The Borders and 18.3% of Lanarkshire (Scottish Government, 2018). Dumfries and Galloway is one of the most diverse regions in the area, with some of the most and least deprived areas of Scotland found here (Dumfries and Galloway Council, 2016).

Data on land cover is not available for the NUTS 2 region UKM9 but is available for South West Scotland (UKM3) which incorporates a large part of the region. Data were not available for cereal, fruit, pulses, root crops and legume/fodder cover (Land cover overview, Eurostat). In 2015, 5,436 square kilometres (km2) of land were used for agriculture in South West Scotland, a decrease from 7,740 km2 in 2009. Land use by forestry has stayed relatively stable and was measured at 2,243 km2 in 2015 a slight decrease from 2012. In comparison, land use for recreation, leisure and sport has increase from 420 km2 in 2012 to 559 km2 in 2015.

Land Cover Type	Percentage
Woodland	24
Cropland	4.3
Artificial Land	4.7
Grassland	58.9
Bare land	1.7
Water	1.4
Wetlands	0.9

Main economic and social issues in the territory

- Good processing capacity
- Transport is poor, particularly further west. This poor infrastructure means that inclement weather can have a major impact on milk delivery to processors/ collection of milk for farms
- Sold from gate prices are compared to supermarket prices
- Supermarkets have too much power e.g. on pricing and public input to supermarkets having an effect on farmer contracts, despite public lack of understanding of farming
- Debt – huge amounts of borrowing can make it impossible to reinvest in farm improvement
- Brexit – uncertainty of effects on markets, subsidies, grants, regulations
- Losing the family run dairy – difficult to take the decision to be a risk taker and risk losing the farm or losing money
- Oversupply of milk locally and globally
- Poor mental health due to isolation, stress and loneliness. This can be exacerbated by poor mobile phone signal and internet connectivity
- Public engagement can be poor in less rural areas
- Public perception can be poor and there is a lack of understanding of farming by the public; cruel, intensive dairying is bad, need to decrease consumption to decrease global warming, welfare is poor (mastitis and lameness), permanent housing bad, calf removal, calf loss, calf transport, bull calves, diseases
- Veganism, dietary changes, changing consumer attitudes

Main environmental issues in the territory

- Working in a beautiful area is good for mental health
- Public perception of the environmental impact of farming and farming's role in climate change is poor

Main agricultural issues in the territory

- Good climate and good grass growing capability that we can use to our advantage to meet global demands
- SRUC – a resource few have – a source of research, consultancy and education
- Good processing capacity but lack of processors and lack of commercial opportunities
- Milk price volatility
- Underpaid and undervalued staff
- Young people not being encouraged into the industry
- Disease threats, particularly things like bovine tuberculosis which is common in Cumbria
- Labour availability; lack of labour and lack of skilled labour
- Not having a succession plan in place on farms

Main dairy farming systems in the territory

Scotland is the fifth largest milk-producing region in UK, with 77% of its production in Southern Scotland. Despite the high density of dairying in the south and though the land in the south is more favourable for this activity than the north, the majority of Scotland's terrain is described as being severely disadvantaged under the EU Less Favoured Area Scheme (LFAS). Despite this, most dairy farmers do not fall into the correct category to receive LFAS payments.

In January 2019, the Scottish Dairy Cattle Association figures showed that compared to January 2018 there has been an overall decrease of 27 herds in Scotland with an increase of 610 milking cows. The average herd size has increased to 201 for Scotland as a whole and to 227 for Southern Scotland, the highest on record. Total milking cows for Scotland is now at 179,538, the highest since 1997, with 137,747 in Southern Scotland.

There are now fewer than 900 dairy herds in the whole of Scotland compared to 5735 herds when records began in 1903. Southern Scotland has the highest density of dairy farms in Scotland, with 659 herds, the majority being found in Dumfries and Galloway. Lanarkshire lost the most herds from January 2018 to January 2019, reducing herd numbers there to 97. Herd size is still noted by the SDCA to be increasing in South West Scotland, though at a slower rate compared to recent years.

The majority of dairy farms in Scotland are all year round calving (approximately 93% based on questionnaire data from SRUC and data from Cattle Information Services). The remaining farms practise block calving, calving in spring or autumn time. The commonest type of parlour on Scottish dairy farms is the herringbone parlour, with few rotaries (generally on large farms) and increasing numbers of robots or robots plus herringbone.

New challenges for dairy sector sustainability in Scotland

Date of the Workshop: 15 and 16 May 2019

Type of participants	Number of participants
Farmers	90
Technicians/technical support	15
Agrifood industry	7
Municipalities/local communities and administrations	3
Parks/natural official office	3
Universities/agricultural highschools	15
NGO	15
Others (precise)	2
TOTAL	150

It was not possible to carry out a workshop as suggested for Scotland. Due to the time of year and silage making, farmers were unwilling to give up their time to come to the workshop we had organised.

Following initial interviews with farmers and key stakeholders (from a range of backgrounds), an interactive SWOT analysis was carried out at two well attended agricultural events to canvass opinions from as large a group as possible, who were actively involved in Scottish dairying.

It was decided to target those at ScotGrass – an annual machinery show, based around silage harvesting – and a conference for sustainable farming and dairying. Over 4000 people attended the event and 150 people were surveyed. Clear patterns emerged at each event with clusters of opinions forming and agreement between those surveyed on opinions. All opinions were collated and ranked by looking at those with the most votes by stakeholders and farmers (where a vote constituted agreement).

Between the two events, though opinions differed and some opinions listed at one event were not listed at the other, the majority of farmers and stakeholders agreed on the same strengths, weaknesses, opportunities and threats in Scottish Dairying in Southern Scotland.

Analysis

Agricultural SWOT

STRENGTHS	WEAKNESSES
• Climate and good grass growing capability, use this to our advantage to meet global demands • High density of farms, particularly in the south west • Health planning is becoming more common as standard farm practice • Red Tractor and other assurance schemes are powerful and commonplace • Industry health initiatives are good e.g. BVD (Bovine Viral Diarrhoea Virus) eradication, Johnes eradication, lameness and mastitis schemes • High welfare standards on many farms and improving standards coming from processor contracts for increased health and welfare which improve public perception • SRUC – a source of agricultural research, consultancy and education together, not found in other countries • Close agricultural community which is close to government, ministers, NFU (National Farmers Union) etc. Ease of access to networks • Good career opportunities in the sector – not just solely "farming"	• Not consistent access to grazing or consistent growing capabilities • Cost of feed high where growing is poorer e.g. Lanarkshire • Systems are diverse, there isn't consistency across the sector • Illegal medicine use common, particularly further west and closer to Ireland • Unregulated use of medicine and hoof trimming i.e. no certification or understanding needs to be shown to medicate own cows • Long hours are unattractive and poor perception of quality of life • Lack of understanding of the role of PLF tools and routes into agriculture. Thought of as a "less academic job" • Debt • Individual farmer actions vs collective • Lack of a strong link between farm milk production and milk processing efficiency • Milk price volatility • Agricultural industry recognises the importance of standards and generally meets them but this is not reflected in financial returns • Cash flow can be a problem - holding farms back from advancement

• Precision farming improving health, welfare, production and job opportunities • Genetics are good in the UK, there is a clear shift from production indices to conformation and longevity • Size of unit • Long history of dairying and strong family ties and networks • Beef from dairy is slowly increasing • Farmers care about the industry as a whole and their animals • We create a product with good nutritional quality • Land availability, affordable land • Processing capacity ○ Local milk processing plants	• Lack of milk contracts and milk contract variance • Farmers can be slow adopters of things • Unlike any other business model; impossible to plan for things like dead stock, milk price fluctuation – variables outwith your control • Cost of private slaughter • Length of growing season • Holstein Friesians in almost every system but not the most suitable cow for a grazing system • Land availability can become a problem • Lack of cooperatives • Underpaid and undervalued staff • Young people not being encouraged into industry • Uneducated farmers
OPPORTUNITIES	**THREATS**
• Milk buyer contracts = more standards and more consistency across the industry as a whole • Bull calves – use of sexed semen, better beef from dairy, dairy calf rearing units may become more important considering threats to suckler systems • Precision Livestock Farming (PLF) technology; opportunities and new people it brings in • PLF with less intensive systems e.g. PLF with grazing systems • Better heifer rearing opportunities = less reliance on imported replacements • Proof of competency – i.e. for medicines, AI, hoof trimming would improve standards • Possibility of manipulating milk i.e. reducing butterfat to reduce processing, skimming etc., increase efficiency • Genetics – right cow for the right job – lower or higher butterfat etc. • Branding and niche products can make milk more attractive • Overproduction – we have the ability to supply more and need the demand to meet this • Climate change could bring the opportunity for different crop growth • Can provide education opportunities and improve people's skills sets • Beef from dairy • 50% of all cows in Scotland are in Southern Scotland • Farmers are adaptable • Farmers who are willing to take a risk • Diversification and niche products – works well and very good examples in southern Scotland (Mossgiel) • Strategies to wrap animals up in nature so that they get healthier • Mobile abattoir to reduce food miles and animal stress during transport for cull cows, transport to death • Cow with calf dairying – better public perception, better for animals? • Smaller units can have better public perception) • Better utilisation of grass • Lack of time for innovation, development etc	• Not enough calf rearing facilities in the area and poor links to supermarkets regarding bull calf rearing • Need to consider how to make mass production seem like niche production to get the market - milk isn't desirable • Bovine TB is a big threat in the area, specifically because TB is rife in Cumbria and disease threats in general • Holstein Friesians are the cow of choice but in the wrong system at the wrong time they can literally milk themselves to death. They are on a metabolic knife edge and not always managed appropriately. There is a need for a more robust cow • Lack of processors in the area • Lack of commercial opportunities Distance between processors, particularly in NE areas of Scotland • Labour availability; lack of labour and skilled labour • Changes in government support, climate change bill • Some of the market requirements are based on public perception, not fact • Brexit • External forces that cannot be controlled which impact business • Cheap food • Not having a succession plan in place • Non British owned dairies taking money out of Scotland

Economic SWOT

STRENGTHS	WEAKNESSES
• Massive local employer, particularly for D&G • Supports a large supply chain, lots of businesses supply and are supported by one farm • Farmer and industry resilience is high, they are adaptive and need to be • Size of milk field in the south west (very high density of farms and cows producing the majority of Scotland's milk) • Processing capacity • For some areas, ease of transport • Large number of small artisan producers • Agriculture in southern Scotland can offer a rewarding career (financially and in terms of mental health	• Declining fertility in herds • Biosecurity, longevity, herd replacement level can be a problem on many farms • Staff training availability poor • Milk price volatility and Debt • Transport can be poor, particularly the further west you travel, infrastructure weaknesses • Reliance on internationally owned processors • Very few medium processors, jumps from small to large • Dairy sector tends to operate in a "bubble" – there are few discussions outside of the sector • Barriers to entry (low unemployment in southern Scotland, age restrictions, mobility) • Gaps in transferrable labour skills? • Very little high value processing and high value products, no opportunities for dried whey etc • Automation can be seen to be removing jobs and changing roles • Sold from gate prices being compared to supermarket prices • Grass based systems are not always low cost but often thought of this way • Supermarkets have too much power
OPPORTUNITIES	**THREATS**
• Milk buyer contracts can offer some security and increases standards across farms • Supermarket contracts and legislation should improve welfare but should also improve pay for better standards • An opportunity to improve genomics and fertility, breeding for better longevity and breeding for what we need – better value • Subsidy changes might change industry for the better – particularly in public eyes if changes are towards climate change mitigation • Less reliance on imported replacements – improve UK herd and reduce biosecurity risks • Staff training opportunities • "Make milk sexy" – make milk into something new, can we make milk cool or focus on niche product sales and branding? Grass and hay fed milk; added value products like "barista milk"; grass based "free range milk"; unpasteurised milk products in Scotland • Opportunity to be more efficient and become better at the cost of production through better knowledge of costs of production and better education from AHDB, SRUC etc. • Discussion groups can improve economic difficulties by sharing what works • Opportunity to build on the powerful Scottish brand and the image of quality Scottish food e.g. Lactalis Old Edinburgh cheese • South of Scotland Enterprise Agency • Brexit • Consolidation of Scottish dairy farming i.e. all moving to southern Scotland • Thought of as a forgotten area by some in terms of tourism – no draw off motorway to come here • Energy production from renewables can lower farmer costs , AD, biomass, solar, wind • Diversification – B&B, rural tourism etc. can be a new revenue stream • Direct selling to consumers. Small farms can speak direct to customers	• Milk price volatility and low milk prices • Lack of opportunities to reinvest • Subsidies – both in terms of Brexit and in general • Niche products don't last as long due to lack of homogenisation – pushes people back to standard products • Debt – there are often huge amounts of borrowing and it can make it impossible to reinvest in farm improvement • Milk price doesn't match feed costs. It's hard to keep up and easy to overinvest when milk price increases. • Brexit – uncertainty • Lending rates and base rates tending to only go one way – i.e. if its not working it will only get worse • Global decisions affect local outcomes (e.g. European supply affecting local milk prices) • Slow adopters • Lack of investment in some processing areas, reliance on a small number of processors e.g. if Lactalis pulled out of Wigtownshire – no choice but to export and increase costs • Losing the family run dairy farm (not wanting to be the risk taker) • Oversupply of milk

Social SWOT

STRENGTHS	WEAKNESSES
• Public engagement in the area is good e.g. RHET, agricultural shows are well attended, Open Farm Sunday but generally only children • Niche products tend to do well once they get going – people can be engaged • We demonstrate high standards through our supermarket contracts etc. • Dairy supports a large number of other sectors • Structure of the industry means people can have more than one job e.g. farmer and contractor • Rural tourism • Farmer resilience • Strong family ties to agriculture and particularly dairying in most families in the South – connection with land • Small communities are supported by dairying in the area • Strong dairying community in SW Scotland and generally globally – support network	• Some farms still have poor welfare and poor standards despite industry improving in general • There is a disconnect between what public say they want and what they will pay for e.g. they want idyllic, small family farms with cows grazing rolling hills but will buy the cheapest product on the shelf • Public places a low value on quality food • Public perception can be poor, smells, dirty, water pollution, perception of poor welfare • Public perception of working life poor; financial rewards not there, poor standards of living, unattractive work:life balance • Lack of awareness of the dairy industry as a whole by public • Lack of awareness of role of dairy farming in countryside management • Isolation, loneliness, mental health can be poor • Mobile phone signal and internet connectivity can be poor and exacerbate the isolation and loneliness • Some towns depending on 1 processing facility, if this were to close there would be a huge negative impact – very common in Scottish towns • Farmers often show blind resilience – poor financial decisions to continue "as is" • Farmers should be involved in research but difficult to engage them • Farmers can be defensive, industry should be more open • Public engagement can be poor in some areas, better communication needed and more involvement from NFU and RHET (Royal Highland Education Trust) in all schools
OPPORTUNITIES	**THREATS**
• Improve public awareness of what actually happens and improve awareness of our standards in Scotland, improve understanding of value of food, including RHET • Increase the use of pain reducing drugs to improve welfare and improve public perception • Milk vending machines on farms near towns, milk men – improve public awareness and get them involved • Make current rules which farmers adhere to regarding pollution clearer to the public • Demonstrate more regarding current supermarket contract standards • Increase awareness of the health benefits of milk • Discussion groups can be a good way to improve isolation in the farming communities and can be popular in dairy communities • Improved internet and digital connectivity could improve isolation • Improved health board recognition of risk of poor mental health and isolation e.g. D&G rural mental health • Social media should be seen as an opportunity, not just a threat • Farmer adaptability and appetite for innovation • Solway coast etc. forgotten region in terms of tourism, do more to encourage people to the area and capitalise on the niche market it provides • Capitalise on peoples farming connections locally, encourage children • Encourage migrant labour by supporting them well, provide a secure job with housing and support • Teach rural tourism and diversification in schools and colleges	• Public perception can be poor and lack of understanding of farming by the public – cruel, intensive dairying is bad, need to decrease dairy consumption to decrease global warming, welfare is poor (mastitis and lameness), permanent housing bad, calf removal, calf loss, calf transport, bull calves, diseases • Bull calves seen as unwanted product, we need to add value to them for both farmers and the public • Subsidy perception – that farmers are supported regardless of what they do or is it more that farmers will be supported if they meet standards • Veganism, dietary changes, changing consumer attitudes • Uncertainty of Brexit and the effect of Brexit on markets (cheese export etc.) • Blind belief from public in what they read in the media, regardless of truth • Fake branding is common in UK supermarkets – legal to advertise imported foods with a "fake farm" to make it seem local i.e. Tesco, Aldi, Asda, Lidl – Birchwood Farm, Woodside Farm, Oakham, Boswell Farms • Large farms and automation can be seen as a threat to current positions – fewer staff needed, fewer families kept in an area through dairying Disease outbreaks will affect not only agriculture but public perception of the area and therefore tourism

Environmental SWOT

STRENGTHS	WEAKNESSES
• More intensively managed units i.e. indoor, 365 housed, more animals, more efficient = reduced GHG • Biodiversity – generally much better than people think and we manage the countryside well • Dairying closely related to rural tourism and landscape • Increasing numbers of solar, wind and AD plants being used for energy • We recycle slurry and consider it a valuable resource • SEPA – staff and approach • We have a positive story to tell generally with the efforts most farmers make • We can tick government policy documents and tell a good story • Working in a beautiful area is good for mental health	• Reliance on purchased protein feeds e.g. Brazilian soya • Reliance on plastic e.g. milk carton plastic (not part of the plastic recycling monetary refund scheme in Scotland) • Some farmers will still be polluting • Phosphate pollution • Public perception of environmental impact • Number of dairy farms close together means that manure cannot be utilised properly in arable farms. This is also worsened by the lack of mixed farms – slurry surplus • Lack of change and innovation to cope with challenges • Lack of creameries in the area means increased transport, longer food miles and greater impact for transporting milk
OPPORTUNITIES	**THREATS**
• Energy generation from renewables can help to offset footprint, AD plants • There is a reducing reliance on antibiotics in the sector, reducing antibiotic resistance • More use of pain relieving drugs • More use of home grown protein sources. Reduce air miles and reduce impact on rainforests etc. overseas • Good water availability and climate means we have a better opportunity to grow more things • Niche products e.g. glass bottle milk, local milk, milk vending machines • Demonstrating biodiversity with field margins and RSPB counts • Subsidies – money for positive environmental and social impacts • Industry carbon footprints, can we reduce it to zero? As an industry can we offset our greenhouse gas emissions? • Focus on integrated management • Farming could be a solution – more focus on positives like carbon sinks • Opportunity to sequester greater amounts of carbon in soil by changing grazing practice	• Antibiotic use, antibiotic resistance and the threat of antibiotic free farming – seen by vets as a disservice to those people farming well with antibiotics • Water availability could become poor as climate changes or flooding could become an issue – weather extremes • Complacency among some farmers regarding biodiversity • Legislative changes affecting how we farm • Large units produce a large amount of slurry which will have an increased environmental impact if not dealt with appropriately. Large units also at higher risk of accidental spillage from burst storage etc. • AD units relatively new, still risks of malfunctioning Public perception of farming's role in climate change

List of issues

Strengths

1. Good climate and good grass growing capability that we can use to our advantage to meet global demands
2. Stakeholders like SRUC who provide research, consulting and education – a strength few other countries have
3. A strong dairying community in southwest Scotland and a global support network
4. A beautiful area to live and work in, which improves mental health
5. Good processing capacity

Weaknesses

1. Supermarkets have too much power over the market and have input into standards – often standards are based on supermarket requests from public thought, not fact
2. Transport is poor, particularly as you move further west in Southern Scotland. In other areas, the A75 would be a dual carriageway – any disruption to the road can block milk transport
3. Young people and new people with no agricultural background are not being encouraged into the sector
4. Isolation and loneliness is still a big problem, this is exacerbated by poor mobile signal, further isolating people. Signal and internet connectivity in southern Scotland can be poorer than the highlands

Opportunities

1. Better utilisation of grass – do more with what we know we are good at and can produce
2. Farmer adaptability and appetite for innovation
3. Precision livestock farming – brings new people into the sector and can improve health, welfare and production
4. Build on the Scottish brand – we know it is sought after globally
5. Make milk sexy – work on improving image (image overall and focus on health benefits) and bringing in more niche products
6. Direct selling to the consumer
7. Cow with calf dairying and dairying that is seen to be more ethical by the consumer – better public perception

Threats

1. Poor public perception of dairying and dairying's role in climate change
2. Losing the family run dairy farm – not wanting to be the one to take the risk and lose it all
3. Labour availability poor and lack of skilled labour
4. Debt – hard to invest to improve if already over indebted
5. Brexit and the uncertainty that surrounds it
6. Veganism and changing consumer attitudes
7. Not having a succession plan in place
8. Lack of processors in the area

Services and dysservices and indicators used to measure them

Category	Description	Indicators	Specific dairy farming systems (if relevant)
Provisioning	**Positive** Good quality food is produced in a large quantities to high standards	High standards from regulations and milk contract/supermarket requirements. Farm assurance schemes such as Red Tractor and Arla 360	All dairy systems
Provisioning	**Positive** Good use of grass to produce milk and meat	Shown through milk from forage and good growth	All dairy systems
Provisioning	**Positive** Use of human food waste (draff, whey permeate) reduces the need to grow animal specific proteins	Use of these products, reduced land use for animal specific proteins	All dairy systems except farms <100 cows (would struggle to use a load before unusable)
Provisioning	**Positive** Integrated farm management – use what you need at the level you need it	Leaf marque accreditation	All dairy systems could do it
Provisioning	**Challenge** Global milk price has a large impact on numbers of farms and cow numbers in Scotland	Loss of farms and cow numbers in response to milk price fluctuation due to global demand	More likely to affect larger or farms with high amounts of debt more
Provisioning	**Challenge** Large reliance on international companies. A British product but a non-British company, do they care enough? Do we have the capacity to be self-sufficient or do we have to rely on imports?	Large processors are non-UK owned	All except self-processing farms
Provisioning	**Challenge** Use of human food waste can become difficult as more people are using it on farm and to feed AD plants	Increasing prices and lack of availability	All dairy affected except farms <100 cows (would struggle to use a load before unusable)
Rural vitality + Socio Economic	**Positive** Massive employer in the area, supports rural communities	Large number of companies in local AKIS networks, large number of farms and people employed in dairy	All dairy systems but large farms more affected if circumstances change – they support more staff

Category	Description	Indicators	Specific dairy farming systems (if relevant)
Rural Vitality + Socio Economic	**Positive** Open Farm Sunday, RHET (Royal Highland Education Trust), agricultural shows etc., all do a good job of linking public to agriculture	Good public engagement at events and RHET regularly attends schools etc.	Possible for all dairy systems but wide differences between farmers in willingness to be involved
Rural Vitality + Socio Economic	**Positive** High density of dairy farms in the area means that theoretically there is a large network of skilled labour and people willing/able to work in the industry	Number of farms and people employed in agriculture	All dairy systems
Rural Vitality + Socio Economic	**Positive** Opportunities for new entrants and a wide variety of roles	Apprenticeships, schemes for new entrants, range of jobs across AKIS networks	All dairy systems, perhaps larger farms more likely to offer apprenticeships than small family farms
Rural Vitality + Socio Economic	**Challenge** Can be difficult to encourage new people into the sector with no agricultural background	Lack of people entering from non-ag backgrounds, perception of poor quality of life, lack of awareness of different range of jobs available	All dairy systems
Rural Vitality + Socio Economic	**Challenge** Appears to be no surplus in labour - availability should be good due to density of farms but people often not there to fill the jobs. Suggested to be as a result of low unemployment in the area	Poor labour availability, lack of relief and night milkers, reliance on technology and automation	All dairy systems but larger and more intensive units more affected
Rural Vitality + Socio Economic	**Challenge** Changing roles with changes in automation and new standards can cause loss of jobs and lower local public perception	Job losses, redundancies, resignations and local perception	All dairy systems but more progressive technology forward farms more affected
Rural Vitality + Socio Economic	**Challenge** Changing public attitudes to dairy, changing diets, poor perception, poor understanding	Increasing growth in veganism, poor public perception, negative media coverage	All dairy systems affected but large and more intensive units often targeted
Environmental, incl. Animal and Human Health	**Positive** Farming has created the current landscape we see, there would be no rolling hills and meadows without it	Current landscape, current biodiversity (bees, meadows, woods, hedgerows, birds) and the countryside in general	All dairy systems
Environmental, incl. Animal and Human Health	**Positive** Farmers are aware of current regulations and risks to the environment and follow the rules to mitigate risks	Regular inspections and regulations, fines for those not following regulation, SEPA (Scottish Environmental Protection Agency)	All dairy systems but large and intensive units often targeted as risk
Environmental, incl. Animal and Human Health	**Challenge** Regulations will get stricter as time goes on, particularly surround things like air quality and slurry storage	Current regulations, changes to regulations expected to mitigate climate change, Brexit changes	All dairy systems but larger, more intensive or housed 365 units more likely to be affected
Environmental, incl. Animal and Human Health	**Challenge** Biodiversity improvements are expected but take time and often there is little financial recompense. If public perception is that farmers destroy the environment, why bother?	Biodiversity changes take time, public perception of farming's impact on the environment is often negative, people don't understand the positive changes farmers make	All dairy systems but larger, more intensive units more affected
Environmental, incl. Animal and Human Health	**Challenge** Dairy is seen as an easy target for the media when considering animal health and welfare and public health; particularly antibiotic resistance	Lots of negative media surrounding the topic of antibiotic use in dairy cattle but little mention of recording and reducing use significantly in the media	All dairy systems but larger, more intensive units a target

Category	Description	Indicators	Specific dairy farming systems (if relevant)
Environmental, incl. Animal and Human Health	**Challenge** Drive for intensification on many farms. If scaling is wrong It could lead to negative impact on environment	Removal of hedges, removal of dry stone walls for larger machinery, changing landscapes and dropping standards	Larger, more intensive units
Cultural Heritage and Quality of Life	**Positive** Communities in the area have a long association with dairying and a large number of well attended agricultural shows	Family connections to dairying and farming in general, good attendance by public at agricultural shows	All dairy systems
Cultural Heritage and Quality of Life	**Positive** Farmers markets, artisan products, willingness to pay for high value, self –processed products	Increasing numbers of farmers markets, increasing awareness by public of dairy in the area and wanting to support local businesses, new products, increased sales	Smaller farms that are more likely to self-process and produce products to sell direct to customers, artisan producers
Cultural Heritage and Quality of Life	**Positive** Improved biodiversity and countryside must have a positive impact on mental health and quality of life	People are happy living and working in a beautiful area, people want to visit the area, its dairy heavy but the biodiversity is very high and we have areas of wetlands and RSPB sites bordering farms	All dairy systems
Cultural Heritage and Quality of Life	**Challenge** On farm processing for small farms and niche product production means constant pressure to meet standards and keep buyers interested	A need to continue to make niche products exciting and stop niche becoming mass produced. Sales and expansion of products necessary. Failure of small businesses where they are overwhelmed	Smaller farms that are more likely to self-process and produce products to sell direct to customers, artisan producers
Cultural Heritage and Quality of Life	**Challenge** Despite strong connection with some people, can be large disconnect between farming and some sectors of the general public	Lack of understanding of farming by the overall general public, farming employs less people than in older generations, a need for public engagement (particularly in less rural areas)	All dairy systems
Cultural Heritage and Quality of Life	**Challenge** Can be a poor quality of life, lack of holidays, unsociable hours, pressure, debt, isolation	High suicide rates in farmers, depression, high numbers of farmers dropping out of the sector	All dairy systems, farms with higher debt, no succession plan, isolated areas affected more
Cultural Heritage and Quality of Life	**Challenge** Use of “pseudofarms” on labels by supermarkets. Reduce custom, lose sense of heritage and pride in local produce. Labels look like local farm branding on shelves but can be imported	Rising numbers of “pseudofarm” labeling across all major supermarkets, advertising standards found them not to be in breach	All dairy systems and all farming systems

List of Innovative practices likely to improve sustainability and competitiveness of dairy farming

Innovative practices	Factors that prevent the adoption	Types of farms that have developed these practices or that are interesting regarding these innovative practices
Enhancing Positives		
Precision livestock farming tools	Investment, education, who makes the decision on farm, age of farmer, farm infrastructure	Variable – anyone could adopt these but generally forward thinking farmers are the ones to do this. Younger, more progressive farmers
Diversification and branding, artisan products, milk vending machines, ice creams and other high value	Initial investments, risk, tradition, don't want to be the one to lose the family farm, pressure to sustain novelty as mass production loses its appeal	Often younger, more progressive, smaller farms
Return to genuine mixed swards	Lack of understanding about mixed swards, seeds that are on offer from companies, image problem of mixed swards for high intensity systems	Smaller, less intensive, more "artisan producers"
Reducing Negatives		
Genomic breeding and breeding for improved phenotypes that don't focus on yield alone	Lack of understanding, tradition, costs, who makes decisions on farm	Progressive, forward thinking farmers
Health planning and disease eradication	Lack of understanding, tradition, perceived costs, who makes decisions on farm	Progressive, forward thinking farmers
Recycling of farm wastes as fertiliser and energy	Tradition; always relied on purchased fertilisers, costs of AD plant set up etc.	Progressive, forward thinking farmers, large units more likely to look at efficient slurry use/storage
Precision farming technology for soils – soil sampling, GPs mapping, pH mapping, fertiliser application	Investment, education, who makes the decision on farm, age of farmer, if the farm is rented, if there is no succession plan	Variable – anyone could adopt these but generally forward thinking farmers are the ones to do this.
Both		
Education, visiting farms, learning new skills, study tours abroad and locally, visiting other systems, discussion groups	Lack of time and resources, social pressures, pressure around money i.e. losing the time and money for a visit	Progressive, forward thinking farmers