A vision for the development of the Northern Ireland sheep industry

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Introduction

Sheep farming across Northern Ireland (NI) provides a wide range of public goods and services as well as playing a hugely important part in sustaining rural communities. There are many benefits to sheep production, for example food production, income generation, cultural heritage, land management, biodiversity and tourism. I believe that the sheep industry in NI now stands at a crossroads and that with the right targeted support it has the potential to go on and become one of the most efficient in the world.

In recent years the breeding ewe flock has shown some changeability. The sheep sector was forecasted to be the worst effected in the case of a disorderly Brexit due to 60% of NI lamb output destined for EU markets. This demonstrates the importance of support measures for the sheep sector moving forward.

Previous studies have shown that the presence of sheep production in the rural economy is vital to both the social and cultural capital of rural regions particularly as they are often located in marginal or economically disadvantaged areas. NI has a mosaic landscape that farmers are rightly proud of, and they deserve better recognition for there efforts in maintaining and enhancing it. A key linkage here is sheep production. There are a range of sheep breeds used in NI from hill to lowland breeds and all are vitally important in delivering a productive and profitable national flock.

Over the course of the last few months, the NI sheep industry has come together and formed an industry taskforce. Its focus has been to look at how possible future agricultural support might be used to address issues within the sector and make it more resilient, efficient and capable of dealing with future challenges.

 One key objective was to produce a robust evidence-based report outlining the industry's vision for the sector, so I hope you take time to read it along with our 'vision for stimulus packages to support the development of the NI sheep industry.'

I would like to thank all the organisations involved and to the members of the group for their contribution to the report. Their enthusiasm and innovative ideas have helped us to look in detail at the challenges the sector faces and to provide the motivation that will help drive and take the sector forward.

The group would like to give a special thanks to Stuart Ashworth for his work and help to facilitate the group and for pulling this report together on our behalf. The group would also like to acknowledge those who provided additional information to ensure the taskforce was able to consider all options.

This report is the first step on what will be a challenging but ultimately hopefully worthwhile journey. This report incorporates climate change, environmental and farm performance outcomes and improvements that offer a real chance of a better future not just for NI sheep farmers but all participating farmers.

John McLenaghan

Chairman Northern Ireland Sheep Industry Taskforce

Executive summary

The sheep sector is vital part of the Northern Ireland (NI) economy. It contributes around 4% (£95m) of total agricultural output, but this performance indicator fails to fully reflect the importance of the sector. It doesn't recognise the importance of sheep farming to individual businesses, to the balance of trade and to the wider food processing sector. Additionally, a simple output metric doesn't recognise the multiplier effect of jobs and economic output generated in the wider economy by sheep farming.

There are over 25,000 farm business in NI. Sheep production is a signification contributor to over 9,800 of these. Consequently, threats to sheep enterprise viability affects the sustainability of more than one third of NI farms.

In addition to contributing to agricultural output, farming is a significant contributor to the wider food and drink sector of NI by providing raw materials to the slaughtering and processing sector and to the balance of trade through the export of live animals, wool and sheep meat.

Between 40% and 50% of sheep produced in NI are slaughtered outside NI. Combining live exports with exports of sheep meat to non-UK markets from Irish abattoirs results in around 60% of sheep meat production being exported outside the UK.

The activity of sheep farming contributes significantly to the wider rural economy through its upstream and downstream demand for services including specialist contractors. For example, scanning and shearing contractors, veterinary services, animal feed production, machinery, property maintenance services, haulage, auction markets as well as slaughtering and meat processing. Input-output estimates for the role of agriculture, show the sector to have one of the highest output multiplier effects in the NI economy turning £1 of primary output to £1.80 of output across the wider economy. Similarly, one job in agriculture generates a further one-point-five jobs in the wider economy.

The contribution of the sector to the wider employment and output of NI will be heavily influenced by having a critical mass of primary production. A decline in primary production diminishes the need for up and downstream businesses and as these ancillary businesses disappear, particularly in fragile rural communities, then the ability to maintain primary production is compromised and a cycle of economic decline will begin. Indeed, there is already a recognised shortage of specialist sheep veterinarians and sheep husbandry technical consultants and scientists that could compromise some of the ambition of this vision statement.

Consequently, the first component of a vision for the future of the NI sheep sector is to maintain the critical mass needed to secure the infrastructure needed to develop the sector and secure a level of profitability to pay family labour and support future capital investment needed to build resilience. The starting point for that critical mass is the current level of physical output of meat and wool. The longer-term future would be better secured if productivity was increased and output grew.

Securing extra output can come from extra breeding animals or more yield from existing breeding animals. Our vision is for the latter. However, extra productivity through larger carcases may not lead to improved income and sector resilience if the product falls outside the market demands of consumers. However, physical output does not secure this vision in isolation; to secure this requires enterprise profitability to be secured at a level where there are sufficient funds to invest in the innovation required to secure improved productivity. Businesses need to be resilient to market fluctuations and variations in production.

Sheep production is of greater significance to the less favoured areas (LFA), which are challenged due to land quality, topography and weather. LFA's are typically a mosaic landscape of open moorland, peat bogs, rough grazing and areas of improved pasture which deliver greater biodiversity and amenity than the more agriculturally productive low land areas. Sheep production converts low quality cellulose into high quality protein from grass and forage while at the same time helping to deliver environmental benefits including carbon storage, landscape biodiversity and water management.

Some of the traditional animal and land management practices that benefited biodiversity, for example daily shepherding of hill and upland ground to "re-distribute" grazing pressures to better reflect the productive capacity of the mosaic landscapes of the less favoured areas, have been lost.

Nevertheless, greater adoption of techniques of regenerative agriculture, grazing management through the use of fencing (both physical and virtual) and rotational grazing, practices could benefit productivity and potentially release land for woodland regeneration. It would also recognise that a single stocking density over the whole farm is a blunt instrument for securing the gains to biodiversity and carbon management that a mosaic landscape creates. Without sheep on the hills, it is difficult to manage the landscape as they are essential for eco system services.

Consequently, the second component of the vision for the NI sheep sector is to secure the long-term capability of the natural capital used in sheep farming and enhance the delivery of public goods. This includes carbon capture and sequestration, soil quality and water management while at the same time reducing greenhouse gas emissions from sheep production over the next decade.

This vision for the NI sheep sector will only be delivered if each individual farm business is resilient. They must be economically viable to the extent that investments can be made to enable the animals and the land used to deliver productivity gains. These productivity gains will be delivered by capturing genetic gains from the breeding sheep used, improved animal health and welfare, soil, and grassland management.

Resilience also requires that the sector must have a pathway for new entrants and farm succession. The conacre system can provide an opportunity for new entrants to gain access to land but the terms of a conacre tenancy provide little security from which to build an asset base. Other tenancy options and business structures, for example limited duration tenancies, contract farming or share farming, would allow a young person to gain skills and assets from which to develop a freestanding business but require the development of legal frameworks and access to specialist advice and guidance.

Not only will a resilient business generate funds for investment and innovation, but it will be able to withstand the normal variation in the production and marketing that comes from a biological production system. However, a resilient business can struggle to cope with market disruptions that come from actions or occurrences outside the control of the producer. Disruptions caused for example, by restrictions in trade, disease control measures resulting in cull policies or animal movement restrictions. Even prolonged climate impacts that result in loss of productive capacity or shortage in key resources like winter feed, can be difficult to absorb. Equally primary production resilience can be jeopardised by challenges elsewhere in the supply chain where recent examples include a lack of slaughter capacity due to a shortage of CO2.

processing staff and business closures. To mitigate these challenges there is a clear need for public support through a crisis management package and blueprint.

While some components of resilience are in the control of producers, an infrastructure is needed to make sure these components are maximised. At the core of building resilience is being able to understand where the strengths and weaknesses of the business currently lie, in broad terms an ability to benchmark with your peer group and so set targets for the future. To this end access to data is important. While many pieces of data already exist, they are not always accessible to producers or available in a consolidated form to allow peer group comparisons.

Integration of farm and off farm IT facilities could and should be improved. Linking abattoir information on for example, weights and grades along with carcase inspection data to produce national and individual key performance measures would improve knowledge. Greater use of veterinary surveillance data and veterinary pharmaceutical use and effectiveness would similarly improve knowledge. Adding farm data related for example to lambing dates and breeds and genetic profiling would also make the data more robust and valuable.

However, making full use of this data and of the science and best practices available to producers requires greater access to training and skills development. This comes through two closely linked services. Firstly, knowledge transfer where the results of research are transferred to producers and their technical advisors by scientists and researchers and secondly knowledge exchange. In the latter case this is the use of peer-to-peer activities that allow the sharing of experience and applied best practice to improve knowledge on animal productivity gains and sustainable management of natural capital that would reduce carbon emissions and generate biodiversity and environmental enhancement.

Our vision for the NI sheep supply chain is:

> **A resilient, vibrant and sustainable industry that uses leading edge technologies to deliver safe high-quality meat and wool through increased productivity while adding value by increasing carbon sequestration, reducing greenhouse gas intensity, and enhancing landscape biodiversity while maintaining the mosaic landscape of our hills and uplands and securing social cohesion.**

We will deliver this resilience by working collectively with government and the wider supply chains to:

- **Increase the access to quality data and the use of that data by developing a national data base and access framework**
- **Increase animal productivity through high animal health and welfare standards, genetic improvement, and resource planning**
- **Increase environmental sustainability through reducing greenhouse gas emissions, sequestering carbon, improving soil and water management, and increasing biodiversity on farms through, for example, including multi species grass mixes, and legumes into crop and grassland management plans**
- **Increase access to knowledge transfer and knowledge exchange to update knowledge and skills and demonstrate best practice through peer-to-peer learning and the training and provision of technical consultants within the supply chain**
- **Maximise market opportunity for meat and wool through market development and improved supply chain feedback**

A framework to deliver this vision is outlined in the following section.

Vision	Themes	Sub themes	Actions	Tools	Additional needs	Agent	Time frame
A resilient, vibrant and sustainable industry that uses leading edge technologies to deliver safe high-quality meat and wool through increased productivity while adding value by increasing carbon sequestration, reducing greenhouse gas intensity, and enhancing landscape biodiversity while maintaining the mosaic landscape of our hills and uplands and securing social cohesion.	Enterprise Resilience	Market access	Risk management tools	Market volatility tools	Private storage aids, price insurance tools	Government and industry consultations	Long term
			Market development	In market trade missions and other trade support	In-market promotion and inward missions	Invest Northern Ireland / Livestock and Meat Commission (LMC)	On-going
			Terms of trade	Trade agreement legal frameworks and administrative infrastructure	Infrastructure support for export certification	Government and industry collaboration	Medium term
		Animal health and welfare	Improved management of animal health on farm	On farm animal health plans and metrics	Development of medicine recording and communication tools	Government and industry collaboration	Short term
					Improved feedback from abattoirs	Industry	Medium term
				Disease eradication/ improved control	Genetic monitoring and selection programme aids	Government / Animal Health and Welfare NI (AHWNI) / industry co-funded research programme	Medium term
					Early warning industry communications	AHWNI	Medium term
					Data management tools	Government industry co-funded research programme	Long term

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A resilient, vibrant and sustainable industry that uses leading edge technologies to deliver safe high-quality meat and wool through increased productivity while adding value by increasing carbon sequestration, reducing greenhouse gas intensity, and enhancing landscape biodiversity while maintaining the mosaic landscape of our hills and uplands and securing social cohesion.	Enterprise Resilience	Animal health and welfare	Improved management of animal health on farm	Continued professional development	Knowledge transfer programmes	Government / AFBI / CAFRE	Short term
		Animal productivity	Improved animal capability (additional to animal health)	Animal selection programmes for maternal traits, lamb growth rates and wool quality	Genetic monitoring and selection programme aids	Government / AHWNI / Industry co-funded research programme	Short term
				Continued professional development	Knowledge transfer programmes	Government / AFBI / CAFRE	Short term
		Input use	Grassland management	Continued professional development	Knowledge transfer programmes	Government / AFBI / CAFRE	Short term
			Rumen research and diet formulation	Applied research and development	Applied research	Government / AHWNI / Industry co-funded research and development programmes	Long term

Vision	Themes	Sub themes	Actions	Tools	Additional needs	Agent	Time frame
A resilient, vibrant and sustainable industry that uses leading edge technologies to deliver safe high-quality meat and wool through increased productivity while adding value by increasing carbon sequestration, reducing greenhouse gas intensity, and enhancing landscape biodiversity while maintaining the mosaic landscape of our hills and uplands and securing social cohesion.	Future workforce, skills, opportunity and resilience	New entrant scheme	Pilot schemes for contract farming/ share farming	Legal frameworks financial incentives	Develop model Legal frameworks and financial incentives	Government and industry	Medium term
		Access to land	Review of conacre system	Legal frameworks	Review and develop legal frameworks	Government and industry	Long term
		Skills development		Continued professional development	Knowledge transfer/ exchange programmes	Government / AFBI / CAFRE	Short term

Vision	Themes	Sub themes	Actions	Tools	Additional needs	Agent	Time frame
A resilient, vibrant and sustainable industry that uses leading edge technologies to deliver safe high-quality meat and wool through increased productivity while adding value by increasing carbon sequestration, reducing greenhouse gas intensity, and enhancing landscape biodiversity while maintaining the mosaic landscape of our hills and uplands and securing social cohesion.	Environmental protection and resilience	Reduce emissions intensity	Genetic improvement	Genetic profiling and development of animal selection measure	Genetic monitoring and selection programme aids	Government and industry	Short term
			Input management	Soil testing and grassland management	Animal and crop planning programmes	Government and industry	Short term
				Continued professional development	Knowledge transfer/exchange programmes	Government / AFBI / CAFRE	Short term
			Emissions monitoring	Greenhouse gas emission recording and planning	Carbon audits and planning	Government and industry	Short term
		Landscape and water management	Bio-diversity monitoring	Bio-diversity audits	Bio-diversity planning and target	Government and industry	Medium term
			Grassland management planning and monitoring	Soil testing and grassland management	Animal and crop planning programmes	Government and industry	Short term
			Farm manures and fertiliser planning and monitoring	Soil testing and fertiliser management	Farm nutrient budget planning	Government and industry	Short term

Vision	Themes	Sub themes	Actions	Tools	Additional needs	Agent	Time frame
A resilient, vibrant and sustainable industry that uses leading edge technologies to deliver safe high-quality meat and wool through increased productivity while adding value by increasing carbon sequestration, reducing greenhouse gas intensity, and enhancing landscape biodiversity while maintaining the mosaic landscape of our hills and uplands and securing social cohesion.	Data management	Improved national database	Integrated database of current data	Accessible sheep industry database	Industry / Government co funded development programme	Government / AFBI / AHWNI / sheep farming representative bodies	Long term
		On farm use of data	Use of data systems to inform farm planning	Continuing professional development	Knowledge transfer and training programmes	Government / AFBI / CAFRE	Short term

Several actions in the framework are already underway. For example, market development work and knowledge exchange programmes; they must continue to be supported and in the case of knowledge exchange extended. However, further actions need collective action to stimulate the adoption of practices to improve productivity and resilience and mitigate environmental impact. Consequently, the taskforce makes the following recommendations.
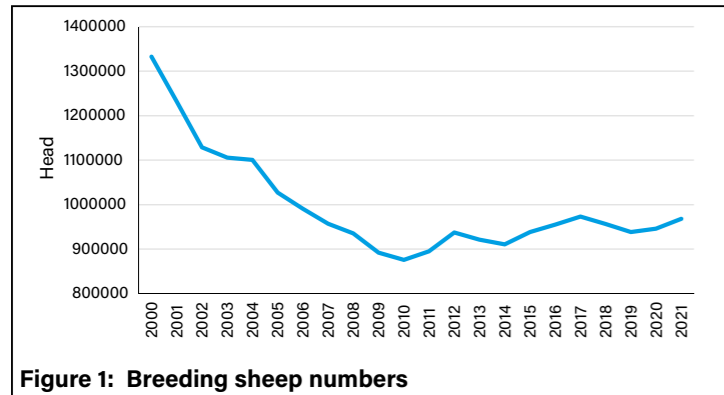
1. **A blueprint should be developed to provide crisis aid for market volatility resulting from an action or incident outside of producers' control. The blueprint should clearly identify the trigger for crisis support and the means by which that support would be paid to the industry.**

2. **An integrated data management and communication programme should be developed that produces key performance indicators for individual business and the sector. The data supplied and accessed by the database should be owned by the industry for the benefit of the industry. Initial work could be done as a research programme.**

3. **A NI sheep genetic improvement programme should be established. This programme should include performance recording of maternal and terminal sire traits and develop a genotype and phenotype profile for recorded sheep. This programme should be centred around, or a similar scheme to, the Signet Sheep Recording scheme or the Sheep Ireland scheme and extend the use of selected local stock sires into the RamCompare NI initiative and the Ruminant Genetics Programme.**

4. **A stimulus programme should be introduced to encourage capital investment and adoption of best practice to drive resilience, animal productivity, skills development, and reduced greenhouse gas emissions.**

5. **A stimulus programme should be introduced to encourage land management actions to maximise the integration of sheep production with biodiversity protection and enhancement.**

6. **A review should be carried out to explore how the reach and effectiveness of the existing CAFRE knowledge exchange programme can be increased through for example accredited independent facilitators and use of social media streams.**

7. **A sheep industry forum should be established to explore sustainability options to meet the demands of the Climate Change targets of the Northern Ireland Assembly set out in the Climate Change Act (Northern Ireland) 2022.**

Appendices

Appendix one: A review of the Northern Ireland sheep industry

Figure 1: Breeding sheep numbers

Figure 2: Index of regional breeding sheep numbers

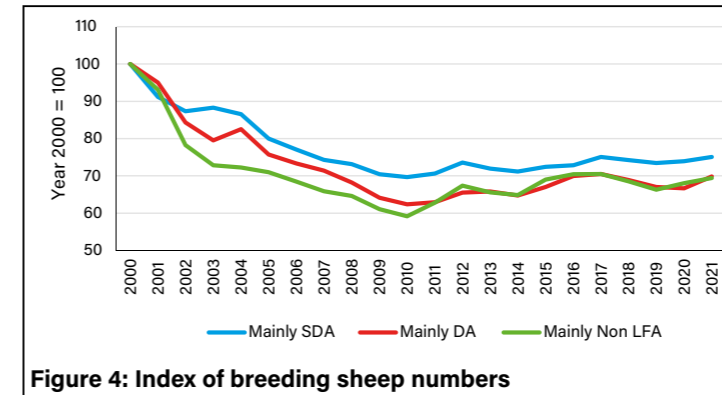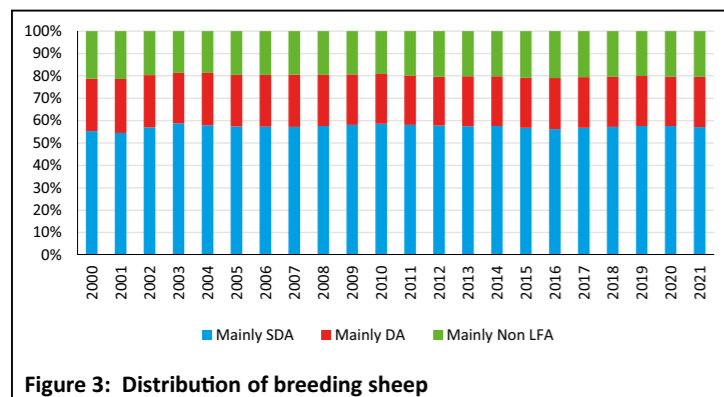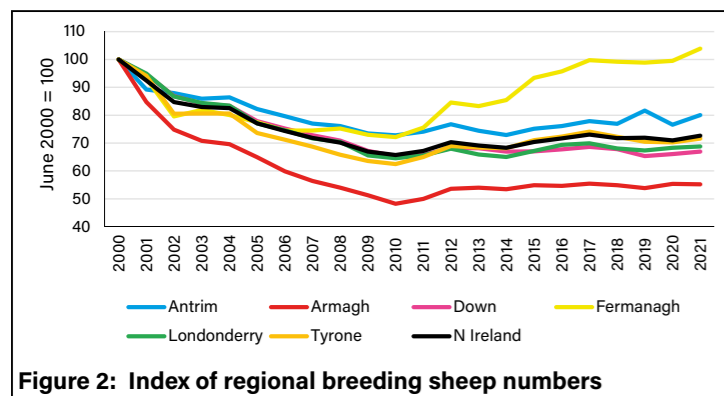
Figure 3: Distribution of breeding sheep

The Northern Ireland (NI) breeding sheep population (figure 1) has fallen considerably, by some 30%, over the past twenty years. Two significant step changes can be observed: 2000 to 2002 as the industry adjusted to the challenges of Foot and Mouth disease and a second between 2005 and 2010, as the sector adjusted to the support policy changing from headage payments to decoupled payments.
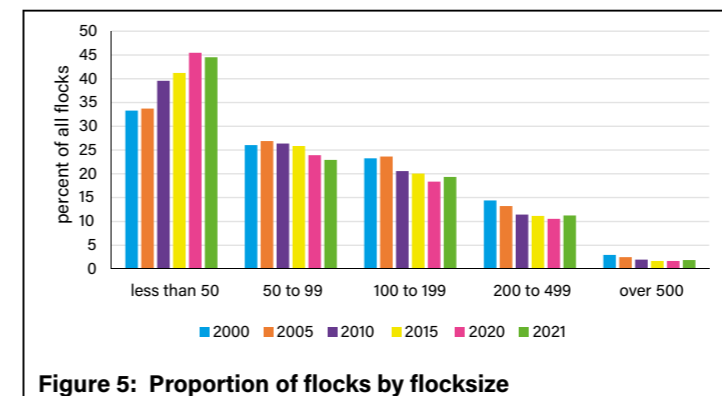
Although there has been some growth since then, a dip in numbers in 2013 and 2014 coincides with a downturn in sheep enterprise profitability, while a dip in 2019 reflects uncertainty over the UK's relationship with the European Union and a downturn in enterprise profitability.

Regional variations in breeding sheep numbers are also apparent (figure 2). County Armagh in particular has seen a significant decline in breeding sheep numbers since 2000. In contrast, County Fermanagh after following the national trend downwards until 2010 has seen a strong recovery in breeding sheep numbers to a point where in 2021 breeding sheep numbers in Fermanagh are slightly ahead of the year 2000; the only county in this situation.

Sheep farming is dominated by activity in the disadvantaged areas (figure 3) where around 80% of all ewes can be found. Almost 60% of ewes are found in the severely disadvantaged areas (SDA) where numbers have been maintained better than in the more favoured land categories (figure 4).

Figure 4: Index of breeding sheep numbers

Figure 5: Proportion of flocks by flocksize

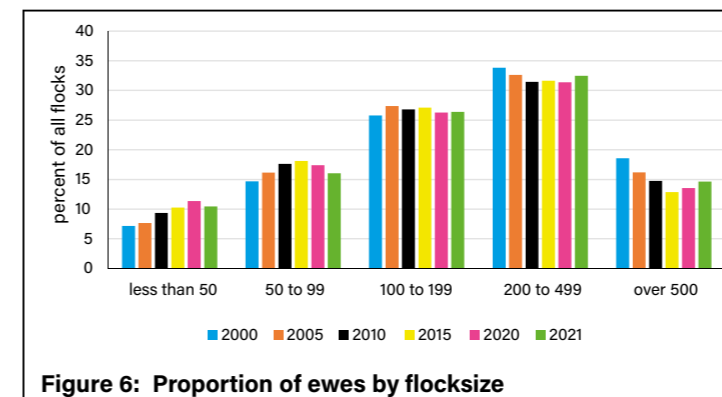**Figure 6: Proportion of ewes by flocksize**

The number of breeding ewes on mainly non-LFA holdings fell by around 40% between 2000 and 2010 (figure 4) compared to a 30% decline among mainly SDA farms. Since 2010 mainly SDA holdings have maintained numbers. In contrast mainly non-LFA holdings and mainly DA holdings have shown some modest recovery since 2010 but nevertheless, the breeding ewe population among these holdings has declined to a greater extent than the mainly SDA holdings.
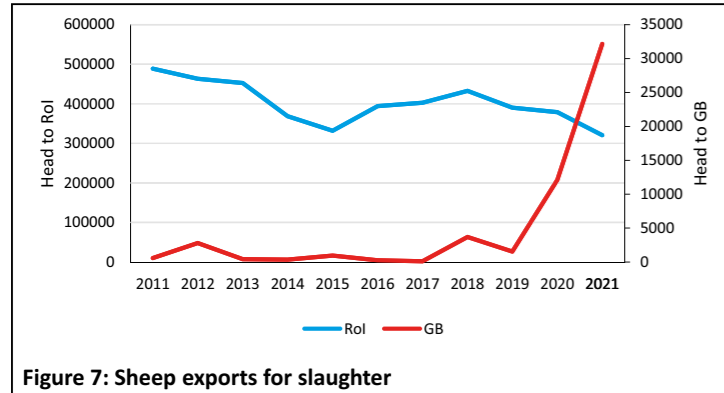
Sheep production in NI has a distinct character to its structure. Although in 2021 there were 9,599 farms recorded as having sheep only 182 of those holdings (less than 2%) had flocks of more than 500 ewes (figure 5) but they farmed 15% of the ewes (figure 6).

Furthermore, the 13% of businesses who farm more than 200 ewes farmed 47% of the ewe population. While 45% of sheep farms keep less than 50 ewes (figure 5) they only account for 10.5% of the breeding flock (figure 6). A decade ago, farms with more than 200 ewes accounted for 47% of ewes and 14% of flocks, but flocks of less than 50 ewe were 39% of businesses and 9% of ewes. Structural change over the past decade then has led to more smaller flocks within the sector.

Producers use a number of routes to market for their lambs and cull breeding sheep. These include auction markets, co-operative groups, and direct sales to abattoirs. The Food Standards Agency currently lists eight abattoirs in NI approved to slaughter sheep however only five currently kill sheep and 97% of the kill is handled by three abattoirs.
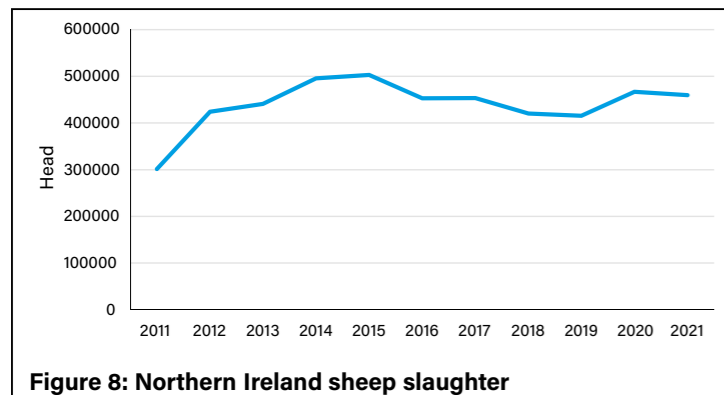
Figure 7: Sheep exports for slaughter

Movement records collated by APHIS show a considerable volume of sheep are exported to slaughterhouses outside NI, the majority to the Republic of Ireland but a small volume to abattoirs elsewhere in the UK (figure 7).

Although volumes moving directly to abattoirs in Great Britain (GB) are small there has been a significant increase since 2019, from less than 1% of exports pre-2019 to 9% in 2021 which may be a consequence of Brexit.

A number of sheep are also moved to auction facilities outside NI and although recorded by APHIS as store and breeding sheep a number will subsequently move from the auction direct to abattoir.

Figure 8: Northern Ireland sheep slaughter

NI sheep slaughtering reached a nadir in 2011 before expanding until 2015 (figure 8). Subsequent to 2015, the annual kill declined until 2020 when some recovery occurred perhaps as a consequence of doubt over trade of live sheep as a consequence of Brexit uncertainty.

Nevertheless, comparing NI slaughter volumes and cross border trade quickly identifies that around 45% of animals slaughtered are slaughtered outside NI.

Additionally, a considerable proportion of the sheep meat produced in NI abattoirs is exported out of NI. Estimates made in 2016[1] indicate that around 30% of NI abattoir production is exported outside the UK and similarly that 60% of production is exported to GB.

Combined with live movements direct to slaughter exports of sheep and sheep meat amount to around 60% of farmgate production being exported outside the UK and more than 90% outside NI itself.

A similar scenario emerges for wool. Estimates by Ulster Wool put annual wool production in NI at around 2.2m kg per year. Ulster Wool has marketed an increasing volume of this wool, reaching 1.4m kg in 2021 up from 1.05m kg five years ago, with most of it is sold to GB companies although some has been sold to China. Although some wool is sold off farm, Republic of Ireland traders buy significant volumes of NI wool. Current values of wool are low, and it is estimated that the current NI wool crop has a farmgate value of around £0.75m.

Despite running successful training courses for shearers over a number of years Ulster Wool still reports a higher level of damaged wool at 6% of deliveries compared to 4% across the UK as a whole. This damaged wool has little or no value in the current market and matching the UK level of damaged wool would add some £18,000 to sheep farm output at minimal cost. Most of this damaged wool is due to it being delivered wet or containing contaminants such as straw; issues that can be easily addressed by suitable on farm management. Ulster Wool is seeing increased interest in provenance of wool from global manufacturers which could be addressed by membership of farm assurance programmes.

A longer term challenged identified by Ulster wool is that the quality of some fleeces is poor in comparison to UK averages. Wool quality can be improved by careful genetic selection.

Consideration of the wool grades handled by Ulster wool indicates that proportion of hill flocks in the Northern Irish flock is little changed over the past five years. However, deliveries of wool from typical upland breeds like Mules has increased by around 50% over the past five years while wool of a lowland type (based on Suffolk and Texel breeds for example) has reduced in importance but remains the most common wool supplied.

[1] Impact of WTO trading on the Northern Ireland beef and sheep industry; LMC 2017

Appendix two: The Northern Ireland sheep industry and its contribution to society

The Northern Ireland (NI) sheep sector delivers in a number of ways for society, but the benefits can be considered to fall into three categories, the economy, the environment and wider society.

Although the sheep sector is only a small part of the NI agricultural economy delivering some 4% or £95.2m of total agricultural output, it makes a contribution to the livelihood of more than one third of NI farm businesses. This creates a wide range of employment opportunities both up and downstream from the farm; whether that be providing raw materials for the important food and drink sector of the Irish economy or using the services of veterinarians, animal feed manufacturers and a myriad of machinery and property maintenance services. For the latter services agriculture may not be the entirety of their client base but agriculture does often mean they are located in rural areas thus providing a local service for the wider rural community.

Experimental economic input-output multipliers produced by the Northern Ireland Statistical Research Agency (NISRA) in 2022[2] puts the type one output multiplier effect measuring the direct and indirect impact for agriculture at one-point-eight, thus for each £1 increase in primary output £0.80 is added through the rest of the economy. The output multiplier for agriculture is second only to the food industry and construction of all industrial sectors considered by NISRA.

Similarly, for every job added in agriculture one-point-five jobs are added in the rest of the economy. The type one employment multiplier is the third highest of all industry categories considered by NISRA. A third multiplier assessment is that of Gross Value Added (GVA) where again the NIRSA assessment shows the considerable value of the agriculture and food manufacturing sector. The estimates from 2018 suggest that improving the GVA in agriculture by £1 will lead to a further direct additional £1.10 increase in GVA throughout the economy while increasing the GVA in the food manufacturing sector by £1 adds a further £1.50 directly to the total economies GVA. Once again, the GVA multiplier effect for both agriculture and food manufacturing are some of the highest in the economy.

The experimental input output data for 2018, also indicates that for the agriculture sector as a whole, around 46% of output is used by the food industry in NI, 28% of agriculture output is exported while around 1% of agriculture output is recirculated within agriculture.

When considered against the output of the entire NI economy, food manufacturing is within the top three sectors alongside construction and real estate. Food manufacture and agriculture combined are the largest contributor to the NI economy contributing nearly 11% of total supplies. Notwithstanding the experimental nature of the NIRSA input output statistics and the lack of analysis of the sub sectors of the agriculture category, the figures clearly identify the importance of a thriving and sustainable agricultural industry to the NI economy.

These industry multiplier effects calculated by NIRSA suggest considerable added value to the whole economy that supporting and encouraging productivity gains within the agriculture sector can bring.

The practice of sheep farming not only contributes directly to the prosperity of the NI economy through the products and services it supplies and uses, but by being involved in the day-to-day management of their farms, sheep farmers are contributing to the management of natural capital to deliver additional benefits for society.

Natural capital can be defined as, "Elements of nature that directly or indirectly produce value or benefits to people, including ecosystems, species, freshwater, land, minerals, the air and oceans, as well as natural processes and functions," (Natural Capital Committee 2014).

Direct benefits of the management of natural capital by sheep farmers will be discussed in appendix three. This section will briefly consider indirect benefits which are increasingly being considered and evaluated by Government.

The publication of the UK natural capital accounts 2022[3] values the health benefits derived from recreation based on enclosed farmland, mountain, moorland, and hill in Northern Ireland at £31m in 2019 while tourism value in these areas was put at £94m in 2019.

In mountain, moorland, and hill areas the presence of sheep or more importantly the tracks they use or create when grazing hills and moorlands, provide improved access for recreational visits. In contrast land abandonment, scrub encroachment and unmanaged heather growth can constrain access for walkers. These characteristics can also contribute to higher risk of wildfire and the loss of recreational value. A continued presence of active sheep farming will help secure public access and the benefits to be gain from outdoor recreation.

Each year there are some 16 agricultural shows in NI which create a core element of the cultural heritage of their communities and provide economic added value through visitor spend.

A decline in both the sheep and the employment they create will lead to a loss of economic value associated with recreation and tourism and the economic value associated with them. Similarly, a loss of employment and activity will diminish the availability of heritage skills in activities like dry stone walling and hedging which help to sustain natural capital.

[2] NI Economic Accounts Project - 2017 and 2018 Experimental Results | Northern Ireland Statistics and Research Agency (nisra.gov.uk) accessed 13/12/2022

[3] UK natural capital accounts: 2022 - Office for National Statistics (ons.gov.uk) accessed 24/1/2023

Appendix three: Northern Ireland sheep farming and the environment

Farming for nature and landscape biodiversity

Sheep farming is a dominant enterprise on much of Northern Ireland's (NI) less favoured areas and important habitats like heather moorland and peat bog. Well managed sheep farming can deliver many benefits for the environment in respect of biodiversity, water management and carbon management.

Correctly managed hill and upland grazing can contribute to carbon sequestration and the retention of carbon in, for example, peat soils. Managed grazing of upland landscapes has the potential to mitigate against wildfires. Across improved grassland and arable soils, grazing can help to deliver good soil structure that in turn has been shown not only to improve soil fertility and reduced need for artificial fertilisers, but also to mitigate the risk of water run-off and flooding.

Much attention has been paid to the consequences of over grazing with little attention to the consequences of under grazing. In particular, under grazing can lead to the build-up of dense matted vegetation that during dry spells can lead to increased fire risk and during wet weather can hinder drainage and lead to landslips and soil erosion as water pressures build within the soil to a point where the soil "bursts" and erosion takes place.

Martin et al (2013)[4] concluded that prolonged exclusion of grazing can be detrimental to biodiversity as less competitive species are lost. Consequently, they observed that low levels of managed grazing can benefit low productivity blanket bog and montane habitats where stocking rates average around one ewe per hectare per year and stock are excluded for much of the winter. In contrast, Pakeman and Nolan (2009)[5] concluded that stocking densities were a blunt and inefficient tool in establishing a good grazing management programme as they recognised that at different points in the year or on different parts of the farm that biodiversity may benefit from a higher or lower stocking density. They concluded that for the preservation of heather moorland that annual usage of 31.6% of the current year's growth provided a means of maintaining moorland condition and biodiversity. However, a practical means of establish such an indicator was not explored.

Such a discussion identifies that farmers are managing a landscape mosaic of soil types and vegetation cover and that sustainable management of such vegetation cover is complex requiring an holistic approach to assessment and livestock management. To this end any programme of support for land management should start with a comprehensive assessment and mapping of the current habitat types and condition.

A long-established heritage practice among hill farms has been to reduce or exclude breeding sheep from moorland during the winter months by bringing the breeding sheep onto in-bye permanent and improved pasture and to away winter breeding replacements, ewe hoggs, on lowland farms. However, this practice has become increasingly difficult and expensive to arrange due to concerns over biosecurity and pressure from host farms to return sheep earlier than was historically the case to allow grass growth for their own farming enterprises.

The importance of mixed grazing to farmland biodiversity was highlighted by Fraser et al (2014[6]) who concluded that "management systems incorporating mixed grazing .... Improve livestock productivity and reduce methane emissions." They also concluded that mixed grazing systems that ".... included semi-natural rough grazing consistently supported more species of birds and butterflies."

The RSPB[7] also observes that low density grazing of extensive pasture (hills and uplands) help ground nesting birds by providing nesting cover.

Forestry and the planting of trees is recognised by many as a means of sequestering and storing carbon. Intensive forestry removes land from agricultural production and while delivering carbon sequestration can reduce biodiversity. Nevertheless, integrated land management and carefully planned tree planting can enhance and contribute towards sheep enterprise profitability through providing shelter and shade. The National Sheep Association (NSA) have produced a thought-provoking analysis of integrating sheep and trees[8]. The NSA conclude that shelter and shade offered by well-planned tree planting can reduce lamb losses by up to 30% and can also deliver productivity gains through improved growth rates and parasite mitigation. However, growth rates and type of trees in the UK mean that small area low density planting is a long-term investment with low return on capital and thus not attractive. A carefully designed support package could deliver both public and private goods.

What is clear from this brief review is that carefully managed mixed livestock grazing can deliver on many levels for the environment. Some of the practices recommended will come with costs, without sufficient short-term improvement in enterprise income to justify the initial investment and will impact on the economic sustainability of the farm enterprises.

The sheep industry is willing to work with Government and other stakeholders to develop a range of environmental enhancement support packages that would deliver for landscape biodiversity, water management and carbon capture as well as enhanced sheep productivity and reduce emissions intensity from sheep production.

Sheep farming for carbon emission reduction

It has long been recognised that improving animal productivity can deliver both economic gain and reduced emissions intensity. It is equally well recognised that animal productivity can be improved through animal fertility, health and genetic gains and diet quality. The Centre for Innovation Excellence in Livestock (CIEL)[9] identified that genetic improvement could deliver benefits through ewe size, feed efficiency, longevity, health, lamb growth and carcase traits. Gains can also be made through improving the quality of forage available to sheep through for example the use of legumes in swards. CIEL report that modelling the gains to be made through animal and crop husbandry productivity gains could reduce emissions from the sheep sector by between 37% and 68%[10]. Nevertheless, the adoption of high genetic merit animals is low in the sheep sector.

[4] Martin D., Fraser M. D., Pakeman R. and Moffat A. M. (2013) Impact of Moorland grazing and stocking rates. Natural England Evidence review NEER006:
[5] Pakeman R.J and Nolan A.J (2009) Setting sustainable grazing levels for heather moorland: a multi-site analysis. Journal of applied Ecology 2009 46 pp363-368

[6] Fraser M. D., Moorby J. M., Vale J. E. and Evans D. M. (2014) Mixed grazing systems benefit both upland biodiversity and livestock production. PLOS One February 2014 Vol 9 Issue2
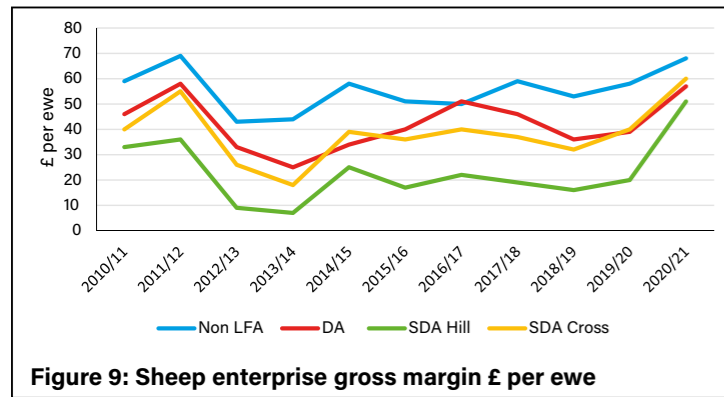[7] Extensively Grazed Grassland | Advice For Farmers - The RSPB accessed 29 November 2022
[8] nsa-and-woodland-trust-sheep-and-trees-compressed.pdf (nationalsheep.org.uk) accessed 1 December 2022
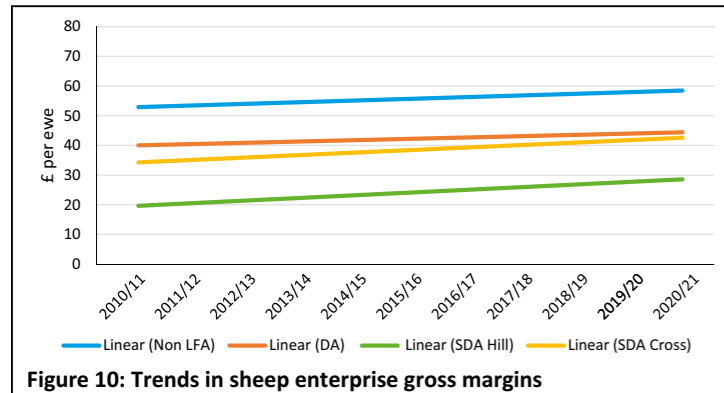[9] CIEL (2022) Net Zero and livestock – how farmers can reduce emissions
[10] CIEL (2022) How farms can reduce emissions: Lamb

Appendix four: Striving for economic resilience and environmental sustainability

Figure 9: Sheep enterprise gross margin £ per ewe

Figure 10: Trends in sheep enterprise gross margins
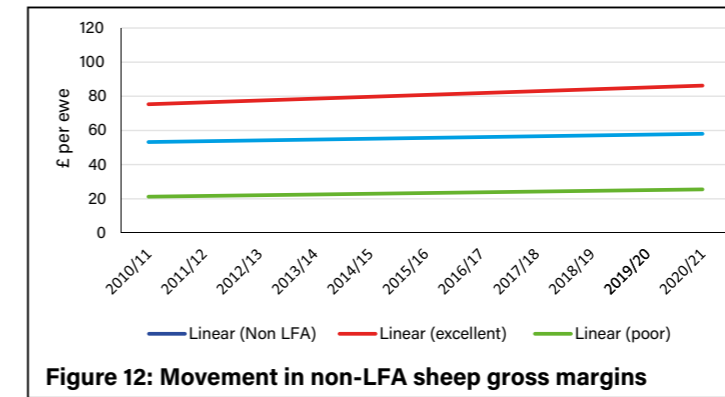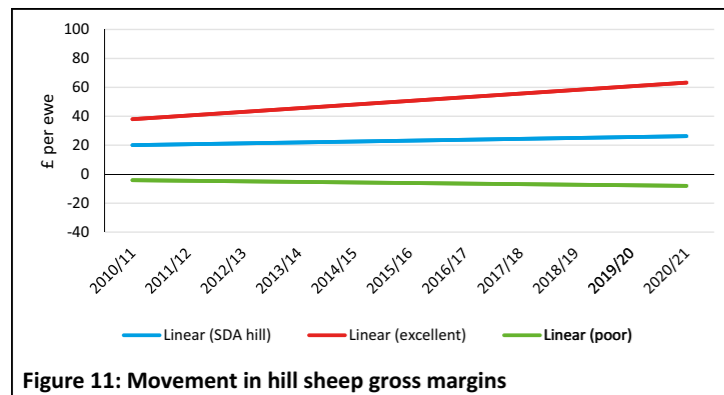

Figure 11: Movement in hill sheep gross margins

For a number of years, the Department of Agriculture, Environment and Rural Affairs (DAERA) when reporting on farm incomes in Northern Ireland (NI), reported enterprise gross margins on many livestock production systems. The gross margins calculated exclude any de-coupled support payments. DAERA also group the margins into several subgroups and categorise excellent performance as the top 15% of businesses by gross margin and poor performance as the bottom 15%. These results are intended to help producers benchmark their enterprise performance with their peer group.

Gross margins can fluctuate from year to year because of volatility in market returns and performance driven by physical climate variation. Figure 9 shows this variation in year-to-year margins reported by DAERA while Figure 10 shows the trend in gross margins over the past decade.

While all enterprise types show an upward trend in gross margins over time, (figure 10) it should be noted that the exceptional improvements in margins in 2020/2021, largely driven by market prices has a significant impact on the trendline. Equally though it must be recognised that the gross margin must cover fixed costs and provide a return on capital invested and for unpaid family labour. The index of agricultural input cost shows an increase over this time period of 19%. Consequently, any improvement in gross margin is quickly eroded by higher fixed costs like energy, machinery and property maintenance and paid labour.

Figure 12: Movement in non-LFA sheep gross margins

DAERA gross margin reporting does show the capability of the top 15% (excellent category) to have improved their gross margin at a faster rate than both the average and the poor performers (figures 11 and 12). Reasons for the difference between excellent performance and average can be quickly identified as higher sale prices, a higher lambing percentage and lamb reared percentage alongside a higher wool crop per ewe. Equally, the DAERA analysis illustrates that cost benefit gains can come from efficient use of feeds, fertilisers, and veterinary services. In most cases excellent businesses spend more per ewe on these variable costs but reap the gains of higher animal performance.

Technically efficient business are not only likely to achieve better gross margins but also to deliver reduced greenhouse gas emissions. Quality Meat Scotland's reporting of beef and sheep enterprise profitability has reported greenhouse gas emission intensity for a number of years and has consistently shown that the top-third of producers ranked by gross margin have an emissions intensity around 7% lower than the average.

Using the benchmarking data published by DAERA identifies a number of topic areas that will improve the resilience of the sheep sector both economically and environmentally particularly higher animal productivity and lower levels of mortality.

For producers to apply and benefit from the messages revealed in the DAERA benchmarking data requires:

- **Improved access to key performance indicators through better access to data**
- **Improved access to high genetic animals to deliver improved technical performance**
- **Access to high quality knowledge transfer staff and resources**
- **Access to leading edge applied research programmes**
- **Access to a wide range of market opportunities, domestically and internationally**
- **Risk management tools to hedge market failure**

Delivering economic resilience and environmental sustainability through making best use of data
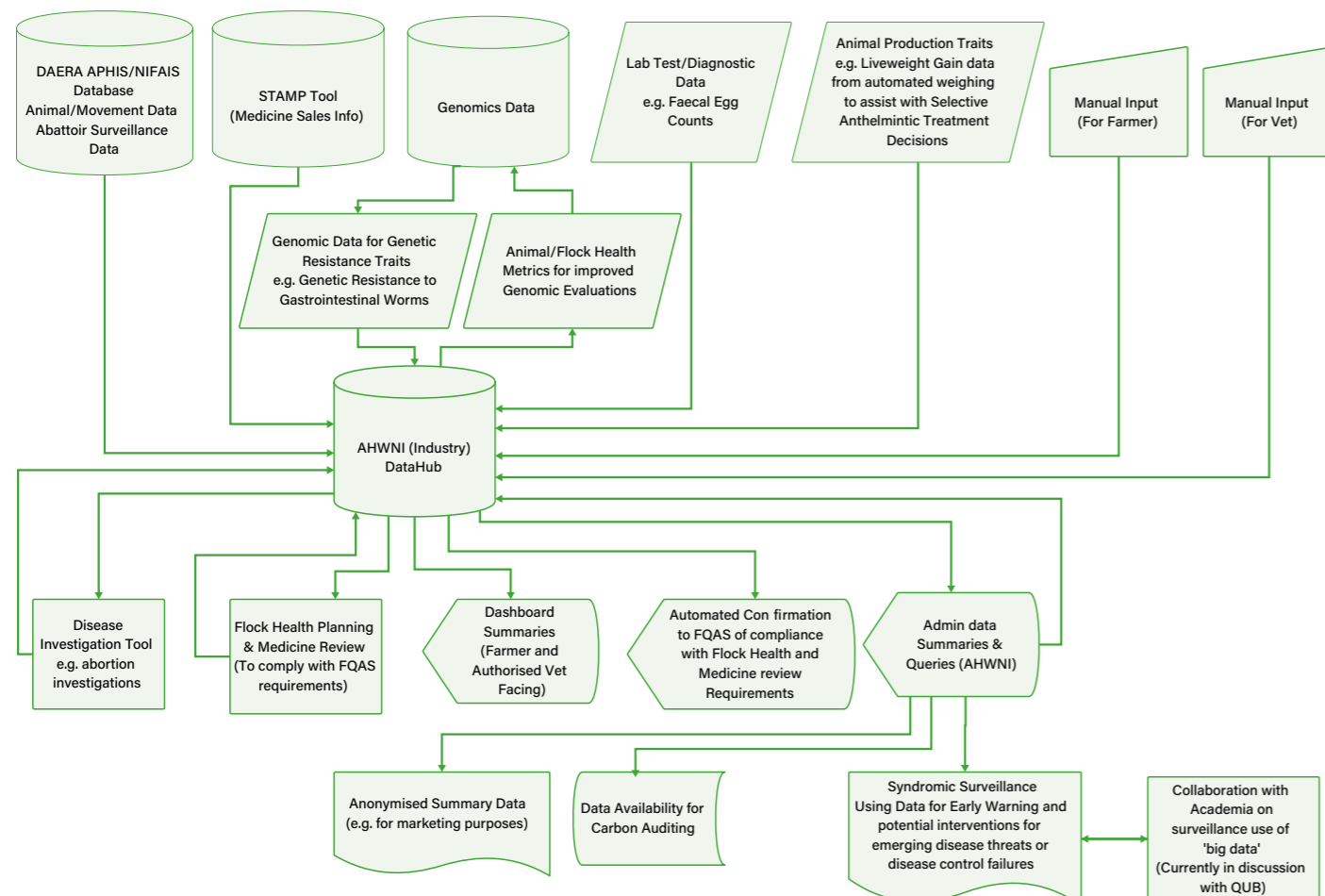
Developing strategies that lead to improved economic and environmental sustainability starts with having sufficient data to establish a baseline from which to set targets and monitor progress. Considerable quantities of data are collected but it is in a fragmented form and not readily available for on farm decision making.

Feedback of available data both at farm level and industry level is fragmented at best. Equally there are weaknesses in the data collected that could be improved by having a centralised hub and spoke data resource to which farmers could contribute to and access.

Market data relating to sale weights and carcase grades exists and in some cases is shared with the owner of the sheep at the time of sale. Similarly post-mortem carcase inspection data is collected but its reporting at consolidated industry level or as individual feedback to producers is limited. Useful feedback of disease incidence and prevalence could be available through the private and state veterinary service.

Electronic identification (EID) means that individual animals can be identified at all key points in their management and marketing. While it is recognised that individual animal birth dates and parentage is not as comprehensive as for cattle more can be done to build and use information.

The following schematic developed by Animal Health and Welfare Northern Ireland shows the potential that exists to develop an integrated database.

Delivering economic resilience and environmental sustainability through genetic improvement

Achieving economic sustainability and reducing greenhouse gases emissions are associated with animal efficiency and productivity. Accessing high quality genetics is at the core of such improvement.

Genetic selection can contribute to increased animal efficiency through identifying animals with important maternal characteristics and ram selection for lamb growth or disease resistance. Genetic selection recording has been available for a number of years through, for example, the RamCompare programme run by Signet. Delivery of genetic improvement requires two things to be in place. Firstly, suppliers of breeding sheep need to be recording data and secondly that data needs to be available to, and understood, by buyers of breeding stock.

Other important sheep producing nations have significant sheep genetic improvement programmes, for example, Sheep Improvement Ltd (SIL) in New Zealand which was established in 1998 and Sheep Genetics Australia which was established in 2005 and is operated by Meat and Livestock Australia (MLA). Sheep Ireland introduced its performance recording service to develop €uro-star indices in 2009.

Nevertheless, genetic trends are slow to be realised. SIL analysis[13] for example show it typically taking four to five years to deliver but then benefits become cumulative within those flocks producing breeding stock for sale. Equally though once identified and placed into a commercial flock genetic gain can occur within a single lambing cycle. Reporting the results of the sixth year of the RamCompare programme Signet reported that gains of £4 to £6 per lamb can be achieved and concluded that "careful selection of a ram can enhance flock profitability by £1200 to £1500 per ram over its working life."[14]

Work carried out in Northern Ireland (NI) as part of the RamCompare programme showed that using rams selected for high muscle scoring resulted in lamb carcase weight 0.2kg more at slaughter but having reached that weight 10 days quicker than their low muscle score counterparts.[15] Although conformation score was unchanged the high index lambs were leaner. The economic gain of this improved physical performance based on one trait alone was not reported but is likely to have been of the order of £2 per lamb.

Each year the NI sheep sector produces over 800,000 lambs for slaughter. If half of these lambs were produced using high genetic value rams, then the work of Signet would suggest a gain of approaching £1m per year for NI sheep farmers.

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13 Genetic trends report .. November 2022 - NZGE | Sheep Improvement Limited (SIL) accessed 1 December 2022
14 RamComapre year six results (2022) RamCompare2022_220428_WEB.pdf (windows.net) accessed 1 December 2022
15 RanCompare NI The effect of sire muscle EBV on lamb performance and carcase quality ramcompare-project-report.pdf (signetdata.com) accessed 1 December 2022

Delivering economic resilience and environmental sustainability through improved animal health and welfare

In 2021, Ruminant Health and Welfare (RWH) published its Ruminant Health and Welfare report[16] which used a survey of the industry to identify key syndromes and diseases where control or eradication would deliver productivity benefits for the cattle and sheep industry.

The key syndromes for the sheep industry were identified as:

- Neonatal lamb disease and mortality
- Reproductive failure (including infertility and abortion)
- Anthelmintic resistance
- Joint ill
- Mastitis

RHW also concluded that the priority diseases were:

- Footrot
- Contagious Ovine Digital Dermatitis (CODD)
- Sheep Scab
- Liver fluke
- Fly strike
- Parasitic gastroenteritis

Interestingly, the survey did not identify Iceberg diseases like Maedi Visna, Caseous Lymphadenitis and OPA Jaagsiekte as top priorities although it was recognised that accreditation programmes would be useful in identifying suitable sources for replacement breeding stock.

Improving sheep health not only enhances animal productivity but also contributes to reduced methane and greenhouse gas emissions. The Moredun Research Institute conclude that, "Improving health and welfare could reduce emissions by 10%"[17] and identified three strategies to achieve this. Namely to improve growth rates and daily liveweight gains, improve feed conversion efficiency and reduce involuntary culling/abortion in breeding stock. While genetics will play a role in these three strategies so too does high health status.

The UK Sheep Animal Health and Welfare[18] group (SHAWG) concluded in 2021, that disease caused by liver fluke could lead to economic losses of £3-£5 per infected sheep. Similarly, lameness could lead to economic loss of between £3.90 and £6.35 per ewe depending on incidence in the flock and Parasitic Gastroenteritis (PGE) is estimated to cost the UK sheep industry around £43m per year. Elsewhere, the annual cost of a sheep scab outbreak is estimated by Animal Health Northern Ireland to be £1,000 and £2,000 per flock.

[16] Ruminant Health and Welfare "Ruminant health and welfare - cattle and sheep welfare priorities - a grassroots survey of the UK. (2021)
[17] Moredun research Institute (2022) "Acting on Methane: opportunities for the UK cattle and sheep sectors"
[18] SHAWG-Report-2021.pdf (ruminanthw.org.uk) accessed 30/11/2022

A starting point towards the achievement of improved health and welfare is to understand the current status of the flock through for example routine monitoring of worms and fluke. Improving information flows that allow the monitoring of disease that can lead to proactive and reactive husbandry interventions has potential to offer significant economic gain for the NI sheep industry. Longer term, genetic profiling and selection has potential to improve disease resistance to a number of animal diseases.

It is not surprising then that SHAWG concluded that a priority development for the sheep sector is to "integrate datasets to improve on-farm decision making to drive profitability and animal performance." Meanwhile the Moredun Research Institute called for "farmers to engage with their vets and animal health advisers to identify major issues …. (and) regularly review livestock health plans."

The challenge for the industry is to increase the use of animal health planning and monitoring in association with professional advice on its interpretation and actions needed. A challenge made harder by the declining numbers of large animal vets and sheep husbandry scientists/advisors.

Delivering economic resilience and environmental sustainability through skills development and knowledge exchange

A key component for delivering resilience is the skills and knowledge levels of those working in the industry. Advancements in science and technologies result in a continuing need for the sharing of knowledge and best practice to enable farmers and their technical advisors to keep up to date with developments.

There are a number of skills training and knowledge exchange programmes currently operating in Northern Ireland. These include Ulster Wool's sheep shearing and wool handling course and CAFRE's initiatives for Business Development Groups (BDG) and Technology Demonstration Farms.

While these current initiatives are to be welcomed their reach among sheep farmers is limited with only 20 specialist sheep BDGs with a reach of 360 farmers. Similarly, although there are currently 42 Technical Demonstration Farms only around 10% have a specific sheep specialism.

The challenge for the industry is to increase the reach of these initiatives and expand the number of facilitators active in providing training courses. Greater use of information technology, podcasts and social media platforms may provide a mechanism for widening reach.

Delivering economic resilience and environmental sustainability through workforce renewal and opportunities for new entrants

Sheep farming, like most other agricultural sectors, is faced with the challenge of an aging workforce. For it to be resilient the sector must be profitable enough to make sheep farming an attractive career option, but it must also have a pathway for new entrants and farm succession.

While the conacre system could provide an opportunity for new entrants to gain access to land, the term of a conacre tenancy provides little or no security for a new entrant to establish themselves and create an asset base from which to progress to a larger business format. Other options to enable a new entrant could include a share farming facility which would allow a young person to gain skills and assets from which to develop a freestanding business.

Appendix five: Membership of the Taskforce

- John McLenaghan, UFU deputy president and Northern Ireland sheep taskforce chair
- Pat McKay, UFU beef and lamb policy committee chair
- Brendan Kelly, UFU beef and lamb policy committee vice chair and Ulster Wool chair
- Alistair Armstrong, UFU hill farming policy committee chair
- Clement Lynch, UFU hill farming policy committee vice chair
- Edward Adamson, NI NSA regional development officer
- Campbell Tweed, NSA member representative and UFU member
- James Lowe, chair Northern Ireland Agriculture Producer's Association (NIAPA)
- Sean Fitzpatrick, NIAPA member representative
- Ian Stevenson, CEO Livestock and Meat Commission for Northern Ireland
- Conall Donnelly, CEO Northern Ireland Meat Exporters Association
- James McCluggage, UFU policy manager
- Daryl McLaughlin, UFU beef and lamb and hill farming policy officer

Notes

A vision for the development of the Northern Ireland sheep industry

The Northern Ireland Sheep Industry Taskforce | January 2023