Conclusion

Science to Inform Farming for the Future

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Sustainability and Resilience

Key Messages:

- There is a greater need than ever for scientific evidence and innovation to help inform policy and adoption of farm practices to meet multiple complex and interlinked challenges
- AFBI, in collaboration with local and international partners, is delivering a wide range of projects aligned to protecting and enhancing the three core pillars of sustainability: Economic, Environmental and Societal
- The Farming for the Future events have showcased some of the recent and ongoing science to help inform resilient and sustainable farming systems now and into the future

The two underpinning themes of AFBI's advice are

1. **You need to measure to be able to manage – Using data to build knowledge and information will drive your sustainability e.g.**
    - It is critical to baseline the health and fertility of soils and then take action to make best use of nutrients and protect our waterways
    - It is essential to measure and budget grass growth especially as we experience the impacts of climate change and build productive grassland systems able to cope with and adapt to shocks with reduced reliance on artificial nitrogen
    - Understand the genetic potential of your animals based on scientific data to ensure better breeding and management decisions
    - Utilise information on the health, welfare and productivity of your livestock to better direct inputs and optimise outputs helping reduce the environmental footprint
2. **Turning challenges into opportunities**
    - Manures from our livestock systems present a major challenge with regard to our environmental footprint but management and technological solutions which have been developed and are being developed will help to bring new income streams and value added products, while also removing the risk of excess nutrients negatively affecting air and water quality.
    - Precision nutrition of livestock improves feed and nutrient use efficiency whilst maintaining or enhancing production. This delivers improved productivity with a reduced environmental footprint.

Science led solutions available now for farmer adoption

During the main tour of AFBI Open days, presenters provided a brief overview of some of the science and innovation ongoing to help the industry address the main environmental challenges, maximise the opportunities from them and deliver sustainable and resilient farms now and into the future. The focus areas then provided an even greater flavour of the large range of work ongoing to support the true sustainability of land based agri-food systems. Below is a summary of several important take home points from the main stops and overall event:

Take homes:

Starting with the soil

Through understanding the health and wellbeing of our soils through existing and new novel indicators more informed management decisions can be taken to deliver improved productivity with reduced losses of nitrogen (N) and phosphorous (P) to the environment. The world leading Soil Nutrient Health Scheme, developed after detailed large scale catchment research, provides a platform for the industry to make positive change in improving soil health, fertility and reduce N and P losses to our waterways. The scheme will also provide a baseline level for the carbon stored in our soils and help improve our understanding on how to protect and increase soil carbon stocks.

Healthy, resilient, and productive swards

Grass growth is no doubt becoming more variable linked to our changing weather. However, there is much optimism that the changing climate could potentially increase the total production of forage. The challenge will be how to capitalise on that potential in a sustainable manner. Predictive tools such as Grasscheck can help inform management and areas such as novel species in the sward, integration of woody biomass and further development of legumes and herbs all show promise. A core element remains to measure, monitor and manage.

Healthy productive and resilient livestock

Precision livestock breeding, incorporating new traits and indexes that encompass the need for productivity, profitability and reduced environmental footprint are already available. With a growing understanding, improved/greater quantities of data and an explosion of omics based science the ability to breed livestock for optimum productivity, reduced environmental footprint and resilience to dietary and climatic change will continue to develop. This is an excellent example of science being integrated into everyday breeding decisions on farms. With NI embarking on major initiative through Sustainable Ruminant Genetics we have a major opportunity to further harness the power of genetics. Advances in 'omic' technologies not only helps us breed more sustainable livestock but also helps identify animal health challenges and develop solutions to protect the health and wellbeing of our livestock.

Getting off to a good start and hitting targets

Key areas of focus have been identified specific to Northern Ireland farms to help youngstock develop to meet growth targets that deliver lifetime performance, protect animal health and welfare, all with the minimal environmental footprint. A wide range of tools have been generated to help guide producers enabling animals to meet their genetic potential. Protecting animal health is a key component with the management, hygiene, technologies to monitor animal behaviour and health along with advances in vaccines all being very much part of the future farm.

More from less in livestock nutrition

Precision nutrition through better understanding of animal requirements, efficiency of nutrient use and how dietary elements work in combination are now being incorporated into farm practice and utilised in making smarter predictions of emissions/nutrient losses in national inventories. Examples of such practice deliver significant reductions in nitrogen and phosphorus losses and lower GHG emissions helping reduce losses and improve the health of our air and water systems.

Much development and testing is underway into dietary strategies which directly reduce methane emissions from ruminants. These include a catalogue of dietary additives which show potential promise to reduce emissions by approx. 10-30%. How these additives perform in commercial practice, in combination, with diverse diets, long term impacts and how their use and impact can be quantified, verified, and accounted for are all the subject of ongoing research. High quality livestock diets remain an underpinning element in productive, environmentally friendly livestock systems.

Livestock manures – a challenge and opportunity

AFBI science has informed the development and supported the use of LESSE to reduce ammonia emissions from land spreading. Coupled with strategies such as switching from urea to protected urea, extending the grazing season and reducing the dietary crude protein content can dramatically reduce ammonia emissions. In addition, new bespoke housing and slurry management systems present opportunities to further reduce ammonia emissions.

Science driven slurry management practices are enabling greater value to be extracted both as a fertiliser (locally or exported) but also as a source of biogas reducing NI's reliance on fossil fuels. Such strategies can also promote a circular bioeconomy and support the creation of new "green" jobs and greater energy security.

Summary

Often a misused term, sustainability is not just about delivering for the environment and nature but must also protect animal welfare, deliver of societal expectation, and deliver a financial return for all stakeholders in the supply chain. This complexity is commonly undervalued and underestimated but highlights the truly amazing role farmers deliver daily, 365 days of the year. Commonly called the three Ps – People, Planet and profit. This rounded, holistic view of sustainability is essential, and is core within AFBI's work programmes and highlighted during the open day presentations.

The role of AFBI science is to provide evidence to help deal with the challenges and changes needed. This evidence informs policy and all stakeholders in the industry, helping develop and deliver innovative solutions. Many solutions are now available, with others at different stages of development. There is no silver bullet, but science backed evidence and innovation is providing the tools for the Northern Ireland farming industry to develop sustainable and resilient farms for the future.

I very much hope that you have enjoyed the open day, have picked up innovative ideas and will have the confidence to make changes to your farming practice which will improve nutrient use efficiency, reduce your carbon footprint, all whilst also enhancing biodiversity and optimising productivity and profitability. Historically agriculture has risen to the continual challenges it has faced, I have every confidence through science informed evidence and innovation the agriculture sector in Northern Ireland will meet these current and future challenges.

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