



See the change, be the change: Overcoming roadblocks to innovation in the New Zealand beef cattle breeding industry

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This paper will analyse the challenges facing beef breeds and breed societies in New Zealand today, and identify ways the industry can more effectively embrace innovation moving forward. The paper will also address New Zealand's unique position as a microcosm of industry issues worldwide and suggest how New Zealand Breed Associations can help overcome roadblocks to industry innovation.

Key-words: Genomics, performance, beef, breed, society, collaboration, technology, infrastructure, commercialisation, phenotype, genotype, pedigree, purity.

While most genetic innovations are specific to the breeds and industries of individual countries, there has been widespread, global move towards innovation in this field fuelled by remarkable advancements in technology over the last decades. Genomic advancements have made a marked impact on the beef industry worldwide, but while the technology has been commercially around for over ten years, the New Zealand beef market has only recently begun to apply genomic prediction.

Agriculture is a lifeblood industry for our economy, and yet, the beef industry in our country has been one of the slowest to adopt genetic innovations vital to their growth and prosperity. There are a variety of reasons for this, and most of these roadblocks still exist today. Differing perspectives among commercial farmers and breeders cause tension, misunderstanding, and lack of collaboration. The industry is facing new challenges, but our deficits are all too familiar and difficult to overcome. The industry's lack of unified vision and infrastructure magnifies these problems and obscures the way forward.

The industry needs a shared vision and strong leadership to unite parties with differing interests and to communicate the value and benefits of genetic improvements. We need a collaboration of minds that will pursue a greater good with passion and integrity. To accomplish this, we also need to integrate industry infrastructures and leverage technology to increase the effectiveness of our efforts. And we need to retain our industry talent by making the New Zealand market the most exciting place to be. To

Summary

Introduction

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accomplish all of these things, it's essential to start with an honest assessment of the thoughts and practices that are holding us back from innovation, as well as realistic ways we can evolve to meet the change and thrive.

Rich industry history: asset turned liability

New Zealand is an agriculture nation. These industries are a huge part of our society, as evidenced by the impact the falling milk price had on our economy in 2014. The fact that the industry is such a crucial part of our national economy means that there is high pressure to perform predictably and profitably. The government encourages businesses to evolve and increase their capabilities, but in reality, leadership is so busy working in the businesses that they have little time to work on the businesses.

One of the contributing factors to this industry issue is the aging farmer demographic. The average age of beef breeders in New Zealand is 58—for other sectors of the larger industry that age may be even higher. While there is much to learn from experienced leaders, the temptation is to keep doing things the way they have been done for the past 40 years. In today's technological and economic climate, that is simply not an option.

The aging farmer demographic plays a big role in the industry's tendency to perpetuate the *status quo*, but it is not the only factor. Risk is a major concern for commercial and breeder farmers. Ideas, systems, and technology that have not been proven through other farmers' implementation are a risk, and they are often avoided in favour of a "sit and hold" mind-set. This cautious tendency, though understandable, is another major factor that holds back innovation. The lack of education for breeders on the topics of genotyping and genomics also contributes to the problem. It's hard to be motivated to implement change when the risks and the benefits are unclear. Without supportive industry and government bodies, clear and accessible information resources, and incentives for innovation, farmers will continue to choose the safer bet: reduced risk now with the unfortunate side effect of short-changed futures.

Tension between short-term and long-term outcomes

There is a tension between short-term and long-term priorities in our industry that must be addressed if we want to achieve survival in the present as well as prosperity in the future. Many of our major players continue to doubt the value of genetic innovation to the industry's present and future bottom line. Genetic innovations require precise data recording, and this long-term data investment is getting left by the wayside in the rush for lucrative commercialisation. The very nature of the beef market (as it is now) demonstrates this slant toward commercial rather than performance breeding in New Zealand. This movement toward commercialisation in the industry is dangerous when considered in context with the growing global market for niche beef products and the growing international competition in commercial markets.

Internationally, the average consumer income is rising—particularly in the middle class—and the middle-class demographic is growing. Mario Pezzini, Director of the OECD Development Centre, states that the size of the global middle class will increase from 1.8 billion in 2009 to 3.2 billion by 2020 and 4.9 billion by 2030. He surmises that the bulk of this growth will come from Asia—a country that will represent 66% of this global middle-class population by 2030. With this growth in the middle class, there is and will continue to be a corresponding growth in the market for organic food and quality branded meat. The New Zealand beef industry is ideally positioned to fill this niche, and it is less than ideally positioned to fill broader commercial demand.

In the commercial market, giants like the United States fill and exceed demand. Alternative forms of protein have the potential to become both formative competitors in the larger global meat market and, possibly, an answer to world hunger. Each of these tasks is beyond the reach of the New Zealand industry alone. In looking to the future, it is vital that we clarify our role in the larger global markets and pursue that role without reserve. We have the potential to improve the eating quality (EQ) of our product with the assistance of genomics and, in doing so, to build a compelling sense of authenticity and story that will appeal to the current market and outdo synthetic meats. By building a library of data, we can support the integrity and quality of New Zealand beef, connecting us with the larger story and increasing our relevance in the global market. But this potential will only be realised if we recognise and pursue it.

Most of the major players in the New Zealand beef industry still struggle to see the value of investing in genetic improvement and performance recording. The market for selling beef bulls for breeding is not very large, and a significant proportion of bulls sold are bred in herds that do not record performance. In addition, beef bull purchasers do not always recognize the value of genetically improved bulls, making it more difficult to incentivize farmers' investment in performance breeding and data recording. Breeds that do record performance and have embraced genomics are stagnating in animal numbers, and many minor breeds are getting smaller and abandoning recording altogether. Data recording has few immediate returns, but it is vitally important long-term.

The move toward commercialisation may be driven by a short-term view toward survival, but it is also affected by the complexity that exists for breeders who are pursuing genetic advancement. The implications of genomics on pedigrees and record-keeping may form an even greater obstacle to their application than money matters. Early adopters of genetic innovations will face the challenge of maintaining herd book integrity in a new and largely uncharted context where errors may be linked with serious consequences.

There is also a rising conversation surrounding the legal ramifications of inaccurate or misleading herd book entries. Breed societies have an obligation in regard to the management of herd books. Any person relying on the integrity of the herd book that suffers loss due to the breakdown of its integrity has the right to sue the breed society that guaranteed the herd book and to claim for damages. Even considered in isolation, this trend towards greater accountability demonstrates the long-term value and security of investment in accurate, conscientious data recording.

Finally, the lack of collaboration within the New Zealand livestock industry is perhaps the most significant roadblock to its implementation of genetic improvements. The industry is fragmented by factions that use dissimilar technology and processes to achieve their unique benchmarks. The lack of integration and functionality in the information infrastructure serving the beef industry makes it difficult to apply not only genetic innovations, but also technologies that would help bridge the gap.

In Ireland, the Irish Cattle Breeding Federation unified infrastructure and brought dairy and beef together. Within this federation, information is shared freely and data has been centralised to empower collaboration and keep track of animal movements from breeder all the way to consumer. All the industry's technologies talk with each another, and up-to-date data analysis guides decision-making. This collaboration, in turn, increases scientific funding in the industry, and the cycle continues. Whether or not

The Linchpin: Collaboration

unification of beef and dairy under one roof is feasible or desirable in the New Zealand industry, we can learn from Ireland's admirable accomplishments: collaboration drives success, and it attracts funding.

The relationship between commercial farmers and breeders is an example of a lack of collaboration that holds the New Zealand industry back from innovation. The tension between commercial farmers and the beef seedstock farmer can not be easily defined as one farmer versus another (many breeders are both pedigree and commercial farmers in their own right), but the progressive farmers who are pursuing genetic advancement through genotyping and performance recording often become the recipients of ill feeling from those who aren't. To the exclusively commercial farmers, the performance breeder is a fat cat, or worse, a tall poppy. If the industry as a whole is to pursue innovation, or even better, the niche market, then it is important that it put the farmers who are investing in innovation and performance on a pedestal and to showcase the successes they achieve. If genetic innovation via performance recording is shown to be a step toward the future and successful, then the tension between commercial and seedstock will decrease because every facet of the industry craves longevity and success.

There is also a lack of unity among performance breeders and breed societies. PBBNZ brings 97% of the beef breed societies in New Zealand under one roof, and it is officially owned by seven of these societies. Despite this fact, there are tensions within breed societies when the interests of the members conflict with the society, or with each other. Many breeds still work in silos rather than together. Scientists, research bodies, government, service providers, breeders, commercial farmers, processors, markets, and consumers all have something to gain and something to give. In order to reap the benefits that each of these industry segments has to offer the others, we must start by sowing, by investing what we can in the effort. We need to work together and invest in technologies that support our collaboration rather than sabotaging it. This will take determination and persistence, but it can be accomplished.

Conclusion

The New Zealand beef breeder industry is a natural microcosm for the larger international industry, and it is ideally positioned to pioneer industry-wide application of genetic improvements. Kiwis are naturally very accepting of change (our country has an extensive track record for turning challenges into opportunities) and our kiwi breeders have the ability to lead the way in pedigree and performance advancements. With our unique client base, PBBNZ can play a major role in spreading innovation. We're already helping breeds integrate the technology and management techniques necessary to apply these innovations, and we understand the legal and logistical concerns surrounding purity and pedigree. In addition, the infrastructure and economies of scale the industry needs, is at the very core of our business. With our connections to breed societies, the science industry, and technology, PBBNZ could be an ideal conduit for collaboration and advancement. PBBNZ is looking to the future and seeking to champion innovation.

The New Zealand beef industry is not suited to end world hunger or to saturate the global commercial meat market, but it can play a significant role on the world stage. With the proper channelling of resources, New Zealand could feed 3-5% of the niche beef market of the world, and in doing so, gain a significant voice in the growing conversation around the integrity and quality of beef products. Pedigree and performance recording have the potential to get us there, but we can't do it alone. We need the support of the international community in our pursuit to strengthen the New Zealand beef industry. Funding, leadership, and talent are essential to these pursuits,



but too many times in the past these precious resources have passed us by. There are many ways that we, as an industry, need to evolve in order to meet the rising challenges of the day. There are many significant roadblocks. But with a vision, determination, and the support of the international community, we can innovate and, just maybe, transform our corner of the global industry.