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***DataGene 5 Year Business Plan  
FY 2020- 2024***

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*May 2019*

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# 1. Introduction

This Business Plan articulates the strategic direction, tactical priorities and operations for the DataGene Board, management and stakeholders. It builds on the previous three-year Business Plan (2016/17 to 2018/19) and the recently updated Herd Improvement Strategy. This Business Plan will guide the direction of DataGene over the period 2019/20 to 2023/24.

The next five years will be a period of significant change for the dairy industry, the herd improvement sector and for DataGene. Declining numbers of dairy cows, pressure on levy funding, falling herd test participation, competition in herd improvement and data services, and industry consolidation could all shape the environment DataGene operates in. Innovations in herd management technologies, systems and software for data-driven decisions, more cow-focused services and global leveraging of expertise all provide positive opportunities for DataGene's future.

DataGene may need to reassess its revenue model and sources of funding during the five-year timeframe, as this plan is predicated on similar levels of total funding as the previous three years. Levy and service funding are both unpredictable and facing some challenges. Opportunities could exist for greater private sector collaboration and completion of development projects to bolster revenue and support innovation. DataGene also has the option to leverage its expertise and resources globally as an income stream.

A key challenge for DataGene within the next five years is how it will continue to position itself within the herd improvement industry. Because of the tremendous opportunities created by pooling data within DataVat and the capability involved with its creation, DataGene can move beyond a specific herd improvement focus to a broader software and data services provider across the dairy industry. The range of scenarios is from "industry good" (predominantly levy funded, competitively neutral) through to fully commercial. A transition to a more commercial footing may obviously shift DataGene to being more of a competitor to some of its existing members. This will need to be carefully considered and managed.

On a day-to-day basis, DataGene has four pillars which support its delivery of results: Improved decision-making from data, Increased farm profitability through herd improvement, Improved animal performance from research and development, and Improved and diversified service offerings. These pillars align with the Herd Improvement Strategy 2019-2024, and whilst DataGene will be involved in other aspects of the Strategy, these are the primary areas where DataGene leads and is accountable. DataGene's products and services are well described in this Business Plan and give a clear picture of how DataGene will operate, what it will deliver, and how it will create value over the next five years.

## 2. Company Description

DataGene was formed in July 2016 as a result of leadership from the Herd Improvement Industry Strategic Steering Group (HISSG), development of the Herd Improvement Strategy and the commitment from many diverse organisations in the herd improvement sphere. DataGene brings together non-competitive herd improvement functions under the one umbrella, including genetics, herd testing, herd recording, data systems and herd test standards. DataGene incorporated the functions of MISTRO Centre in July 2016, and acquired the operations and staff of Australian Dairy Herd Improvement Scheme (ADHIS) in November 2016. DataGene is an independent and industry-owned organisation responsible for driving genetic gain and herd improvement in the Australian dairy industry and is an initiative of Dairy Australia and the broader dairy industry.

## 2.1. Herd Improvement Industry Vision

The Herd Improvement Industry Strategic Steering Group (HISSG) agreed the following vision for the herd improvement industry in 2014, which remains unchanged for the Herd Improvement Strategy 2019-2024:

***Dairy farmers maximise their profit through a vibrant herd improvement industry offering effective and highly valued services***

## 2.2. DataGene Vision

DataGene's vision aligns with the herd improvement industry vision:

***DataGene enables farmers and their industry to maximise profit through data-driven decisions***

## 2.3. DataGene Mission

The underlying rationale for DataGene's existence is to give farmers and industry the tools to improve decision making and increase farmer profit:

***DataGene delivers world-class genetic evaluation, software and decision-making tools to enable Australian farmers to improve their herds and maximise their profits through data-driven decisions and innovative industry services***

## 2.4. Herd Improvement Industry Principles

The Herd Improvement Industry Strategic Steering Group (HISSG) was formed in 2013 and agreed to a number of principles and created Herd Improvement 2020 strategy paper which have underpinned subsequent actions. In 2018/19 a refresh of the strategy was undertaken and the paper was launched after months of consultation at the Herd '19 conference in Bendigo. The updated principles from the Herd Improvement Strategy 2019-2024 are:

1. Genetic improvement is vital to the profitability of the Australian dairy herd;
2. Australian evaluation and research capability is vital to genetic improvement in Australia;
3. Broad based farmer support/understanding of genotype by environment (GxE) effects and Australian evaluations is vital to Australian evaluation and research capability;
4. Industry wide extension/marketing and advocacy/leadership is vital for broad based farmer support/adoption of Australian evaluations;
5. Measurement of animal performance is vital to managing animal performance;
6. Cooperation and efficiency in the sharing of data is vital for mutual benefit across the industry;
7. Farmers control access to on-farm data, and;
8. Animal performance and farm data is critical for enhanced traceability and transparency through the value chain.

DataGene endorses these principles, which underpin its strategy and operations.

## 2.5. DataGene Values

DataGene has a number of values that define what's important to the organisation and guide its activities, behaviours and performance:

1. We work towards shared and innovative outcomes for members and stakeholders (commitment to clients);
2. We depend on genuine and sustained stakeholder engagement (direct, open & honest communication);
3. We are genuinely inclusive and value farmer and member involvement in governance and oversight functions (inclusive);
4. We aim to be creative and innovative in our products and services (innovation);
5. We treat our people with respect, support them in their development and value their contribution to our success (engagement with employees); and
6. We apply best-practice corporate governance and financial management principles (integrity & ethical values).

## 2.6. Membership

DataGene is owned by the dairy industry, with foundation members being Dairy Australia, Australian Dairy Farmers (ADF) and the National Herd Improvement Association (NHIA). As at October 2018, total membership of DataGene was 25 members including herd test centres, genetics suppliers and breed associations.

DataGene members	
<ul style="list-style-type: none"><li>• Dairy Australia</li><li>• Australian Dairy Farmers</li><li>• National Herd Improvement Association of Australia</li><li>• ABRI</li><li>• ABS Australia</li><li>• Agri-Gene</li><li>• Apiam Animal Health</li><li>• Australian Reds</li><li>• Brown Swiss Australia</li><li>• Cobden Artificial Breeders Co-op</li><li>• Farmwest</li><li>• Genetics Australia</li></ul>	<ul style="list-style-type: none"><li>• Guernsey Cattle Society of Australia</li><li>• Herd Improvement Co-operative Australia</li><li>• Holstein Australia</li><li>• Jersey Australia</li><li>• Livestock and Business Centre</li><li>• National Herd Development</li><li>• Neogen Australasia</li><li>• Nu-Genes</li><li>• Semex</li><li>• TasHerd</li><li>• Viking Genetics</li><li>• Wellbred Genetics</li><li>• Yarram Herd Services</li><li>• Zoetis</li></ul>

## 2.7. Stage of Business

Since formation in July 2016, DataGene's focus has been on updating and developing the required infrastructure to deliver industry genetic evaluation, herd improvement and data services. This 'start up' or establishment phase has been characterised by significant software development, incorporation of staff from different organisations, implementation of new processes and systems, establishment of new offices and working to engage and collaborate with multiple partners across the herd improvement industry. DataGene is now moving into a 'growth' phase as it leverages its infrastructure and capability to deliver improved herd improvement functions and expand into other products and services. DataGene is moving beyond a specific herd improvement focus to ultimately being a software and data services provider across the dairy industry.

## 2.8. Location

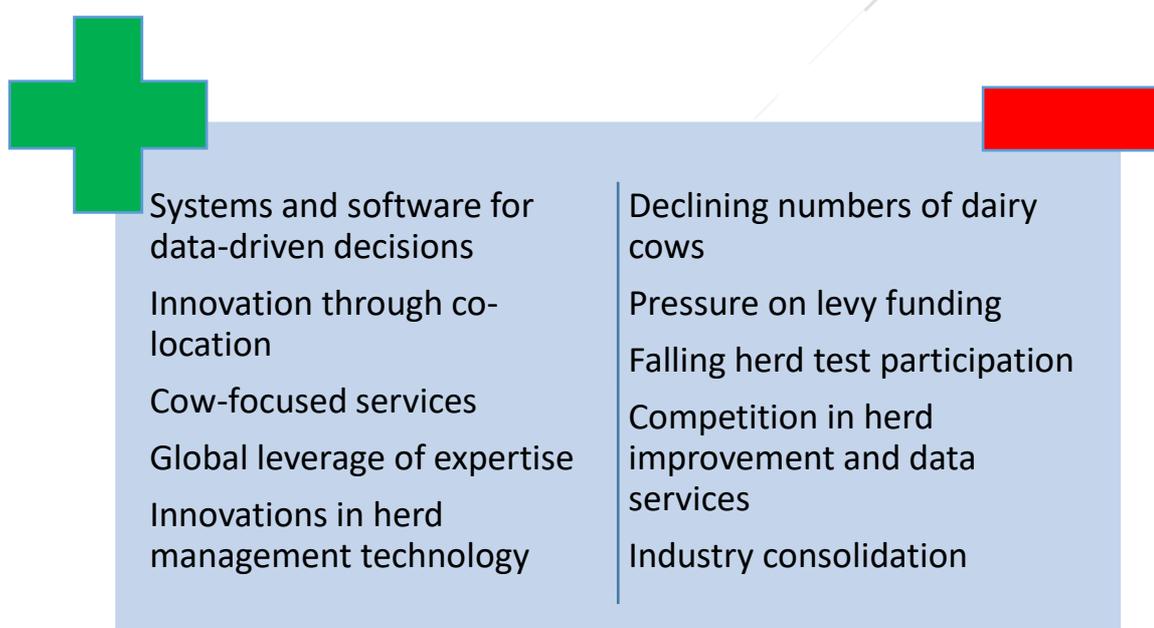
DataGene offices are located at AgriBio, on the Latrobe University campus at Bundoora, Victoria. This location provides close proximity to the research and development activities provided by Agriculture Victoria through DairyBio and other projects. The DataGene offices are shared with NHIA, Holstein Australia and Jersey Australia enabling efficiency of shared services and opportunities to collaborate effectively. There will be ongoing work to ensure efficiencies across back office functions, such as financial reporting, human resources, and technology.

# 3. Context

## 3.1. Operating Environment

DataGene's focus is on providing service and products to the Australian dairy industry. The long-term outlook for the dairy industry remains strong, based on the ongoing strong demand for dairy products globally. However, the operating environment for the Australian dairy industry has had a number of challenges over recent years.

There are 10 factors driving change in the operating environment that have the potential to significantly impact DataGene's business over the next five years:



### 3.1.1. Declining numbers of dairy cows

The scale of the herd improvement industry in Australia is essentially defined by the size of the national dairy herd. Numbers of dairy cows have been falling by 1.5% on average each year over the past five years. In 2017/18, the national herd was estimated to be 1,520,000 cows – 276,000 fewer cows than 2007/08. Cow numbers likely to continue declining (on trend) or remain static in the foreseeable future. The shrinking national dairy herd puts severe operational and economic pressures on service providers involved in herd improvement.

### 3.1.2. Pressure on levy funding

One factor directly contributing to a declining national herd has been the pressure on farm profitability, due to volatile prices, climate change and rising costs. In recent years, volatility in farmgate milk prices and farm incomes have impacted farmer confidence and ability to grow. This coupled with challenging seasonal conditions has resulted in national milk production falling by 0.63% on average each year over the past twelve years.

A reduction in farm confidence and profitability impacts the ability of farmers to purchase DataGene services such as genomic testing and the services of its members, such as herd testing. Milk production falls also directly impacts on Dairy Australia's revenue, and levy income in 2018/19 will be under further pressure with milk production down 6.7% YTD compared to the previous year, as at March 2019. Dairy Australia is currently the primary source of funding for DataGene. Approved funding for DataGene for the three years ending 2018/19 totalling over \$6.7 million and covered approximately 75% of the operating costs of DataGene. A new five-year funding agreement covering the years in this plan has been agreed with Dairy Australia.

An additional factor impacting on Dairy Australia funding support of DataGene may be a change in strategic direction over the five-year period that sees funding reduced or ceased.

### **3.1.3. Falling herd test participation**

The number of cows participating in herd recording has decreased over the past decade, at a greater rate of decline than the trend for total cow numbers. In absolute terms, there were 280,000 fewer cows participating in herd recording in 2016/17 compared to 2006/07. This is equivalent to a one-third reduction in herd recording numbers over a decade. Currently, 40% of cows and 44% of herds are herd tested, compared to 49% of cows and 55% of herds ten years ago. Herd testing historically provided the basis for phenotypic data collection and analysis. Reduced herd test participation has the flow on effect of reduced data for genetic evaluations and other industry purposes (e.g. reports, benchmarks, etc).

### **3.1.4. Competition in herd improvement and data services**

The threat of competition and new entrants is real, particularly in the field of data services. For example, LIC's publicly stated strategy is to take a lead in farm management software and explore growth opportunities beyond New Zealand. This plan includes taking the MINDA cloud platform into international pastoral markets, investing in data capture (sensors) and developing future decision support / artificial intelligence tools.

Another example, although unlikely, could be a commercial entity requesting access to phenotypic data via DataVat to develop competing breeding values based on Australian data (or to validate overseas breeding values with Australian data). A more likely example is an overseas service provider offering a proprietary breeding values that have been developed and validated overseas. Given the well-established genotype by environment interactions, this would mean that the overseas breeding values could be inappropriate for use in Australia.

### **3.1.5. Industry consolidation**

The genomic revolution will continue to change the artificial insemination sector and ongoing consolidation of bull companies is likely to continue. DataGene's client numbers could reduce slightly over time due to herd recording centre or artificial breeding company mergers or acquisitions, as has occurred in the past. There is a possibility that a reduction in client numbers could reduce Centre software revenue as consolidated firms or collectives could reduce their Centre-related costs from what they would have been as separate entities.

### **3.1.6. Systems and software for data-driven decisions**

Issues around data collection, access and use have persisted in the Australian dairy industry for many years. Development of the 'Centralised Data Repository' (CDR), now called DataVat, was considered by the Australian dairy herd improvement industry for more than a decade and a number of reviews confirmed the value of creating a pre-competitive pool of animal performance data.

The development of DataVat provides significant opportunities for DataGene and the Australian dairy industry to more effectively deliver herd management and information services. The key opportunity is to use data more effectively across the value chain. This will require a commitment from industry bodies to use DataVat as a central source and for all industry funded projects to connect to it. In addition, other stakeholders, both data providers and data users, will need to be engaged and buy into the use of DataVat as a hub for dairy data.

### 3.1.7. Innovation precinct

The creation of DataGene and the development of the herd improvement industry 'Dairy House' is much more significant than just a co-location exercise. It represents a unique herd improvement innovation precinct, with researchers interacting and innovating with the end users and the rest of the supply chain in one location. The value of this arrangement should not be underestimated and should be promoted, especially to potential funders of innovation such as the Australian Government.

### 3.1.8. Global leverage

DataGene has the potential to leverage its expertise and resources globally. A number of overseas organisations and companies have expressed interest in what DataGene has been able to achieve since 2016. The capability and approach taken has been well regarded and provides opportunities for international partnerships during the period of this plan. This may provide a useful additional revenue stream to bolster DataGene's income.

### 3.1.9. Cow-focused services

Increasing numbers of dairy females and bulls are being genotyped by both farmers and bull companies. In 2017/18, the number of genomically-tested bulls was 4,018, up from 555 bulls in 2012/13. The number of genomically-tested cows from commercial herds was 15,199 in 2017/18 from a base of zero in 2012/13. Based on global experiences, a significant upsurge in the genomic testing of young females should be achievable in coming years. This provides a solid foundation for expansion of DataGene products and services with a "cow focus", notwithstanding declining cow numbers.

### 3.1.10. Innovations in herd management technology

The potential for innovation in herd management and herd improvement technologies is huge. The upsurge in device connectivity, data volumes and computer speeds, plus rapid advances in automated systems and artificial intelligence will revolutionise herd management and on-farm decision-making. These developments provide new ways to use of data to improve decision-making and generate predictive analysis (rather than retrospective reporting).

## 3.2. SWOT Analysis

Strengths and weaknesses of DataGene and opportunities and threats in the wider operating environment were identified as context for this business plan;

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> <li>• DataVat capable of housing data from a variety of sources and enabling new services and products</li> <li>• Strong membership base and close collaboration with herd improvement industry partners</li> <li>• In-house capability, industry knowledge and experience</li> <li>• Resilient staff committed to DataGene's mission</li> </ul>	<ul style="list-style-type: none"> <li>• Critical mass of data still required to fulfil the vision for DataVat</li> <li>• Substantial reliance on Dairy Australia funding, which is under pressure</li> <li>• Key person dependency and burnout risks</li> <li>• Little engagement with milk companies, banks, farm advisors and other 'non-herd improvement' stakeholders</li> <li>• Use of genomic testing of female animals remains relatively low</li> </ul>

<ul style="list-style-type: none"> <li>• Service providers increasingly supporting DataGene and promoting Australian breeding values and indices</li> <li>• Standing Committees provide strong links between industry and DataGene</li> <li>• Strong science pipeline of improvements</li> <li>• Redeveloped Genetic Evaluation System New Platform (GES NP) provides a step-change for genetic evaluations</li> <li>• Leader in a unique herd improvement innovation precinct</li> <li>• Strong international relationships</li> </ul>	<ul style="list-style-type: none"> <li>• Consultation with a heavily governed industry can slow development processes</li> <li>• Limited resources to take advantage of technological opportunities</li> <li>• Limited social media presence and corporate capability material that is not program-based</li> </ul>
<p><b>OPPORTUNITIES</b></p>	<p><b>THREATS</b></p>
<ul style="list-style-type: none"> <li>• Data services and analytics through DataVat to improve decision-making and provide predictive analysis</li> <li>• Upsurge in device connectivity, data volumes and computer speeds, plus rapid advances in automated systems and artificial intelligence / machine learning</li> <li>• Increasing uptake of inline milk measuring tools and other sensing technologies</li> <li>• Traceability and production transparency services</li> <li>• Changes in scale of farm operations and increased requirements for decision-making support, particularly for large farms</li> <li>• Greater private sector involvement and investment farms</li> <li>• Potential to leverage expertise and resources globally</li> <li>• Collaboration with other Australian ag sectors, e.g. red meat industry</li> <li>• Increased coordination to reduce duplication and improve efficiency of services</li> <li>• Flexible arrangements for accessing and maintaining key expertise</li> <li>• Provision of new tools for client groups, e.g. bull companies</li> </ul>	<ul style="list-style-type: none"> <li>• Declining numbers of dairy cows is shrinking the market for products and services</li> <li>• Farm and industry profitability remain volatile and under pressure</li> <li>• Ongoing reduction in herd test participation</li> <li>• Reliance on third party cooperation on data access</li> <li>• Difficulty in industry access to some phenotypic data, e.g. data collected from inline milk meters</li> <li>• Competition in herd improvement and data services</li> <li>• Pressure on levy funding</li> <li>• Need for greater efficiency and capacity to offer herd improvement services on-farm</li> <li>• Herd improvement not clearly linked to profit by all farmers and service providers</li> <li>• Slow adoption of new innovations</li> <li>• Increasing activism and consumer scrutiny on how animals are treated and milk is produced, including provenance, food safety, animal treatments, dehorning, timed AI programs, etc.</li> <li>• Potential pressure on live exports to China</li> <li>• Growing use of proprietary breeding values and indices</li> <li>• Ongoing need to work with industry opinion leaders</li> <li>• Challenges to extension and training in the industry</li> <li>• Herd test staff and others have little opportunity to improve skills and service provision through training</li> <li>• Milk production recording viewed predominantly as a management tool for managing cell count, inconvenient for farmers and technologically limited</li> </ul>

### 3.3. Customers

DataGene customers include dairy farmers, service providers and industry bodies:

- **Dairy farmers** - the number of Australian dairy farms has fallen from 7,953 in 2007/08 to 5,699 in 2017/18, reflecting a continuing global agricultural trend of “fewer, bigger farms”. Coupled with a reduction in farm numbers has been an increase in average herd size. In 2017/18 the average herd size was 274 cows, up from 206 cows in 2007/08.
- **Herd recording centres** - there are currently eight herd recording centres in Australia. They are currently deploying a plan for herd recording services designed to meet the current and future needs of dairy farmers, their advisers and other industry partners.
- **Bull companies** - there are about nine major bull companies operating in the Australian market producing semen for sale to farmers. These can be both domestic and foreign-owned companies and have both domestic and foreign bulls. Some importing companies are marketing collaborations between multiple bull companies.
- **Artificial breeding companies** - there are about a dozen artificial breeding companies, including a very limited number of non-reseller affiliated providers, that perform inseminations for farmers. They may or may not be part of a bull company, a herd recording centre or a reseller.
- **Resellers** - a unique feature of the Australian herd improvement landscape that operate as intermediaries or brokers between farmers and bull companies. Resellers are often also herd recording centres and may provide many other management services such as synchronisation programs, inseminations, pregnancy testing, data entry, etc.
- **Breed societies** - the registered sector in the Australian dairy industry consists of seven major breed societies (Holstein, Jersey, Brown Swiss, Ayrshire, Illawarra, Guernsey and Australian Dairy Red Breed). The two largest breed societies are Holstein Australia and Jersey Australia, which together cover 95% of registered cattle and members.
- **On-farm software companies** - the field of companies providing on-farm software related to farm management, including milking, feeding of individual cows, veterinary treatments, matings, production information, etc. is very broad. However, there are two main types of on-farm software:
  - Proprietary software used to operate and support equipment from that specific company (e.g. DeLaval, Lely, Jantec), which may or may not integrate with other software or industry systems.
  - Software developed either in Australia or overseas to integrate with various dairy equipment brands, but usually do not integrate across multiple companies and may not communicate with other industry data services, e.g. MISTRO Farm, EasyDairy, DairyComp 305, etc.
- **Milk processors** - the milk processors are potential clients of DataGene in the field of data services. As they look to add traceability to their supply chains and to ensure compliance with regulation and social license, the collection and analysis of data becomes increasingly important. In addition, efforts to streamline quality assurance audits may be efficiently undertaken through DataVat.
- **Regulators** – Dairy regulators, such as Dairy Food Safety Victoria, are also potential clients
- **Other species** – Industry bodies that operate in other species (animals and plants) are also potential clients is so far as DataGene has experience working with large datasets in agriculture and the technology behind building data repositories.
- **Other genetic evaluation centres** – Genetic evaluation of other species and particularly in other countries takes place with similar requirements and outputs. This could enable

DataGene to leverage its experience in building the Australian dairy evaluation system to other species or countries,

### 3.4. Collaboration

DataGene collaborates with a range of organisations to enable pre-competitive actions such as data sharing, the development and conduct of research and development, extension activities, strategy development and promotion of the dairy industry and herd improvement sector:

- **Industry organisations**, particularly Dairy Australia, the Gardiner Foundation, Australian Dairy Farmers and the National Herd Improvement Association
- **Private sector entities**, including herd recording centres, bull companies, breed societies and resellers
- **Government agencies**, particularly the Victorian Government, through Agriculture Victoria and its partnership in DairyBio, and with the Australian Government, through the Department of Agriculture and Water Resources
- **Universities**, particularly LaTrobe and Melbourne Universities.

Many of these collaborations occur as required to support broader industry objectives. Where collaborations are of a longer-term nature and/or involve a commitment of resources or capability, these will be formalised through Memorandums of Understanding or contracts (such as for research and development initiatives).

Dairy Moving Forward (DMF) is the dairy industry's research, development and extension (RD&E) strategy under the National Primary Industries RD&E Framework. The national framework structure through DMF has become widely accepted as the basis for coordinated RD&E in the industry. The objective of the national framework is to develop, oversee and guide the coordination and alignment of research, development and extension in the dairy industry, and to ensure the outcomes of investments in RD&E address the industry-agreed priorities.

DataGene and its Standing Committees operate as highly effective forums to identify and provide guidance on the priority of research, development and extension initiatives within the Animal Performance theme area, which encompasses herd improvement as well as other aspects such as animal health and welfare. It is recommended that an annual stakeholder forum (e.g. a herd improvement Community of Interest (COI)) is convened to ensure all stakeholders have the opportunity to be updated on progress against the strategy and provide additional feedback.

### 3.5. Competition

A key challenge for DataGene within the next five years is how it will position itself within the herd improvement industry. The factors driving change could lead to scenarios ranging from remaining as an "industry good" organisation (predominantly levy funded, competitively neutral) through to a fully commercial entity. A transition to a more commercial footing may shift DataGene to being a competitor with some existing partners. This will need to be considered very carefully.

#### 3.5.1. Genetic Evaluation

Given the large industry good component of the dairy genetic evaluation work of DataGene which benefits all farmers and the broader herd improvement industry, it is unlikely that a direct commercial competitor would emerge.

Significant competition does exist from overseas breeding values and proprietary breeding values from international commercial companies. There are no barriers to entry for use of overseas breeding values by Australian farmers. This is one of the most significant challenges for DataGene is to ensure that Australian farmers understand the benefit of using Australian breeding values in their herd improvement programs.

To develop a competing breeding value based on Australian data (or to validate an overseas breeding value with Australian data), the key barrier is the need to gather significant amounts of phenotypic data. At the current time, there is no other source of significant phenotypic data available in Australia except through the DataGene Centre software. However, it would be possible for a competitor to go directly to farmers for their data. In the United States, Zoetis have released their own breeding value and index by getting farmers' agreement to access their phenotypic data and match it with their significant genomic data. This could potentially occur in Australia at some point. Alternatively, a commercial entity could request access to phenotypic data via DataVat and DataGene's Data Governance Committee and Board would need to consider the benefits to Australian farmers if this request was made.

### **3.5.2. Software & Data Services**

The herd recording software market has undergone considerable consolidation over the last five years and DataGene Centre software currently accounts for more than 90% of this market. DataGene Centre is highly specialised software tailored to Australian conditions. Any new competitors would need to justify developing a specific product for a relatively small market. Overseas software would need to be modified considerably, which would be costly. A new market entrant would experience significant establishment costs and relatively low margins, with a long time-horizon for recouping market entry costs.

DataGene has two small Australia competitors in the herd recording software area – TasHerd, which is the only firm in the Tasmanian market and AHRS (Australian Herd Recording Services) which has a small market share in Queensland.

The expansion and transformation of the business through DataVat will make it less likely that commercial competitor will arise for Centre. DataVat will encourage competition at the farmer and service provider level, while integrating the ties between Centre and the DataVat.

In software development services, there are multiple competitors. However, DataGene has an unmatched understanding of the Australian dairy industry and has developed deep specialised knowledge in both software development and its application in the dairy industry. This capability will be leveraged to develop and improve future DataGene products and services, and support partners in their businesses.

The threat of competition and new entrants is real, particularly in the field of data services. For example, LIC's publicly-stated strategy is to take a lead in farm management software and explore growth opportunities beyond New Zealand. This plan includes taking the MINDA cloud platform into international pastoral markets, investing in data capture (sensors) and developing future decision support / artificial intelligence tools.

## 4. Products, Services & Projects

From a strategic perspective, DataGene has four pillars which support its delivery of results: Improved decision-making from data, Increased farm profitability through herd improvement, Improved animal performance from research and development, and Improved and diversified service offerings. This represents a change from the categories used in the previous business plan (Genetic Services; Data and Software Services; Support Services) to better reflect DataGene's business focus and activities.

Strategic Priorities			
<p style="text-align: center;"><b>Improved decision-making from data</b></p> <ul style="list-style-type: none"> <li>• Develop and support new decision tools</li> <li>• Expand and secure data</li> <li>• Drive and support industry innovation</li> </ul>	<p style="text-align: center;"><b>Increased animal performance through herd improvement</b></p> <ul style="list-style-type: none"> <li>• Increase reliabilities</li> <li>• Improve service delivery</li> <li>• Increase farmer and industry service uptake</li> <li>• Increase the number of genomically tested females</li> </ul>	<p style="text-align: center;"><b>Improved animal performance from research and development</b></p> <ul style="list-style-type: none"> <li>• Deliver new health breeding values</li> <li>• Use genomics and other technology (MIR) to predict future performance</li> </ul>	<p style="text-align: center;"><b>Improved and diversified services</b></p> <ul style="list-style-type: none"> <li>• Build and maintain DataGene and industry infrastructure</li> <li>• Develop and maintain industry solutions</li> <li>• Establish new revenue streams</li> </ul>

These pillars align with the Herd Improvement Strategy 2019-2024, and whilst DataGene will be involved in other aspects of the Strategy, these are the primary areas where DataGene leads and is accountable. DataGene's products and services are described below under each of the 2024 Herd Improvement Strategy goals.

### 4.1. Improved Decision-Making from Data

2024 Herd Improvement Strategy goals:	LEAD
<b>CENTRALISED DATA REPOSITORY</b> - DataVat is supported and enhanced, and operates as 'single entry/multiple use' system with seamless transmission of data between on-farm systems, DataGene, and industry data users	DataGene
<b>COORDINATED DATA MANAGEMENT</b> - DataGene, with industry support, acts as a single responsible data aggregator cooperating with milk processors, industry regulators, animal health sector and other industry partners to exploit efficiencies and synergies in data collection and analytics	DataGene
<b>HERD RECORDING INNOVATION</b> – Herd recording centres rapidly introduce new technology and services that are of increased value for farmers from herd recording and associated data (e.g. pregnancy testing, fertility indicators, novel milk composition analysis, etc.)	Herd recording centres
<b>DECISION SUPPORT TOOLS</b> - The use of existing tools and resources (e.g. Good Bulls Guide, Selectabull, Genetic Progress Report, Genetic Futures Report, Fertility Focus Report, Mastitis Focus Report, etc.) to make the best whole-farm decisions is increased from 2017/18 levels, and new reports, tools and resources are developed	DataGene
<b>ACCESS TO PHENOTYPES</b> - The GINFO system is adequately resourced, supported and maintained to enable phenotypic data collection and build the accuracy of genomic selection in the future	DataGene

### **4.1.1 DataVat (Centralised Data Repository)**

The focus over the timeframe of this plan is to support and enhance the DataVat infrastructure, acquire data from a range of industry participants, and support industry partners to develop tools, resources and analysis that leverage the data for the benefit of farmers. The initial focus is on 'bedding down' DataVat and then shifting to acquiring data from other sources.

DataVat can change the way the entire industry works if it reaches its potential as a central pool of data, linking the farm system with other industry data sources. The power of combining datasets to unleash innovation is both profound and at this stage unknown. Profound because it can enable the step change from historic reporting of events to future prediction of events, thereby giving farmers more tools to manage their farms. Unknown because the speed and exact trajectory of the developments cannot be accurately predicted.

### **4.1.2 Coordinated data management**

In order to support and enhance the DataVat infrastructure, DataGene will work with other industry bodies to take responsibility as the industry data aggregator to cooperate with milk processors, industry regulators, animal health sector and other 'non-traditional' data sources to collect, analyse and manage this data. DataGene will work towards having all data that is collected by industry, whether that be on farm, by the processors or by industry bodies, linked through DataVat. This creates both a single source of truth for the dairy industry but also a single entry-multi use environment for farmers. DataVat should enable data entered by farmers through any means to be transferred for other uses, with their permission. Any new industry digital resources should link through DataVat and take advantage of the infrastructure created. Historically, other data has not been integrated with herd improvement data, e.g. milk processor data, data from in-line milk metering, etc. – which now provides the opportunity to leverage greater value from combinations of data that previously were difficult to integrate. One expected benefit from this integration is the development of predictive reporting and tools rather than retrospective reporting of events.

### **4.1.3 Decision support tools**

The focus over the timeframe of this plan is to support and enhance existing decision support tools created and managed by DataGene, such as the Good Bulls Guide, Genetic Progress Report, Herd Test Dashboard, Herd Data app, Fertility Focus report, Mastitis Focus Report, etc. DataGene will also support industry partners to develop tools, resources and analysis that leverage DataVat for the benefit of farmers. DataGene may develop additional tools in future where there is clear industry good and market failure, but the primary strategy will be to partner with members to develop and support these tools.

### **4.1.4 Access to phenotypes**

Ginfo will establish a reference population that will contain phenotypic data of 60,000 milking animals in 200 herds to reflect the genetics, location and farm systems utilised in the broad Australian dairy population. The Ginfo project is undertaken by DataGene using contracted collection of data and tissue samples from other industry partners.

These herds contain sufficient measured and collated phenotypic data to drive up the reliability of breeding values. Ginfo farmer collaborators will become the primary source for the Australian industry's ongoing evaluation of the current suite of Australian Breeding Values in addition to providing data for the research and development required for new ABVs. It will also explore the collection of emerging and new phenotypes of farmer interest particularly for animal health traits.

## 4.2. Increased Animal Performance through Herd Improvement

2024 Herd Improvement Strategy goals:	LEAD
<b>USE OF AUSTRALIAN METRICS</b> - A large majority of farmers and service providers recognise the value of herd improvement, its contribution to farm profitability, and have confidence in the BPI (and HWI and TWI) and ABVs	DataGene
<b>INCREASE REPLACEMENTS FROM GOOD BULLS</b> – The industry records an increased percentage of replacement cows from AI sires across the national herd compared to 2017/18 levels and more heifers joined to AI compared to 2017/18 levels	DataGene
<b>INNOVATION IN EVALUATIONS</b> - Technological and methodological innovation maintains world best practice genomic evaluations	DataGene
<b>CLEAR VALUE PROPOSITION</b> - The value proposition of data-informed decisions and herd improvement (e.g. herd recording, use of breeding indices) to farmers, as well as other industry participants (such as veterinarians, consultants, milk processors and other industry bodies), is effectively communicated	DataGene

### 4.2.1 Use of Australian metrics

The priority over the timeframe of this plan is to close the gap between potential and actual genetic gain, by increasing the number of farmers using Australian profitability metrics to drive elite sire selection. These messages need to engage a wider section of the dairy industry including finance, milk companies, veterinarians and on farm consultants. DataGene will work with its members and Dairy Australia to deliver messages, tools and resources e.g. Good Bulls Guide, Selectabull, Genetic Progress Report, etc. that increase the use of Australian breeding indices. The aim is to increase the number of farmers and service providers that recognise the value of genetic improvement, its contribution to farm profitability, and that have confidence in Australian breeding values.

### 4.2.2 Increased replacements from AI

One of the key drivers of increasing the rate of genetic gain is the level of artificial insemination (AI) use (particularly across replacement stock). Two-thirds of dairy farmers believe it is very important to continuously improve herd genetics and 84% of dairy farms use AI to do so. This provides a solid foundation for more farmers to recognise the link between herd improvement and improved returns, and for more farmers to use AI to breed their replacements. The average proportion of herd replacements from AI is 71%, but in 2016/17 only 28% of herds had at least 80% of their herd sired by AI. DataGene will assist in developing messages around the benefits breeding replacements from good bulls using AI, and work with key influencers including herd recording centres, bull companies and Dairy Australia to propagate these messages.

### 4.2.3 Innovation in evaluations

DataGene owns and manages Australia's national independent dairy genetic evaluation database and analysis with the aim of increasing the rate of genetic improvement in the dairy industry. DataGene is the sole entity calculating and supplying Australian-specific breeding values.

DataGene will retain its key focus on genetic evaluation services and products, mainly breeding values, indices and genomic breeding values for farmers and bull companies, etc. DataGene will refine these products over time based on requirements from farmers and the broader industry. In addition, as DairyBio develops new breeding values, with a focus on health and resilience, DataGene will implement these and deploy these to the industry.

The rise of proprietary breeding values and indices is unlikely to abate as companies work to differentiate themselves in the marketplace. DataGene will continue to develop its

role as independent validation for proprietary algorithms and breeding values to ensure farmers can make informed decisions regarding the management of their herds.

#### 4.2.4 Clear value proposition

Effective extension, marketing, proof of concept and demonstration of the verified link between profit and herd improvement, and a clear understanding of this for farmers and the wider industry, will enable the industry to capture more of the potential genetic gain by demonstrating how to make better decisions for herd improvement. The changing extension landscape will require a rethink of the way genetics is embedded into industry messaging. DataGene will work closely with its members on common messaging, and work closely with the Regional Development Programs (RDPs) and Dairy Australia to deliver targeted material and embedded content.

### 4.3. Improved Animal Performance from Research and Development

2024 Herd Improvement Strategy goals:	LEAD
<b>IMPROVE TRAIT RELIABILITY</b> - Improvement in reliability of existing traits, e.g. fertility, feed saved, calving ease, heat tolerance, etc.	DairyBio
<b>IMPROVE GENOMIC RELIABILITY</b> - Improve reliability of traits measured using genomic methods / selection such that genomic reliability is at globally comparable rates for major traits and indices	DairyBio
<b>NEW BREEDING VALUES</b> - Development of new breeding values which are of particular economic and/or sustainability importance to Australian dairy farmers, e.g. lameness, resilience, mastitis, etc.	DairyBio
<b>INCREASING GENOMIC TECHNOLOGY USE</b> - Genomic technology uptake and the on-farm benefits from this technology for farm profit improvement are increased, including development of new herd management tools that use genomic data	DataGene
<b>PREDICTION OF PERFORMANCE</b> - Lifetime prediction of performance of individual cattle based on breeding merit, assessment of non-additive gene effects, observations of cow's performance, and novel characteristics (e.g. cow's individual response to feed and health challenges)	DairyBio

#### 4.3.1 Increasing genomic technology use

The number of genomically-tested females from commercial herds was 15,199 in 2017/18 from a base of zero in 2012/13. Based on global experiences, a significant upsurge in the genomic testing of young females should be achievable in coming years. This provides a solid foundation for expansion of DataGene products and services with a "female focus", notwithstanding declining cow numbers.

There are also new opportunities with genomic data to improve the prediction of a cow's profitability through her lifetime. Research initiatives will integrate the genomic and MIR information to provide farmers with more accurate predictions of which cows will be most profitable at each lactation, which then forms the basis for breeding and culling decisions and increased genetic gain.

Underpinning a move to dramatically increase the level of female testing is the requirement for slick services where farmers and genomic service providers have quick and easy access to genomic breeding values within a short timeframe. There is considerable work required to tune GES NP and DataVat for this velocity of service.

## 4.4. Improved & Diversified Service Offerings

2024 Herd Improvement Strategy goals:	LEAD
<b>SHARED INFRASTRUCTURE AND CAPABILITY</b> - Infrastructure (e.g. DataVat) and capability is leveraged to provide software and data services across the dairy industry	DataGene
<b>SHARED EFFICIENCIES</b> - Efficiencies are delivered in the administrative requirements of breed societies including the recording and processing of memberships, registrations, classification, transfers and exports;	Breed societies
<b>ADEQUATE SUPPORT FUNCTIONS</b> - 'Development, implementation and maintenance' functions for services, tools and resources are comparable or better than international peers	DataGene
<b>COORDINATED SERVICE DEVELOPMENT</b> - The industry efficiently and effectively coordinates development and implementation of data and software services for the benefit of dairy farmers	DataGene
<b>EXPANDED COLLABORATION</b> - DataGene identifies clear priorities for collaboration in the medium term with key stakeholders in other livestock sectors and/or non-herd improvement areas, e.g. feedbase, that are beneficial to the Australian dairy industry	DataGene

### 4.4.1 Shared infrastructure & capability

There remain opportunities for innovation, co-operation and rationalisation within the sector, particularly with regards to pre-competitive services, marketing, laboratories, transport and logistics.

DataGene Centre software provides important services to its herd recording centre and artificial breed company clients, which they are likely to continue to require and value into the future. Centre software only has two competitors in Australia. However, based on the current condition of the dairy industry, the ability to drive revenue growth from this market is small. Support and enhancements for this software is a key element of DataGene's role. Over the timeframe of this plan, Centre will be redeveloped to take advantage of DataVat and on a more modern technology platform. DataGene will work closely with its clients to ensure their requirements are met.

DataGene is working with Dairy Australia and Agriculture Victoria to calculate the Forage Value Index (FVI) in 2019. In addition, this is expected to include extension and stakeholder engagement work for the FVI as well. This transition enables the industry to leverage DataGene's core capabilities, GES NP and DataVat, and enable further expansion into the forage genetics area.

### 4.4.2 Adequate support functions

Development, implementation and maintenance functions are often overlooked and not effectively resourced at a project level. These 'overhead' functions are critical to ensuring that research outcomes meet end-user needs and that they are delivered to market. DataGene has, and will into the future, play a key supporting role through the provision of development, implementation and maintenance functions, which should be recognised by key strategic partners such as DairyBio and Dairy Australia. Whilst these functions may be hidden, they have a significant cost to DataGene and need to be fully funded.

### 4.4.3 Coordinated service development

The reduced national herd size is shrinking the potential market for service providers, hindering their ability to innovate. By collaborating, they can meet farmer demands more quickly. In order to improve the provision of herd improvement services to farmers and drive innovation in delivery, duplication of effort should be reduced and the focus shifted to pre-competitive collaboration. Industry consolidation may have a significant impact on the operations of herd test centres and breed societies in particular. A more collaborative approach, with likely consolidation of basic functions, will be part of the response to fiscal pressure. DataGene has a clear role to lead and sustain the coordination of service development.

#### 4.4.4 Expanded collaboration

DataGene has the potential to leverage its expertise and resources globally. It also has the opportunity to collaborate with other Australian agricultural sectors, e.g. the beef industry, to utilise its capability and develop new revenue streams.

DataGene has gained significant experience in the delivery of complex programs of work that draw upon research, genetic science, technology, complex business rules and algorithms that are not understood by general IT professional services providers and system integrators. It also has access to geneticists, statisticians, business leaders, project managers, change management experts and technical IT delivery staff within a scalable and manageable project model.

DataGene has a technology delivery partner in an Offshore Delivery Centre (ODC) which provides a large portion of the development skills for technology maintenance and development. This relationship is well established and robust, allowing DataGene to tap into a deep pool of specialised skills as required.

Through the development of GES NP and DataVat, DataGene has created significant expertise in the design and development of both genetic evaluation systems and data systems. This expertise, and the capacity that comes with it, can be applied to both other industries and other countries. DataGene will actively explore opportunities to leverage expertise and capacity through collaboration domestically and internationally. Collaboration can diversify revenue streams, reduce development costs by sharing these with collaborators, and improve internal systems and processes through learning from external implementation. This can increase the overall bank of knowledge for the Australian dairy industry. All potential collaboration will be judged against a robust and detailed due diligence framework to ensure it is in the interests of DataGene, its members and the Australian dairy industry.

## 5. Operational Plan

### 5.1. IT Infrastructure

DataGene IT infrastructure will continue to evolve over the life of this plan, driven by the constantly changing technology landscape. Core challenges that will confront DataGene are the managing the growth of data in DataVat from the Internet of Things, maintaining the balance between cloud services versus own resources, understanding the role of blockchain technology, and exploring the use of artificial intelligence in dairy.

DataGene will continue to have need of both local servers and cloud computing resources. Core office functions will require ongoing investments in mobile computing.

Two core tasks within IT infrastructure will be around maintaining a robust data governance framework through the Data Governance Working Group and ensuring data security through effective hardware, software and processes. The Board will take a keen interest in ensuring compliance with all regulatory rules and meeting stakeholder expectations. Management will undertake penetration testing and security audits regularly.

### 5.2. Legal & Accounting Needs

The ongoing legal requirements of DataGene will continue to be provided by a small firm with experience of DataGene requirements. During the exploration of any significant new projects either domestically or internationally, DataGene expects to engage a larger firm to review documentation and structures as a risk mitigation strategy.

A key area of legal work over the life of this plan regards data governance and privacy. DataGene will play a lead role in working within the herd improvement industry to encourage consistency and standards in the handling of data.

Accounting needs will continue to be met by working in collaboration with DataGene's co-tenants, Holstein Australia, Jersey Australia and the National Herd Improvement Association. This will ensure that efficiencies across the organisations can be achieved in accounting and other back office functions.

External accounting and auditing services will be maintained through this period to provide effective oversight and advice.

### 5.3. Agreements & Contracts

DataGene has a range of client service contracts already in place and with the launch of DataVat, it will be introducing even more. The key client services agreements are: with the users of Centre software; with users of the genetic evaluation system, such as bull companies and other providers; with traditional data suppliers; and the Service Level Agreements with new data suppliers and users of DataVat.

There are two key foundational agreements for DataGene. Firstly, the recently agreed funding agreement with Dairy Australia which covers the five years under this plan. This agreement also lays out the framework for other work DataGene undertakes for Dairy Australia. The second foundational agreement is with Agriculture Victoria which covers expertise and resources necessary to delivery genetic evaluation services.

### 5.4. Communication & Marketing

DataGene's marketing and communication program supports the organisation in delivering its mission. This includes promoting DataGene products and services (including public ABV releases), developing extension resources and collateral, creating opportunities for interactive communication with stakeholders and influencing product and service development to ensure user-friendly products and messages.

Outcomes which the marketing and communication program contribute to include:

- Dairy farmers value the contribution of data-driven decisions/herd improvement to the profitability of their dairy business.
- Dairy farmers and their advisors utilise DataGene products and services in their decision making, including the Australian genetic evaluation system (ABVs and indices, Good Bulls icon), HerdData, Good Bulls App and tools/reports on DataVat.
- Industry stakeholders recognise and value DataGene as an independent and collaborative service provider that delivers world-class herd improvement services to Australian dairy farmers.

DataGene communicates with a wide range of audiences. While the aim is for clear, consistent messaging, DataGene may customise its communication to specific audiences in terms of the content, level of technical detail, presentation format and distribution vehicles. Key audiences fall within the following groups:

- Australian dairy farmers.
- Breeders of elite genetics (dairy farmers).
- Investors (members, funders of specific projects).
- Herd Improvement industry: herd test centres, semen/bull companies, breed societies, AI service providers, genomics service providers, software providers.
- Herd data sources: software suppliers, herd test centres farmers, milking equip companies, vets.
- Influencers (non-HI people who influence farmers' herd improvement systems e.g. RDP extension network, consultants, vets, nutritionists).
- Collaborators (genetics researchers at Agriculture Victoria, DairyBio, overseas researchers).
- DataGene team (including genetic evaluation team at Agriculture Victoria and personnel at TMA).
- Media.
- Other stakeholders.

DataGene's workplan includes an on-going stream of new products and services. Where possible, launch campaigns will be aligned with regular 'events' on DataGene's calendar such as public ABV releases (April, August and December), its AGM and biennial Herd conferences.

Communication activities may involve direct communication (face-to-face, print and via email) and mass media such as digital/web and traditional, electronic and social media. Examples of DataGene's 'flagship' communication resources include Industry Standing Committees, the Good Bulls Guide/App, Annual Update, GeneMail, DataVat and the DataGene website.

## 6. Management & Governance

### 6.1. Board

DataGene is governed by seven-member skills-based Board. Board members are elected at an Annual General Meeting on their knowledge and experience in dairy, herd improvement, finance and governance. The Board must include three Directors with direct expertise in dairy farm management. Directors are entitled to serve a three-year term and up to three consecutive terms (i.e. nine years). The ongoing rotation of Directors ensures the ongoing refreshment of skills and experience on the Board.

### 6.2. Standing Committees

DataGene's Standing Committees enable members to have direct influence over DataGene's priorities and program activities. These committees are not simply advisory bodies, but exercise authority as delegated by the DataGene Board in areas of industry policy and guidelines.

These committees comprise individuals from within the dairy industry and herd improvement sector who possess relevant skills and experiences. Standing Committee members are nominated by stakeholders and appointed by the DataGene Board. Each Standing Committee is chaired by a member of the DataGene Board and includes at least one member of the DataGene management team.

DataGene's Committees are:

- **Genetic Evaluation Standing Committee** - provides advice and recommendations to the DataGene Board on specialist matters in relation to genetic evaluation and related technologies.
- **Data Services Standing Committee** - provides advice and recommendations to the DataGene Board on specialist matters in relation to opportunities for new tools and services that help farmers make data-driven decisions.
- During 2019/20, a **Herd Test Centre Committee** (HTCC) will be formalised, operating as a sub-committee of DataGene similar to existing Standing Committees. The Herd Test Centre Committee will make recommendations and proposals to DataGene Board and management, and respective centre Boards (or equivalent) on herd test-related matters, including software and service development.

### 6.3. Data Governance Group

The Data Governance Group is a technical group that develops policies and processes for the use and sharing of data. This will be increasingly crucial as the Centralised Data Repository/DataVat becomes operational and decisions around access to, and use, of data become more complex. The Data Governance Group makes detailed technical decisions about the way data is handled, presented and disseminated to industry. The Data Governance Group is a sub-group and not one of the main Standing Committees. It exists primarily to help establish the guidelines for the Centralised Data Repository/DataVat and works closely with the Data Services Standing Committee.

## 6.4. User Groups

User groups provide an additional level of industry consultation. Each informal group comprises a small number of active users on a specific DataGene software product or tool. Their role is to ensure a better alignment of resources to fulfil user needs and to identify and prioritise refinements and improvements to DataGene products. User Groups meet as required.

## 6.5. Organisational Structure

DataGene's organisational structure has evolved since formation and will continue to be refined as the company changes and grows. The management structure established by the CEO is fit for purpose to deliver DataGene's vision to the industry. Staff have been placed into functional areas based on the types of work completed. All staff are employees of DataGene, with the exception of the science staff within Genetic Evaluation who are employees of Agriculture Victoria.

Central to the structure is the leadership team who work closely together and with the rest of the company to establish the DataGene culture, standards and processes to allow the achievement of its vision.

A Lead Science function is provided by DairyBio rather than by a DataGene employee. However, the integration of the science into the implementation framework is a key driver for the creation of DataGene. Therefore, it is important to recognise this in a management structure and institutionalise the shared planning and implementation across the organisations.

# 7. Financial Plan

## 7.1. Industry Funding Rationale

The Lacey and Coats report<sup>1</sup> in 2013 dealt with the rationale for levy investment in herd improvement, specifically around genetic evaluation. The report estimated the potential benefits of **addressing issues of market failure in herd improvement could be worth in the neighbourhood of \$25 million in gross farm margin per annum** due to genetic gain, a figure which may well rise with continuing innovation in genomic technology. This seminal report concluded that this substantial sum would justify continued industry investment in herd improvement to realise the value of genetic gain. A summary of the main conclusions of this report was:

- The rationale for collective investment in genetic evaluation in Australia is sound, past investment has generated valuable intellectual property and future investment has good prospects to maintain and enhance this value.
- Broad industry backing and support is required to effectively marshal industry stakeholders to help promote and deliver genetic evaluation.
- Company self-interest will dominate unless there an overarching industry vision and plan is in place and independent information is widely available. While herd improvement and semen companies provide dairy farmers with information to assist making purchase decisions, there is much evidence to suggest that industry (levy-funded) tools play an important role in validating recommended bulls and providing data for comparing bulls being offered by one company with those offered by others.
- An industry-wide program is required to effectively market current and future genetic evaluation, and this program should encompass all stakeholders who play a role in influencing the decisions of dairy farmers in this field.

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<sup>1</sup> Lacey R. and Coats S. (2013) Development of genetics scenarios and implications for the Australian dairy industry. Final Report, submitted to Dairy Australia, April 2013

- Dairy Australia must help develop and lead a process to engage the sector, develop a herd improvement strategy and implement that strategy. This should be a very collaborative process so that all key players in the herd improvement sector are engaged and invested in the resulting strategy.

## 7.2. Dairy Australia Funding

Dairy Australia is currently the primary source of funding for DataGene. Approved funding for DataGene for the three years ending 2018/19 totalled over \$6.7 million and covered approximately 75% of the operating costs of DataGene. The remaining 25% came from fees from services such as software provision, genomic evaluation and export heifer certification. This service income is highly variable. In particular, the most at-risk funding is from the export of dairy heifers to China, which has been a significant portion of income in the past few years.

Given the significant portion of the work that DataGene does is considered industry good for the benefit of farmers, funding contributions from Dairy Australia are expected to be required for the foreseeable future. DataGene and Dairy Australia have recently agreed a five-year funding agreement to cover the life of this Plan. However, it is likely that pressure on levy funds will increase over the time horizon of this plan. A key goal for DataGene over the first three years of this plan (2019/20 to 2021/22) is to push service fee income to at least 50% of operating expenses. This will need to occur through development of new services, such as data access, reports and tools, rather than simply the raising of existing fees.

## 8. Risk

A formal risk management framework was implemented in 2017 to monitor and address risks, as well as establish a plan for ongoing management of these risks. The risk register and management plan are reviewed regularly by the Board and management.

Key risks in specific area are listed below:

### 8.1. Funding Risks

- Unplanned or severe reduction in Dairy Australia funding to DataGene, especially due to changing priorities within Dairy Australia
- Dairy Australia funding falling due to milk production falling to a lower level or levy polls reducing the levy rate
- Ongoing funding of the reference population through Ginfo project is not financially sustainable
- Cow genotyping does not increase

### 8.2. Operational & Personnel Risks

- Personnel dependency in a small team of highly technical staff
- Service providers (and farmers) do not take up services
- Herd improvement is not embedded in broader extension effort from Dairy Australia
- Extension and marketing messages for herd improvement do not resonate with farmers and do not contribute to increasing focus on herd improvement
- Data providers do not implement the necessary changes within their own systems or processes to provide data to and allow access to DataVat
- Ginfo project is unable to access suitable herds and data to determine accurate high-quality phenotypes
- Significant and sustained technical failure, e.g. server outage
- Cybersecurity threats

### 8.3. Strategic Risks

- Ongoing decline in the size of the national dairy herd
- Ongoing reduction in herd test participation
- Use of genomic testing of female animals remains low
- Other companies release proprietary breeding values and indices through farmer agreement to access phenotypic data and match it with genomic data
- Lack of industry commitment to using DataVat as the central data repository

### 8.4. Compliance Risks

- Non-compliance with regulations such as Privacy Act, particularly data breaches

### 8.5. Reputational Risks

- Issues around data security and privacy of data, e.g. data breach
- Lack of confidence in breeding indices and their calculation

## APPENDIX 1: Comparison of changes in dairy industry

	2007/08	2012/13	2017/18
Number of dairy farms	7,953	6,398	5,699
Number of dairy cows	1,641,000	1,688,000	1,561,000
Average herd size (no. cows)	206	264	274
Average annual milk production per cow (litres)	5,275	5,498	6,070
Average annual milk production per cow (kg MS)	391	409	454
	2006/07	2011/12	2016/17
Number of herd test recorded cows	877,804	731,082	598,090
% herd test recorded cows	53.5%	43.3%	38.3%
Average herd size – herd recorded herds	197	222	236
Average annual milk production per cow (litres) – herd recorded herds	6,452	6,930	6,861
Average annual milk production per cow (kg MS) – herd recorded herds	473	505	501
Lactation length (days) – herd recorded herds	312	322	324

## APPENDIX 2: ACHIEVEMENTS TO DATE (2016-2019)

### GENETIC EVALUATION SYSTEM – NEW PLATFORM (GES NP)

In 2013, an upgrade to the Genetic Evaluation System, New Platform (GES NP) commenced as this software had reached the end of its effective life after 16 years of use. There was an ongoing need to maintain and further develop the capabilities of GES to cope with increasing data volumes, more complex computations and calls for more on-demand service by customers.

The objective of the GES NP initiative was to deliver a state-of-the-art genetic evaluation system, with a planned life cycle of at least fifteen years, capable of generating breeding values using improved automation and process simplification over that period. There were deliverables across four main areas: improving the accuracy of ABVs, improving quality assurance, increasing operational efficiency and meeting increasing demand for ongoing development.

During the upgrade of GES NP, it was recognised that there was significant efficiencies and synergies in developing the Centralised Data Repository in parallel, particularly as seamless data flow between GES NP and DataVat (as the Centralised Data Repository is now called) was vital. This resulted in some delays to the delivery date for a fully functioning GES NP, which was operational in April 2019. The new system included a complete rewrite of the access portal for clients and the client interface. It also allows for a single click operation of the entire system and runs in a fraction of the time it took the old system. While the development of system was delayed due to its complexity and the expansion of deliverables, the resulting system is a step change for the industry.

### DATAVAT (CENTRALISED DATA REPOSITORY)

DataVat is a centralised, industry-owned repository where quality-assured data from all sources are accessible for industry-wide use. Data can move easily across the industry and be used by both industry and service providers to deliver decision-making tools to farmers. Development of DataVat was considered by the Australian dairy herd improvement industry for more than a decade and a number of reviews over recent years confirmed the value of creating a pre-competitive pool of animal performance data. Herd improvement stakeholders through HISSG have strongly supported the establishment of DataVat.

The project to develop DataVat commenced in 2016, and a functioning version was delivered in April 2019. This development includes a new portal for accessing data and tools such as the Fertility Focus and the Mastitis Focus Reports, as well as new tools such as the Genetic Futures report. Farmers and service providers will be able to provide permission for data access and use through this portal as well. The first data to populate DataVat will be traditional data from herd test centres and breed societies. The focus will then shift to acquiring data from other sources such as on farm software, processor and machine manufacturer data.

### GINFO

The GINFO project (Australia's genomic information nucleus), funded through the Dairy Futures CRC, concluded in June 2016. GINFO collected phenotypic data from 100 dairy farms across Australia, to establish a strong genomic reference population. This phenotypic data underpins the calculation of both traditional and genomic breeding values. GINFO increased the reliability of the Balanced Performance Index by over 5% and for Overall Type by over 7%, demonstrating the power of this approach. Dairy Australia funded the continuation of the GINFO project through June 2019, with an expansion to 150 herds in 2019 and 200 in 2020. This will ensure the continued provision of high value phenotypes and genotypes.

### CO-LOCATION WITH INDUSTRY PARTNERS

After four years in the planning, DataGene moved into purpose-built offices in November 2018 that it shares with Holstein Australia, Jersey Australia and the National Herd Improvement Association. This co-location has allowed for operating efficiency and will enable the partners to work in a more streamlined and collaborative manner into the future. It will also help drive back-office synergies.

## **MIR FOR PROFIT**

The “MIR profit: Integrating very large genomic and milk mid infrared data to improve profitability of dairy cows” project combined very large genomic datasets and phenotypes derived from mid infrared (MIR) spectra of milk samples. Recent research in a number of countries had shown that MIR can be used to predict feed efficiency, energy balance, fertility, health and methane emissions. Armed with these predictions, farmers can then intervene to manage their cows more profitably, targeting fertility, health and nutrition treatments of specific cows.

The MIR for Profit project concluded in 2017, and the knowledge derived from this research will underpin further research and the development of on-farm predictive tools and genomic breeding values through DairyBio.

## **IMPROVING HERDS**

In 2014, the Gardiner Foundation provided a grant for a major project focussing on ‘Improving farm profitability by demonstrating the value of genetics and herd improvement’. A key goal of the project was to ensure collaboration across the industry. Key industry organisations involved in the project were Dairy Australia, Agriculture Victoria, NHIA, DataGene and Holstein Australia. The project also included international collaborators with experience in demonstration and modelling projects, namely the Scottish Rural and Agricultural College and the French National Institute for Agricultural Research, respectively.

The project concluded in April 2018 by demonstrating to farmers and service providers in a clear, practical manner that genetic improvement and herd testing can help drive farm profit.

## **CONSOLIDATION**

The creation of DataGene involved the merger of the operations of ADHIS and Mistro into the new entity, as well as the integration of staff from different organisations and sites into one location. The successful integration of people, processes and operations into one organisation should be acknowledged as a significant achievement. This integration occurred at the same time as the creation of DataGene and the establishment of governance and other processes that support its functioning.

## **USE OF ABVs**

Since inception, DataGene has worked with industry to address concerns with Australian Breeding Values and to operate in an open and transparent manner. This has seen all the bull companies testing bulls through DataGene, up from only 1 in 2011. The use of ABVs in marketing material has continued to increase as farmers have been requesting bull proofs from the Australian system. This has resulted in a pleasing increase in the rate of genetic gain for the sires of cows, rising from an average of \$17 per year from 2005-2017 to \$34 from 2017 to 2018. In addition, the level of bull testing reached over 4,000 in 2017/18 from only 555 in 2012/13 as companies have gained confidence in the system.

## APPENDIX 3: Activity Plan 2019-20 to 2023-24

### STRATEGIC PRIORITY 1 – IMPROVED DECISION-MAKING FROM DATA

	2019/20	2020/21	2021/22	2022/23	2023/24
DATAVAT	<ul style="list-style-type: none"> <li>DataVat functional and hosting 5 tools/reports.</li> </ul>	<ul style="list-style-type: none"> <li>Maintain, support and enhance DataVat, including prioritized developments and upgrades.</li> <li>Develop the capability to handle the increased volume and frequency of data from a growing source of industry devices</li> </ul>	<ul style="list-style-type: none"> <li>Maintain, support and enhance DataVat, including prioritized developments and upgrades;</li> <li>Develop the capability to handle the increased volume and frequency of data from a growing source of industry devices through near - real time and (potentially) real time two-way data integration with on-farm devices.</li> </ul>	<ul style="list-style-type: none"> <li>Maintain, support and enhance DataVat, including prioritized developments and upgrades;</li> <li>Review CDR/DataVat platform operation.</li> </ul>	<ul style="list-style-type: none"> <li>Maintain, support and enhance CDR / DataVat, including prioritized developments and upgrades.</li> </ul>
COORDINATED DATA MANAGEMENT	<ul style="list-style-type: none"> <li>Data from Australian DPCs, Breed Societies, software &amp; dairy automation companies integrated into DataVat</li> <li>Industry data governance framework in place</li> </ul>	<ul style="list-style-type: none"> <li>Data from high priority international milking machine suppliers integrated into CDR;</li> <li>Remaining high value data providers integrated into DataVat (milk processor data, vet software, IDEXX, etc.)</li> <li>Industry data governance framework maintained</li> </ul>	<ul style="list-style-type: none"> <li>Examine opportunities around integrating other industry data sets - DairyBase, Dairy Farm Monitor, ABS data etc;</li> <li>Expand data sources for DataVat, including integration with on farm-devices, and fostering new uses for this data.</li> <li>Industry data governance framework maintained</li> </ul>	<ul style="list-style-type: none"> <li>Expand data sources for DataVat, including integration with on farm-devices, and fostering new uses for this data</li> <li>Industry data governance framework maintained</li> </ul>	<ul style="list-style-type: none"> <li>Expand data sources for DataVat, including integration with on farm-devices, and fostering new uses for this data.</li> <li>Industry data governance framework maintained</li> </ul>

HERD RECORDING INNOVATION	<ul style="list-style-type: none"> <li>Explore development and implementation of single herd reporting software platform;</li> <li>Promote value of herd recording via Extension Strategy and/or Marketing &amp; Comms Plan.</li> </ul>	<ul style="list-style-type: none"> <li>Maintain, support and enhance herd reporting software platform, including prioritized developments and upgrades;</li> <li>Contribute to MIR implementation via herd recording centres.</li> </ul>	<ul style="list-style-type: none"> <li>Continue to assist herd recording centres to innovate including keeping abreast of international developments;</li> <li>Partnership model and resources to support innovative herd recording centres.</li> </ul>	<ul style="list-style-type: none"> <li>Continue to assist herd recording centres to innovate including keeping abreast of international developments.</li> </ul>	<ul style="list-style-type: none"> <li>Continue to assist herd recording centres to innovate including keeping abreast of international developments.</li> </ul>
DECISION SUPPORT TOOLS	<ul style="list-style-type: none"> <li>Promote existing tools via Extension Strategy and/or Marketing &amp; Comms Plan;</li> <li>Work with industry partners to develop new tools utilising DataVat.</li> </ul>	<ul style="list-style-type: none"> <li>Work with industry partners to develop new on-farm tools utilising DataVat;</li> <li>Explore opportunities for artificial intelligence / machine learning in tools and reports;</li> <li>Promote existing tools via Extension Strategy and/or Marketing &amp; Comms Plan.</li> </ul>	<ul style="list-style-type: none"> <li>Examine opportunities for development of tools and resources for use across value chain, e.g. milk processors, quality assurance, etc;</li> <li>Promote tools via Extension Strategy and/or Marketing &amp; Comms Plan.</li> </ul>	<ul style="list-style-type: none"> <li>Expand range of tools utilising DataVat data and DataGene capability;</li> <li>Promote tools via Extension Strategy and/or Marketing &amp; Comms Plan.</li> </ul>	<ul style="list-style-type: none"> <li>Expand range of tools utilising DataVat data and DataGene capability;</li> <li>Promote tools via Extension Strategy and/or Marketing &amp; Comms Plan</li> </ul>
ACCESS TO PHENOTYPES	<ul style="list-style-type: none"> <li>27,000 hair samples</li> <li>27,000 genotypes</li> <li>8,438 Linear Type Evaluations</li> </ul>	<ul style="list-style-type: none"> <li>32,250 hair samples</li> <li>32,250 genotypes</li> <li>12,000 Linear Type Evaluations</li> </ul>	<ul style="list-style-type: none"> <li>21,000 hair samples</li> <li>21,000 genotypes</li> <li>12,000 Linear Type Evaluations</li> </ul>	<ul style="list-style-type: none"> <li>21,000 hair samples</li> <li>21,000 genotypes</li> <li>12,000 Linear Type Evaluations</li> </ul>	<ul style="list-style-type: none"> <li>21,000 hair samples</li> <li>21,000 genotypes</li> <li>12,000 Linear Type Evaluations</li> </ul>

## STRATEGIC PRIORITY 2 – INCREASED ANIMAL PERFORMANCE THROUGH HERD IMPROVEMENT

	2019/20	2020/21	2021/22	2022/23	2023/24
USE OF AUSTRALIAN METRICS	<ul style="list-style-type: none"> <li>National Breeding Object Review initiated;</li> <li>Integrate the messages from ImProving Herds into industry extension</li> </ul>	<ul style="list-style-type: none"> <li>NBO Review conducted and report produced;</li> <li>Work closely with DA regional team to deliver messages on the value of Australian</li> </ul>	<ul style="list-style-type: none"> <li>Revised Indices released;</li> <li>Work closely with DA regional team to deliver messages on the value of Australian</li> </ul>	<ul style="list-style-type: none"> <li>Work closely with DA regional team to deliver messages on the value of Australian metrics promote new indices.</li> </ul>	<ul style="list-style-type: none"> <li>Subsequent National Breeding Object Review initiated;</li> <li>Work closely with DA regional team to deliver messages on</li> </ul>

	and marketing, including DataGene members;	metrics.	metrics/promote new indices.		the value of Australian metrics.
INCREASED REPLACEMENTS FROM GOOD BULLS	<ul style="list-style-type: none"> <li>• Work with DA and bull companies to develop extension messages on the value of increasing replacements from Good Bulls.</li> </ul>	<ul style="list-style-type: none"> <li>• Work closely with DA regional team and bull companies to deliver messages on the value of increasing replacements from Good Bulls.</li> </ul>	<ul style="list-style-type: none"> <li>• Work closely with DA regional team and bull companies to deliver messages on the value of increasing replacements from Good Bulls.</li> </ul>		
INNOVATION IN EVALUATIONS	<ul style="list-style-type: none"> <li>• GESNP, interfaces and solvers in production. Weekly ABVs become normal;</li> <li>• Provisional Breeding Values released weekly</li> <li>• Define the implementation requirements for the use of MIR data in new tools;</li> <li>• Prepare business case for use of MIR in evaluations;</li> <li>• New Mastitis, Calving Ease and Gestation Length breeding values.</li> </ul>	<ul style="list-style-type: none"> <li>• Maintaining, supporting and enhancing GESNP, including prioritized developments and upgrades;</li> <li>• New traits and algorithms updated between ABV runs;</li> <li>• Updated Type and composites;</li> <li>• Updated Feed Saved;</li> <li>• Conduct routine check of semen fertility model. Improvements are made.</li> </ul>	<ul style="list-style-type: none"> <li>• Maintaining, supporting and enhancing GESNP, including prioritized developments and upgrades;</li> <li>• Implement DairyBio improved model for Fertility ABVs. New Fertility ABVs released.</li> <li>• Health Trait ABVs tested and produced;</li> <li>• Cross breed evaluations are implemented, if appropriate;</li> <li>• Conduct routine check of cell count ABVs. Improvements are made.</li> </ul>	<ul style="list-style-type: none"> <li>• Maintaining, supporting and enhancing GESNP, including prioritized developments and upgrades;</li> </ul>	<ul style="list-style-type: none"> <li>• Maintaining, supporting and enhancing GESNP, including prioritized developments and upgrades;</li> </ul>
CLEAR VALUE PROPOSITION	<ul style="list-style-type: none"> <li>• Complete Extension Strategy inclusive of or in conjunction with: <ul style="list-style-type: none"> <li>○ Social Media Strategy</li> <li>○ Marketing &amp; Comms Plan;</li> </ul> </li> <li>• Integrate the messages from ImProving Herds</li> </ul>	<ul style="list-style-type: none"> <li>• Undertake a consultative needs assessment with stakeholders to ensure genetic services, extension strategy and delivery is meeting stakeholder requirements;</li> </ul>	<ul style="list-style-type: none"> <li>• Annual extension strategy Review;</li> <li>• Work closely with DA regional team to deliver messages on the value of herd improvement.</li> </ul>	<ul style="list-style-type: none"> <li>• Annual extension strategy Review;</li> <li>• Work closely with DA regional team to deliver messages on the value of herd improvement.</li> </ul>	<ul style="list-style-type: none"> <li>• Annual extension strategy Review;</li> <li>• Work closely with DA regional team to deliver messages on the value of herd improvement.</li> </ul>

	<ul style="list-style-type: none"> <li>into industry extension and marketing;</li> <li>• Work with DA to develop extension messages on the value of herd improvement;</li> <li>• Work with herd improvement industry to create and align messages.</li> </ul>	<ul style="list-style-type: none"> <li>• Work with banks and milk companies to increase their support of herd improvement;</li> <li>• Work closely with DA regional team to deliver messages on the value of herd improvement.</li> </ul>			
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### STRATEGIC PRIORITY 3 – IMPROVED ANIMAL PERFORMANCE FROM RESEARCH & DEVELOPMNET

	2019/20	2020/21	2021/22	2022/23	2023/24
INCREASING GENOMIC TECHNOLOGY USE	<ul style="list-style-type: none"> <li>• Develop extension / Marketing &amp; Comms messages on the value of genomic testing of female stock</li> <li>• Variants added to SNP panels from DairyBio research. Reference set maintained.</li> </ul>	<ul style="list-style-type: none"> <li>• Deliver extension / Marketing &amp; Comms messages on the value of genomic testing of female stock</li> <li>• Variants added to SNP panels from DairyBio research. Reference set maintained.</li> </ul>	<ul style="list-style-type: none"> <li>• Deliver extension / Marketing &amp; Comms messages on the value of genomic testing of female stock</li> <li>• Variants added to SNP panels from DairyBio research. Reference set maintained.</li> </ul>	<ul style="list-style-type: none"> <li>• Deliver extension / Marketing &amp; Comms messages on the value of genomic testing of female stock</li> <li>• Variants added to SNP panels from DairyBio research. Reference set maintained.</li> </ul>	<ul style="list-style-type: none"> <li>• Deliver extension / Marketing &amp; Comms messages on the value of genomic testing of female stock</li> <li>• Variants added to SNP panels from DairyBio research. Reference set maintained.</li> </ul>
NEW AND IMPROVED BREEDING VALUES	<ul style="list-style-type: none"> <li>• Participate in DairyBio research to develop health trait ABVs and a report on health trait ABVs delivered to GE standing committee</li> </ul>	<ul style="list-style-type: none"> <li>• Participate in DairyBio research to develop health trait ABVs</li> </ul>	<ul style="list-style-type: none"> <li>• Participate in DairyBio research to develop health trait ABVs</li> <li>• Contribute to MIR implementation research to identify further improvements, with projects scoped for further research</li> </ul>	<ul style="list-style-type: none"> <li>• Participate in DairyBio research to develop health trait ABVs</li> <li>• Contribute to MIR implementation research to identify further improvements, with projects scoped for further research</li> </ul>	<ul style="list-style-type: none"> <li>• Participate in DairyBio research to develop health trait ABVs</li> <li>• Contribute to MIR implementation research to identify further improvements, with projects scoped for further research</li> </ul>
IMPROVED GENETIC EVALUATION METHODOLOGY	<ul style="list-style-type: none"> <li>• Participate in Crossbreed implementation research</li> </ul>	<ul style="list-style-type: none"> <li>• Implementation of MIR data in evaluations completed</li> <li>• Implementation of new weighted-SNP evaluations</li> </ul>			

		<ul style="list-style-type: none"> <li>• Explore alternative methodology such as SNP MACE and Single Step</li> </ul>			
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## STRATEGIC PRIORITY 4 – IMPROVED AND DIVERSIFIED SERVICE PROVISION

	<i>2019/20</i>	<i>2020/21</i>	<i>2021/22</i>	<i>2022/23</i>	<i>2023/24</i>
SHARED INFRASTRUCTURE AND CAPABILITY	<ul style="list-style-type: none"> <li>• Develop DataVat as industry web portal.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop, support and maintain DataVat.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop, support and maintain DataVat.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop, support and maintain DataVat.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop, support and maintain DataVat;</li> <li>• Review DataVat operation;</li> <li>• Continue with marketing recommendations and sales strategy for DataVat.</li> </ul>
ADEQUATE SUPPORT FUNCTIONS	<ul style="list-style-type: none"> <li>• Ensure appropriate DataGene staff capability to deliver support</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure appropriate DataGene staff capability to deliver support</li> <li>• Review quality and level of support with all industry partners</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure appropriate DataGene staff capability to deliver support</li> <li>• Review quality and level of support with all industry partners</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure appropriate DataGene staff capability to deliver support</li> <li>• Review quality and level of support with all industry partners</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure appropriate DataGene staff capability to deliver support</li> <li>• Review quality and level of support with all industry partners</li> </ul>
COORDINATED SERVICE DEVELOPMENT	<ul style="list-style-type: none"> <li>• Customer engagement strategy developed for Centre/Apps;</li> <li>• Review, revise and continue delivering against Marketing and Communications Plan;</li> <li>• Implement fixes identified in previous Users Group meeting;</li> <li>• Build business cases where required for improvements identified in previous</li> </ul>	<ul style="list-style-type: none"> <li>• Ongoing Maintenance of Centre software while the transition to GESNP begins;</li> <li>• Proposed Sunset of Centre software system June 2020;</li> <li>• Build new Centre software;</li> <li>• Review customer engagement strategy &amp; implement improvements;</li> <li>• Annual Members</li> </ul>	<ul style="list-style-type: none"> <li>• Complete implementation of new Centre software;</li> <li>• Review customer engagement strategy &amp; implement improvements;</li> <li>• Annual Members Forum.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop, support and maintain Centre software;</li> <li>• Review customer engagement strategy &amp; implement improvements; Annual Members Forum.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop, support and maintain Centre software;</li> <li>• Review customer engagement strategy &amp; implement improvements;</li> <li>• Annual Members Forum.</li> </ul>

	Users Group; Annual Members Forum.	Forum.			
EXPANDED COLLABORATION	<ul style="list-style-type: none"> <li>• Explore the opportunities with other ag industry businesses and international herd improvement sectors;</li> <li>• Develop sales &amp; marketing plan for international sales of DataGene products and services.</li> </ul>	<ul style="list-style-type: none"> <li>• Implement sales &amp; marketing plan for international sales of DataGene products and services.</li> </ul>	<ul style="list-style-type: none"> <li>• Implement sales &amp; marketing plan for international sales of DataGene products and services</li> </ul>	<ul style="list-style-type: none"> <li>• Implement sales &amp; marketing plan for international sales of DataGene products and services</li> </ul>	<ul style="list-style-type: none"> <li>• Implement sales &amp; marketing plan for international sales of DataGene products and services</li> </ul>

