Australian Government
Department of Agriculture, Fisheries and Forestry

Technical Report

Program and KPI:	Program 5
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Acknowledgements

Executive Summary

Program 5 was established to develop and deliver systems to utilise the data generated in Programs 1-3 and stored in Program 4 to improve supply chain efficiency and profitability. The strategy was to develop tools to accurately value carcasses.

This provided a foundation for working in partnership with high impact businesses to develop generic data decision tools and customise them for maximum impact within specific supply chains.

The tools included feedback systems to producers and optimisation systems within processing companies. The implementation of these tools is assisting supply chains to extract additional value from the supply chain.

Contents

Program 5 – Data and Decisions

1 Sub Program 5.1

Enhance Carcase Value Tools

The aim of this sub-program was to develop tools for valuing carcasses and thereby providing a foundation for work within supply chains to improve both abattoir profitability and feedback to producers. The sub-program supported the achievement of the scientific outcome S(viii): "*Deploy algorithms within two abattoirs that translate the carcase/meat quality measurements into VBP and novel pricing mechanisms up and down the supply chain*".

The program focussed on lamb and beef supply chains and both built on the success initiated in ALMTech 1, and established new engagements to further expand ALMTech's reach across the industry. Each supply chain engaged in the program had specific cut requirements, costs of trimming and market options that required a customised approach for each. Thus, the refinement of the calculators was an important ongoing activity.

In addition to the 16 supply chains (8 lamb / sheep, and 8 beef) from 13 companies engaged at the commencement of the current ALMTech funding period, a further 3 lamb supply chains and one beef supply chain were supported with the value calculators. Adoption of the value calculators has enabled supply chains to understand and identify opportunities to adopt value-based pricing mechanisms for use within their businesses and to engage directly in shaping the supply of livestock from producer networks, that better meet processing, and consumer specifications. This has culminated in one lamb processor launching the industry's first 'objective carcase measurement grid' that rewards producers for carcase traits that improve processing efficiency and consumer expectations for eating quality.

KPI		Technical Report
1.35	Report on a prototype Value Based Pricing (VBP) system using the optimisation tool.	• Reverse engineering the Carcase Optimisation Tool to determine lamb value
2.34	Provide a report on the prototype Value Based Pricing (VBP) system using the optimisation tool.	
2.35	Provide a report on the ongoing development of a Value Based Pricing (VBP) system.	• Summary of yearly, monthly, daily and between and within lot variation in MSA carcase data • Value-based pricing system based on carcase yield and eating quality traits • Beef primal cut weight prediction from diverse breed crosses • Re-analysis of beef carcase pricing data with less variation in yield in carcases analysed
2.36	Provide a report on the integration of carcase value calculators into proprietary data management systems.	• Commercial use of DXAFat% in-plant to predict shortloin fat cap depth and sort lamb carcases to minimise fat trimming **CONFIDENTIAL**
3.31	Provide the Final report on the integration of carcase value calculators into proprietary data management systems.	• Development of an integrated prediction algorithm for carcase fat using DXA installed on the hot slaughter chain to support real-time sortation decisions by Frew Foods International **CONFIDENTIAL** • A framework to ensure data integrity to support the commercial implementation of dual-energy X-ray (DXA) systems and data use in red meat processing.
2.37	Provide a report on the implementation of a Value Based Pricing (VBP) system.	• Case study on the implementation of GMP's value-based pricing grid for lambs
3.32	Provide the Final report on the implementation of a Value Based Pricing (VBP) system.	

2 Sub Program 5.2

Enhance Data Decision Tools

Sub-program 5.2 focussed on a strategy to continue to further develop tools that were prototyped in ALMTech 1. The program contributed towards industry outcome I(vi): "*Link objective carcase measurement with data capture, storage, dissemination and management systems for use up- and down-stream within the value chains to maximise communication and profit and be implemented by the 10 value chain partners*".

To support this objective, two Lamb Carcase Optimisation Tools (COT) were further developed and used to engage with a range of supply chain partners to address both strategic and tactical situations. The COTs make use of the cut weight prediction algorithms and the cut tree hierarchy developed for use within the Lamb Value Calculator to drive the optimisation model.

The Strategic COT provides a framework to analyse actual boning room outcomes of yield and profit with optimal predictions of what could have been possible if every carcase had been allocated to its uniquely optimal end use. Consequently, the strategic tool has a role in identifying future business opportunities based on improving processing efficiency to optimise yield and profit

The Tactical COT was developed to be used as a day-to-day to tool assist boning room management to allocate a complete carcase inventory to the optimal cutting plan for the day.

The underlying purpose of carcase optimisation is to enable "*the right carcase*" to be allocated to "*the right cut*".

Successful engagement with supply chains to evaluate carcase optimisation opportunities is dependant on plants being able to achieve the 'real-time' integration of objective carcase measurement data from multiple sources across the plant. To first enable this fundamental outcome for plants, ALMTech lead foundational collaborations across a wide range of supply chain partners that included the objective carcase technology providers (e.g. Scotts Robotics & Automation, Frontmatic, MasterBeef, Miniprobes), plant software providers (e.g. Cedar Creek Company/Marel, Triton & other 3rd party information technology providers), Meat Standards Australia, as well as the supply chains themselves (Frew Foods International, Greenstock Pty Ltd, Woolworths Group, Gundagai Meat Processors, Coles, WAMMCO, JBS Australia, Australian Country Choice, Kilcoy Global Foods).

7

KPI		Technical Report
1.36	Report on ongoing developments to, and use of, the optimisation tool.	• Lamb Carcase Optimisation Tool Cut Tree Hierarchy
2.38	Report on ongoing developments to, and use of, the optimisation tool.	
2.39	Report on the use of the optimisation tool in Supply Chains.	• The tactical model in optimization of boning room management
3.34	Provide the Final report on the use of the optimisation tool in Supply Chains.	• Capacity of the LVC to predict cut weight using DEXA lean estimates in a commercial environment at GMP **CONFIDENTIAL**
3.33	Provide a report on the final developments, and use, of the optimisation tool.	• A case study in carcase optimisation in a domestic supply chain **CONFIDENTIAL**

3 Sub Program 5.3

Enhance supply chain efficiency and engagement

The aim of Sub-program 5.3 was to continue strong engagement along the red meat industry supply chain, from paddock to plate, to continue to grow the industry's skills and capacity to create additional value from adoption of objectively measured yield and eating quality traits. The program contributed towards industry outcome I(ix): "*In collaboration with commercial providers, deploy software systems to optimise sorting of raw materials to best meet customer specifications for finished products that utilise yield and eating quality data generated for carcases and primal cuts, thereby capturing productivity and profitability benefits*".

Program 5 has worked collaboratively with supply chains and other industry partners to support processor's network of supply chain officers through a range of collaborative projects established to support the implementation of technologies and tools developed across the five ALMTech programs. This delivery model has also enabled ALMTech to leverage other industry funded programs, including the Animal Health for Wealth Rural Research and Development for Profit programs.

A significant outcome for this program has been the validation of DXA as a tool to create additional value to a lamb supply chain by using yield measurement to improve sortation of carcases to boning groups. Whereas other lamb supply chains have identified processing benefits associated with the use of DXA data to drive robotic cutting systems (JBS) and have used DXA yield predictions to build trusting relationships with suppliers by providing yield feedback to lamb breeders, proving the ability of the technology to identify additional profit from manual boning room operations is a first for the industry and a highlight for ALMTech.

KPI		Technical Report
1.37	Report on one new collaborative project for enhancing supply chain efficiency.	• Commercial use of DXAFat% in-plant to predict shortloin fat cap depth and sort lamb carcases to minimise fat trimming **CONFIDENTIAL**
2.41	Provide a report on new collaborative project(s) for enhancing Supply Chain efficiency.	• Development of an integrated prediction algorithm for carcase fat using DXA installed on the hot slaughter chain to support real-time sortation decisions by Frew Foods International **CONFIDENTIAL**
3.36	Provide the Final report on new collaborative project(s) for enhancing Supply Chain efficiency.	• Capacity of the LVC to predict cut weight using DEXA lean estimates in a commercial environment at GMP **CONFIDENTIAL** • A case study in carcase optimisation in a domestic supply chain **CONFIDENTIAL** • Benchmarking flock performance within a value-based payment grid for lamb - a producer case study
1.38	Report on appointment of an additional Supply Chain engagement facilitator	• Captured in quarterly reports
2.42	Provide a report on the appointment of an additional Supply Chain engagement facilitator.	
1.39	Report on succession development of two postdoctoral fellows through their participation in supply chain meetings	• Final Report of The Supply Chain Group – 2020 to 2022
2.43	Provide a report on the succession development of two postdoctoral fellows through their participation in Supply Chain meetings.	
3.37	Final report on succession development of two postdoctoral fellows through their participation in Supply Chain meetings.	
2.40	Provide a report on the ongoing conduct of the Supply Chain Group.	
3.35	Provide the Final report on the conduct of the Supply Chain Group.	
3.38	Provide a report on the development of materials to support adoption of grading technologies.	• PGS Mentoring Lamb Compliance • Adoption through Supply Chain Engagement