HEALTH 4 WEALTH

Health 4 Wealth Pilot Studies Design Day

Final Report
APL Project 2017/2251

June 2018

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Acknowledgements

This project is supported by funding from Australian Pork Limited, the Australian Meat Processors Corporation, Meat & Livestock Australia and the Department of Agriculture and Water Resources.

Executive Summary

The project, "Enhancing supply chain profitability through reporting and utilization of peri-mortem information for livestock producers" (referred to in this document as Health 4 Wealth) is one of the seventeen projects that received funding under Round 2 of the Rural Research and Development for Profit Program. The Project is a partnership between APL, MLA, AMPC, DEDJTR and SARDI.

The Project is being conducted over four years (July 2016 – June 2020) and aims to develop standards for the consistent reporting, recording and analysis of disease-related peri-mortem information for use by producers, processors, regulators and other key stakeholders. A national approach to reporting this information will contribute to streamlining investments in systems that are commonly used in abattoirs, such as processing automation, accreditation and certification, and slaughter floor design.

One of the activities of the Health 4 Wealth Project is to run pilot trials that identify the challenges or barriers to implementing the standards and software modules and that recommend solutions before rollout of a national feedback system.

The objective of this project was a workshop to design and develop Health 4 Wealth Pilot Studies that ensure the Studies meet the requirements of the DAWR-APL, MLA and AMPC Industry Collaborative Research Agreement for the Health 4 Wealth Research Project within a nine-month period with the aim of completion by June 2019.

The workshop was held at the Stamford Sydney Airport Hotel on 15 May 2018 and attended by Project Partners and the Project Expert Panel.

The Health 4 Wealth Pilot Trials Design Day stimulated robust discussion and debate amongst the workshop participants and was successful in providing guidance to the Health 4 Wealth Project Management Committee in the design of the pilot trials.

Overall, there seemed to be consensus that:

- Processor input is required during the planning of the pilot trials.
- A test system is required.
- Validation of data collected will be critical to the success of the pilot trials.
- The project should aim to work with a limited number of plants for the trials. Both export and domestic plants could be considered.
- There is merit in a staged approach i.e. data collection, feedback to producers and then sharing in a central database.
- The trials will need to be tailored to the plant. This will make development of a standard protocol difficult.
- The experimental unit will be the abattoir / supply chain.
- Data collection needs to be standardised within species and across plants. This will help to ensure accuracy and verification.

- Part of success is an easy to use, robust system of data collection and reporting. Feedback on this should be collected as part of the trials. Cost of the various stages also need to be considered i.e. cost to producers and processors, so the project does not build systems that are uneconomic.

- Each site will need a project champion and/or mentor.

However, several key issues need to be resolved before the pilot trials can begin, particularly for the red meat industry:

- The selection of a test system, whether the same test system will be used at all plants and whether existing technology can be integrated into the Health 4 Wealth pilot trials?

- The selection of plants for the trials and the contractual arrangement between MLA, APL and the plants, noting the requirements of the MOU between APL and AgVic, as partners in the Health 4 Wealth project.

- How to standardise data collection within the need to tailor the data collection to each plant. During the workshop several participants told the workshop facilitator that developing a "trial protocol" would not be a useful approach. The challenge will be to develop another approach to meet the needs of the Health 4 Wealth pilot trials.

The challenge for the Health 4 Wealth Project is to resolve these key issues to allow the trials to commence no later than September 2018, to allow completion, analysis and reporting by the June 2019 milestone.

Table of Contents

1. Background to Research

The Australian Government's Rural Research and Development for Profit Program is a $200 million competitive research initiative with funding available over eight financial years (2014-22). The objective of the program is to realise productivity and profitability improvements for primary producers by:

a) generating knowledge, technologies, products or processes that benefit primary producers;

b) strengthening pathways to extend the results of rural R&D, including understanding the barriers to adoption; and

c) establishing and fostering industry and research collaborations that form the basis for ongoing innovation and growth of Australian agriculture.

The project, "Enhancing supply chain profitability through reporting and utilization of peri-mortem information for livestock producers" (referred to in this document as Health 4 Wealth) is one of the seventeen projects that received funding under Round 2 of the Rural Research and Development for Profit Program. The Project is a partnership between APL, MLA, AMPC, DEDJTR and SARDI.

The Project is being conducted over four years (July 2016 – June 2020) and aims to develop standards for the consistent reporting, recording and analysis of disease-related peri-mortem information for use by producers, processors, regulators and other key stakeholders. A national approach to reporting this information will contribute to streamlining investments in systems that are commonly used in abattoirs, such as processing automation, accreditation and certification, and slaughter floor design.

Whilst many meat processing recording systems are already in place, data collection on disease-related carcase and offal condemnations and feedback of this information to producers varies considerably. This Project aims to introduce a standardised and comprehensive approach to data collection of disease-related carcase and offal condemnations and feedback to producers. This will allow producers to monitor disease prevalence in their livestock and make informed decisions to maximise yield outcomes. A standardised approach will also provide the quantitative data to support on-going risk assessments of inspection procedures for diseases with pathognomonic post mortem changes.

One of the activities of the Health 4 Wealth Project is to run pilot trials that identify the challenges or barriers to implementing the standards and software modules and that recommend solutions before rollout of a national feedback system.

2. Objectives of the Research Project

The objective of the project was a workshop to design and develop Health 4 Wealth Pilot Studies that ensure the Studies meet the requirements of the DAWR-APL, MLA and AMPC Industry Collaborative Research Agreement for the Health 4 Wealth Research Project within a nine-month period with the aim of completion by June 2019.

3. Introductory Technical Information

Not applicable.

4. Research Methodology

The project was a facilitate workshop held at the Stamford Sydney Airport Hotel on 15 May 2018.

The workshop was facilitated by Dr Joan Lloyd.

Workshop participants included:

- David Hamilton, SARDI
- Rob Barwell, Animal Health Australia
- Clive Richardson, MINTRAC
- Mac Tawadros, DAWR
- Thorir Sandholt, Marel (morning only)
- Nick Saharan, Marel (morning only)
- Jessica Jolley, SARDI
- Rebecca Austin, MLA
- Verity Suttor, MLA
- Jonathon Webber, Ag Consultant
- Tony Abel, APL
- Eleni Tsougranis, JLC

The agenda for the workshop is provided in Appendix 1.

5. Results

1. Voice Capture presentation was given by Clive Richardson noting the following comments:

- A lot of testing has been conducted however, the technology will be further tested during a 12 week in plant trial.
- Trials will be conducted in 5 plants in five sheep plants in Victoria
- The voice capture is conducted by sheep "lots" not individual carcase / body
- The trials will commence late May and conclude end of September
- AHA is providing funding for the trials
- Key factors that need focusing on are: accuracy, links to existing or new system in plant and ease of use
- Critical to the success of the using the technology is to ensure the Meat Inspector calls the beginning and end of a lot
- The technology can be linked to a camera to capture carcase images simultaneously while the voice capture is being done.
- Weakness of voice capture tech is that condemns aren't captured.

2. Marel / INNOVA presentation

- Presentation on the INNOVA technology was given, covering the history of Marel and the Innova software, which is designed to support quality assurance program in food processing through in-line data capture.
- An early prototype animal health/conditions data capture system for use in a sheep processing plant was presented. The prototype will allow data capture at multiple points (carcase inspection, green offal inspection, red offal inspection, pathology rail, retain rail), including condemns. Electronic images of can also be collected. A one-page summary describing the Innova option is provided in Appendix 2.

3. Breakout Sessions

Group 1: Tony, Rob, Bec, Jonathan, David, Nick

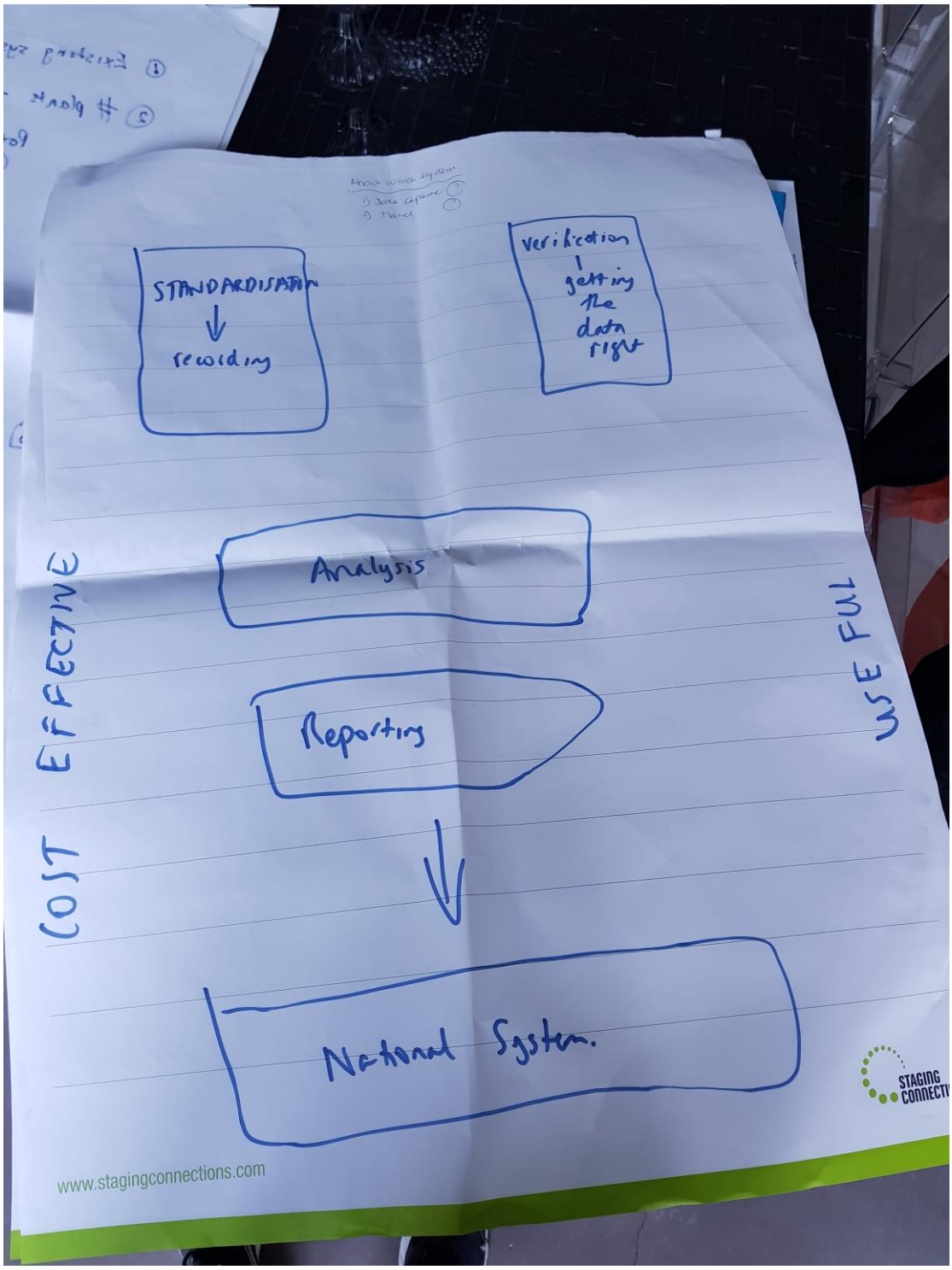
Group 2: Verity, Mac, Jessica, Clive, Thorir

4. Breakout Session 1

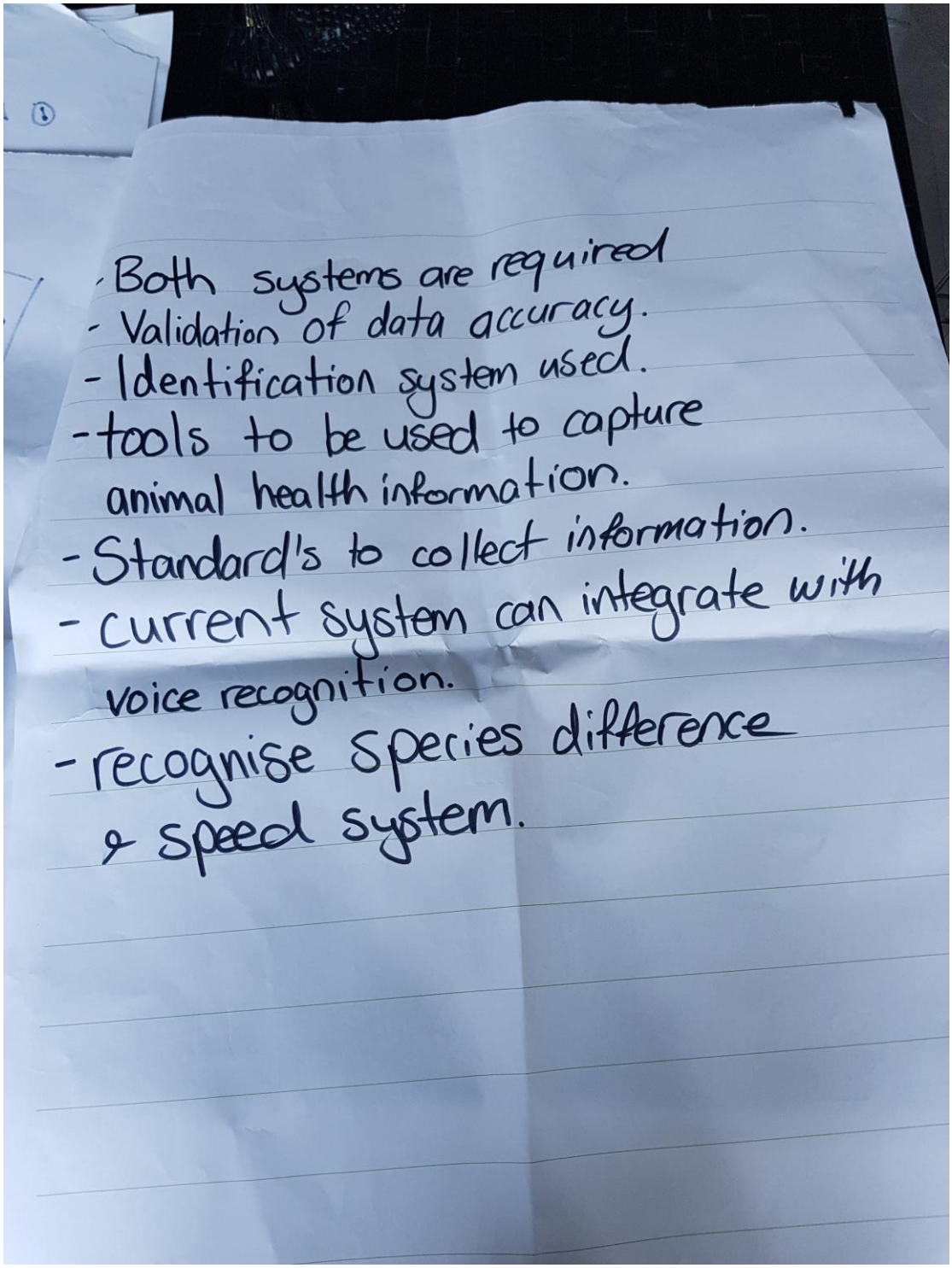
Questions:

- Can we use Innova and/or voice data capture as the pilot data collection, storage and reporting system in the Health 4 Wealth pilot studies? Yes? No? Why? Why not?

Group 1 Notes:



Group 2 Notes



Summary from both breakout groups included:

Key issues identified during this session were that:

i) Processor input is required during the planning of the pilot trials

ii) A test system is required but questions were raised such as, what would it look like? Do we or can the technologies be integrated into existing systems? How do we test / validate the system?
iii) Validation of data will be critical
iv) How will the system be analysed?
v) What would the pilot look like? How many plants etc?

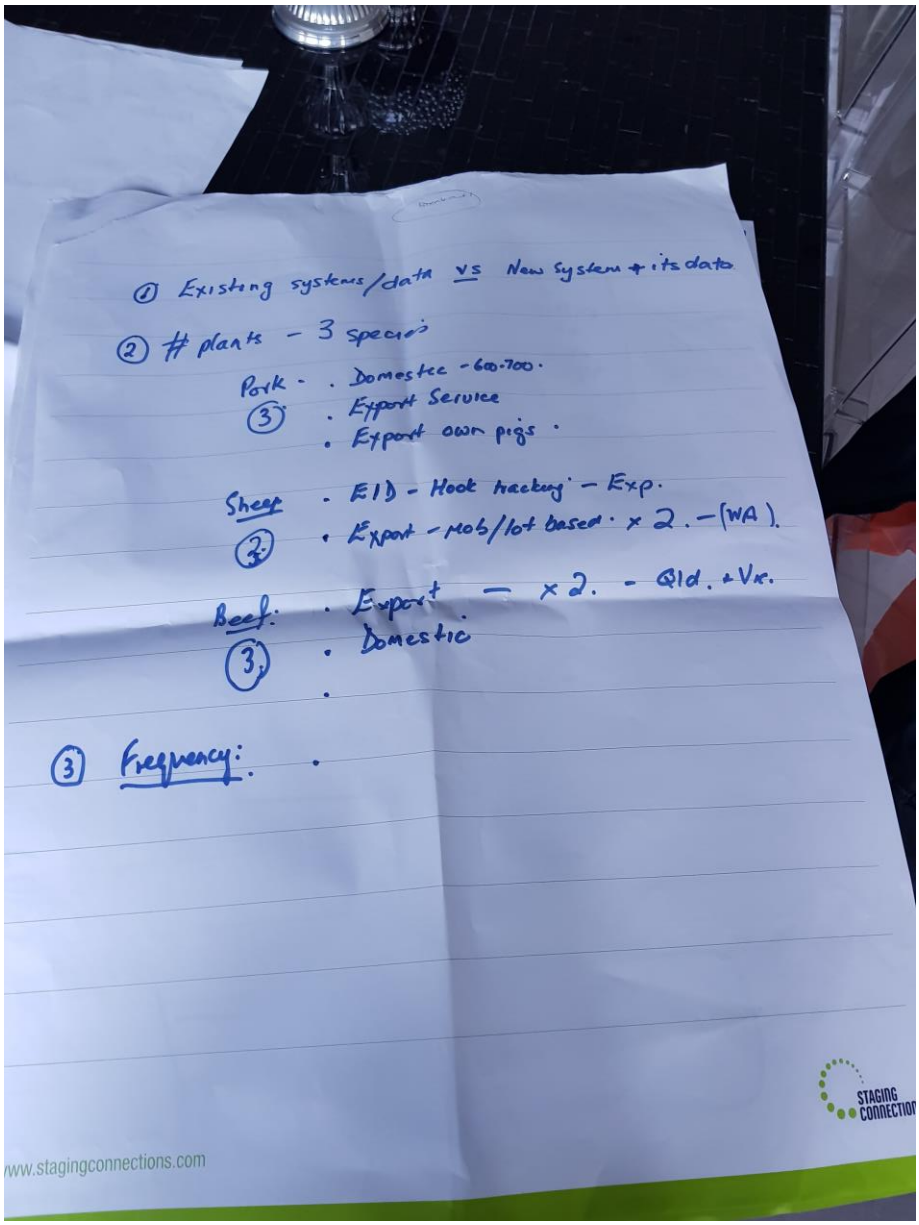
5. Breakout Session 2

Group 1: Tony, Rob, Bec, Jonathan, David
Group 2: Verity, Mac, Jessica, Clive

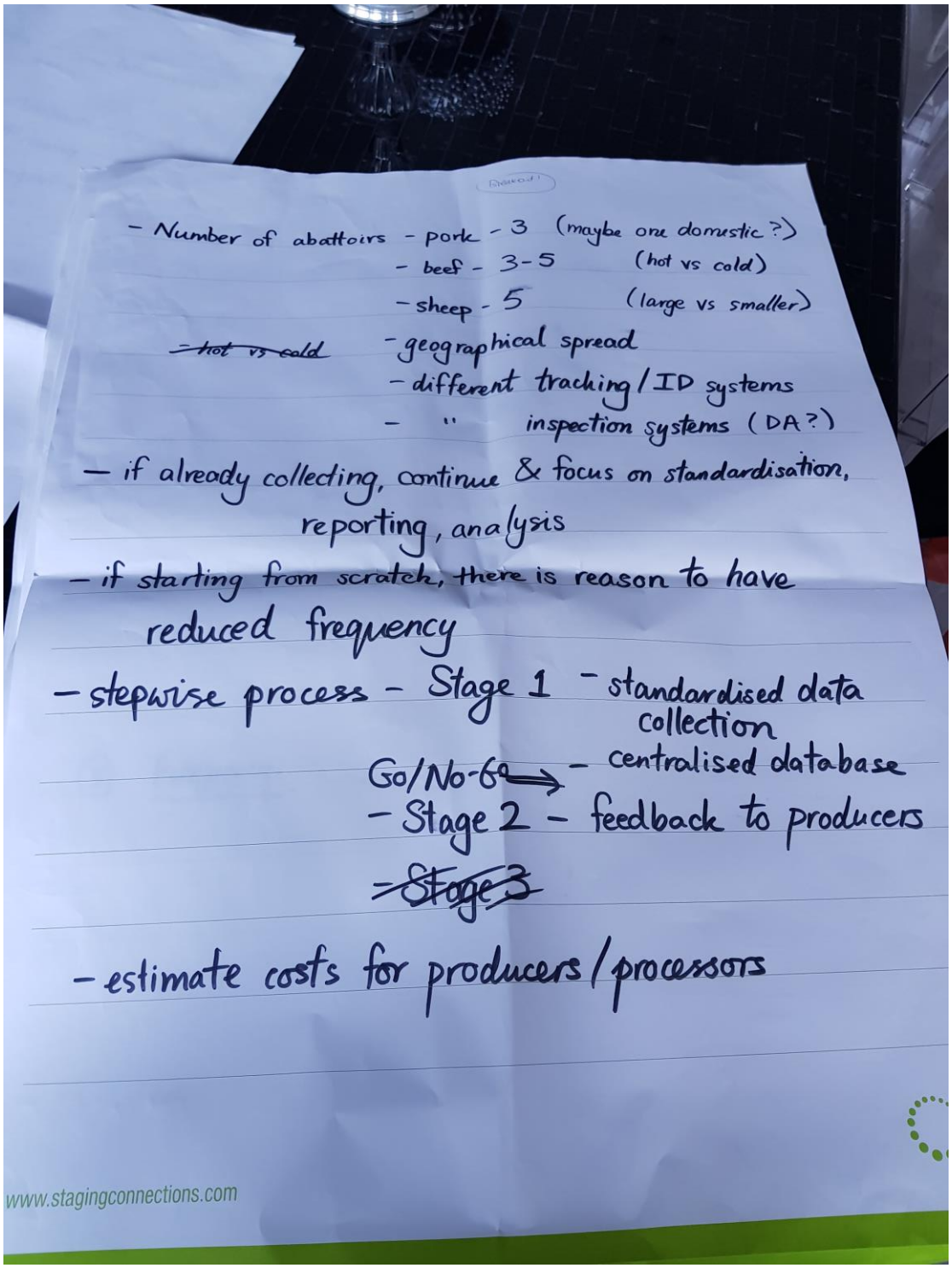
Questions:

- What is a valid size sample > (n=? abattoirs)
- What are we testing?
    i. Data Collection > Frequency without 'overkill' i.e. Every day? Every shift? Every hour? / 3 hours a day? 3 times a week?
    i. Feedback Systems
    ii. Central Information Storage Analysis
- Approach > Staged i.e. 1 + 2 + 3 over 9 months or all at once?

Group 1 Notes:



Group 2 Notes:



Key needs identified during this session were that:

i) The project should aim to work with a limited number of plants for the trials. Both export and domestic plants could be considered.

ii) There is merit in a staged approach.
iii) The trials will need to be tailored to the plant. This will make development of a standard protocol difficult.
iv) Cost of the various stages needs to be considered i.e. cost to producers and processors.

5. Breakout Session 3

MLA provided the workshop with an update on the LDL direct upload project, as well as other projects being funded through the MLA Donor Company. Key learnings from these projects are:

- In one project data capture by meat inspectors was reliable, with approximately 70% of data discarded for various reasons such as, inaccuracy, poor data entry, inconsistency of type of data and general lack of usefulness.

The PowerPoint presented is included as Appendix 3.

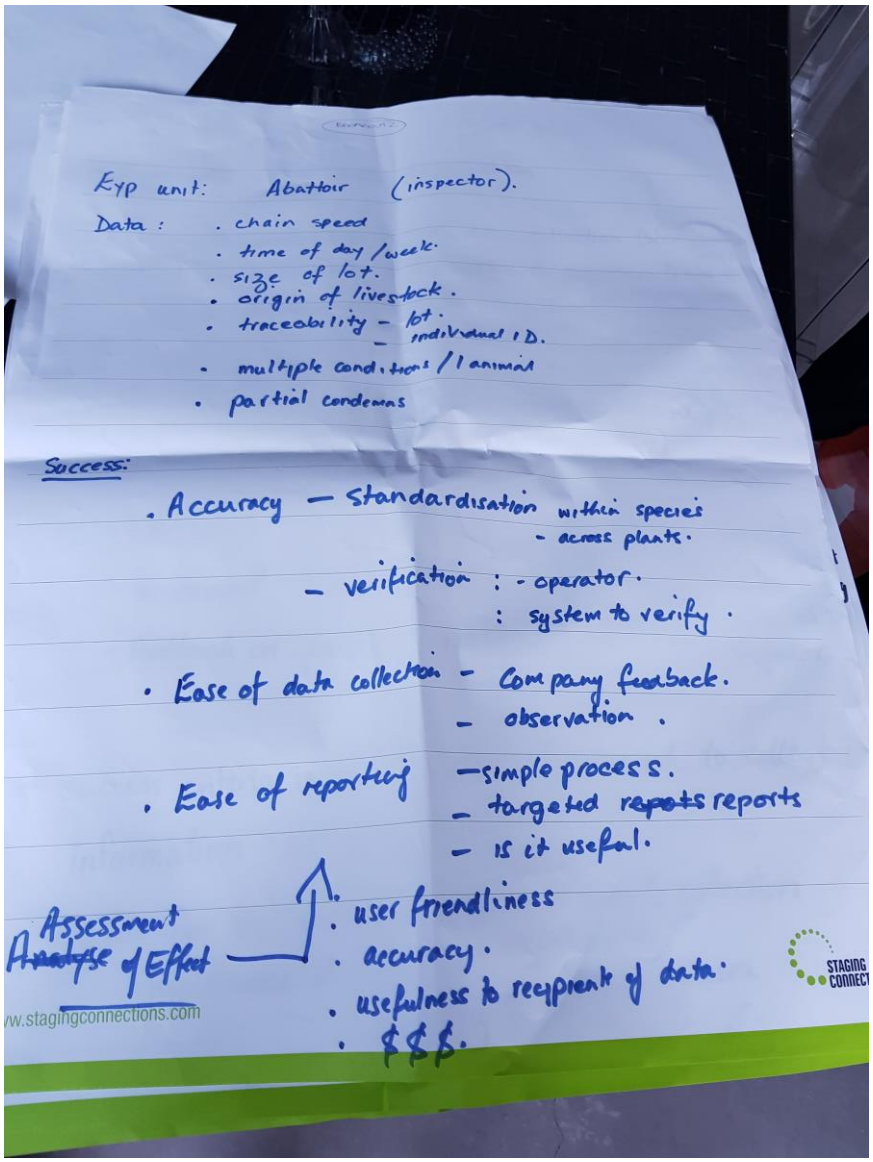
The two breakout groups then discussed the following questions associated with the assessment of effect:

DATA and COLLECTION
- What is the experimental unit?
- What data will be collected on the systems?
- What will we be measuring?

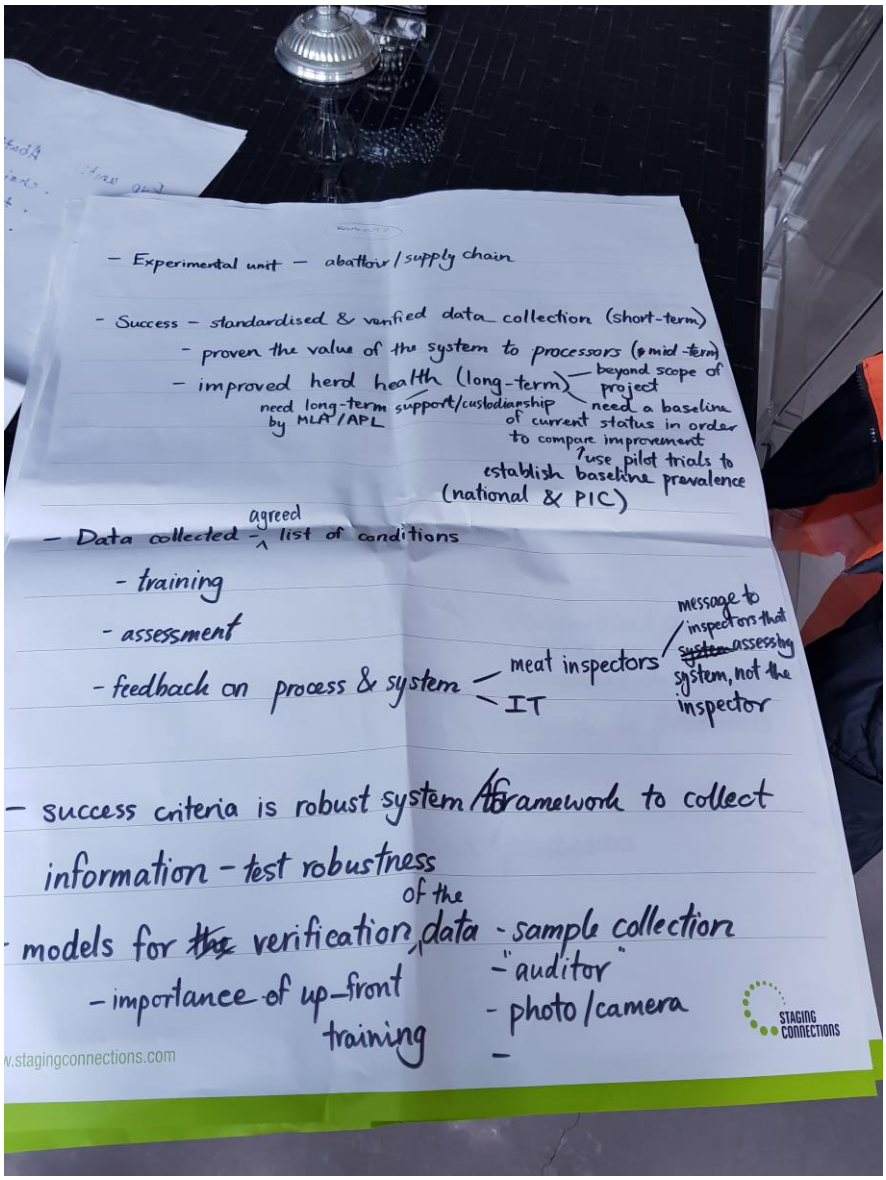
SUCCESS
- How will we measure success?
  - Accuracy
  - Ease of date collection and transfer
  - Ease of reporting

ASSESSMENT OF EFFECT
- How will we analyse the results?
- What will we report on?

i) Group 1 Notes:



ii) Group 2 Notes:



Generally, consensus was reached during this session that:

i) The experimental unit will be the abattoir / supply chain.
ii) Data collection needs to be standardised within species and across plants. This will help to ensure accuracy and verification.
iii) Part of success is an easy to use, robust system of data collection and reporting. Feedback on this should be collected as part of the trials.

7. Breakout Session 4

Questions:

- How will we monitor the trials to ensure they are run to Protocol?
- Who will monitor?
- What will we monitor?

Generally, consensus was reached during this session that:

i) Each site will need a project champion and/or mentor.
ii) The project champion could be the QA Manager or Senior Meat Inspector.
iii) The mentor could be physically close or remotely located. Frequent visits will be needed at the start of the trials to touch base with the plant on a daily / regular basis. This could be across all species or by species. There will also need to regular re-visits.
iv) A role of the mentors could be to determine whether there is interest in the study and if it is working.

8. Breakout Session 5

Questions:

- Start date?
- Completion date?
- Inclusion criteria?
- Exclusion and removal criteria?

i) Plant must have an inspection arrangement that will allow data collection prior to commencement

ii) LDL as platform / pro-forma > 3 plants and 2 x non-LDL plants (to fit across Health 4 Wealth pilot studies)

iii) Voice recognition trials may fit into Health 4 Wealth studies > learnings and / or tandem work.

6. Discussion

The Health 4 Wealth Pilot Trials Design Day stimulated robust discussion and debate amongst the workshop participants.

Overall, there seemed to be consensus that:

i) Processor input is required during the planning of the pilot trials. SARDI has already done this for pork. A similar process may be required for red meat, taking into consideration the tight timelines for the trials.

ii) A test system is required but questions were raised such as, what would it look like? Do we or can the technologies be integrated into existing systems? How do we test / validate the system?

SARDI has decided to use the Marel Innova system to build the pork data collection and feedback system. There may be some savings and learnings from using a similar system for red meat. Ultimately this will be a decision of the red meat industry.

iii) Validation of data collected will be critical to the success of the pilot trials.

iv) The project should aim to work with a limited number of plants for the trials. Both export and domestic plants could be considered.

v) There is merit in a staged approach i.e. data collection, feedback to producers and then sharing in a central database.

vi) The trials will need to be tailored to the plant. This will make development of a standard protocol difficult.

vii) The experimental unit will be the abattoir / supply chain.

viii) Data collection needs to be standardised within species and across plants. This will help to ensure accuracy and verification.

ix) Part of success is an easy to use, robust system of data collection and reporting. Feedback on this should be collected as part of the trials. Cost of the various stages also need to be considered i.e. cost to producers and processors, so the project does not build systems that are uneconomic.

x) Each site will need a project champion and/or mentor.

xi) The project champion could be the QA Manager or Senior Meat Inspector.

xii) The mentor could be physically close or remotely located. Frequent visits will be needed at the start of the trials to touch base with the plant on a daily / regular basis. This could be across all species or by species. There will also need to regular re-visits.

xiii) A role of the mentors could be to determine whether there is interest in the study and if it is working.

7. Implications & Recommendations

The Health 4 Wealth Pilot Trials Design Day was successful in providing guidance to the Health 4 Wealth Project Management Committee in the design of the pilot trials.

However, several key issues need to be resolved before the pilot trials can begin, particularly for the red meat industry:

i) The selection of a test system, whether the same test system will be used at all plants and whether existing technology can be integrated into the Health 4 Wealth pilot trials?

ii) The selection of plants for the trials and the contractual arrangement between MLA, APL and the plants, noting the requirements of the MOU between APL and AgVic, as partners in the Health 4 Wealth project.

iii) How to standardise data collection within the need to tailor the data collection to each plant. During the workshop several participants told the workshop facilitator that developing a "trial protocol" would not be a useful approach. The challenge will be to develop another approach to meet the needs of the Health 4 Wealth pilot trials.

The challenge for the Health 4 Wealth Project is to resolve these key issues to allow the trials to commence no later than September 2018, to allow completion, analysis and reporting by the June 2019 milestone.

8. Intellectual Property

Not applicable.

9. Technical Summary

Not applicable.

10. Literature cited

Not applicable.

11. Publications Arising

Not applicable.

Health 4 Wealth | A Research Project
Agenda FINAL

Meeting: **H4W Pilot Trials Design Day**

Date: 15 May 2018

Venue: Stamford Hotel Sydney Airport

Time: 9:30 am – 3:30 pm

AGENDA ITEMS

Workshop Facilitator: Joan Lloyd

Time	Item	Responsibility
9:30	**Arrival and morning tea**	All
10:00	**Welcome & General Overview** General Introduction & "Around the Table" Introductions Meeting Objectives General overview / snapshot about the H4W | A Research Project	Joan
10:10	**"The Voice" – Data Capture Technology:** Introduction to AMPC/MINTRAC Voice Data Capture	Clive
10:30	**The Innovators Behind the Technology:** Innova	Nick/ Þórir

11:30	**Show & Tell:** Demonstration of prototypes	Marel/MINTRAC
12:00	**Breakout 1**	All
	Can we use Innova and/or voice data capture as the pilot data collection, storage and reporting systems in the H4W pilot trials?	
12:15	**Lunch**	
1:00	**Let's Design: Pilot Studies** Includes MLA Presentation on learnings from other AH data collection projects	All
3:00	**It's A Wrap:** **Going Forward:** Summary and agreed actions	Joan Eleni

Conclusion by 3:30 pm. At the end of the workshop a separate meeting will be held between SARDI, MAREL & APL to further plan the pork pilot trials. The workshop venue is available until 6:00 pm.

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Marel's Innova solution for animal condition data capture and reporting

About Innova Software

Innova is Marel's food processing software made up of various solutions. Innova Quality Control is a flexible data registration and monitoring module that fits into the modular Innova design. Innova QC can run as a standalone system or be integrated into the setup of bigger systems. The system handles various inspection items, inspection processes and responses. The software is continuously developed to fit changing requirements.

Features & benefits

- Flexible, fast and easy to operate
- Easy to configure and modify
- Drive actions based on responses
- Condition images, inspection procedures, process can be pre-loaded for easy operator reference
- Flexible data registration, monitoring & processing of data
- Inspections can be linked to lots, processing lines, plant, state etc.
- Results can be sent as an email alerts, i.e. from the slaughter floor to boning room, as well as detailed reports
- Build in standard reports that can be customised to suit requirements
- Options to integrate data with 3rd party systems such as LDL or other industry database
- Maintain single source of truth across large data sets
- Easily scalable with low entry cost
- Locally supported in Australia
- System can be setup on Windows based tablets, PCs or hand-held devices

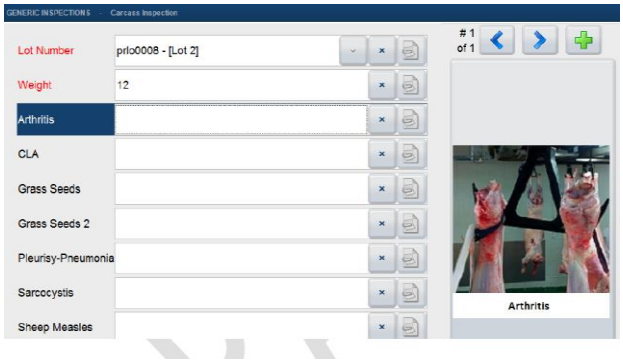
Innova is a potential solution to simplify animal health and conditional data collection in beef and sheep meat plants.

Software is easy to operate and already been used at meat plants across the world. The user interface can be configured to run specific inspection checks and data can be collected against various inspection parameters at multiple points such as yards, inspection platform, offal trays, pathology rail, retain rail etc. The inspections can be grouped, and a score can be generated based on severity to drive action such as

- Animal is fit to kill,
- Processed as a suspect,
- Emergency kill required
- Condemn.

The system opens great opportunity for Australian processors to drive ante-mortem and post-mortem inspection checks; this information is actionable and will provide significant value to the supply chain once analysed at the abattoir, supply chain or industry level.

Proof of concept trial can be delivered in a matter of weeks. Following is an example of operator screen to capture conditions in sheep plants developed with Dr Joan Lloyd.



ADVANCING FOOD PROCESSING

MLA animal health project update

Verity Suttor

MEAT & LIVESTOCK AUSTRALIA

Agenda

MLA Donor Company projects

- Supply chain projects
- EID enabled project
- Extension officers
- LDL animal health direct upload pilot
- Proposed projects coming up

Improving cattle health and wellbeing at farm level using abattoir data feedback (P.PSH.0841)

Purpose: to use livestock slaughter data to drive on-farm practice change that improves animal health and wellbeing, reduces waste, and increases farm and processing productivity.

Status: public report being developed.

Improving cattle health and wellbeing at farm level using abattoir data feedback (P.PSH.0841), contd.

Key learnings:

- Inconsistencies in data recording.
- Over 65% of carcases condemned were due to controllable processes.
- Organ condemns were linked to disease conditions present in the herd:
  - Nephritis linked to Leptospirosis.
  - Hydatids linked to Neospora.
- Regular monitoring may provide early-warning signs.

Collection and reporting of inspection data for continuous improvement and productivity throughout the beef supply chain (P.PIP.0464)

Purpose: to develop a method of collecting and reporting meat inspection data for continuous improvement in productivity throughout the supply chain.

Key learnings:

- Data validation is a really big job
- Trialled draft national standard
- Change management

Status: Awaiting final report

Analysis and extension to support beef producers in improving animal health performance (P.PIP.0753)

Purpose: look at the opportunity to improve processor and producer returns by improving animal health in the national cattle herd through the supply of sub-clinical animal health information.

Outputs will be:

- A cost impact of various disease conditions.
- Improved extension material for producers.
- Provide specialist veterinary support.
- On going validation of inspection data collection.
- 6 monthly reports to H4W group built into the agreement.

EID enabled – stimulating the information supply chain (P.PSH.0923)

Purpose: to enable supply chain participants to make more informed decisions, create new business models and improve business performance leading to an improvement in the efficiency of production within the sheep meat value chain.

Key outcomes:

- Producers are motivated and capable of seeking, interpreting and taking action based on information.
- Increase supplier/producer understanding of their feedback and compliance to market specifications and improve their skills to implement change in management practices.
- Farm advisors provide accurate informed advice and support services to producers

Reducing the financial impact of endemic conditions in sheep (PSH.0852)

Purpose: monitor and analyse a range of endemic conditions in sheep processed in South Australia.

Biosecurity SA (within PIRSA), Thomas Foods International, JBS (via Dept. Ag. & Water Res.), AHA and University of Adelaide (UA).

>80% of sheep slaughtered in SA

$3.4 MILLION OVER 3 YEARS

MEAT & LIVESTOCK AUSTRALIA

By 30-Nov-2020:

- Monitor and record the occurrence of specified endemic sheep conditions.
- Provide feedback on condition occurrence and potential on-farm interventions.
- Provide verified data to AHA and MLA for producer feedback through LDL or other agreed mechanisms.
- Explore options and trial an individual animal recording mechanism.
- Quantify the cost of major condition occurrence within each supply chain.
- Identify key epidemiological risks and causes for conditions of major financial impact.
- Develop a business case for a national comprehensive monitoring (>50% of sheep killed) program.

Supply chain extension officers

- Engagement of a full time resource for three years for fifteen companies/supply chain groups to drive the adoption of the increasing array of carcase feedback that is being provided to producers ie. OM (LMY, eating quality, animal health and value based pricing.
- Development of the extension process, tools and materials for wider industry use.
- Quantify the impact of the adoption of feedback
- New model of extension and adoption
- 4 positions contracted
- 5 in the process of being approved

$8 MILLION OVER 3 YEARS

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Animal Health Direct Upload Proof of Concept

- Objectives
  - Demonstrate that individual and lot based animal health data can be efficiently and accurately transferred to producers through existing industry infrastructure ie. NLIS and LDL.
  - Demonstrate animal data can be tied to individual animal where individual ID is present.
  - Verification and adoption of Drat National Standard.
  - Learnings and recommendations to be used by H4W, NLIS and LDL.
- Who will be involved?
  - 3 supply chains are involved.

Proposed projects coming up

- TOR: Effect of offal defects on carcase characteristics, performance and health of feedlot cattle.
- Proposals to change the required post mortem inspection practices.

Health 4 Wealth | A Research Project | Strategy Snapshot

HEALTH 4 WEALTH

PORK

- Cost-benefit analysis
- Risk assessment
- Other SARDI work
- Draft Standard

SHEEP

- OJD surveillance
- Voice Data Capture
- NSHMP
- SA EAS & MDC project
- LDL Upload
- Zoetis Producer Tours
- Draft Standard
- ALMTech Project

CATTLE

- Individual plant initiatives
- LDL upload pilot
- Draft Standard
- ALMTech Project

H4W Activities

1. Business Case
2. Standards Development
3. Business Information Storage & Analysis
4. Software
5. Pilot Studies

H4W Key Research Questions

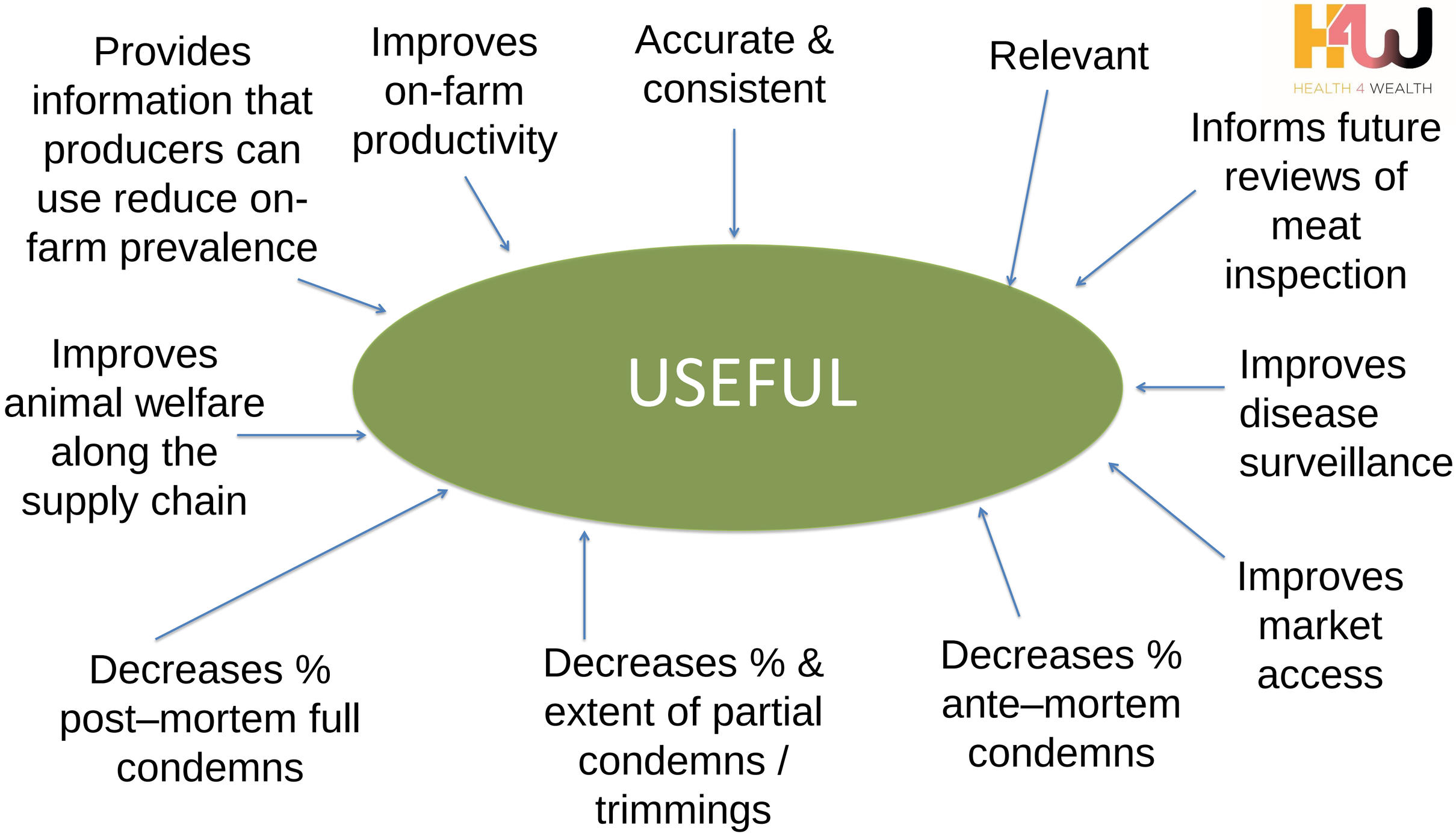
1. Do abattoir animal health feedback systems reduce the prevalence of disease in animals presented for slaughter?
2. Are abattoir animal health feedback systems accurate to the level of the individual consignment/farm or animal? If not, what is needed to make them accurate?
3. How much data should be collected for the systems to be relevant? Is the same amount of data need for all species & different supply chains?
4. Can a system be developed that costs less to implement & run than the potential returns?

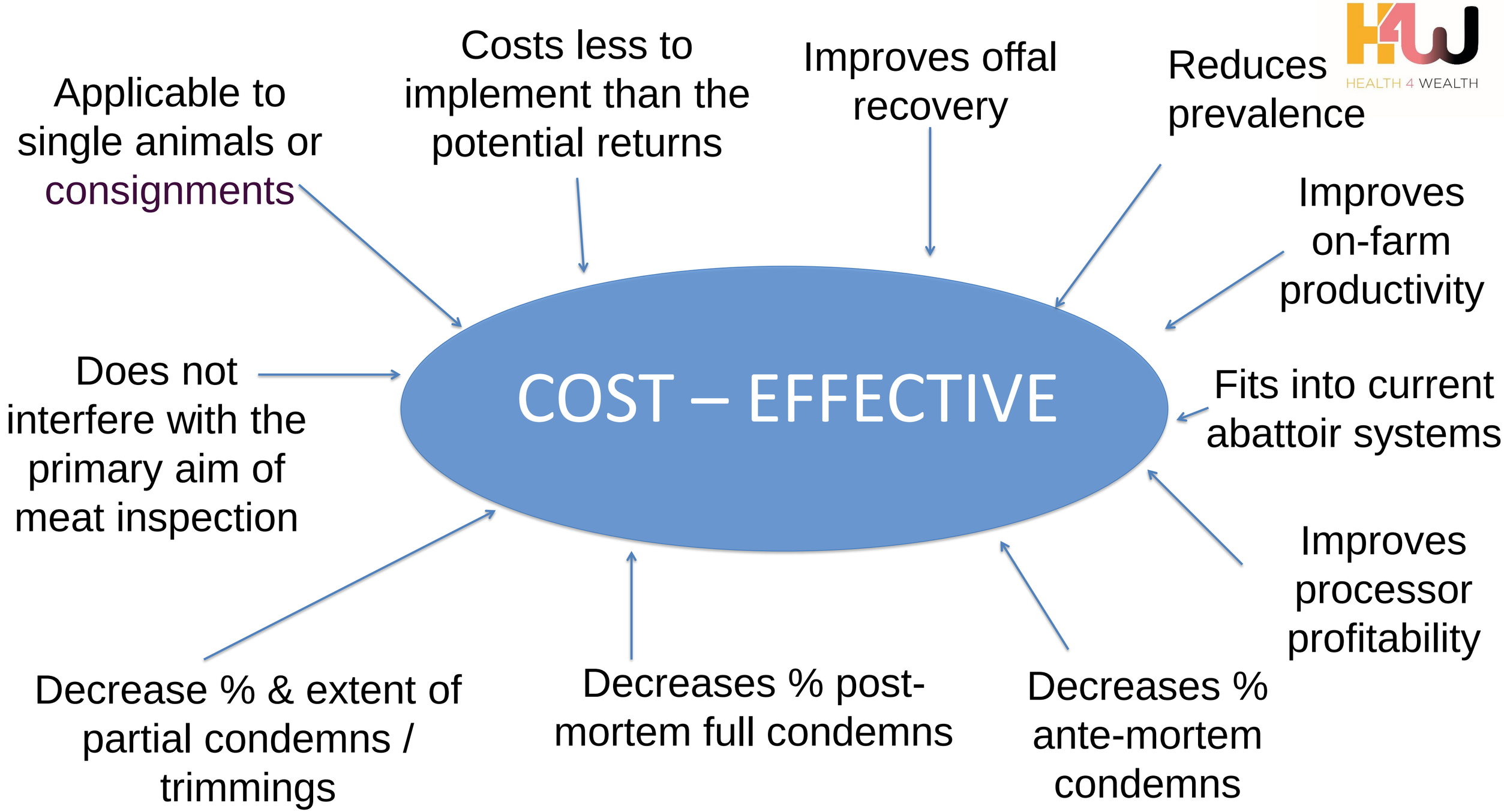
Abattoir Animal Health Feedback Systems Are Useful & Cost Effective

H4W Tier 1 , 2 & 3 Stakeholders

Other Projects That Drive to Commercial Fruition

FULLY FUNCTIONING SYSTEMS


Provides information that producers can use reduce on-farm prevalence
Improves on-farm productivity
Accurate & consistent
Relevant
Informs future reviews of meat inspection
Improves animal welfare along the supply chain
USEFUL
Improves disease surveillance
Decreases % post–mortem full condemns
Decreases % & extent of partial condemns / trimmings
Decreases % ante–mortem condemns
Improves market access


Applicable to single animals or consignments
Costs less to implement than the potential returns
Improves offal recovery
Reduces prevalence
Improves on-farm productivity
Does not interfere with the primary aim of meat inspection
COST – EFFECTIVE
Fits into current abattoir systems
Improves processor profitability
Decrease % & extent of partial condemns / trimmings
Decreases % post-mortem full condemns
Decreases % ante-mortem condemns