



Australian Government
Department of Agriculture



Australian Pork Industry Adoption and Awareness Survey

Final Report
APL Project 2014/527

February 2016

GoAhead Extension Solutions

Principal Investigator – Greg Mills B.Sc. Dip.Sc.Ag. MAIA.

PO Box 4423

West Armidale NSW 2350

Acknowledgements

This project is supported by funding from Australian Pork Limited and the Department of Agriculture.

Disclaimer: The opinions, advice and information contained in this publication have not been provided at the request of any person but are offered by Australian Pork Limited (APL) and GoAhead Extensions Solutions (GES) solely for informational purposes. While APL & GES has no reason to believe that the information contained in this publication is inaccurate, APL & GES are unable to guarantee the accuracy of the information and, subject to any terms implied by law which cannot be excluded, accepts no responsibility for loss suffered as a result of any party's reliance on the accuracy or currency of the content of this publication. The information contained in this publication should not be relied upon for any purpose, including as a substitute for professional advice. Nothing within the publication constitutes an express or implied warranty, or representation, with respect to the accuracy or currency of the publication, any future matter or as to the value of or demand for any good.

Executive Summary

Survey respondents showed differing approaches to adopting information depending on the type of industry issues presented. While some producers identified as innovators in humane treatment of animals, producers identified in all categories from innovators to laggards in regards to food safety issues. These results would suggest that differing issue may require consideration of multiple approaches to extension design and delivery if high rates of awareness and adoption are to be achieved.

On farm welfare benchmarking showed low levels of awareness and adoption with only the largest piggeries, indicating that it had been or it was planned to implement benchmarking. The awareness of the risk and consequence of PRRS virus introduction to Australia through importation of pork was generally good with slightly lower awareness in small producers. Good levels of awareness are seen across adoption categories with the earlier majority requiring more information before acting on this issue.

All sizes of producers and adoption categories show very high levels of awareness and adoption of the changes in dietary lysine requirements in finisher pigs. This may reflect piggery manager's stronger interest in key production issues rather than some issue which may be seen as more peripheral. It is of interest that the awareness is so high given that most producers would use professional nutritionist and producers may not be directly involved in implementing the level of lysine in their pigs' diets.

The level of awareness of the 'Pigs in School' and Biogas projects was high across the industry. It is notable that many respondents expressed a need for more information before implementing biogas projects. Given the high level of interest in the early adopter category additional technical extension in this area may be suggested as beneficial.

The awareness of the National Environmental Guidelines for Outdoor Piggeries is high across all production sizes. Implementation is low as expected as the guidelines only apply to outdoor piggery and this was only a small section of the sample set provided. Awareness of Physi-Trace: National Livestock Traceability Performance, awareness of eating quality fail rate study and the 'How to Cook a Pork Steak' Campaign is similarly high across all segments of the industry.

The most valued sources of information for producers remains face to face contact with industry professionals, with veterinarians (1st), nutritionist (2nd), private consultants (3rd) and APL staff (5th) scoring highest scores from produced and also scoring consistently high across information sources. APL/CRC roads shows were highly regarded (4th) and the APL Weekly Communique (6th) is the most valued publication. APL/CRC Roadshows were highly regarded by participants. Survey respondents identified Toowoomba, Melbourne, Perth, Murray Bridge, Bendigo, Young and Sydney as the most prefer location for workshops and events.

Retail traders self-identified predominantly as early adopters in regard to food safety, humane treatment of animals and particularly in making changes to their business. Therefore, suggesting the retail sector is a seeker of information before making changes in the operations of their business in these areas. As may be expected the retail sector shows relatively high levels of awareness of product related programs around cooking times, eating quality and traceability.

Table of Contents

Acknowledgements	1
Executive Summary	2
1. Background to Research	7
2. Objectives of the Research Project	8
3. Introductory Technical Information	8
4. Research Methodology	9
5. Results	12
5.1 Response Rate	12
5.2 Response – Farm Size	12
5.3 Response – Adoption Categories	12
5.4 Producer Responses	13
On farm welfare benchmarking	13
The risk and consequence of PRRS virus introduction to Australia through importation of pork	15
Changes in dietary lysine requirements in finisher pigs	17
‘Pigs in schools’ education program	19
National Environmental Guidelines for Outdoor Piggeries	22
Physi-Trace: National Livestock Traceability Performance	24
Eating quality fail rate study	25
How to Cook a Pork Steak Campaign	26
5.5 Summary of Survey Results	27
5.6 Value of sources of information when making changes to you pig production system.	28
5.7 Preferred Workshop Locations	29
5.8 Retail Industry	30
6. Discussion	32
7. Implications & Recommendations	35
8. Intellectual Property	36
9. Literature cited	37
10. Publications Arising	38
11. Appendix 1. Producers survey	39
12. Appendix 12. Retailer survey	50

List of Tables

Table I Online survey response rate for farms and retail. 12

List of Figures

Figure 1. Influence of stakeholders perceived by small-scale pig producers (<100 sows) in Australia on their on-farm and traceability practices. Influence is: 1, no influence; 2, some influence; 3, significant level of influence; and 4, high level of influence (Hernández-Jover et al., 2012a) 9

Figure 2 The distribution of adopter categories (BUSPH 2013) 10

Figure 3 Responses based on farm size (Sow Numbers) 12

Figure 4. Distribution of Adoption Categories by Issue 13

Figure 5. Awareness of on farm welfare benchmarking by farm size 13

Figure 6. Awareness and adoption of on farm welfare benchmarking by farm size 14

Figure 7. Awareness of on farm welfare benchmarking by adoption category 14

Figure 8. Awareness and adoption of on farm welfare benchmarking by adoption category 15

Figure 9. The risk and consequence of PRRS virus introduction to Australia through importation of pork by farm size 15

Figure 10. Awareness and adoption of the risk and consequence of PRRS virus introduction to Australia through importation of pork by farm size 16

Figure 11. The risk and consequence of PRRS virus introduction to Australia through importation of pork by adoption category 17

Figure 12. Awareness and adoption of the risk and consequence of PRRS virus introduction to Australia through importation of pork by adoption category 17

Figure 13. Changes in dietary lysine requirements in finisher pigs by farm size 17

Figure 14. Awareness and adoption of changes in dietary lysine requirements in finisher pigs by farm size 18

Figure 15. Changes in dietary lysine requirements in finisher pigs by adopter category 18

Figure 16. Awareness and adoption of changes in dietary lysine requirements in finisher pigs by adoption category 19

Figure 17. Awareness of 'Pigs in schools' education program by farm size 19

Figure 18. Awareness of 'Pigs in schools' education program by farm size 20

Figure 19. Biogas project by farm size 20

Figure 20. Awareness and adoption biogas project by farm size 21

Figure 21. Biogas project by adoption categories 21

Figure 22. Awareness and adoption of Biogas project by adoption categories 22

Figure 23. National Environmental Guidelines for Outdoor Piggeries by farm size 22

Figure 24. Awareness and Adoption of National Environmental Guidelines for Outdoor Piggeries by farm size 23

Figure 25. National Environmental Guidelines for Outdoor Piggeries by adoption category 23

Figure 26. Awareness and Adoption of National Environmental Guidelines for Outdoor Piggeries by adoption category	24
Figure 27. Awareness of Physi-Trace: National Livestock Traceability Performance by farm size	24
Figure 28. Awareness of Physi-Trace: National Livestock Traceability Performance by adoption categories	25
Figure 29. Awareness of Eating quality fail rate study by farm size	25
Figure 30. Awareness of Eating quality fail rate study by adoption category	26
Figure 31. Awareness of How to Cook a Pork Steak Campaign by farm size	26
Figure 32. Awareness of How to Cook a Pork Steak Campaign by farm size	27
Figure 33. Survey summary of on-farm questions	27
Figure 34. Survey summary of industry program questions	28
Figure 35. Relative value of information source when making changes in pig production systems (0 = Low – 10 = High)	28
Figure 36. Information source when making changes in pig production systems categories as High, Medium & Low.	29
Figure 37. Preferred workshop location by number of respondents.	29
Figure 38. Preferred workshop location by number of sows represented	30
Figure 39. Distribution of Adoption Categories by Issue.	30
Figure 40 Awareness of APL program by retail sector.	31
Figure 41 The value sources of information to the retail sector about pig production system.	31
Figure 43. Awareness an adoption across on all investigated on-farm issues	32

I. Background to Research

The decline in R,D&E funds has seen a shift from managing large long-term R,D&E programs to smaller short-term projects resulting in an increase in smaller amounts of R,D&E funds allocated to a large number of individual groups or projects. There has also been an increase in the proportion of funds provided by private industry players to supplement State government R,D&E programs. The lack of pork R,D&E funds has occurred in parallel with an increase in the cross-sector R&D projects/programs to share R,D&E resources on common priority areas such as animal welfare, biosecurity, climate change and feed grains.

APL has adopted a R&D process which facilitates the efficient use of R&D resources and maximises research outcomes for industry. Two key components of the R&D process are the R&D Advisory Committee and the industry Specialist Groups. The R&D process is an eighteen-month cycle and includes the development of research priorities which are addressed by projects delivered either internally or by industry.

The industry Specialist Groups define strategic priorities for APL's R&D program and are comprised of 'expert' participants from industry, research providers, state and federal government, and APL managers.

The industry Specialist Groups advise the R&D Advisory Committee (RDAC) on relevant research and development in their specialist area and assist with attainment of APL strategic objectives by:

Utilising expertise within the Specialist Group to match R&D opportunities to APL strategic objectives;

- Prioritising projects and the most appropriate mode of commissioning (e.g. tender, general call);
- Alerting the RDAC to potential shortages in capability, infrastructure or resources that are impeding the pork industry's capacity to meet research and development objectives;
- Placing appropriate emphasis on technology transfer through recognition of the need for investment in the development of skills and infrastructure within the industry as a key element;
- Providing advice on opportunities for the leverage of research funds to secure additional funds; and
- Where appropriate, providing advice on the selection of research projects.

Prior to this study there were six industry Specialist Groups, each chaired by an industry representative and assisted by an APL Research & Innovation (R&I) Manager. Membership is on application and subject to annual review.

GoAhead Extension Solutions was engaged to conduct this survey of pork industry participants to investigate the awareness and adoption of projects which were identified by the Specialist Groups and subsequently implemented over recent years.

The following key projects were identified by Australian Pork Limited from each of the Specialist Groups that had been the focus of capacity building and adoption activities.

- SG1: Market Development
 - Eating quality fail rate study
 - How to cook study
- SG2: Genetics, Reproduction & Welfare

- On farm welfare benchmarking
- The risk and consequence of PRRS virus introduction to Australia through importation of pork
- SG3: Nutrition, Health & Physiology
 - Changes in dietary lysine requirements in finisher pigs
- SG4: Industry capability & technology transfer
 - 'Pigs in schools' education program
- SG5: Environment Management
 - Biogas
 - National Environmental Guidelines for Outdoor Piggeries
- SG6: Food safety, Biosecurity & Quality Assurance
 - Physi-Trace: National Livestock Traceability Performance Standards

2. Objectives of the Research Project

The objective of this project is to evaluating the rate of adoption of research outcomes and the impact they have on industry by determining the awareness of specific research and development activities. Therefore, providing more informed insights into where R&D investment is having the greatest impact and identify areas which can be improved.

3. Introductory Technical Information

Extension is a key mechanism that can contribute to many of the different dimensions of resilience (Hunt *et. al.* 2012). Feder *et. al.* (2012) suggested that extension systems need not be uniform, and will require different providers for different clienteles, with public providers and funding focusing more on smaller-scale and less commercial farmers. With the current 'unravelling' of the agricultural RD&E system in Australia the discipline of extension can be considered as a subset of the greater society in which it exists. (Hunt *et. al.*, 2012). An evaluation of Web 2.0 extension strategies found overall themes that emerged regarding the factors that encouraged adoption of the new technologies were that they needed to be easy to use, save time and money, and they required the provision of support (James, 2015).

Brashear *et. al.* (2000) who surveyed 127 Illinois pork producers found that after discovering a new technology they indicated that they discussed the new technology with a current user of that technology. This approach was used by 94.1% of small producers, 100% of medium producers, 90% of large producers, and 80% of corporations. Results also showed that university specialists were called on by only approximately 40% of small and medium producers as well as corporations while 60% of large producers pursued information from them. In 2000 internet was used very little by respondents to pursue information. Only 8.2% of small producers and 20% of medium producers indicated that they used the Internet and none of the large producers or corporations claimed to use it. Brashear *et. al.* (2000) studies showed producers when considering the implementation of new technology into an operation, producers look at profitability more than any other factor. It is contemplated by 97.7% of small producers, 90% of large producers, and 100% of all medium producers and corporations.

Hernández-Jover *et al.*, (2012a) investigated communication and extension strategies for improved biosecurity amongst small-scale Australian pig producers. This research found stakeholders' influence

from the producers' perspective as shown in Fig. 1. Interviews and focus group discussions revealed small-scale pig producers considered veterinarians and other producers as the most useful sources of information due to their knowledge and expertise on pig production. Family members were also contacted regularly as they were considered part of the business.

Influence	4	Veterinarians Other producers Family	State Department of Primary Industries Food Authority Australian Quarantine Inspection Services Abattoirs
	3	Livestock agents Rural suppliers Abattoirs Buyers	Livestock agents Other producers Buyers
	2	State Department of Primary Industries Australian Pork Limited	Veterinarians Australian Pork Limited
	1	Animal Health Australia Department of Agriculture, Fisheries and Forestry	Animal Health Australia Department of Agriculture, Fisheries and Forestry
		On-farm practices	Traceability

Figure 1. Influence of stakeholders perceived by small-scale pig producers (<100 sows) in Australia on their on-farm and traceability practices. Influence is: 1, no influence; 2, some influence; 3, significant level of influence; and 4, high level of influence (Hernández-Jover et al., 2012a)

Hernández-Jover et al., (2012b) conducted a cross-sectional study at the height of the Influenza Pandemic (H1N1/09) outbreak in the Australian human population and before the virus was reported in the first piggery in Australia in July 2009. The study showed the most important sources of information during this outbreak for producers were APL (93%), veterinarians (89%) and the state Department of Primary Industries (DPI) (75%). The first two considered the most trusted sources of information. Television, radio and other farmers were considered more important sources of information by small herds and veterinarians by larger herds.

4. Research Methodology

Survey Methodology

This survey used an on-line tool which was sent to both pork producers, and retail meat traders. Those survey were identified by and the contact detail provided by APL and it was categorised into the production size of the piggeries involved. The on-line survey used 'Survey Monkey'® and was followed up with telephone calls and email call to action to encourage completion of the survey. To further encourage completion of the surveys and increase response rate the survey was incentivised with the opportunity to be entered into a draw to win a fuel voucher. The survey is shown in Appendix 1.

The survey examined key APL R& D extension projects identified by APL to identify the level of awareness and implementation by producers. Respondents were also surveyed about their valued sources of information or "trusted advisers". This information is key to targeting future extension projects to key change agents or influencers.

The survey instrument also provided for the segmentation of results by five 'Adopter' categories, based on Everett Rogers' Diffusion of Innovations theory: Innovators, Early Adopters, Early Majority,

Late Majority and Laggards. Early Adopters are a key segment of interest because they are critically important opinion leaders. Through understanding their views, the sources they trust and the channels of information they use, appropriate communication can be developed and targeted. Diffusion of Innovation (DOI) Theory, developed by E.M. Rogers in 1962, has been summarised by the Boston University School of Public Health (BUSPH, 2013) as follows.

Adopter Category Definition

Innovators - These are people who want to be the first to try the innovation. They are venturesome and interested in new ideas. These people are very willing to take risks, and are often the first to develop new ideas. Very little, if anything, needs to be done to appeal to this population.

Early Adopters - These are people who represent opinion leaders. They enjoy leadership roles, and embrace change opportunities. They are already aware of the need to change and so are very comfortable adopting new ideas. Strategies to appeal to this population include how-to manuals and information sheets on implementation. They do not need information to convince them to change.

Early Majority - These people are rarely leaders, but they do adopt new ideas before the average person. That said, they typically need to see evidence that the innovation works before they are willing to adopt it. Strategies to appeal to this population include success stories and evidence of the innovation's effectiveness.

Late Majority - These people are skeptical of change, and will only adopt an innovation after it has been tried by the majority. Strategies to appeal to this population include information on how many other people have tried the innovation and have adopted it successfully.

Laggards - These people are bound by tradition and very conservative. They are very skeptical of change and are the hardest group to bring on board. Strategies to appeal to this population include statistics, fear appeals, and pressure from people in the other adopter groups.

It is important to note that an individual may be classified into different categories for different types of innovations. For example, an early adopter for mobile phone technology may be a laggard for quality assurance.

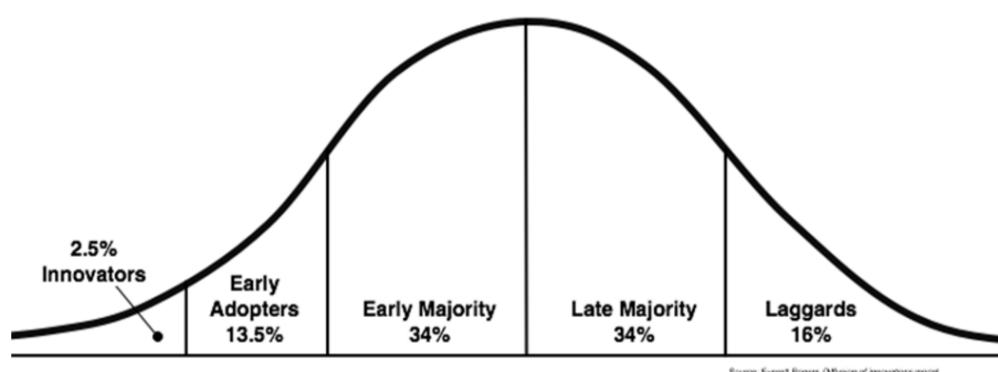


Figure 2 The distribution of adopter categories (BUSPH 2013)

BUSPH (2013) notes that the stages by which a person adopts an innovation, and whereby diffusion is accomplished, include awareness of the need for an innovation, decision to adopt (or reject) the innovation, initial use of the innovation to test it, and continued use of the innovation. There are five main factors that influence adoption of an innovation, and each of these factors is at play to a different extent in the five adopter categories.

1. Relative Advantage - The degree to which an innovation is seen as better than the idea, program, or product it replaces.
2. Compatibility - How consistent the innovation is with the values, experiences, and needs of the potential adopters.
3. Complexity - How difficult the innovation is to understand and/or use.
4. Trialability - The extent to which the innovation can be tested or experimented with before a commitment to adopt is made.
5. Observability - The extent to which the innovation provides tangible results.

The boarder responses of the survey were also accumulated for reporting purposes into three key areas;

1. Unaware – respondents indicated that they were not aware of the issue
2. Aware – respondents are aware of the issue but have not taken any action on the issue
3. Adoption – respondents are aware of the issue and have made a decision bases on this awareness. This may include implementing or deciding that implementation is not suitable for their business.

5. Results

5.1 Response Rate

The response rate for the different categories of farm size is shown in table one.

Group	Result	Target	Reponses
Small Farm	3	11	27%
Medium Farm	2	10	20%
Large Farm	1	11	9%
Extra Large Farm	6	8	75%
APL Delegate	27	34	79%
Total	39	90	43%
Retail	7	16	44%

Table 1 Online survey response rate for farms and retail.

5.2 Response – Farm Size

Figure 3 shows the distribution of responses based on farm size in regard to categories based on the number of sows.

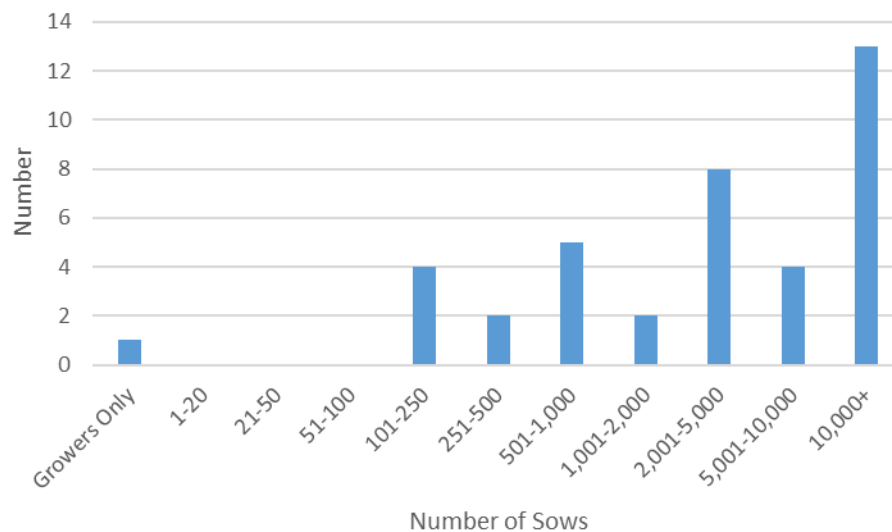


Figure 3 Responses based on farm size (Sow Numbers)

5.3 Response – Adoption Categories

Producers were identified to adopter categories for 'Making Production Changes', 'Humane Treatment of Animals' and "Food Safety Issues" as shown in Figure 4.

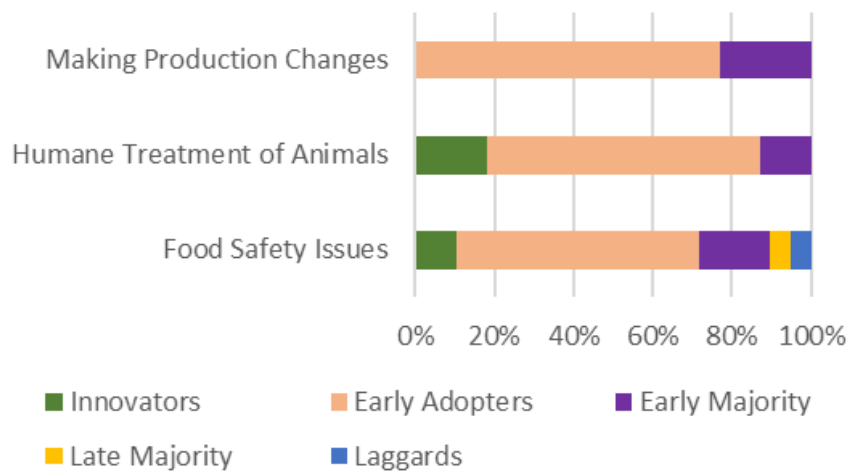


Figure 4. Distribution of Adoption Categories by Issue

5.4 Producer Responses

On farm welfare benchmarking

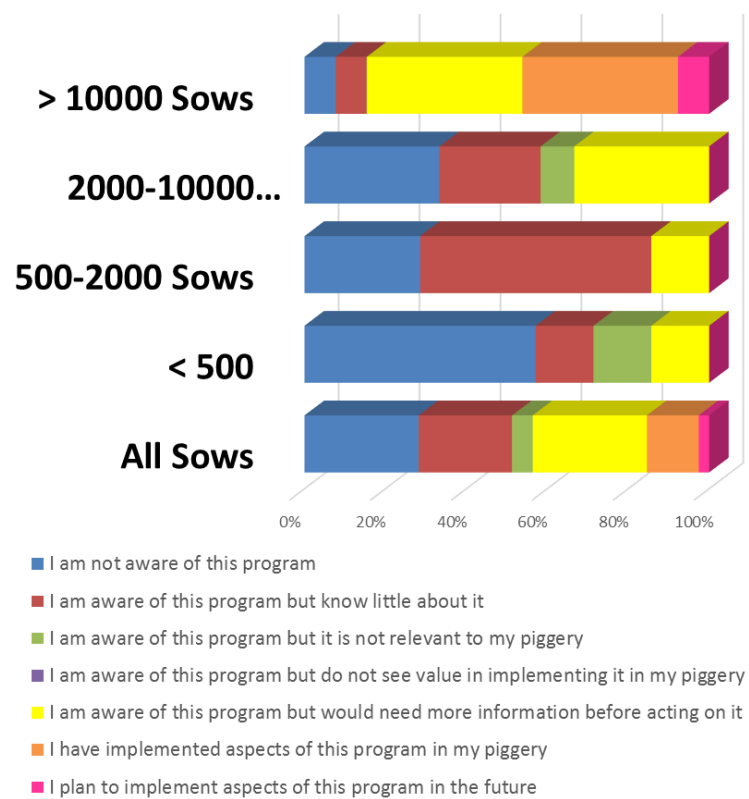


Figure 5. Awareness of on farm welfare benchmarking by farm size

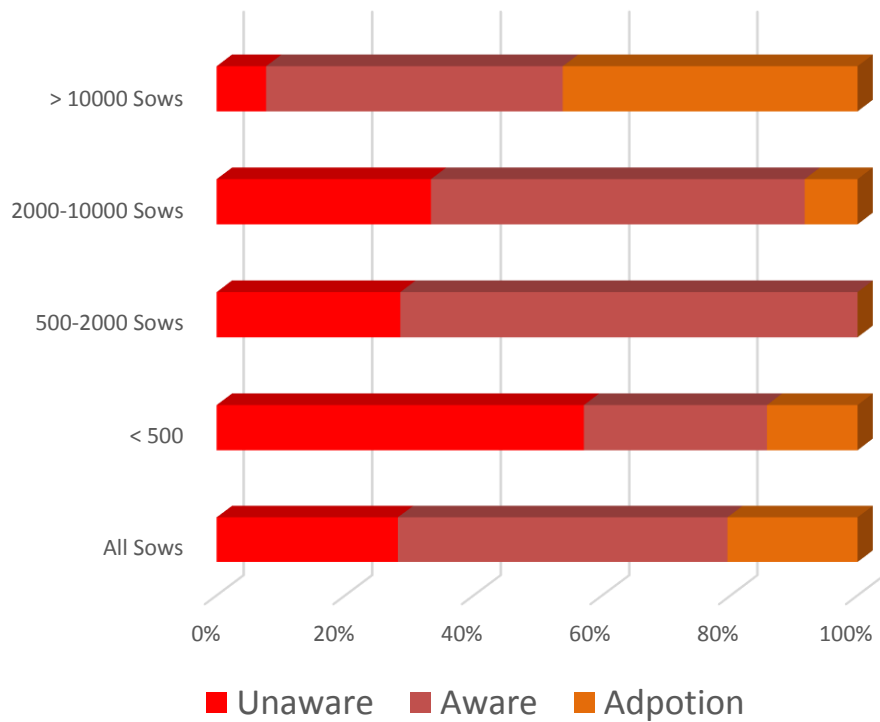


Figure 6. Awareness and adoption of on farm welfare benchmarking by farm size

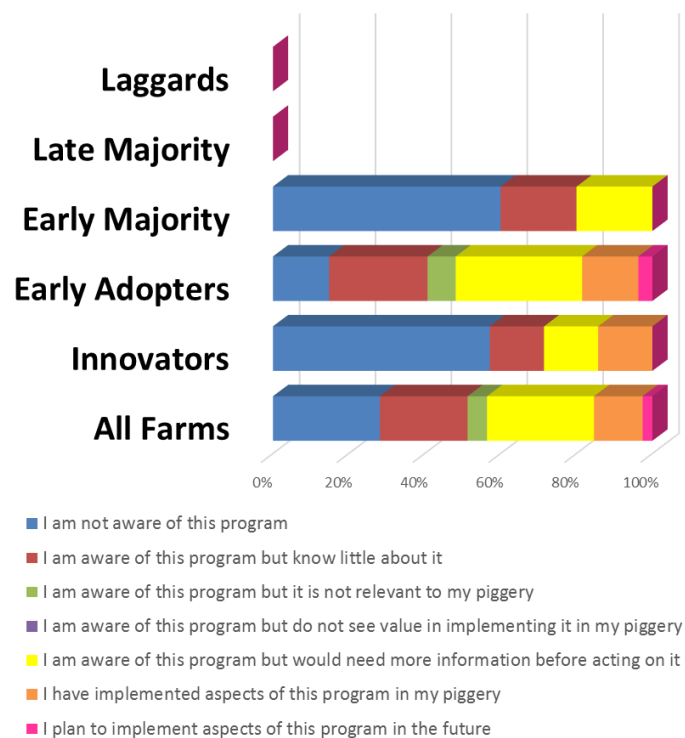


Figure 7. Awareness of on farm welfare benchmarking by adoption category

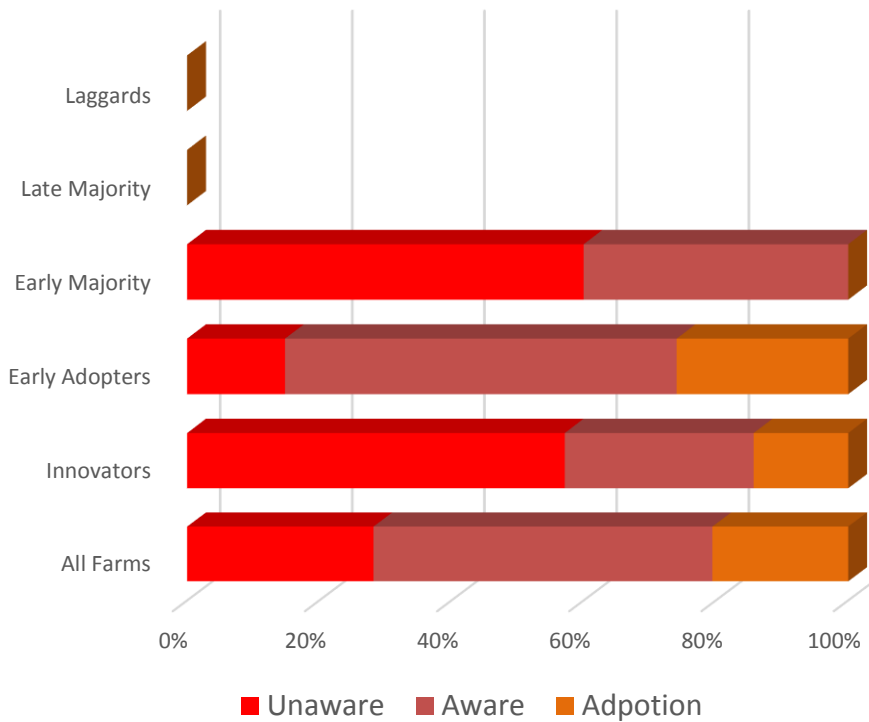


Figure 8. Awareness and adoption of on farm welfare benchmarking by adoption category

The risk and consequence of PRRS virus introduction to Australia through importation of pork

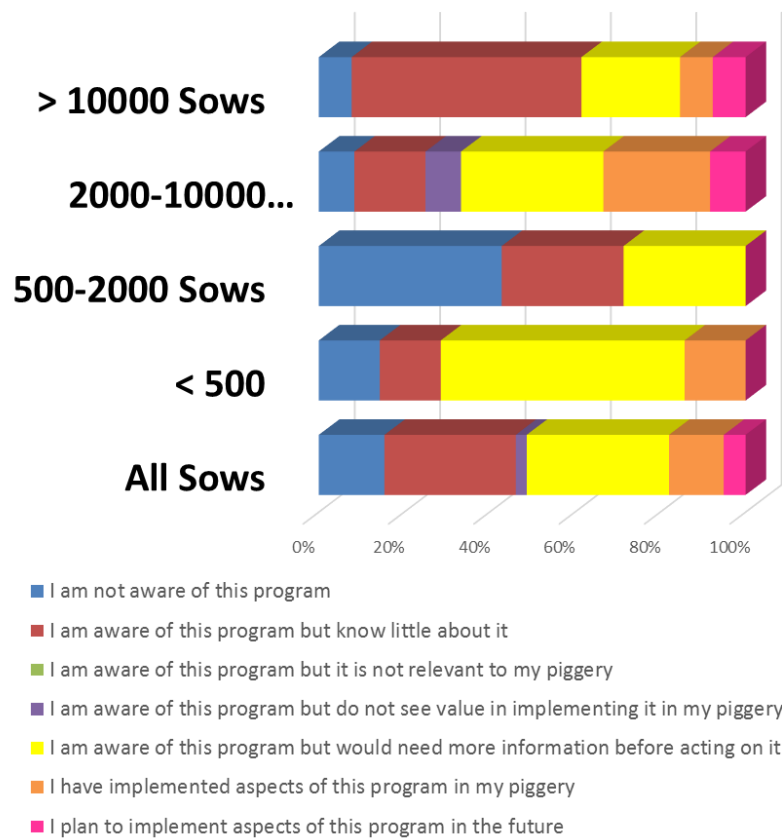


Figure 9. The risk and consequence of PRRS virus introduction to Australia through importation of pork by farm size

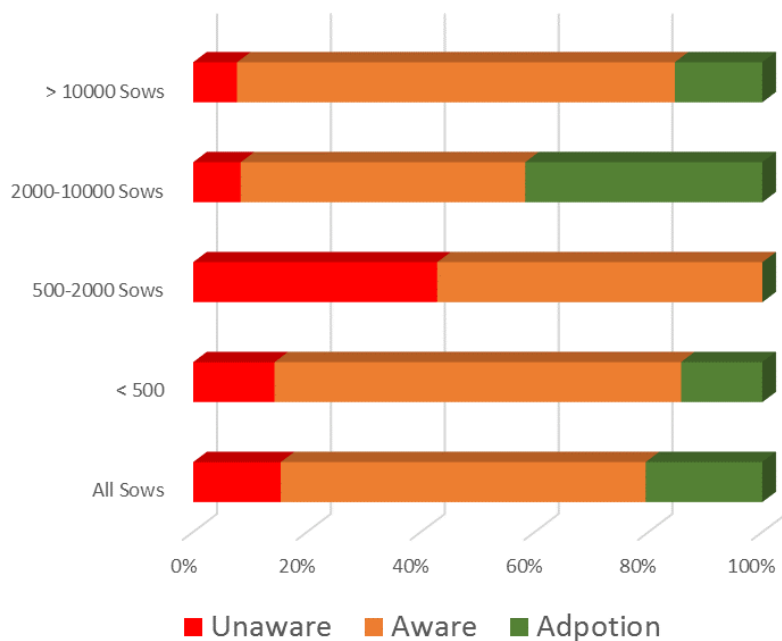


Figure 10. Awareness and adoption of the risk and consequence of PRRS virus introduction to Australia through importation of pork by farm size

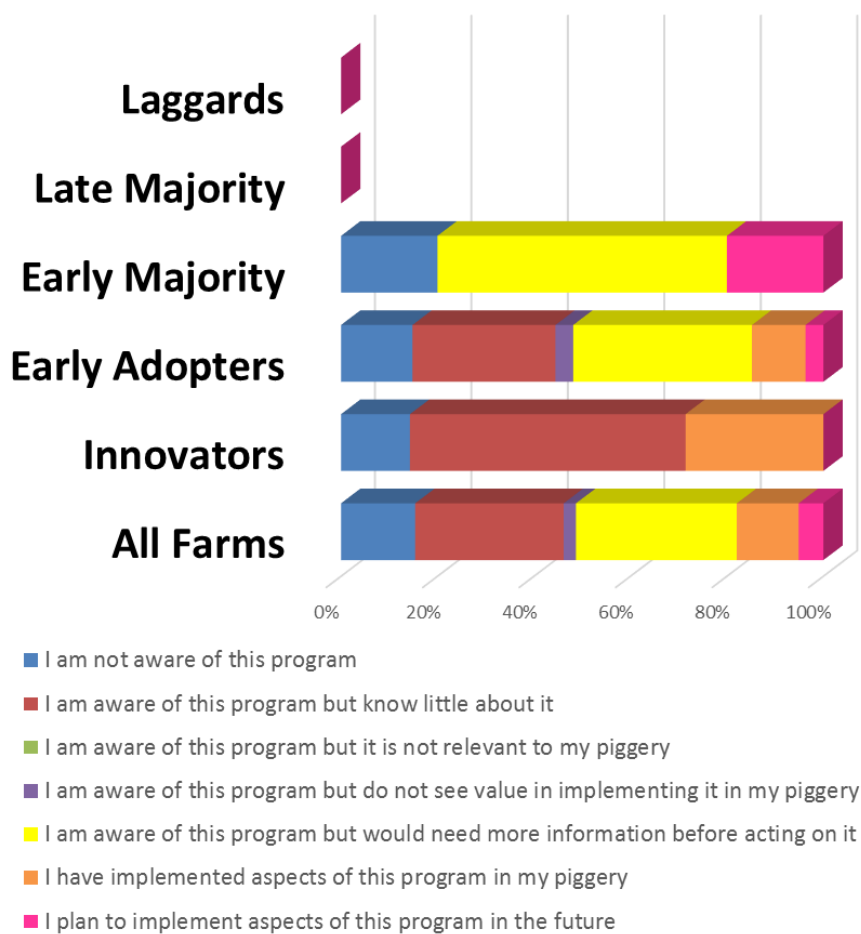


Figure 11. The risk and consequence of PRRS virus introduction to Australia through importation of pork by adoption category

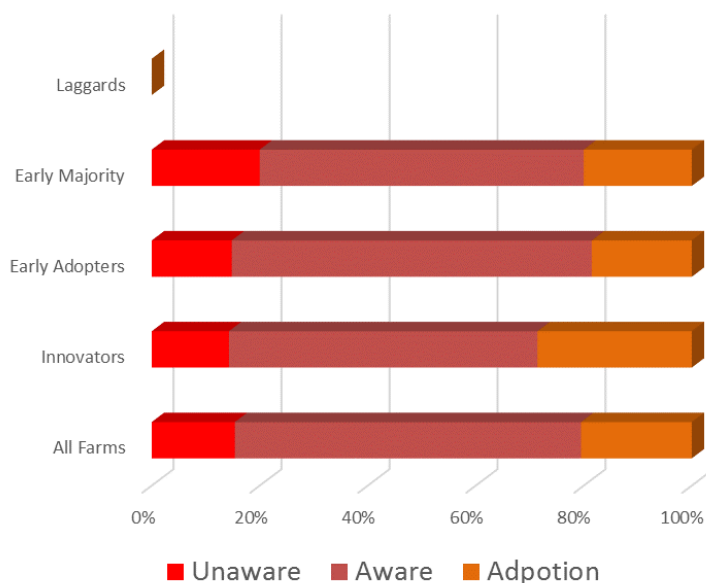


Figure 12. Awareness and adoption of the risk and consequence of PRRS virus introduction to Australia through importation of pork by adoption category

Changes in dietary lysine requirements in finisher pigs



Figure 13. Changes in dietary lysine requirements in finisher pigs by farm size

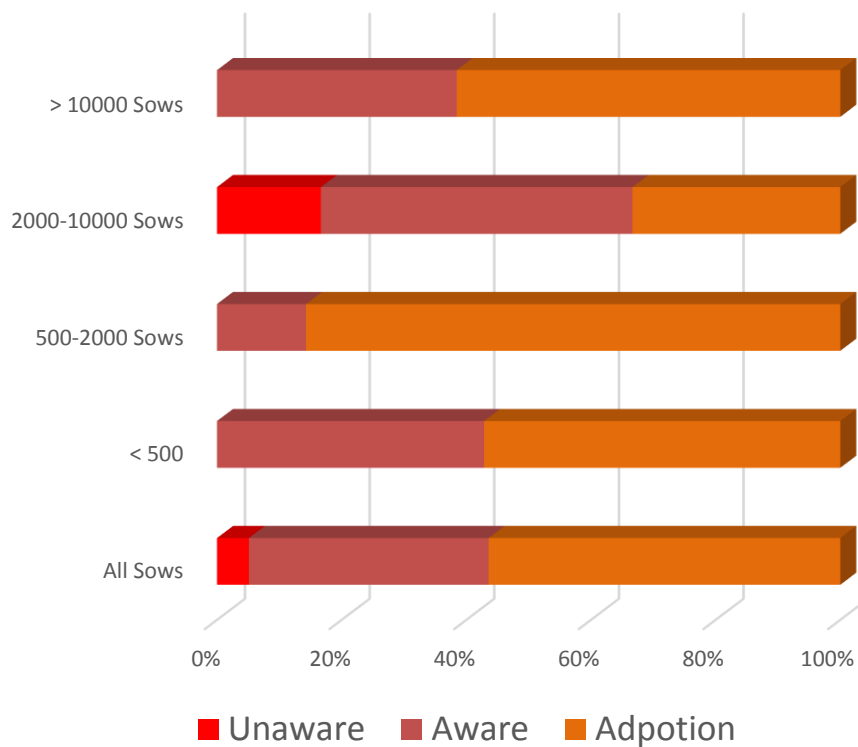


Figure 14. Awareness and adoption of changes in dietary lysine requirements in finisher pigs by farm size

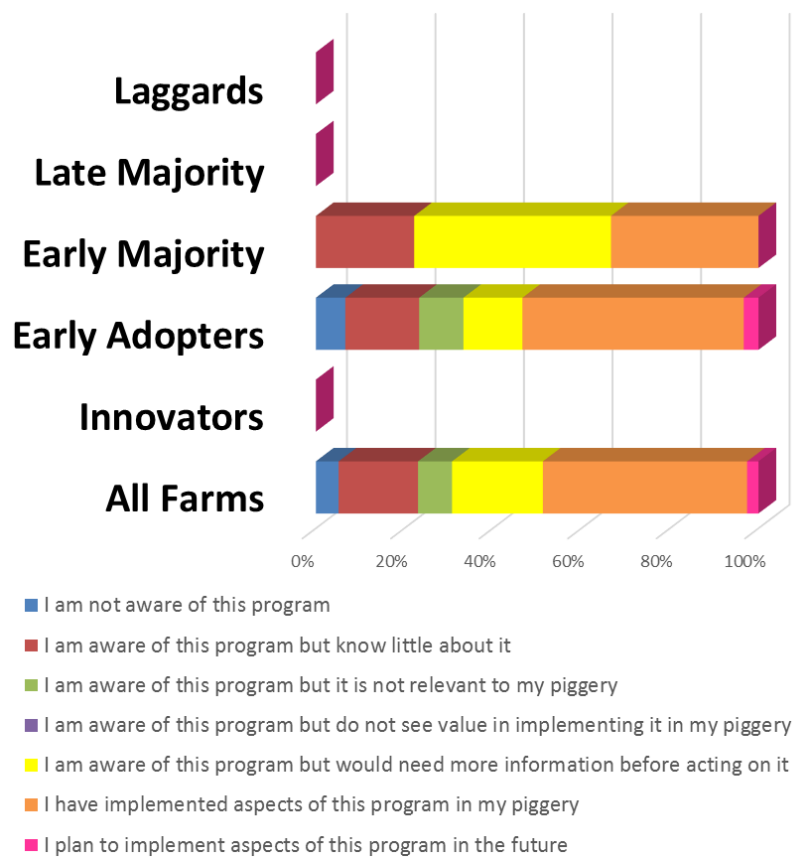


Figure 15. Changes in dietary lysine requirements in finisher pigs by adopter category

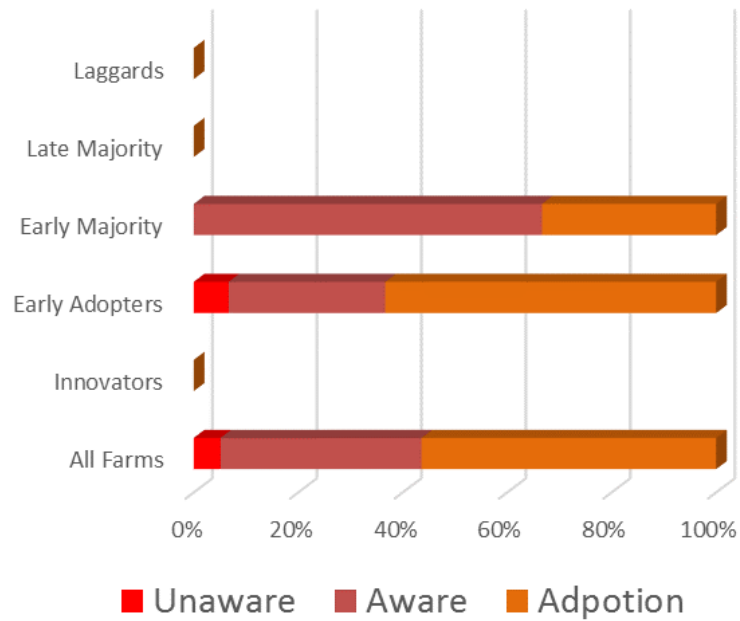


Figure 16. Awareness and adoption of changes in dietary lysine requirements in finisher pigs by adoption category

'Pigs in schools' education program

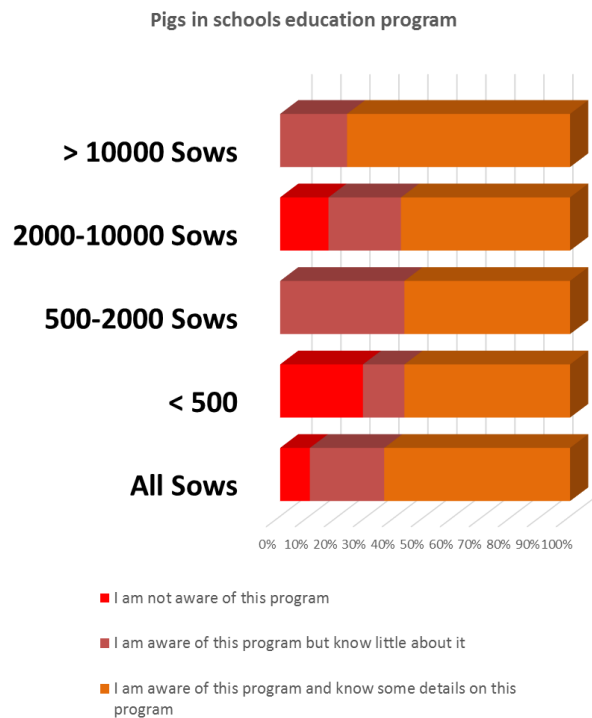


Figure 17. Awareness of 'Pigs in schools' education program by farm size

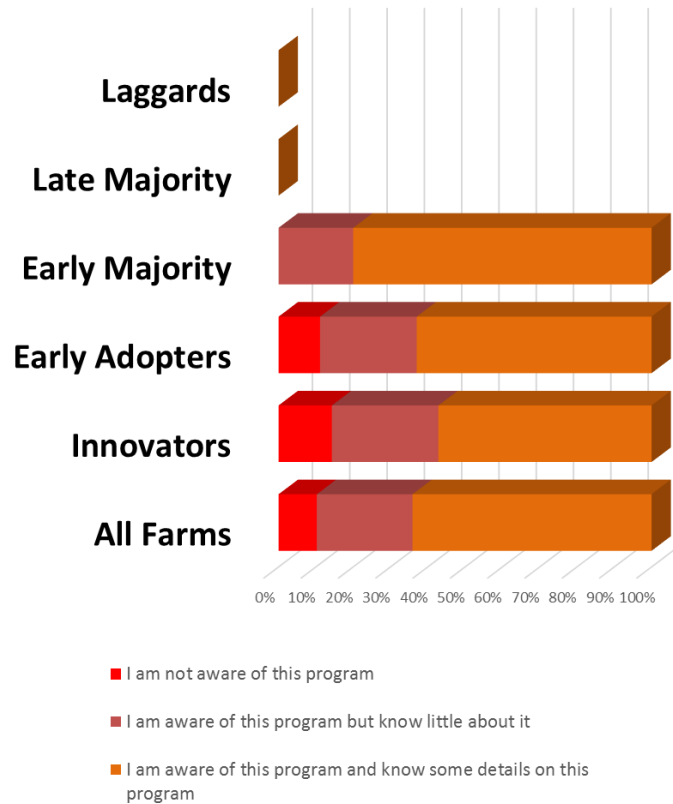


Figure 18. Awareness of 'Pigs in schools' education program by farm size

Biogas Project

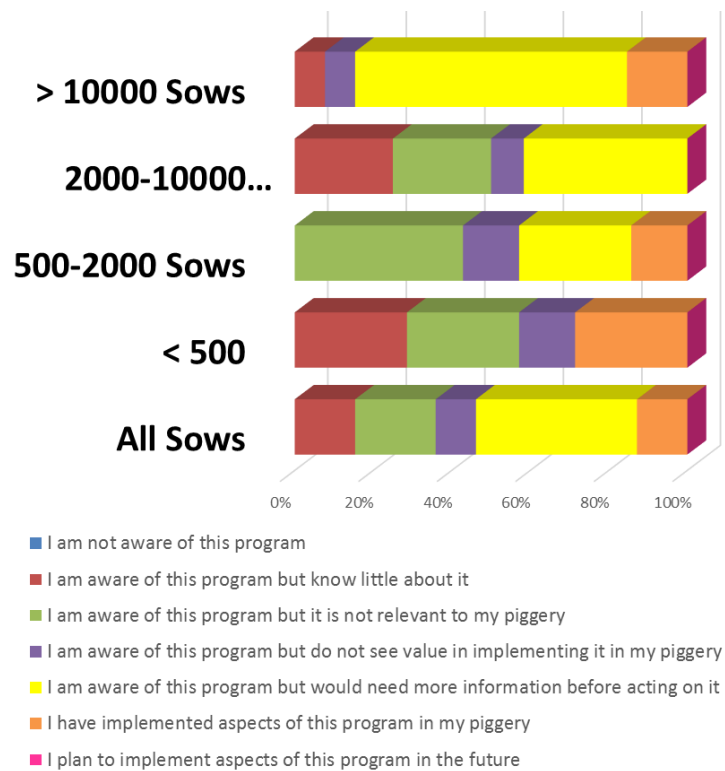


Figure 19. Biogas project by farm size

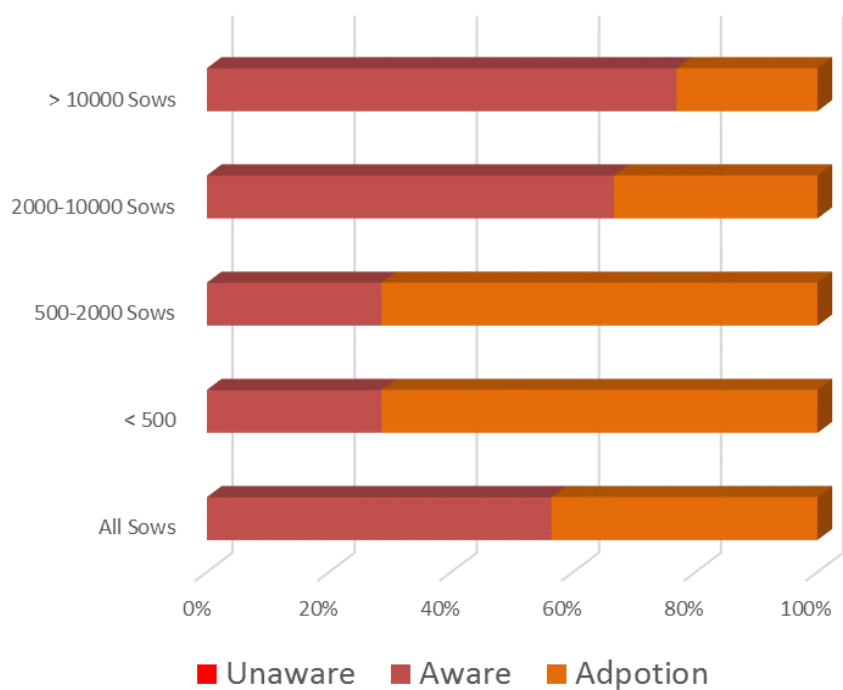


Figure 20. Awareness and adoption biogas project by farm size

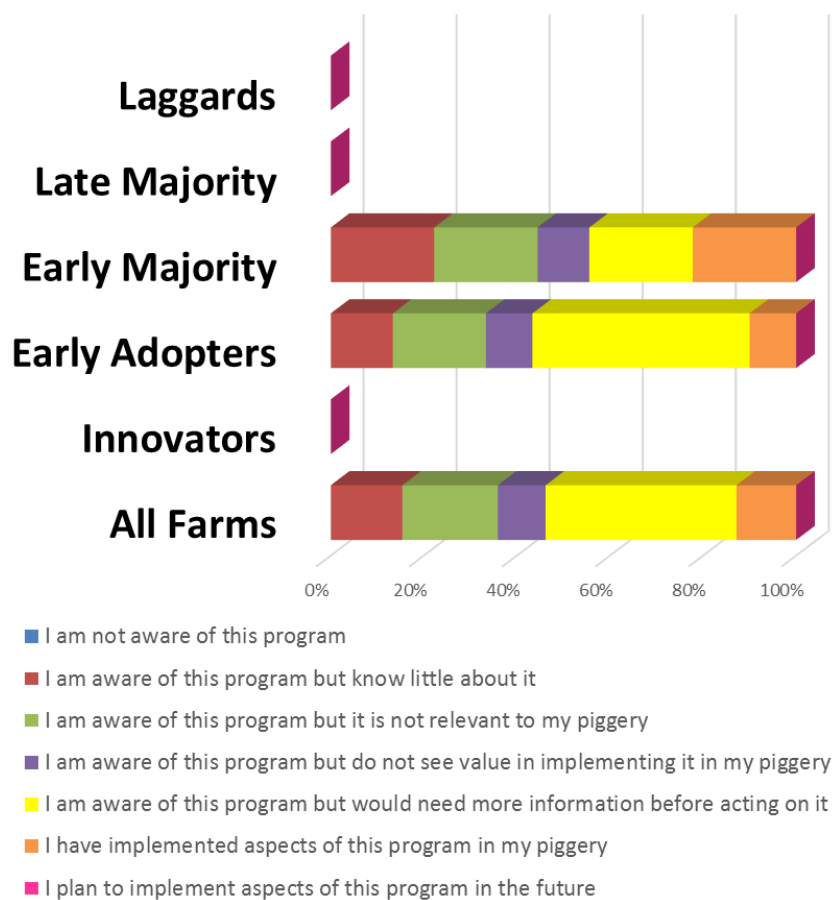


Figure 21. Biogas project by adoption categories

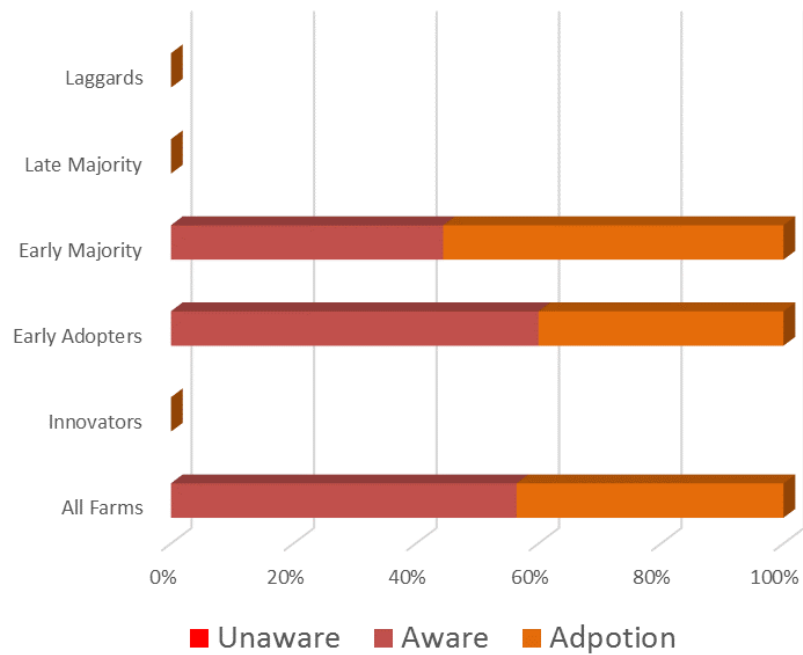


Figure 22. Awareness and adoption of Biogas project by adoption categories

National Environmental Guidelines for Outdoor Piggeries

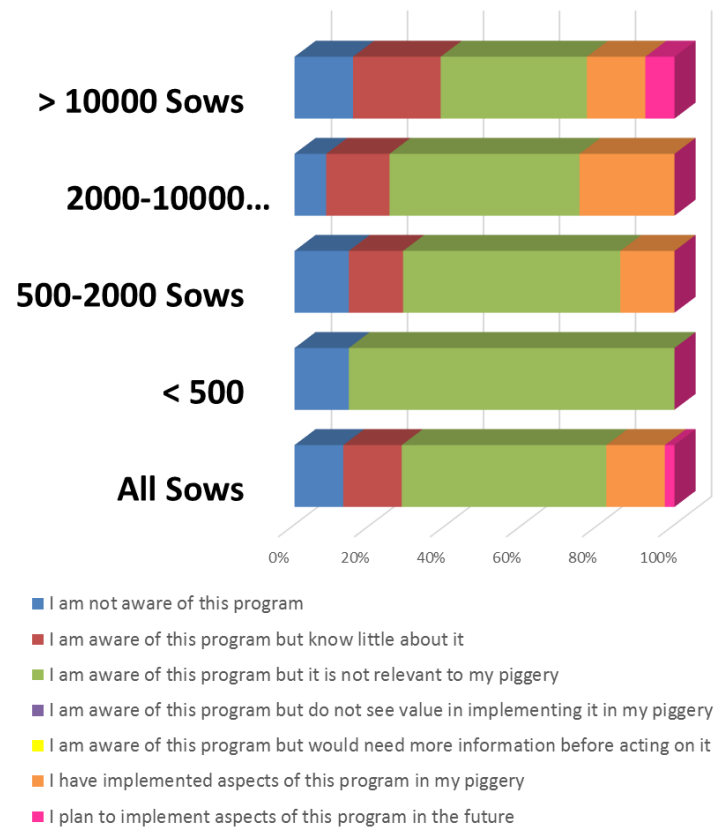


Figure 23. National Environmental Guidelines for Outdoor Piggeries by farm size

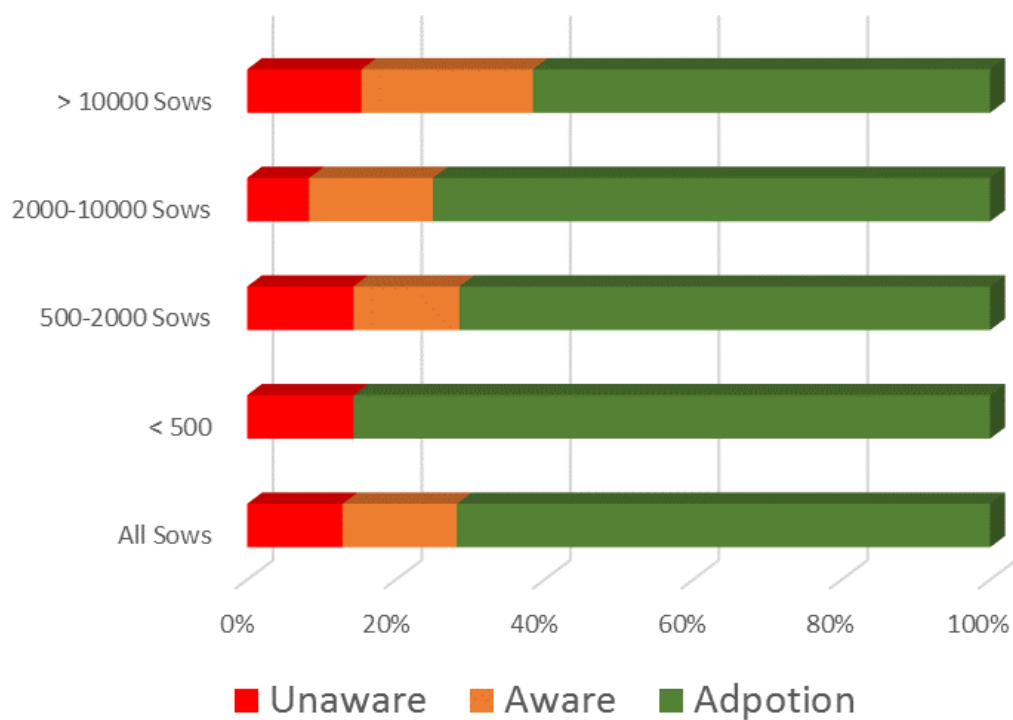


Figure 24. Awareness and Adoption of National Environmental Guidelines for Outdoor Piggeries by farm size

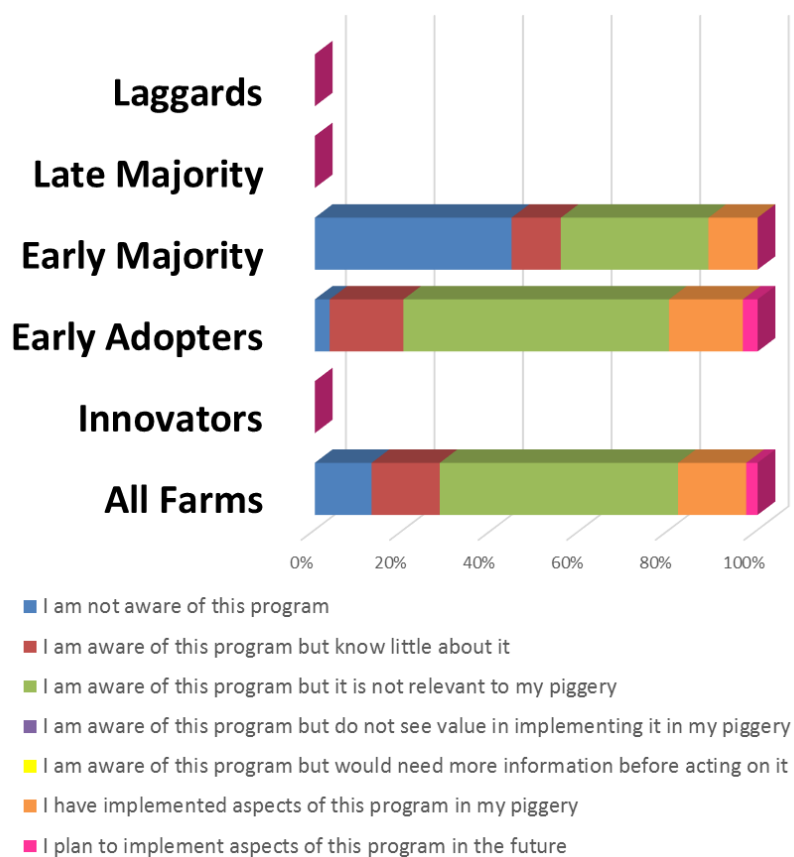


Figure 25. National Environmental Guidelines for Outdoor Piggeries by adoption category

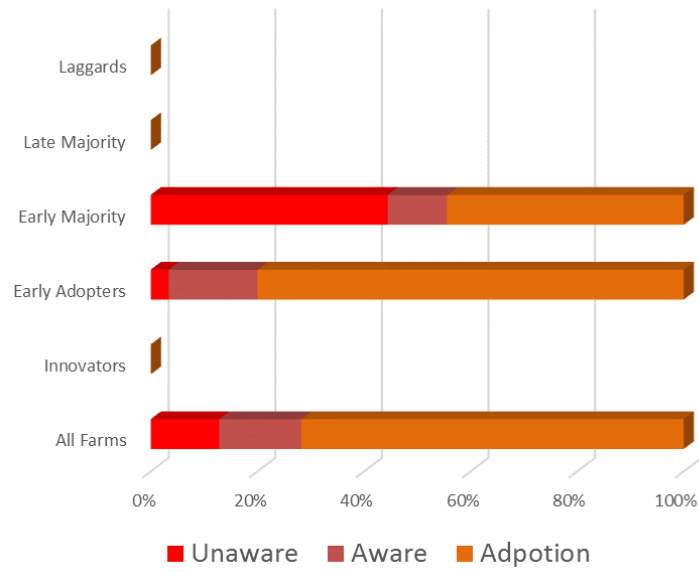


Figure 26. Awareness and Adoption of National Environmental Guidelines for Outdoor Piggeries by adoption category

Physi-Trace: National Livestock Traceability Performance

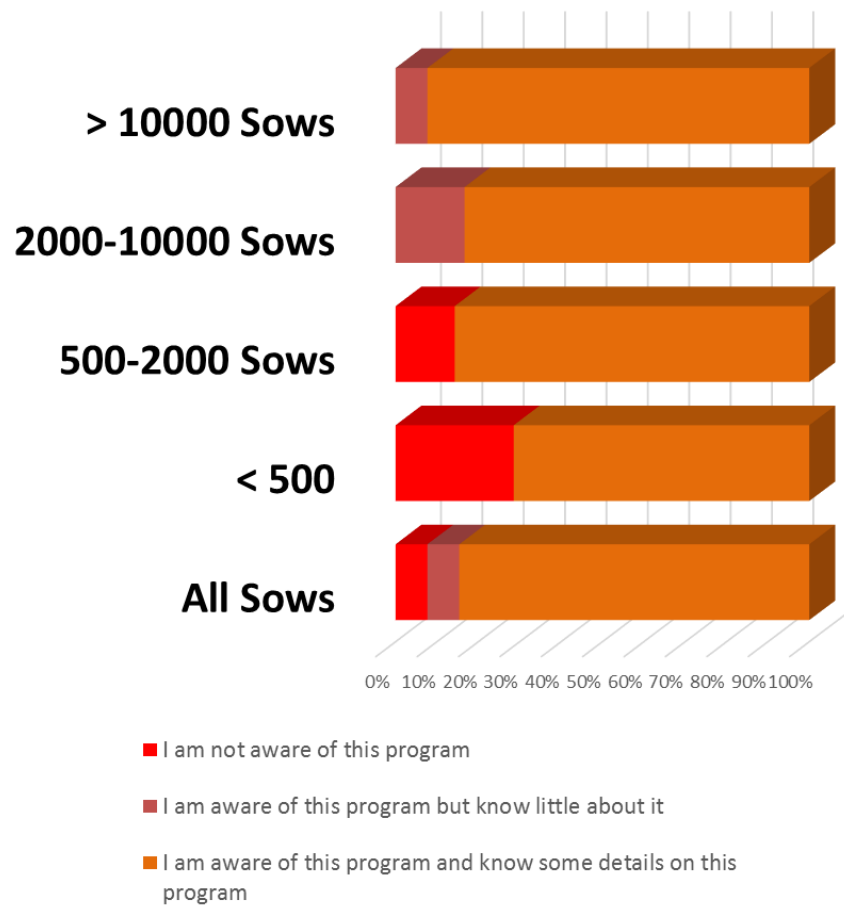


Figure 27. Awareness of Physi-Trace: National Livestock Traceability Performance by farm size

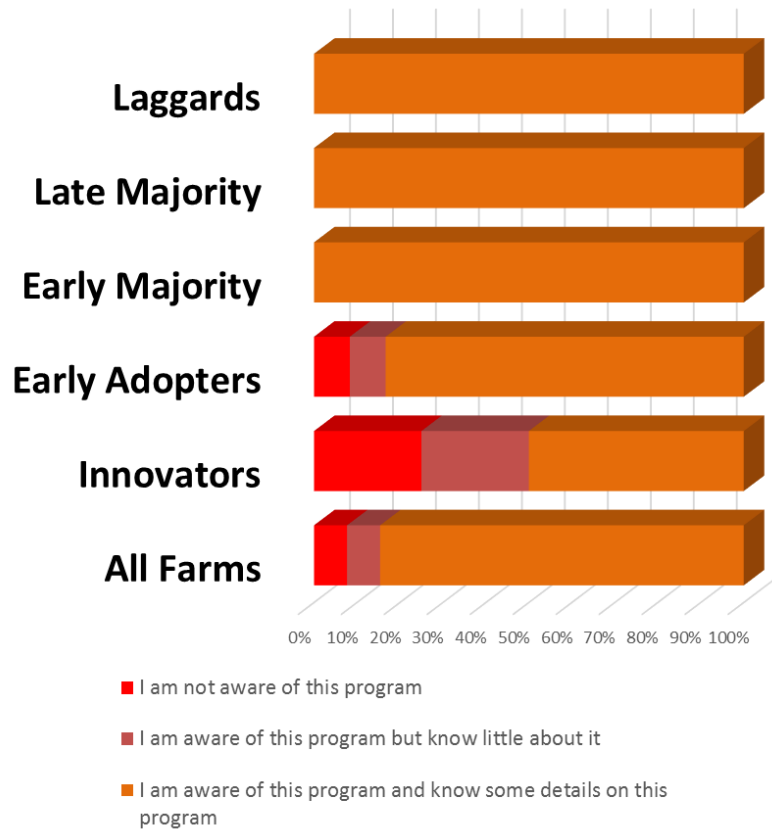


Figure 28. Awareness of Physi-Trace: National Livestock Traceability Performance by adoption categories

Eating quality fail rate study

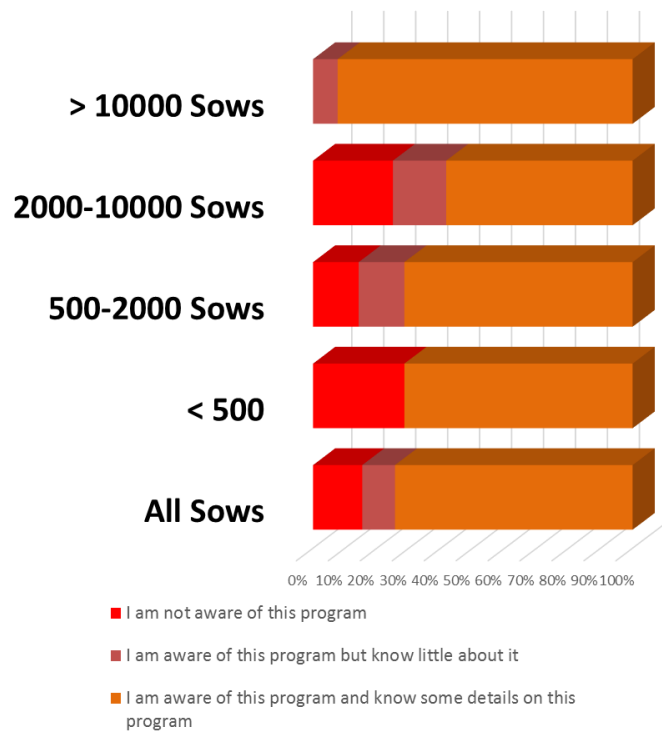


Figure 29. Awareness of Eating quality fail rate study by farm size

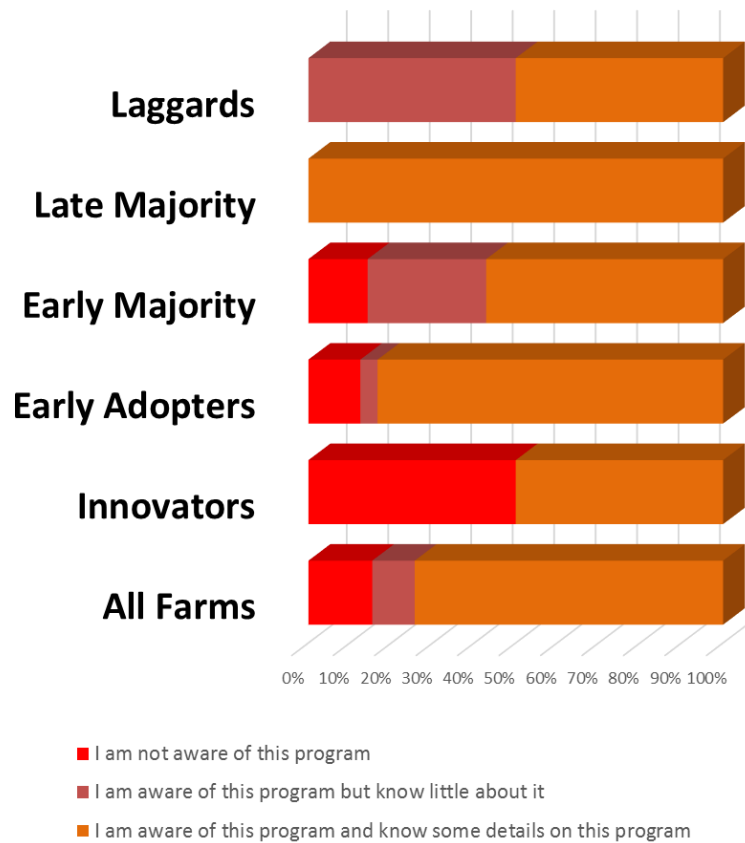


Figure 30. Awareness of Eating quality fail rate study by adoption category

How to Cook a Pork Steak Campaign



Figure 31. Awareness of How to Cook a Pork Steak Campaign by farm size

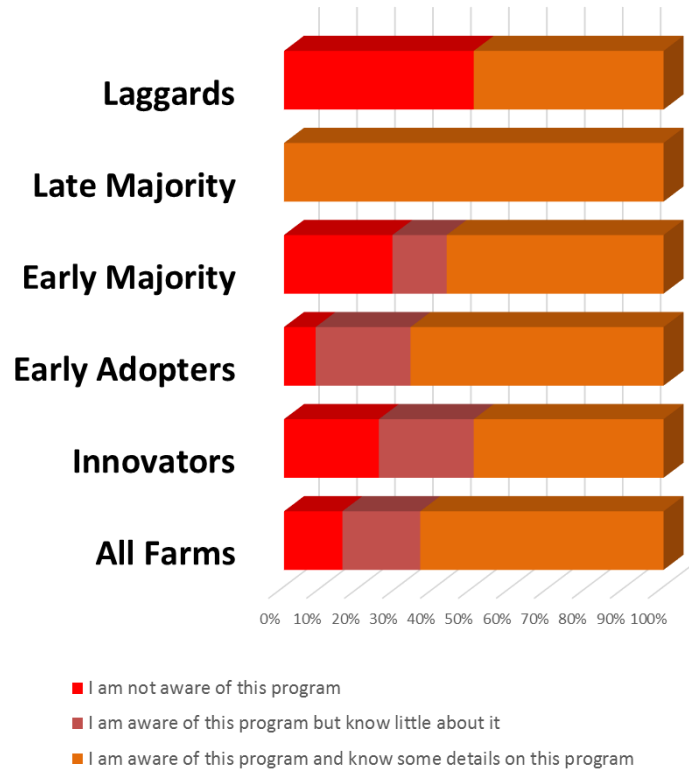


Figure 32. Awareness of How to Cook a Pork Steak Campaign by farm size

5.5 Summary of Survey Results

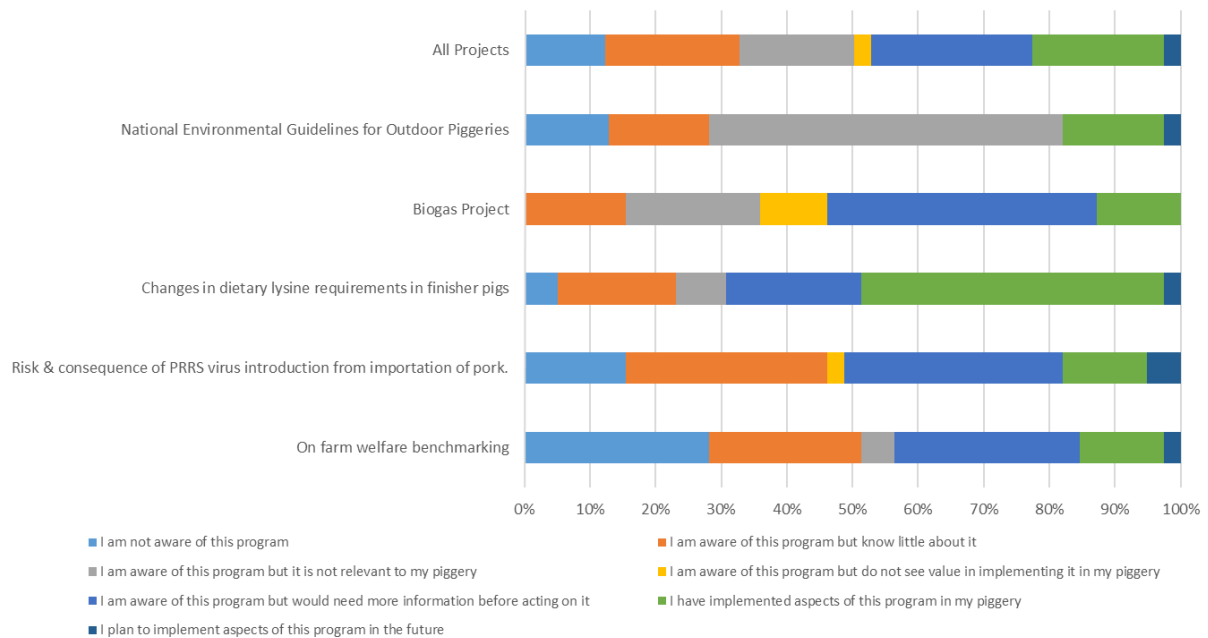


Figure 33. Survey summary of on-farm questions

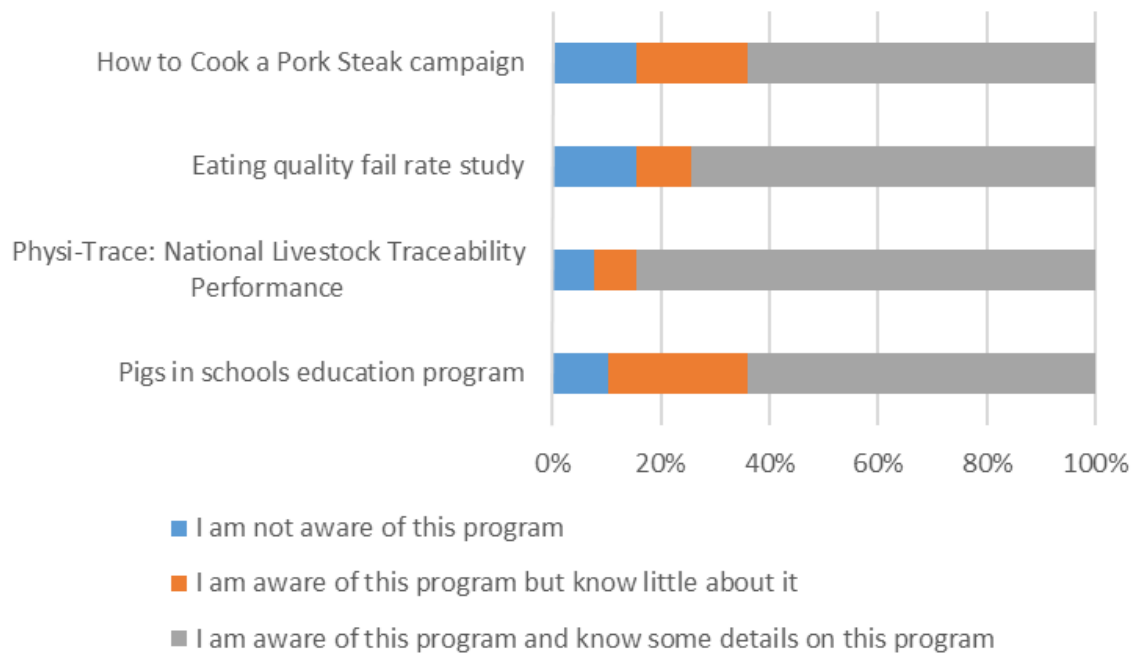


Figure 34. Survey summary of industry program questions

5.6 Value of sources of information when making changes to you pig production system.

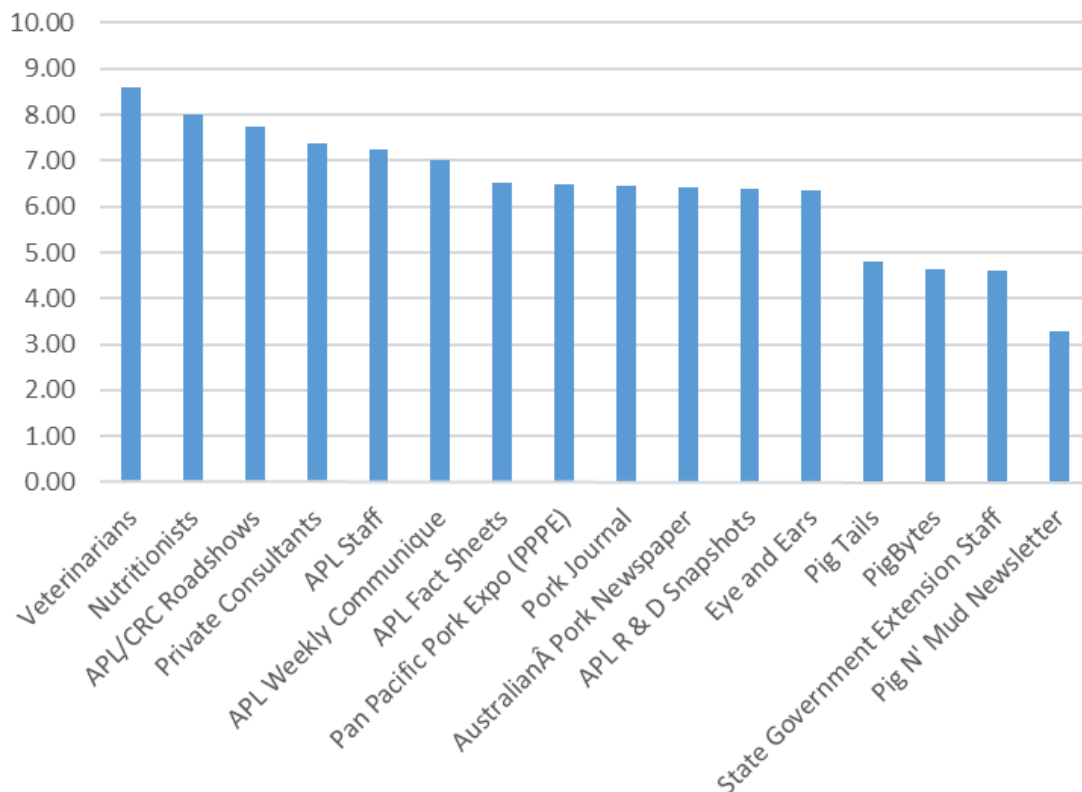


Figure 35. Relative value of information source when making changes in pig production systems (0 = Low – 10 = High)

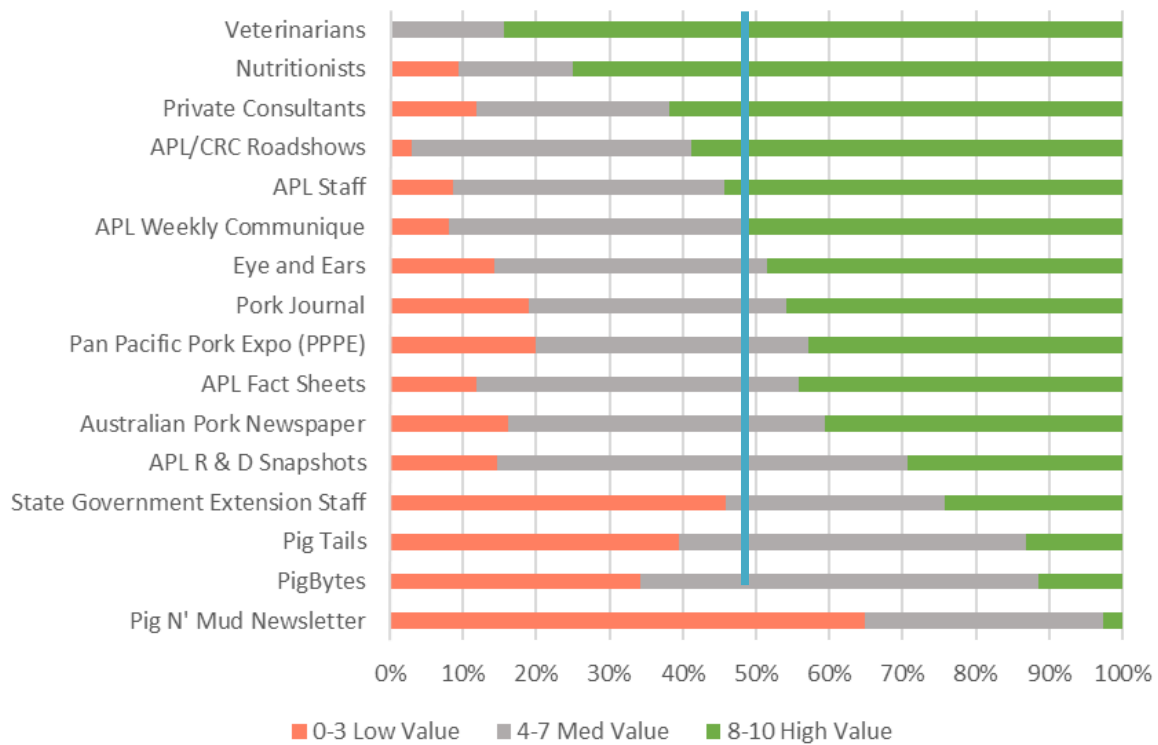


Figure 36. Information source when making changes in pig production systems categories as High, Medium & Low.

5.7 Preferred Workshop Locations

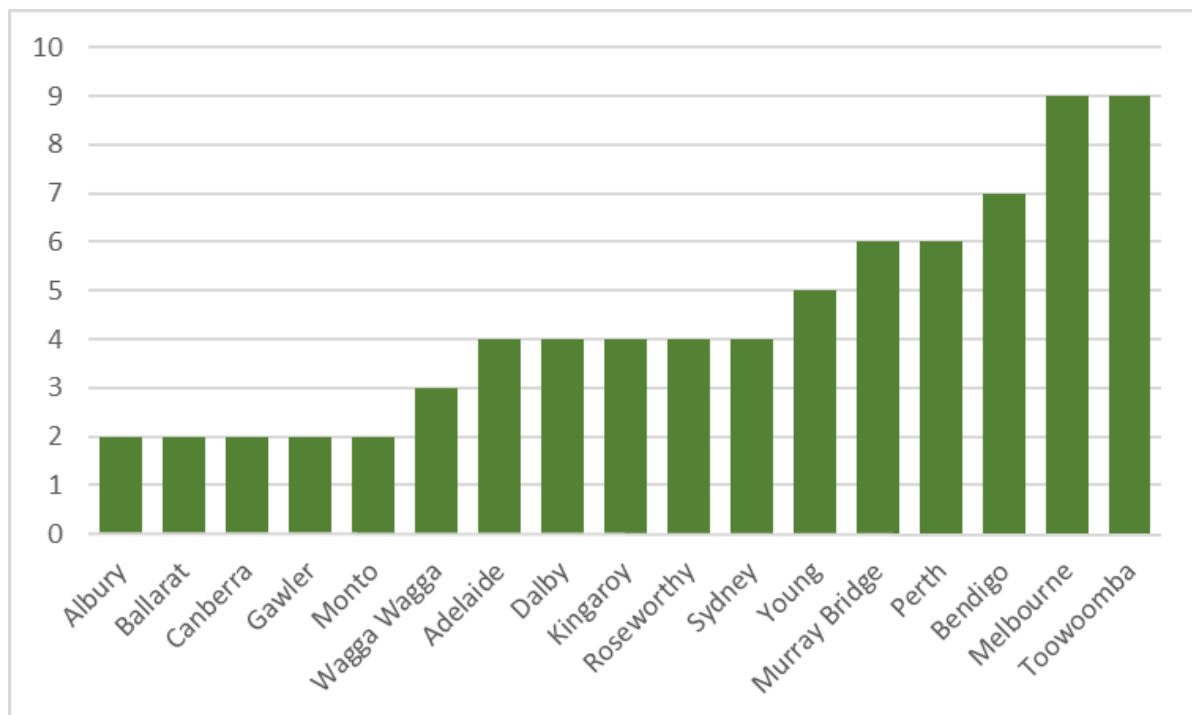


Figure 37. Preferred workshop location by number of respondents.

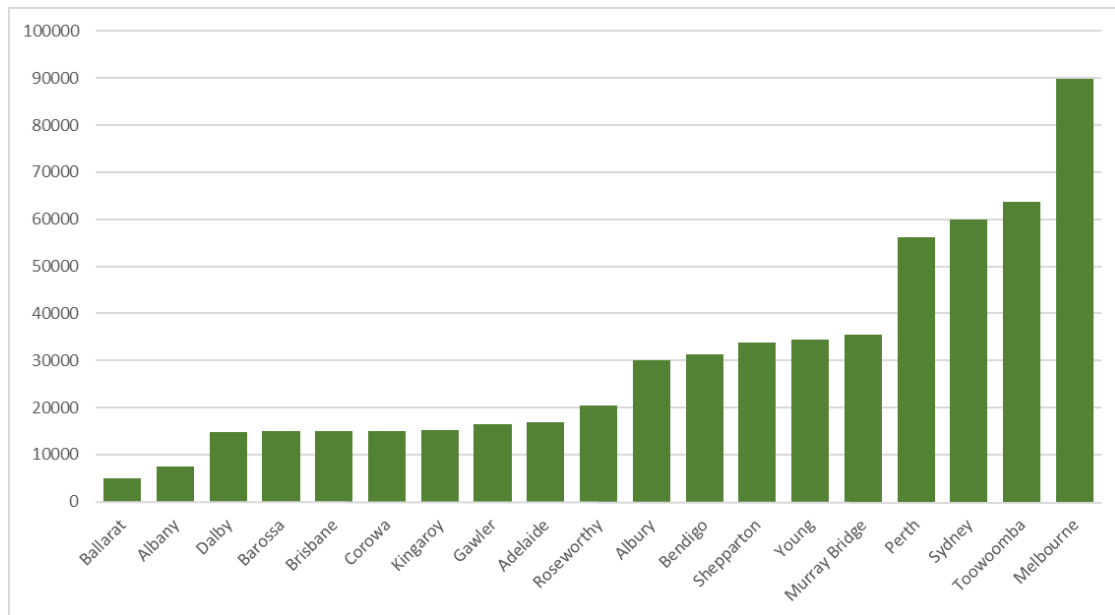


Figure 38. Preferred workshop location by number of sows represented.

5.8 Retail Industry

Retail meat traders were identified to adopter categories for 'Making Business Changes', 'Humane Treatment of Animals' and "Food Safety Issues".

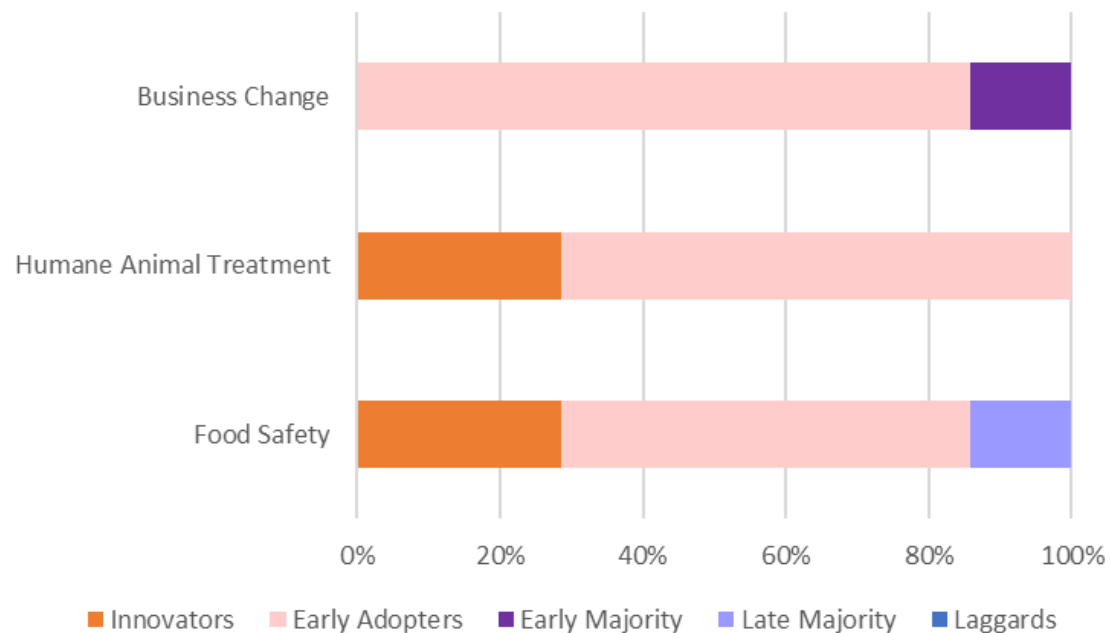


Figure 39. Distribution of Adoption Categories by Issue.

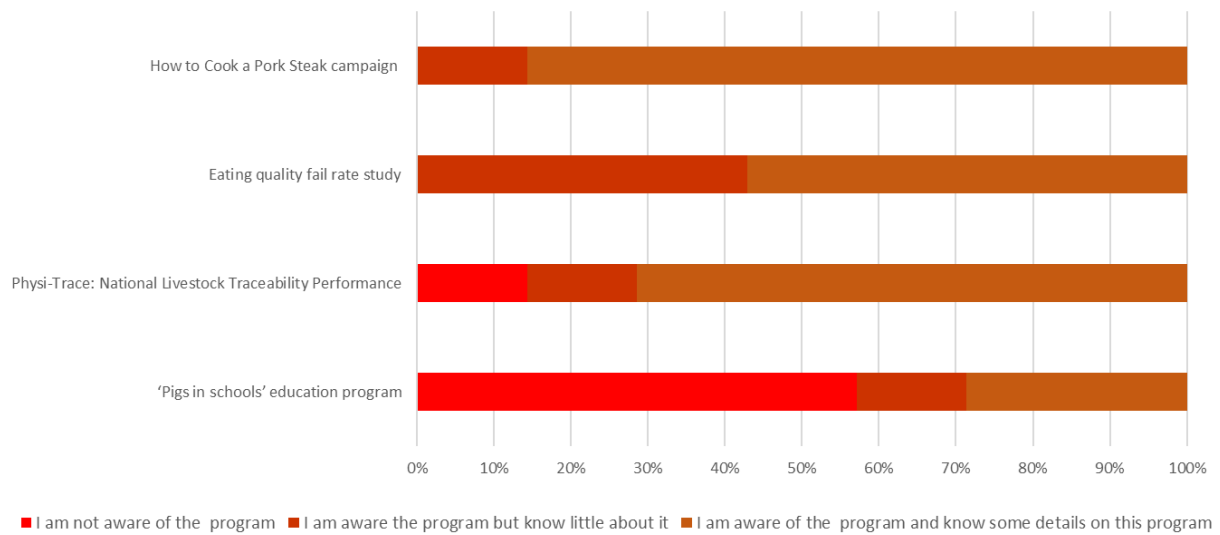


Figure 40 Awareness of APL program by retail sector.

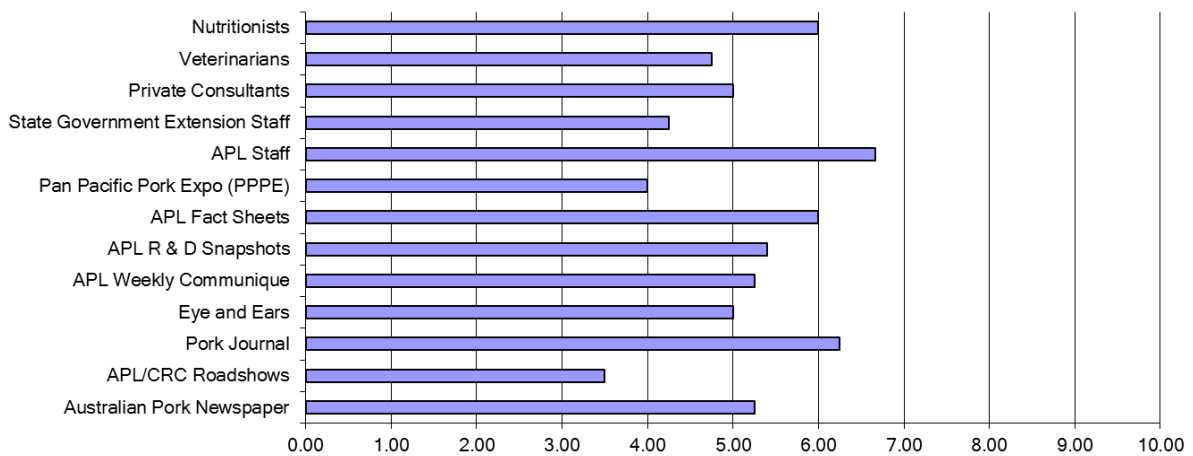


Figure 41 The value sources of information to the retail sector about pig production system.

6. Discussion

The response rate (43%) achieved by this survey is consistent with previous a survey conducted in the Australian Pork Industry. Hernández-Jover et al., (2012a) designed a questionnaire and posted to Australian Pork Limited (APL) members (n = 460), obtaining responses from 182 producers (39.6%).

Survey respondents showed differing approaches to adopting information depending on the type of industry issues presented. As shown in Figure 4, producers self-identified as early adopters and in the early majority when making productions changes. While some producers identified as innovators in humane treatment of animals, producers identified in all categories from innovators to laggards in regard to food safety issues. These results would suggest that differing issue may require considering different approaches to extension design and delivered if high rates of awareness and adoption are to be achieved.

The overall level of awareness and adoption of all on farm issues is relatively high. As shown in Figure 43 the level of awareness and adoption was 87% with adoption exceeding 60%. Given some of the tested issue could not be applied on some farms this represents a sound level of adoption. It is notable that the levels of unawareness are slightly lower in the smaller piggery. Despite this higher level of unawareness, the levels of adoption are greater in these smaller piggeries. As seen in Figure 34 the levels of awareness for industries programs was lower than for onfarm issues.

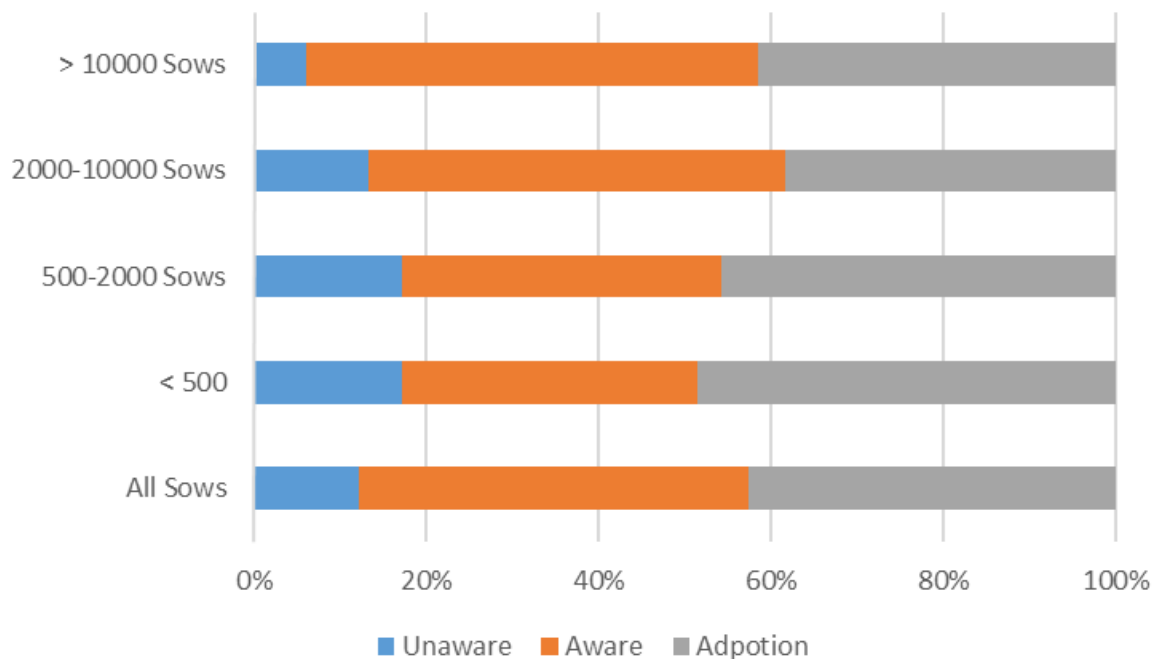


Figure 43. Awareness an adoption across on all investigated on-farm issues

On farm welfare benchmarking (Figure 6) showed low levels of awareness and adoption with only the largest piggeries indicating that it had been or it was planned to implement benchmarking. Early adopters, who are very comfortable investigating new ideas, had the greatest exposure to the concepts of welfare benchmarking (Figure 7). The low level of awareness in the early majority and innovators would suggest that current extension methodologies may not have wide appeal to these sections. This is not uncommon in innovators as they are prone to act in isolation and take risk which mean that they do not often fully research and seek out information before making decisions. Therefore, making innovators a difficult audience to target in extension. The early majority is often looking to the success of others and discussing issues with their peers before implementing change. The lack of awareness in this category may suggest that strategies such as disseminating case studies may be advantageous to heighten awareness and possible adoption by this category of producers. The early majority were historically serviced by on farm field days, as this meet their need to see the success of other farmers before adopting new technologies. As the pork industry has contracted in the number of producers and biosecurity provisions restricts the visits to other farms, extension to the early majority has become more problematic.

The awareness of the risk and consequence of PRRS virus introduction to Australia through importation of pork was generally good (Figure 10) with slightly lower awareness in small producers. Good levels of awareness is seen across adoption categories with the earlier majority requiring more information (Figure 11) before acting on this issue.

All sizes of producers and adoption categories show very high levels of awareness and adoption changes in dietary lysine requirements in finisher pigs. This possibly reflect piggery manager's stronger interest in key production issues rather than some issue which may be seen as more peripheral. It is of interest that the awareness is so high given that many producers would use professional nutritionist and producers may not be directly involved in implementing the level of lysine in their pigs' diets.

The level of awareness of the 'Pigs in School' and Biogas projects was high across the industry. It is notable that many respondents expressed a need for more information before implementing biogas projects (Figure 19). Given biogas projects are most viable in larger piggeries and this category is showing that greatest need for more information, targeted extension in this area may be fruitful in increasing the adoption of this technology. Given the high level of interest in the early adopter category (Figure 21) more extension in this area may be suggested. There has been a number of extension initiatives in the area and given the high number of APL Delegates in the sample it would be anticipated that they would have a high awareness of biogas issues. It is not within the scope of this study to identify on which aspects producers are seeking more information. More details studies in the area of biogas extensions may reveal what gap exist in producer knowledge that is limiting their decisions and actions on biogas.

The awareness of the National Environmental Guidelines for Outdoor Piggeries is high across all production sizes (Figure 24). Implementation is low as expected as the guidelines only apply to outdoor piggery and this only a small section of the sample set provided. Awareness of Physi-Trace: National Livestock Traceability Performance (Figure 27), Awareness of Eating Quality Fail Rate Study and (Figure 29) and How to Cook a Pork Steak Campaign (Figure 32) is similar high across all segments of the industry.

The most valued sources of information for producers remains face to face contact with industry professionals, with veterinarians (1st), nutritionist (2nd), private consultants (3rd) and APL staff (5th) scoring highest scores from producers (Figure 35) and also scoring consistently high across

information sources (Figure 36). APL/CRC Roadshows were highly regarded (4th) and the APL Weekly Communique (6th) is the most valued publication. Pig Tails, Pig Bytes and Pig N' Mud newsletter low score is mostly due to the target audience for these publication not widely represented in the survey respondents.

APL/CRC roads shows were highly regarded by participants. Survey respondents identified Toowoomba, Melbourne, Perth, Murray Bridge, Bendigo, Young and Sydney as the most preferred location for workshops and events.

Retail meat traders self-identified predominantly as early adopters in regard to food safety, humane treatment of animals and particularly in making changes to their business (Figure 39). Therefore, suggesting the retail sector is a seeker of information before making changes in the operations of their business in these areas. No clear preference for the sources of this information was identified (Figure 41). APL Staff, APL Fact Sheets and the Pork journal would appear to be the most highly regarded and have the greatest potential to deliver information on APL programmes to this audience. As may be expected the retail sector shows relatively high levels of awareness of product related programs around cooking times, eating quality and traceability (Figure 40). Respondent awareness was high in these areas but they expressed that their knowledge was limited. Thereby suggesting an opportunity to provide more detail in areas. The levels of awareness and knowledge of the 'Pig in Schools' program were both low.

7. Implications & Recommendations

The survey highlighted that the level of existing awareness, knowledge and adoption of APL research projects varied for each issues. Benefits would be derived from undertaking similar detailed analysis on a regular basis across a wider cross section of the pork industry. Providing produces with the opportunity to enter text based responses to elicit more detail on information gaps would provide greater insight into the information need of producers and the effectiveness of the extension methodologies utilized.

As a general observation extension activates has be more effective in the early adopter category and more limited in the early majority adaptor category. Greater uptake may be achieved if additional extension strategies where utilised that targeted this section of producers more directly.

8. Intellectual Property

No Intellectual Property was identified within the outcomes of this project

9. Literature cited

BUSPH. (2013). Boston University School of Public Health, Behavioural Change Models - Diffusion of Innovation Theory http://sphweb.bumc.bu.edu/otlt/MPH-Modules/SB/SB721-Models/mobile_pages/SB721-Models4.html

Brashear, G.L., Hollis., and Wheeler, M.B. (2000). Information Transfer In The Illinois Swine Industry: How Producers are Informed of New Technologies. *Journal of Extension*. Vol 38. <http://www.joe.org/joe/2000february/rb4.php>

Feder, G., Birner, R., & Anderson, J. R. (2011). The private sector's role in agricultural extension systems: potential and limitations. *Journal of Agribusiness in Developing and Emerging Economies*, 1(1), 31-54.

James, D. J. (2015). Adoption and use of Web 2.0 technologies: a comparison of four adoption models as a case study of a state government eExtension project (Doctoral dissertation, University of Southern Queensland).

Hernández-Jover, M., Gilmour, J., Schembri, N., Sysak, T., Holyoake, P. K., Beilin, R., & Toribio, J. A. (2012a). Use of stakeholder analysis to inform risk communication and extension strategies for improved biosecurity amongst small-scale pig producers. *Preventive veterinary medicine*, 104(3), 258-270.

Hernández-Jover, M., Taylor, M., Holyoake, P., & Dhand, N. (2012b). Pig producers' perceptions of the Influenza Pandemic H1N1/09 outbreak and its effect on their biosecurity practices in Australia. *Preventive veterinary medicine*, 106(3), 284-294.

Hunt, W., Birch, C., Coutts, J., & Vanclay, F. (2012). The many turnings of agricultural extension in Australia. *The Journal of Agricultural Education and Extension*, 18(1), 9-26.

10. Publications Arising

Nil

11. Appendix I. Producers survey



D 2015 Technology Adoption by Australian Pork Farmers

Welcome to the 2015 Survey

Thank you for participating in our survey.

Your feedback is important.



D 2015 Technology Adoption by Australian Pork Farmers

Tell us a little bit about you

* 1. When it comes to food safety issues, which one of the following best describes you? (Select one answer)

- ☐ I'm quick to form opinions on food safety issues and rarely rely on others for input
- ☐ I actively seek information on food safety issues so I can weigh the issues and have informed opinions
- ☐ I usually make up my mind about food safety issues after others have debated the issues at length
- ☐ I don't really think about food safety issues unless I happen to see or hear something on TV, radio or the internet
- ☐ I only think about food safety issues if I'm forced to



D 2015 Technology Adoption by Australian Pork Farmers

* 2. When it comes to humane treatment of animals on my farm, which one of the following best describes you? (Select one answer).

- ☐ I'm quick to form opinions on humane treatment of farm animals issues and rarely rely on others for input
- ☐ I actively seek information on humane treatment of farm animals issues so I can weigh the issues and make informed decisions
- ☐ I usually make up my mind about humane treatment of farm animals issues after others have debated the issues at length
- ☐ I don't really think about humane treatment of farm animals issues unless I happen to see or hear something in the media or other pig farmers
- ☐ I only think about humane treatment of farm animals if I'm forced to



D 2015 Technology Adoption by Australian Pork Farmers

* 3. When it comes to making changes to how you produce pigs, which one of the following best describes you? (Select one answer)

- ☐ I'm quick to form opinions on adopting new technologies and practices and rarely rely on others for input
- ☐ I actively seek information on adopting new technologies and practices so I can weigh the issues and have informed opinions
- ☐ I usually make up my mind about adopting new technologies and practices after others have debated the issues at length
- ☐ I don't really think about adopting new technologies and practices unless I happen to see other pig producers implementing them successfully
- ☐ I only think adopting new technologies and practices if I'm forced to



D 2015 Technology Adoption by Australian Pork Farmers

Tell us a little bit about you

4. Are you male or female?

- ☐ Female
- ☐ Male

5. What is your age?

- ☐ 17 or younger
- ☐ 18-20
- ☐ 21-29
- ☐ 30-39
- ☐ 40-49
- ☐ 50-59
- ☐ 60 or older



D 2015 Technology Adoption by Australian Pork Farmers

6. What is the highest level of school you have completed or the highest degree you have received?

- ☐ Less than high school Year 12
- ☐ High school Year 12
- ☐ TAFE or Certificate Level
- ☐ Bachelor degree
- ☐ Prost Graduate Qualification



D 2015 Technology Adoption by Australian Pork Farmers

Tell us a bit about your piggery

* 7. What production systems do you use to produce pigs

- ☐ Indoor Intensive Housing
- ☐ Bred Free Range
- ☐ Free Range

* 8. Which best describes your production system

- ☐ Farrow to Finish
- ☐ Farrow to Wean
- ☐ Grower Herd Only



D 2015 Technology Adoption by Australian Pork Farmers

Sow herd numbers

* 9. How many sows do you manage.

- ☐ No Sows / Growers Only
- ☐ 1-20
- ☐ 21-50
- ☐ 51-100
- ☐ 101-250
- ☐ 251-500
- ☐ 501-1,000
- ☐ 1,001-2,000
- ☐ 2,001-5,000
- ☐ 5,001-10,000
- ☐ 10,000+



D 2015 Technology Adoption by Australian Pork Farmers

Role in Industry

10. Please select the description which best describes your role in the pig industry.

- ☐ Piggery Owner
- ☐ Piggery Manager
- ☐ Other (please specify)



D 2015 Technology Adoption by Australian Pork Farmers

Australian Pork Research, Development & Extension Program

The following questions list a range of Australian Pork Research, Development & Extension programs that have been made available to farmers.

Please let us know which programs you are aware of and may have implemented.



D 2015 Technology Adoption by Australian Pork Farmers

On farm welfare benchmarking

To develop a practical Pig Welfare Benchmarking Tool (PWBT) that can be used on farm for self auditing by Australian pork producers and stockpeople.

* 11. On farm welfare benchmarking

- ☐ I am not aware of this program
- ☐ I am aware of this program but know little about it
- ☐ I am aware of this program but it is not relevant to my piggery
- ☐ I am aware of this program but do not see value in implementing it in my piggery
- ☐ I am aware of this program but would need more information before acting on it
- ☐ I have implemented aspects of this program in my piggery
- ☐ I plan to implement aspects of this program in the future



D 2015 Technology Adoption by Australian Pork Farmers

The risk and consequence of PRRS virus introduction to Australia through importation of pork

To develop and implement a framework to prioritise and investigate planning requirements for possible exotic disease outbreaks.

* 12. The risk and consequence of PRRS virus introduction to Australia through importation of pork.

- ☐ I am not aware of this program
- ☐ I am aware of this program but know little about it
- ☐ I am aware of this program but it is not relevant to my piggery
- ☐ I am aware of this program but do not see value in implementing it in my piggery
- ☐ I am aware of this program but would need more information before acting on it
- ☐ I have implemented aspects of this program in my piggery
- ☐ I plan to implement aspects of this program in the future



D 2015 Technology Adoption by Australian Pork Farmers

Changes in dietary lysine requirements in finisher pigs

Validate the optimum lysine requirement of the grower finisher pig.

* 13. Changes in dietary lysine requirements in finisher pigs

- ☐ I am not aware of this program
- ☐ I am aware of this program but know little about it
- ☐ I am aware of this program but it is not relevant to my piggery
- ☐ I am aware of this program but do not see value in implementing it in my piggery
- ☐ I am aware of this program but would need more information before acting on it
- ☐ I have implemented aspects of this program in my piggery
- ☐ I plan to implement aspects of this program in the future



D 2015 Technology Adoption by Australian Pork Farmers

'Pigs in schools' education program

The APL education program is an investment in the future of the industry. The units contain activities aiming to educate students on the pork industry and the benefits it provides to us all. The activities also encourage students to engage their families and wider communities and share their learning experiences.

* 14. 'Pigs in schools' education program

- ☐ I am not aware of this program
- ☐ I am aware of this program but know little about it
- ☐ I am aware of this program and know some details on this program



D 2015 Technology Adoption by Australian Pork Farmers

Biogas

By covering a pond with an impermeable membrane, the biogas can be captured and destroyed by simply flaring, utilised to for heat to offset farm gas use or for combined heat and power generation on farm. Engineered digesters may be used in place of the covered pond.

* 15. Biogas Project

- ☐ I am not aware of the Biogas project
- ☐ I am aware the Biogas project but know little about it
- ☐ I am aware of the Biogas project but it is not relevant to my piggery
- ☐ I am aware of the Biogas project but would need more information before acting on it
- ☐ I have implemented aspects of the Biogas project in my piggery
- ☐ I plan to implement aspects of the Biogas project in the future



D 2015 Technology Adoption by Australian Pork Farmers

National Environmental Guidelines for Outdoor Piggeries

The National Environmental Guidelines for Rotational Outdoor Piggeries 2013 encapsulates a national approach to environmental management of rotational outdoor piggeries. The guidelines include up-to-date best practise environmental management for rotational outdoor piggeries and complement the industry's quality assurance program APIQü® FR and APIQü® OB.

* 16. National Environmental Guidelines for Outdoor Piggeries

- ☐ I am not aware of the National Environmental Guidelines for Outdoor Piggeries
- ☐ I am aware the National Environmental Guidelines for Outdoor Piggeries but know little about it
- ☐ I am aware of the National Environmental Guidelines for Outdoor Piggeries but it is not relevant to my piggery
- ☐ I am aware of the National Environmental Guidelines for Outdoor Piggeries but do not see value in implementing it in my piggery
- ☐ I am aware of the National Environmental Guidelines for Outdoor Piggeries but would need more information before acting on it
- ☐ I have implemented aspects of the National Environmental Guidelines for Outdoor Piggeries my piggery
- ☐ I plan to implement aspects of the National Environmental Guidelines for Outdoor Piggeries in the future



D 2015 Technology Adoption by Australian Pork Farmers

Physi-Trace: National Livestock Traceability Performance

Physi-Trace (fingerprinting Australian pork) is a key collaboration project that involves a number of government and private research partners. This project will enable the industry to analyse an unidentified pork sample to determine the pig's country of origin, its state and growing region and the source farm.

* 17. Physi-Trace: National Livestock Traceability Performance

- ☐ I am not aware of the Physi-Trace: National Livestock Traceability Performance program
- ☐ I am aware the Physi-Trace: National Livestock Traceability Performance program but know little about it
- ☐ I am aware of the Physi-Trace: National Livestock Traceability Performance program and know some details on this program



D 2015 Technology Adoption by Australian Pork Farmers

Eating quality fail rate study

To ensure the maintenance and growth of domestic pork consumption, and growth of the export market for premium pork products, pork consumers must be confident they will have a positive eating quality experience when purchasing fresh pork. Thus, the availability of pork of variable eating quality needs to be minimized or completely eliminated from the supply chain .

* 18. Eating quality fail rate study

- ☐ I am not aware of the eating quality fail rate study
- ☐ I am aware the eating quality fail rate study but know little about it
- ☐ I am aware of the eating quality fail rate study and know some details on this study



D 2015 Technology Adoption by Australian Pork Farmers

How to Cook a Pork Steak

How easy it is to cook a juicy and tender pork steak in just 10 minutes.

* 19. How to Cook a Pork Steak campaign

- ☐ I am not aware of the How to Cook a Pork Steak campaign
- ☐ I am aware the How to Cook a Pork Steak campaign but know little about it
- ☐ I am aware of the How to Cook a Pork Steak campaign and know some details on this study



D 2015 Technology Adoption by Australian Pork Farmers

Information Sources

20. How do you value each of the following sources of information when making changes to you pig production system.

	0 Low Value	1	2	3	4	5 Moderate Value	6	7	8	9	10 High Value
Australian Pork Newspaper	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
APL/CRC Roadshows	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Pork Journal	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Pig N' Mud Newsletter	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Eye and Ears	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
APL Weekly Communique	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
PigBytes	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
APL R & D Snapshots	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
APL Fact Sheets	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Pig Tails	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Pan Pacific Pork Expo (PPPE)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
APL Staff	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
State Government Extension Staff	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Private Consultants	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Veterinarians	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Nutritionists	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐



D 2015 Technology Adoption by Australian Pork Farmers

Workshop Locations

21. Which towns are the best locations for you to attend APL workshops.

Preference 1

Preference 2

Preference 3



D 2015 Technology Adoption by Australian Pork Farmers

Thank you for participating in this important survey.

You will now have the opportunity to enter your details to enter the draw for one of five \$50 fuel vouchers.

You will be redirected to a new page where your details will be collected independently of your responses.

12. Appendix 12. Retailer survey



2015 Australian Pork

Welcome to the 2015 Survey

Thank you for participating in our survey.

Your feedback is important.



2015 Australian Pork

Tell us a little bit about you

* 1. When it comes to food safety issues, which one of the following best describes you? (Select one answer)

- ☐ I'm quick to form opinions on food safety issues and rarely rely on others for input
- ☐ I actively seek information on food safety issues so I can weigh the issues and have informed opinions
- ☐ I usually make up my mind about food safety issues after others have debated the issues at length
- ☐ I don't really think about food safety issues unless I happen to see or hear something on TV, radio or the internet
- ☐ I only think about food safety issues if I'm forced to



2015 Australian Pork

* 2. When it comes to humane treatment of animals, which one of the following best describes you?
(Select one answer).

- ☐ I'm quick to form opinions on humane treatment of farm animals issues and rarely rely on others for input
- ☐ I actively seek information on humane treatment of farm animals issues so I can weigh the issues and make informed decisions
- ☐ I usually make up my mind about humane treatment of farm animals issues after others have debated the issues at length
- ☐ I don't really think about humane treatment of farm animals issues unless I happen to see or hear something in the media or other pig farmers
- ☐ I only think about humane treatment of farm animals if I'm forced to



2015 Australian Pork

* 3. When it comes to making changes in your business, which one of the following best describes you?
(Select one answer)

- ☐ I'm quick to form opinions on adopting new technologies and practices and rarely rely on others for input
- ☐ I actively seek information on adopting new technologies and practices so I can weigh the issues and have informed opinions
- ☐ I usually make up my mind about adopting new technologies and practices after others have debated the issues at length
- ☐ I don't really think about adopting new technologies and practices unless I happen to see other businesses implementing them successfully
- ☐ I only think adopting new technologies and practices if I'm forced to



2015 Australian Pork

Tell us a little bit about you

4. Are you male or female?

- ☐ Female
- ☐ Male

5. What is your age?

- ☐ 17 or younger
- ☐ 18-20
- ☐ 21-29
- ☐ 30-39
- ☐ 40-49
- ☐ 50-59
- ☐ 60 or older



2015 Australian Pork

6. What is the highest level of school you have completed or the highest degree you have received?

- ☐ Less than high school Year 12
- ☐ High school Year 12
- ☐ TAFE or Certificate Level
- ☐ Bachelor degree
- ☐ Prost Graduate Qualification



2015 Australian Pork

Australian Pork Research, Development & Extension Program

The following questions list a range of Australian Pork Research, Development & Extension programs that have been made available to farmers.

Please let us know which programs you are aware of and may have implemented.



2015 Australian Pork

'Pigs in schools' education program

The APL education program is an investment in the future of the industry. The units contain activities aiming to educate students on the pork industry and the benefits it provides to us all. The activities also encourage students to engage their families and wider communities and share their learning experiences.

* 7. 'Pigs in schools' education program

- ☐ I am not aware of this program
- ☐ I am aware of this program but know little about it
- ☐ I am aware of this program and know some details on this program



2015 Australian Pork

Physi-Trace: National Livestock Traceability Performance

Physi-Trace (fingerprinting Australian pork) is a key collaboration project that involves a number of government and private research partners. This project will enable the industry to analyse an unidentified pork sample to determine the pig's country of origin, its state and growing region and the source farm.

* 8. Physi-Trace: National Livestock Traceability Performance

- ☐ I am not aware of the Physi-Trace: National Livestock Traceability Performance program
- ☐ I am aware the Physi-Trace: National Livestock Traceability Performance program but know little about it
- ☐ I am aware of the Physi-Trace: National Livestock Traceability Performance program and know some details on this program



2015 Australian Pork

Eating quality fail rate study

To ensure the maintenance and growth of domestic pork consumption, and growth of the export market for premium pork products, pork consumers must be confident they will have a positive eating quality experience when purchasing fresh pork. Thus, the availability of pork of variable eating quality needs to be minimized or completely eliminated from the supply chain .

* 9. Eating quality fail rate study

- ☐ I am not aware of the eating quality fail rate study
- ☐ I am aware the eating quality fail rate study but know little about it
- ☐ I am aware of the eating quality fail rate study and know some details on this study



2015 Australian Pork

How to Cook a Pork Steak

How easy it is to cook a juicy and tender pork steak in just 10 minutes.

* 10. How to Cook a Pork Steak campaign

- ☐ I am not aware of the How to Cook a Pork Steak campaign
- ☐ I am aware the How to Cook a Pork Steak campaign but know little about it
- ☐ I am aware of the How to Cook a Pork Steak campaign and know some details on this study

2015 Australian Pork

Information Sources

11. How do you value each of the following sources of information about pig production system.

	0 Low Value	1	2	3	4	5 Moderate Value	6	7	8	9	10 High Value	N/A
Australian Pork Newspaper	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
APL/CRC Roadshows	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Pork Journal	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Eye and Ears	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
APL Weekly Communique	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
APL R & D Snapshots	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
APL Fact Sheets	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Pan Pacific Pork Expo (PPPE)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
APL Staff	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
State Government Extension Staff	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Private Consultants	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Veterinarians	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Nutritionists	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

2015 Australian Pork

Thank you for participating in this important survey.