![NZDFA NZ Deer Farmers Association logo]

Deer Farmers attitudes towards benchmarking and data recording system requirements

A Project completed as part of the Kellogg Rural Leadership Programme

Pania Flint
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Executive Summary

Deer Industry New Zealand is currently involved in a Primary Growth Partnership and levy payer funded project called Passion to Profit (P2P). The overall aims are to improve market returns and on-farm productivity for deer farms. One of the contributing projects to P2P is the definition and recording of Key Performance Indicators (KPIs) and industry benchmarks.

Data recording and benchmarking is important for business growth and a feature of higher performing farms. Benchmarking requires real-time management of data within an electronic database. Use of electronic data storage can be considered a "new technology" on farms which have traditionally kept pen and paper records. Adoption of new technologies follows a well described pattern amongst populations.

This study aimed to determine the attitudes of farmers towards data recording and benchmarking and the system requirements to encourage uptake of digital data recording technology.

The study design was an online survey of seventy eight farmers using SurveyMonkey. Of these seventy five responses provided useful data. Questions related to demographic information, current practices, attitudes towards data recording and benchmarking and requirements and impediments to the use of digital data recording systems.

Deer Farmers have a high level of interest in setting targets, recording production and benchmarking. They consider previous performance on their own properties and on farms similar to themselves as the most important factors for determining what their targets are.

Respondents considered that it is not adequate to solely focus on own performance and that comparison with other farms within the same year is also necessary to help them set realistic targets and identify potential areas for improvement.

The level of uptake of digital recording of production is low and manual records using paper and diaries are the most common method. Data are more likely to be formally recorded when there is a mandatory requirement to do so. For example financial accounts for tax return purposes.

There are a wide range of reasons for limited uptake of digital production data recording and benchmarking. These reasons vary between farmers. Relative satisfaction with current systems probably provides inertia for change along with the perception that current systems on offer will not provide a significant level of advantage, are too complicated to use or have other limitations.

The most important factors for achieving a high level of uptake are a simple system that is easy to use with good support. It needs to be reasonably priced, integrate well with other systems and give immediate feedback on the situation on the farm by comparing year on year and generating graphs and printable reports. The system should be accessible to all farmers and thus allow for offline use in situations of poor internet connectivity.

A wide range of privately managed digital recording and management options exist. These are not well integrated with each other, except perhaps for FarmIQ and data is not directly comparable or accessible between the systems. There is a relatively small number of deer farms in New Zealand so a high level of participation in a single platform will be required for adequate benchmarking. The deer industry should investigate whether a nationally managed collectively owned database is appropriate similar to those provided by Beef and Lamb NZ and Dairy NZ.

Acknowledgements

Introduction

The New Zealand Deer Industry is currently part way into a Primary Growth Partnership funded seven year project titled "Passion to Profit". This project aims to both improve the venison marketing strategy and also improve production efficiency on farm. There are a large number of smaller projects that support the overall goal of Passion to Profit. On farm productivity focuses on developing tools, extension of knowledge and bringing farmers together to discuss ideas for improvement on their own properties. Advance Parties are facilitated discussion groups for deer farmers and the primary initiative for transfer and sharing of knowledge with farmers. Improvement can only be demonstrated if the results are recorded and published in some way. One of the contributing projects was the development of benchmarking indices. This involved a group of large scale deer farmers working together to determine what suitable key performance indicators should be used to both compare progress on a farm from year to year and make comparisons between farms so that individuals can gauge how they are performing and where improvements could be made. What is lacking is a consistent, user-friendly, widely adopted method for collecting the farm data that is required to generate the KPIs and reports so that farmers can use the information to make informed decisions and monitor the outcomes of those decisions.

Agribusiness magazine issue 122, May/June 2017 features yet another farm management software option. Digital recording of farm information is an ever increasing and competitive service with each claiming to fill a gap that existed in the current list of available tools. AgriOne website lists 415 apps and software options available for farmers to assist with all aspects of data recording, management and decision making. The majority of these are for specific purposes such as variable rate irrigation, effluent pond monitoring, feed and financial budgeting. A few are designed for whole system recording and analysis and fourteen were noted as benchmarking tools. Apart from software required for specific technologies on-farm or for compliance, the uptake of farm production recording and benchmarking systems remains relatively low amongst mainstream farmers and the biggest 'gap' appears to be a lack of integration of the different recording options (Scrimgeour, 2016) to allow true national benchmarking across the full range of farms in New Zealand. Investigating the drivers of top performing farmers, Elliot and Wakelin (2016) were challenged with finding a credible sample of top and mid performing farmers from existing records.

There is perceived value in benchmarking farm data and setting objective targets for measurable farm performance outcomes. Scrimgeour (2016) states that monitoring of farm systems is crucial for informing real time operational decisions and for evaluating performance over time. Verissimo and Woodford (2005) examined the traits of six top performing sheep and beef farmers in the South Island. Benchmarking against other top performing farmers and setting realistic targets were identified as common traits amongst the six farmers studied. Financial benchmarks were attained

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from the farmers' financial advisors and farm performance through formal and informal comparisons with other high performing farms. These farmers also attended field days regularly and engaged in a high level of reading to attain new information. That report did not mention how the farmers were selected as 'top performers'. Elliot and Wakelin (2016) conducted a qualitative study of 30 top financially performing and 28 mid-tier performing hill country sheep and beef farmers. They found that the main drivers were family and way-of-life but top performing farmers were more likely to have tangible goals supported by recorded figures and benchmarking. This was driven by a passion for performance and confidence in themselves and their industry.

There appears to be limited research and understanding as to why only a small percent of farmers adopt digital recording and benchmarking systems. For the purposes of this discussion the use of digital recording is considered as a "new technology" or "change" in farming practice. The Cinta report (2012) surveyed 600 deer farmers and identified a number of factors relating to practice change attitudes. This report will be referred to in more detail in the discussion section. The Cinta report found that the main incentive to change was to increase profitability and efficiency, whereas when farmers were asked what was the biggest or reasons for not proceeding with a considered change or adoption of new technology, 70% of respondents answered "Don't know". Lissaman et al (2013) suggested that farmers acquire the information that they need specifically for their farm and environment from various sources and base this on a perceived benefit. These authors refute the suggestion that farmers are set in their ways and change will require a younger generation of farmers that are willing to adopt new technologies. Contrary to that notion, Lissaman et al argue that uptake of new technologies is considered alongside current knowledge and older farmers have a better overall understanding of their farm system and therefore ability to predict the added benefits of new technology within the existing farm structure. Robinson (2009) details five factors that facilitate the adoption of new innovations. 1. Relative advantage, 2. Compatibility with existing values and practices, 3. Simplicity and ease of use, 4. Trial-ability and 5. Observable results. It is possible that low uptake of digital recording has been a reflection of the fact that the options available do not match these five criteria well. Alternatively, as pointed out by Schrimgour (2016) perhaps the large array of options and limited integration of these does not instil confidence in knowing which is the right system to use. Highly integrated systems such as FarmIQ may facilitate a change in this area (Isaacs and White, 2016).

Some of the more renowned recording and benchmarking options include Farmax, FarmIQ and integrated farm financial packages. Farmax prepares a detailed report of many aspects of farm performance including pasture growth and demand, reproduction, livestock growth and financial performance. This is for an individual farm with a level of benchmarking against other farms of similar type or within the local region.

FarmIQ is a software that was developed by Landcorp and Silver Fern Farms with government and industry funding. This is a comprehensive farm management software that is used on Landcorp properties. It is also available to private farmers on a subscription basis. It is one of the most highly integrated systems linking with Cashmanager Rural, Farmax, Tru-Test measuring devices, Gallagher measuring devices, NAIT, Silver Fern Farms and Farmlands.

Banks and accounting software providers have developed some financial benchmarking services. For example, ASB and Xero provide a benchmarking service called "Figured" and Cashmanager Rural offers financial performance monitoring and benchmarking tools to its customers.

Benchmarking Deer Performance

There have been three major benchmarking projects supported by the Deer Industry.

The Richmond-Wrightson Deer Performance Projects (Walker et al, 1999) were based in the Hawkes Bay. A number of publications from on-farm trials and benchmarking data based on participants farms were produced.

DeerMaster (Campbell 1998) was a benchmarking project based in South Canterbury/North Otago and resulted in the publication of the Deer Industry Manual (Beatson et al, 2000) along with several publications of on-farm trial results.

A Sustainable Farming Funded project carried out by DeerSouth, "The expansion of deer farming benchmarking production systems and related technology transfer on a national basis", was completed in 2004 (Lawrence, 2003). This project was transferred to the agricultural software development company, Rezare ready to be taken to a National level, however this did not eventuate (T. Pearse, *pers, comm*). Lawrence (2003) reported that there was strong support for the benchmarking service amongst farmer members but timely reporting of farm data was an ongoing challenge.

Currently the Deer Industry website has some set targets that are considered achievable for a well managed deer herd. Alongside this, a number of tools for farm data recording and analysis have been developed. These are available as downloadable excel spreadsheets on the "Hub" of the www.deernz.org website. There has been limited use of these tools in their current format (I. Moffatt, *pers. comm.*) and there is no capability for benchmarking with other farms.

Benchmarking in other animal production sectors

Currently, the deer industry does not produce real productivity measures based on surveys of farmer performance. This is in contrast to both Beef and Lamb NZ and Dairy NZ which perform similar roles to Deer Industry New Zealand for sheep and beef farmers and dairy farmers respectively.
Beef and Lamb New Zealand provide up-to-date benchmarking tools online. These are simple tools that allows farmers to select the farm type and location for comparison of their own farm performance. The KPIs are largely focused around financial outcomes. More detailed individual farm measurements and comparisons are also available through various extension programmes. Also available to sheep and beef farmers is the more comprehensive farm production and benchmarking programme, StockCARE®, provided by AgriNetworks (Mulvaney and MacColl, 2016).

DairyNZ provides a benchmarking service for dairy farmers in the form of DairyBase.

The need for a national deer performance benchmarking system

Anecdotal comments from farmers attending Deer Farmer discussion groups, particularly Advance Parties, has created an awareness of farmers' desire for a national benchmarking system that would allow them to compare their performance with other similar farms and/or to compare their own farm performance year-on-year. This observation of farmer enthusiasm is supported by developers of past benchmarking projects for deer farmers (Dave Lawrence, pers. comm; Tony Pearse, pers comm). In response to this, a database was developed using the Filemaker database programme to record information from farmers that are members of Advance Parties. This database is useful from a data management perspective but has major limitations for farmers to use it directly. The database has a primary function of recording the outcomes of Advance Party meetings for the purposes of reporting back to the project funders rather than storing and reporting farm financial and production benchmarking information. Further options were examined for developing a benchmarking database for all deer farmers to use. This issues and options were explored and suggestions for how to best progress made.

This current project involved a survey of deer farmers looking at their attitudes towards benchmarking and recording. It also examines the reasons farmers are reluctant to enter data into digital recording systems and what features farmers would find most useful or rewarding in a benchmarking and recording system. This approach was used on the premise that greatest uptake of a new system will be achieved when farmers can see that it will contribute to their goals, be compatible with their current values and practices and produce tangible results that are meaningful in a format they are comfortable using.

Materials and Methods

The method used was an online survey executed using Survey Monkey.

It was promoted by the Deer Industry via their online newsletters and Facebook page. Current members of Advance Parties were also sent direct email links to the survey.

The survey was open from 23 May 2017 until 30 June 2017.

The individual questions are included in the results below.

Results

Seventy Eight farmers responded to the survey online. Not all respondents answered all the questions. Due to the small number of respondents, only descriptive statistical data can be produced. I.e there is not enough data to make statistical comparisons between different groups of farmers or to perform multivariate analysis to account for confounding or correlated variables.

Statistical analysis and graphical display was made using Microsoft excel.

Each question is stated below as it appeared in the survey, followed by a brief description and graphical display of the results.

Section 1: Demographic and Farm description information.

Question 1: Your name
Answers confidential

Question 2: Farm name
Answers confidential

Question 3: Phone number
Answers confidential

Question 4: Postal Address
Answers confidential

Question 5: Email address
Answers confidential

Question 6: Farm size (ha)
Respondents that answered this question: 71
The mean farm size was 1,402ha, (standard deviation 2,866ha, range 12 to 22,000ha). Figure one shows the range in farm sizes. Of the 71 respondents, 41 had farms less than 600ha. The data were heavily skewed to the right with the greatest represented group farming less than 200ha.

There was a smaller group of farmers farming between 2500 and 10000ha and a single farmer with more than 20,000ha.
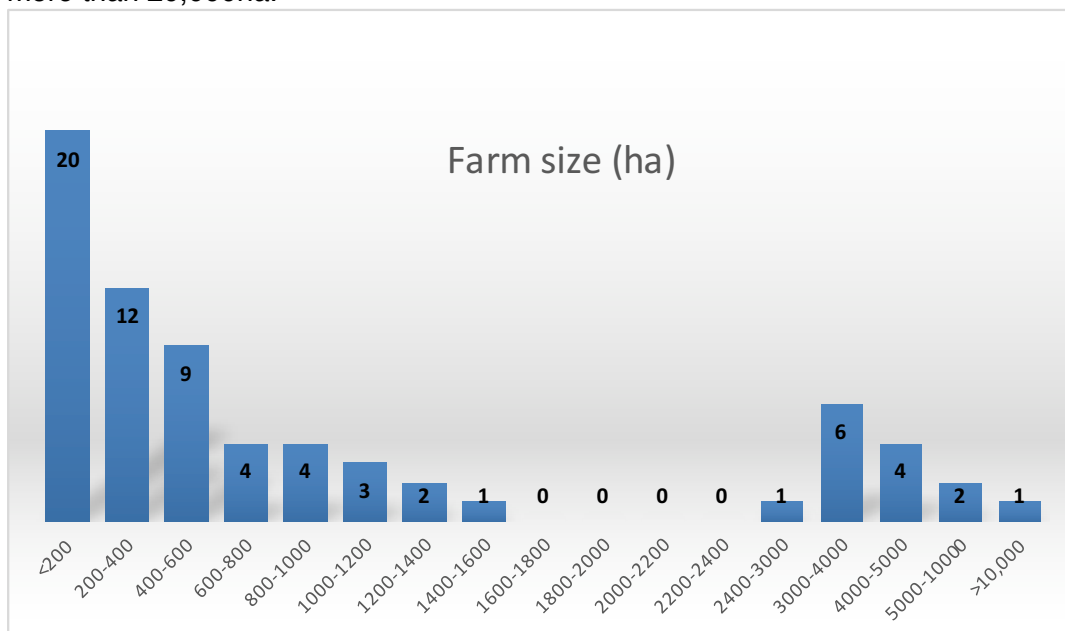

Figure 1: Number of farms grouped into each farm size range as indicated

Question 7: What is your position on the farm?

Respondents: 73

Forty two out of 73 respondents (58%) were owner/managers. The next largest group were "Owners". If these two groups were added together, it would account for 57 (78%) of respondents. 12 (16%) were managers and the remaining were made up of other staff, partners, shareholders and lease holders. Figure 2 shows the breakdown of respondents for employment position.
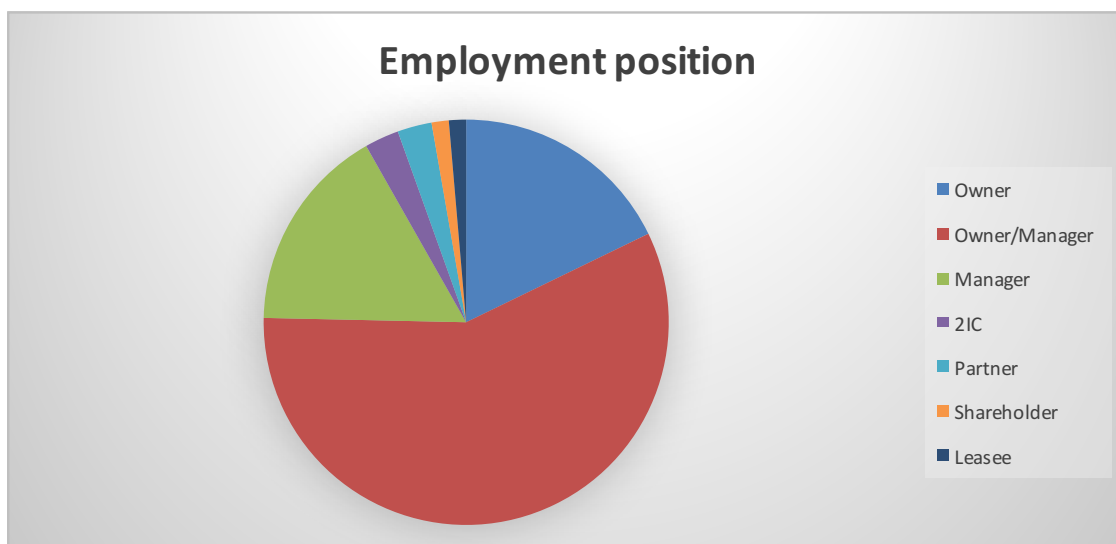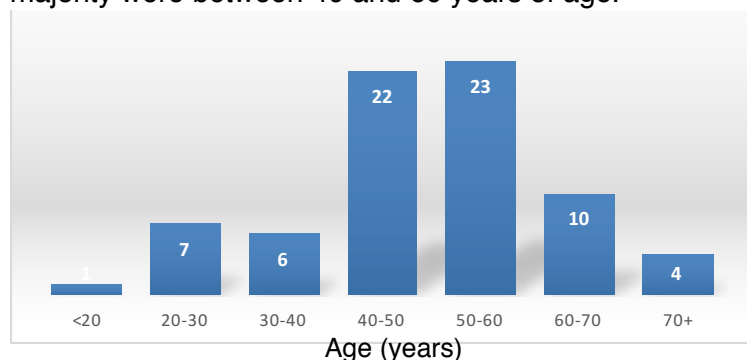

Figure 2: Position that each respondent classified themselves as having on the farm

Question 8: What age bracket do you fit into?

Figure 3 shows the number of farmers that were in each of the age brackets categorised. The majority were between 40 and 60 years of age.

Figure 3: Number of respondents that fit into each of the age brackets specified on the x-axis.

**Question 9: Approximately what percent of stock units on your farm are:**

Deer
Sheep
Cattle

Respondents: 73

The answers varied widely between farms to this question.
The average across all farms was 54% deer (range 9 to 100%), 30% sheep (range 0 to 79%) and 23% cattle (range 0 to 60%).
Twelve of the respondents had 100% deer and 25 had 90% or more stock units as deer. Figure 4 shows that small farms less than 100ha tended to have a high percent of deer stock units, whereas for farms greater than 100ha, there was no correlation between farm size and percent of stock units as deer.
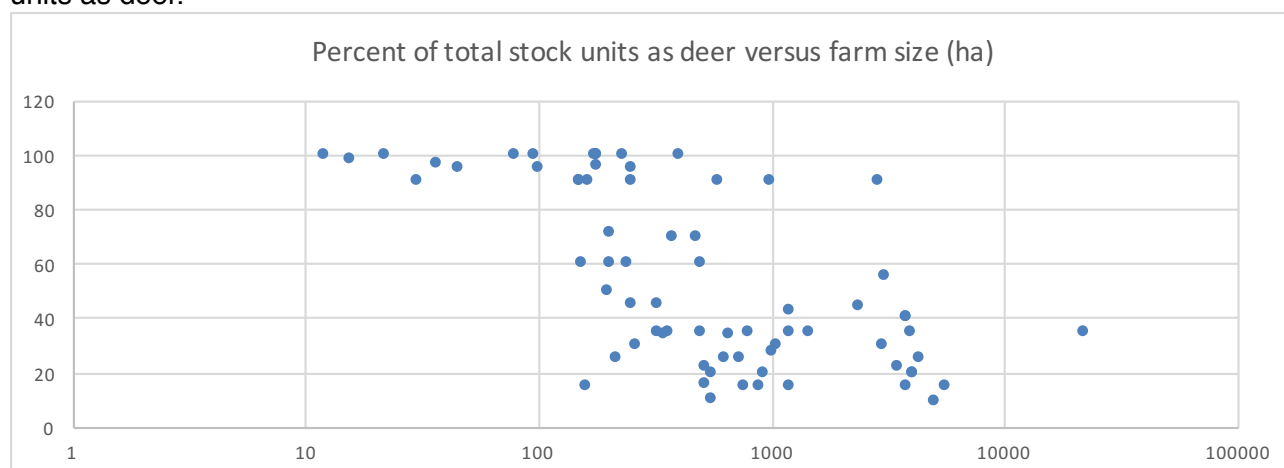
Figure 4 Relationship between farm size (x-axis, log 10 scale) and percent of stock units as deer.

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Question 10: How many of the following classes of deer do you carry?

Table 1 shows the mean, range and total across all respondents for the number of breeding hinds, finishing deer and velvet stags carried.

Total deer represented was just under 100,000. This is approximately 11% of the estimated New Zealand farmed deer population of 850,000.

Table 1: Mean, minimum and maximum head of deer in different stock classes carried on respondents farms along with the total for all respondents.

Class of deer	mean	min	max	Total of all respondents	% of total
Breeding hinds	767	20	4250	49851	50%
Finishing deer	597	0	3000	32823	33%
Velveting stags	326	0	3900	16617	17%
Total deer				99291	

Question 11: What is the focus of your deer operation.

respondents: 73
Respondents were able to select more than one option. The most common focus was breeding and finishing for venison (44%) followed by velvet (34%). Table 2 shows the results as the number and percent of respondents that identified each focus type for their deer operation.

Table 2: Number of farms that identified the focus of their deer operation in each of the categories listed.

	Number	%
Breed to sell store weaners	10	14%
Breed and Finish	32	44%
Finish only	3	4%
velvet	25	34%
trophy	9	12%
mixed velvet and venison	8	11%
stud	4	5%

Section 2 :Target setting

Question 12: How often do you set production targets?
Respondents: 68

Monthly	6 (8.8%)	
2-6 times/year	23 (34%)	
Annually	33 (48.5%)	
Never	4 (5.8%	

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Question 13: Do you set targets for the following?

Figure 5 shows that percent of respondents that do or do not set targets for each of the parameters listed on the graph. This question also allowed farmers to answer NA if they considered the parameter was not relevant to their farm.

The most common production outcomes that respondents set targets for were reproduction in both mixed aged and yearling hinds followed by growth rates. Growth rates had a higher proportion of NA responses which may reflect the farms that sell weaner deer store or run velvet stags only. Less than 20% set targets for individual paddock performance and financial performance targets were set by approximately 30-40% of respondents.
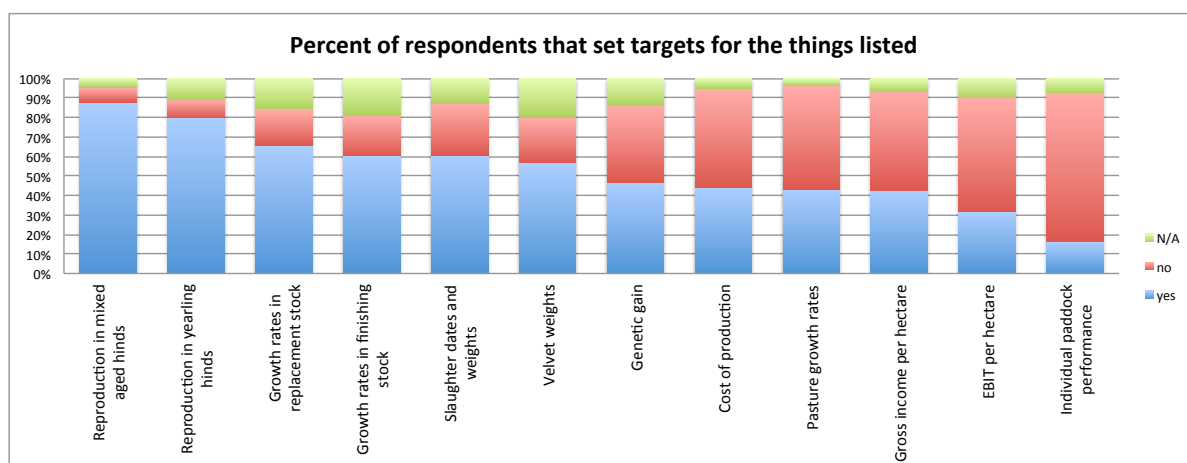
Figure 5: Percent of respondents that set targets for each of the production or financial outcomes listed.

**Question 14: Which of the following measurements do you currently record?**

This question related to the physical recording of specific information rather than target setting. More than 90% of farmers recorded animal health treatments. Weaning percent was also documented on the majority of farms. These data are shown in figure 6. Respondents were given the option of stating that they recorded none, all or some of the animals or outcomes within the herd.
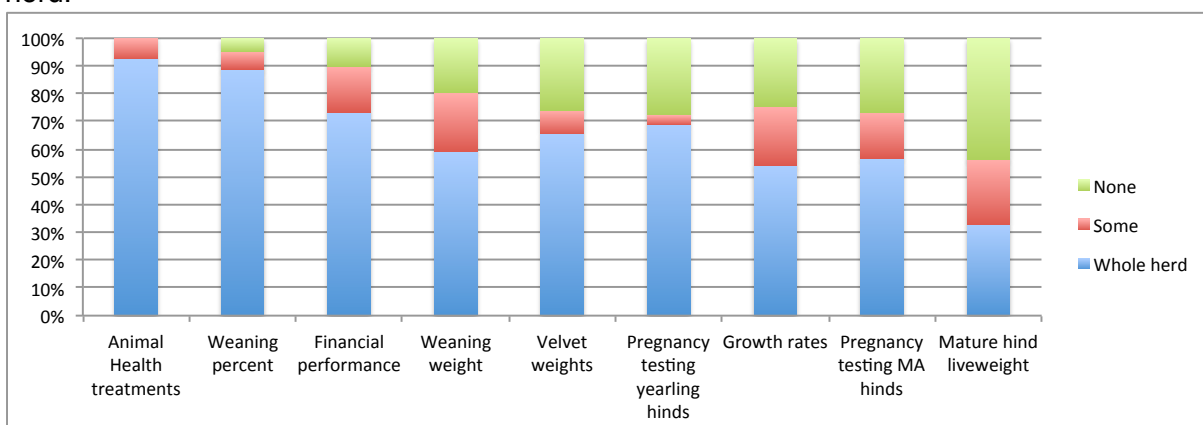
**Figure 6: Percent of respondents that keep physical records of selected aspects of their farm management and production as shown. When the response was 'None", this may reflect the farming focus and when the response was "some: this indicates that some of the animals, but not all are actively recorded.**

Question 15: How important are the following for helping you set your production targets?

Respondents were asked to rank from 1-10 how important they felt each of seven selected influencers of performance targets were for their own operations. Figure 7 shows the mean score for each of these parameters and figure 8 shows the number of respondents that scored each parameters in each ranking category (1=not important to 10= very important). Previous performance on the farm was the most important factor overall with farm advisors having the least influence. For each of the options, there was at last one respondent that considered that option to be very important.
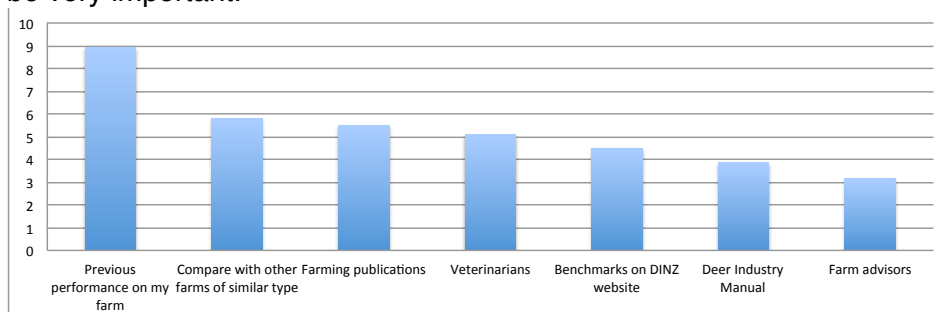
Figure 7: Mean score (1-10, 1= not important, 10= very important) of how important these seven selected parameters are for helping
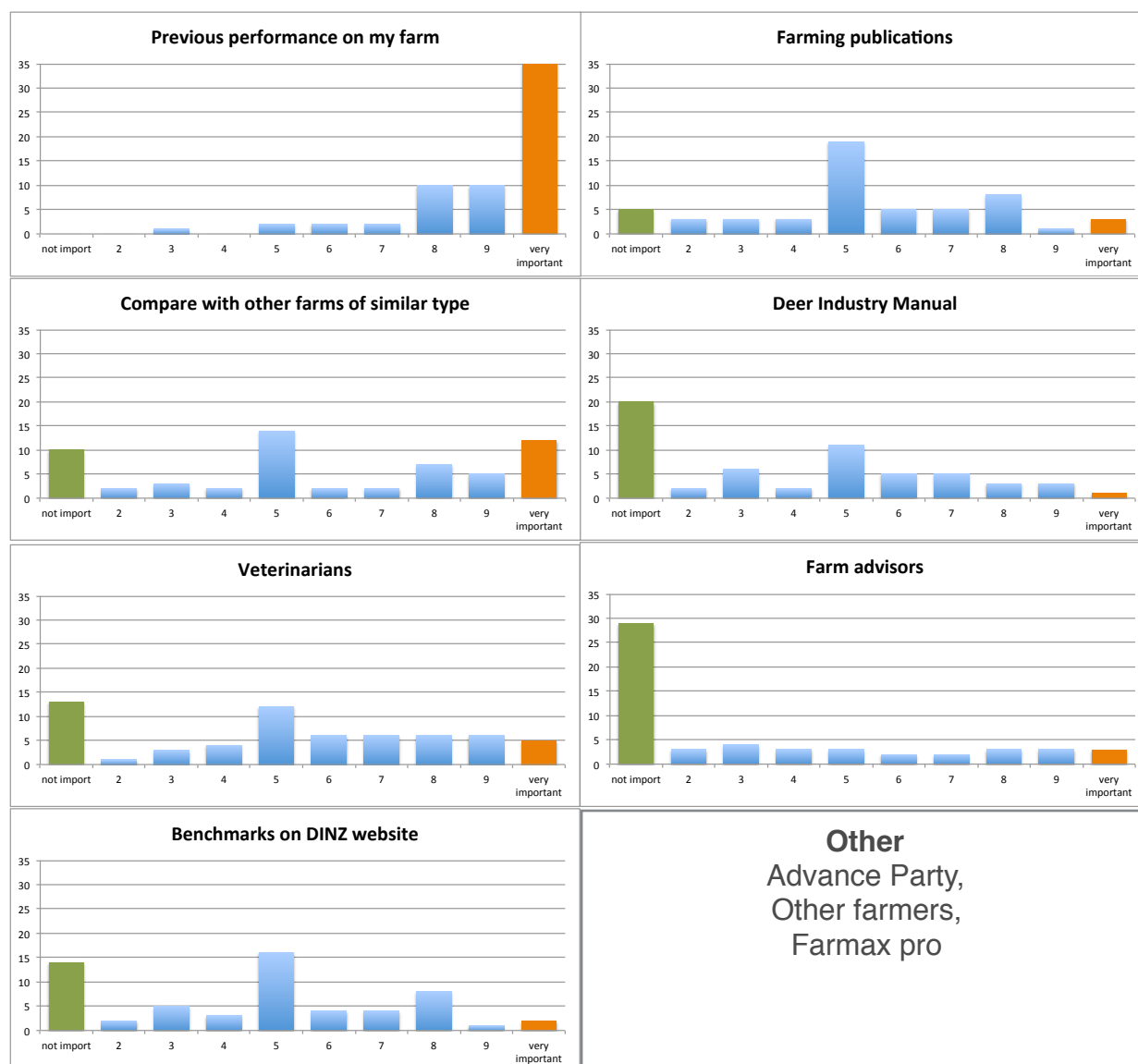
Figure 8: Number of farmers that ranked each of the tools for helping set their own farm production targets from 1 = not important to 10= very important. Also included are some "other" responses to this question.

Question 16: How strongly do you agree with the following statements.

These statements were constructed following anecdotal conversations with farmers at discussion group meetings. The purpose of this question was to gauge attitudes towards benchmarking and recording data. Figure 9 shows the number of respondents that ranked how strongly they agreed with each statement from 1 (Do not agree) to 10 (Strongly agree).


Figure 9: Number of individual respondents that indicated how strongly they agreed with each statement relating to attitudes towards recording and benchmarking. From 1= Do not agree to 10= strongly agree

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Question 17: Have you ever, or do you currently use any of the following?

Respondents: 66

Eleven well known data recording and analysis tools were listed and respondents asked to say whether they currently use it, have never used it or no longer use it. Under "Other" respondents were asked to specify what they had or currently used. Results are shown in figure 10.

The most commonly used recording method was dairies, pen and paper, followed by excel spreadsheets. Accounting software should be group for the purposes of descriptive analyses which would result in 55/66 (83%) using accounting software and thus accounting software was the most common electronic recording system used.
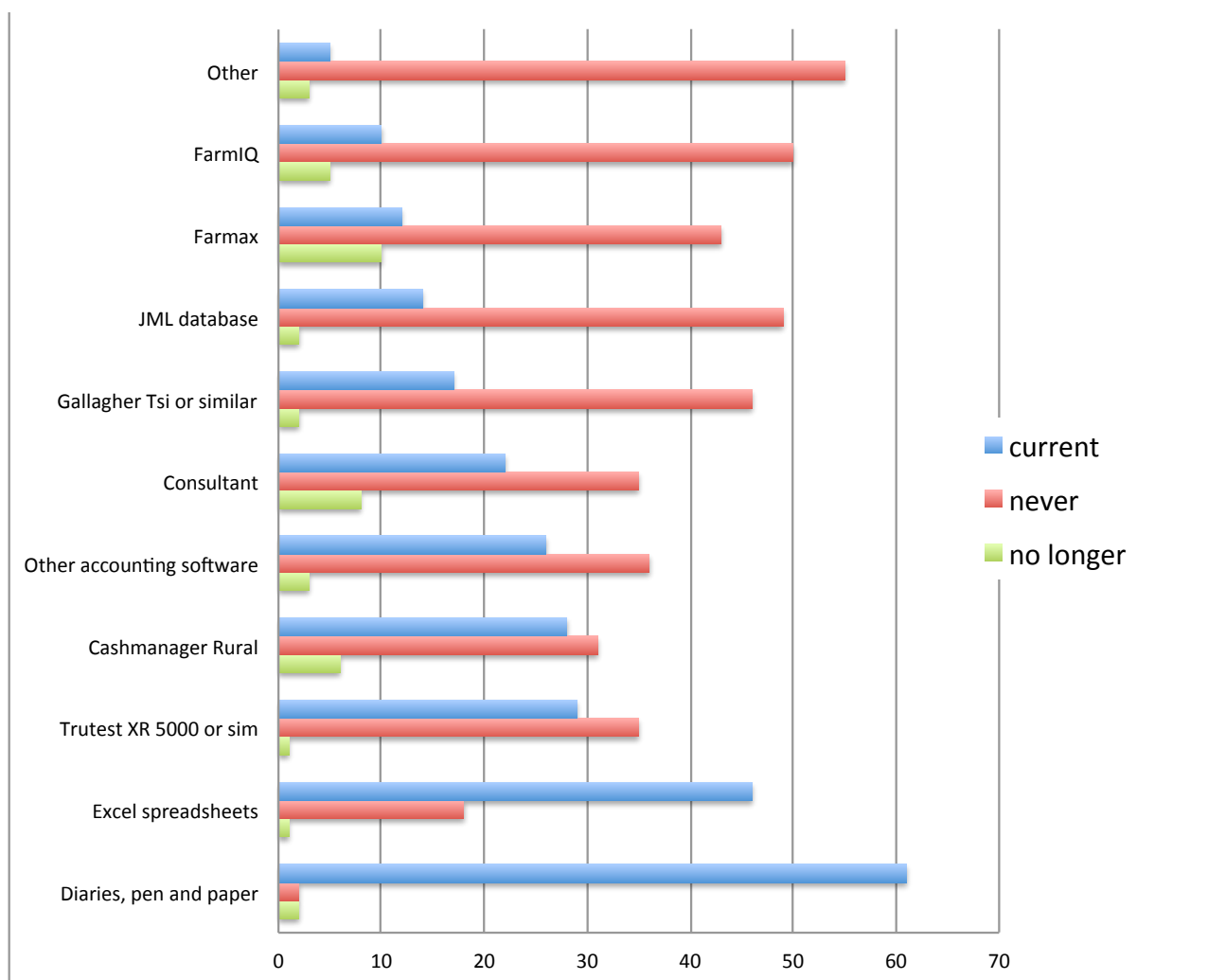
Figure 10: Number of respondents that said they currently use, have never used of no longer use the eleven selected data recording and/or analysis tools.

Farmers that responded "Other" listed the following

- Banklink
- Handwritten spreadsheets in the 80s
- MINDA
- Digital diary
- Herdmaster 4
- Endeavour 2 Farm Mapping, paddock and stock recording system

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Question 18: If you have used any of the above systems in the past, but no longer do, why did you stop using it/them?

Responses to this question are listed here as they were recorded.

• Used Farmax lite but had issues with accurate pasture growth rates/assessment
• Outmoded
• Looked at FarmIQ but found it very generic, could only grade a mob, not an individual.
• I couldn't make it appropriate to a farm of this scale
• Cashmanager was too complicated for my skills
• Used Farmax to evaluate our strengths & weaknesses in a one off situation Found it useful
• Not needed
• Accrual accounting to much work for little benefit
• Up graded to Tru test syncs with FarmIQ.
• Have recently purchased TSi2 and will no longer need to keep records on paper that take to0 long to read through
• Couldn't stick at using conventional diary
• Still use all of them
• Not had time and got out of touch with how to use. n/a
• Not used on this farm
• Using a better systems that works for us
• Went from Cashmanager to Xero
• Not applicable
• Been farming deer for 34 years, think I have it worked out and have very high profit per ha for my type of farm.
• Cost: benefit
• Cost and effectiveness
• Change of Employer, Landcorp using different accounting systems.
• Farm IQ was expensive for the recording available that I do not already have. Money was better spent employing the services of a consultant.
• Didn't use them enough so they became irrelevant (not enough office time available)
• Not much use in stud situation
• Replaced with Tsi
• We were getting more relevant information being involved with other deer farmers

Question 19: How do you rate your current production recording system for the following:

This question was designed to gauge the current level of satisfaction with the system that farmers are currently using.

Table 3: Number (precent) of respondents that described their current recording systems as poor, moderate, good or excellent)			
	Poor	**Moderate**	**Good**	**Excellent**
Ease of use	5 (7.6%)	22 (33%)	30 (45%)	9 (14%)
Value for decision making	5 (8%)	15 (23%)	30 (46%)	15 (23%)
Value for money	2 (3%)	12 (18%)	33 (50%)	18 (27%)
Records what I want	3 (4%)	12 (18%)	36 (54%)	15 (23%)
Flexible	6 (9%)	14 (21%)	31 (48%)	14(21%)
Overall	21(6%)	75 (23%)	160(49%)	71(22%)

Question 20: If you were to use an electronic system for recording production, how important would the following features by.

Respondents were asked to rank from 1 (not important) to 10 (very important) how important each of the listed characteristics would be for them to decide to use an electronic production data recording system. Mean scores are shown in figure 11. Individual responses are shown in figures 12a and 12b. There was wide variation between respondents. Ease of use and technical support were considered the most important aspects while mobile phone apps and internet capability were considered least important.
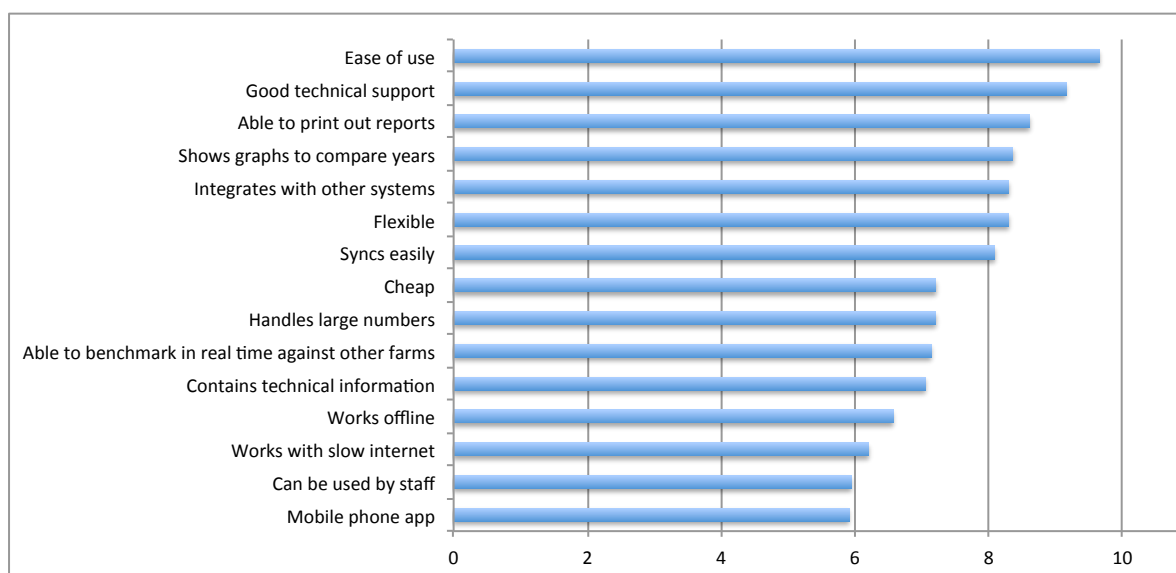
Figure 11: Mean score for how important each of the listed features would be for deciding to use an electronic data recording system. 1= not important, 10= very important.

Question 21: Which of the following information would you consider useful to record and benchmark?

Respondents were asked to answer yes or no for each of the following production and performance parameters as to whether they considered them useful to record and benchmark. Reproduction outcomes and animal growth rates were considered important by the greatest number of respondents. Figure 13 shows the number of respondents that considered each of the fifteen suggested topics as being useful to record and benchmark.
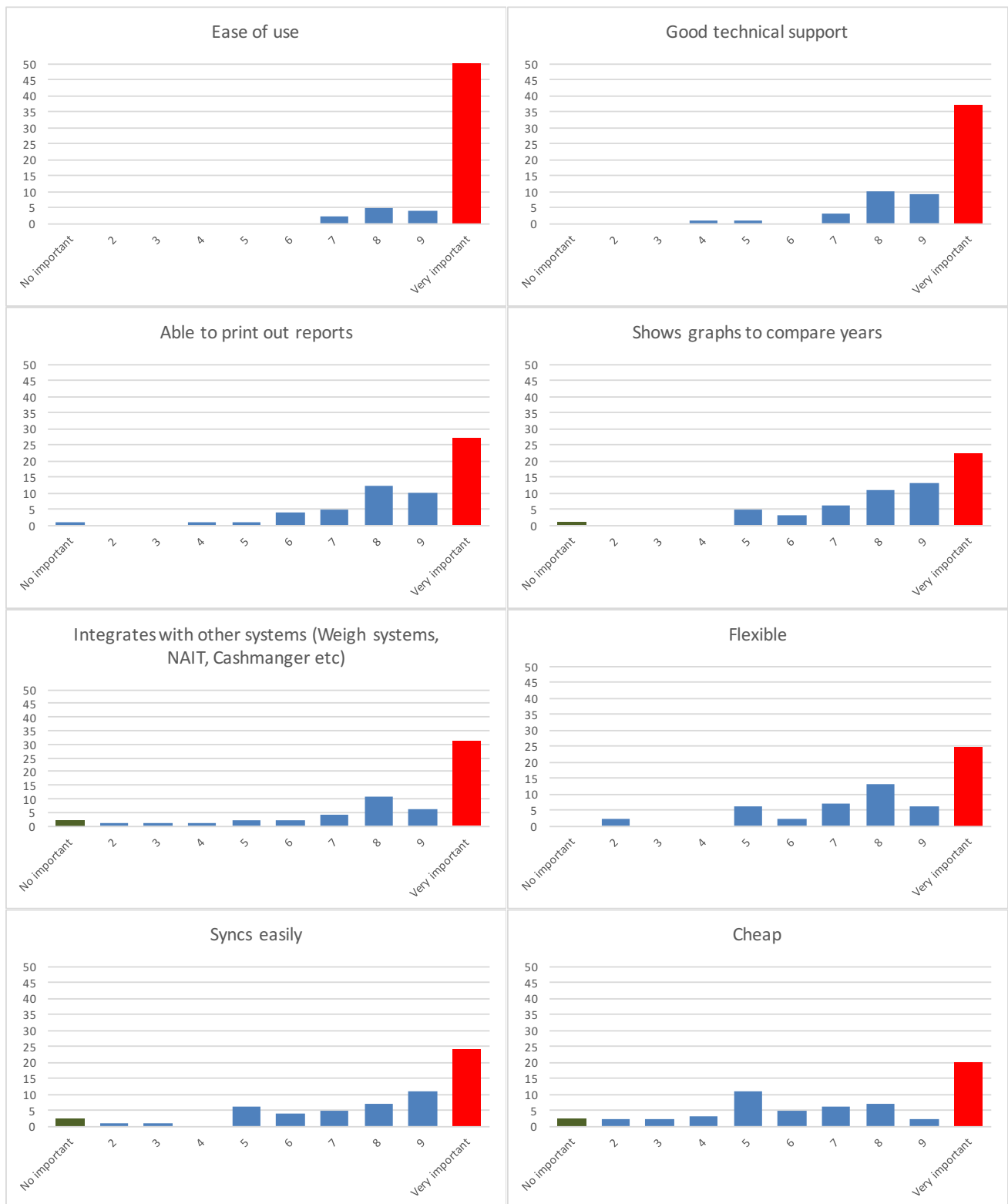
Figure 12a: Number of respondents that ranked each of the features of an electronic data recording system from 1 (Not important) to 10 (very important).
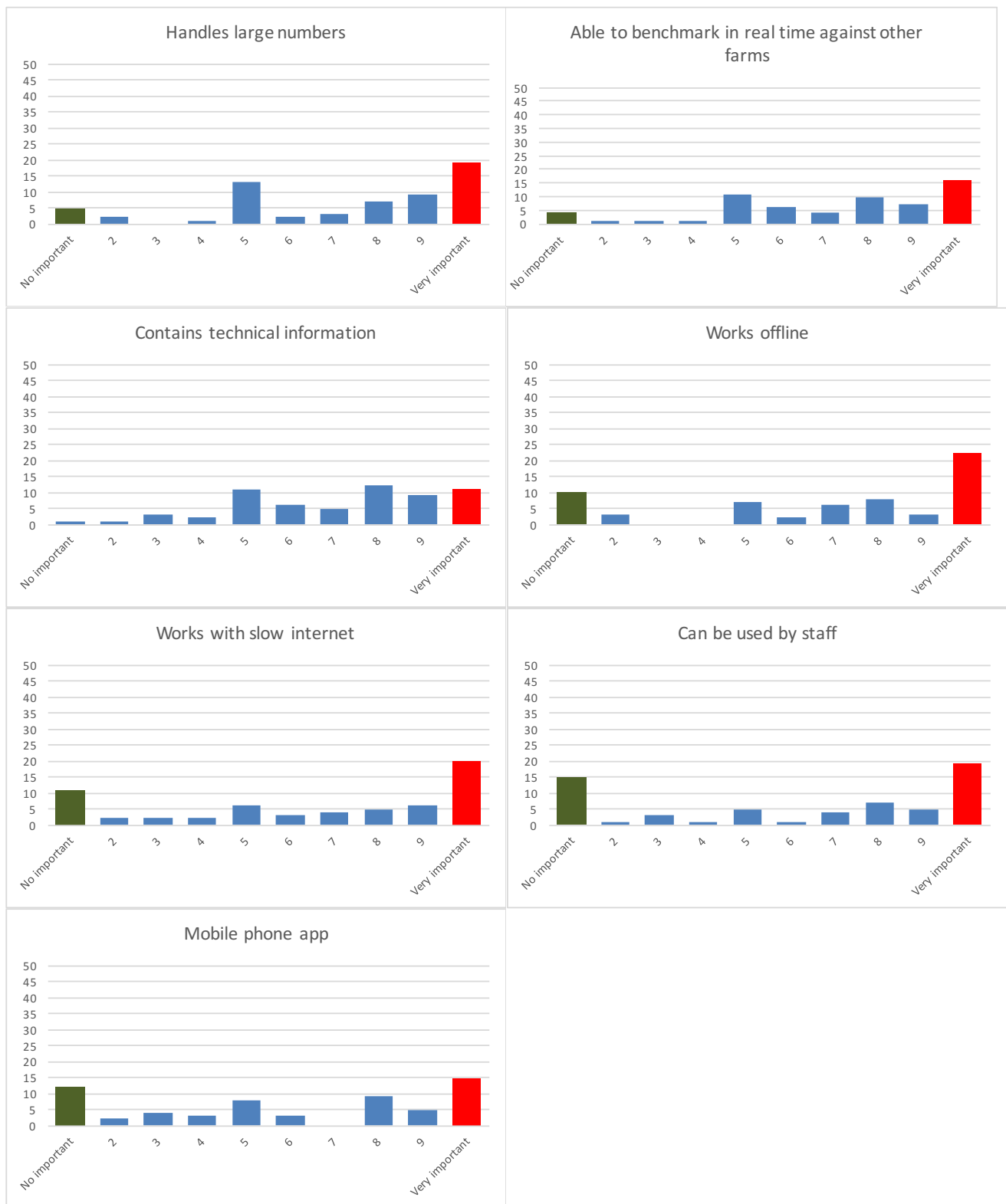
Figure 12b: Number of respondents that ranked each of the features of an electronic data recording system from 1 (Not important) to 10 (very important).
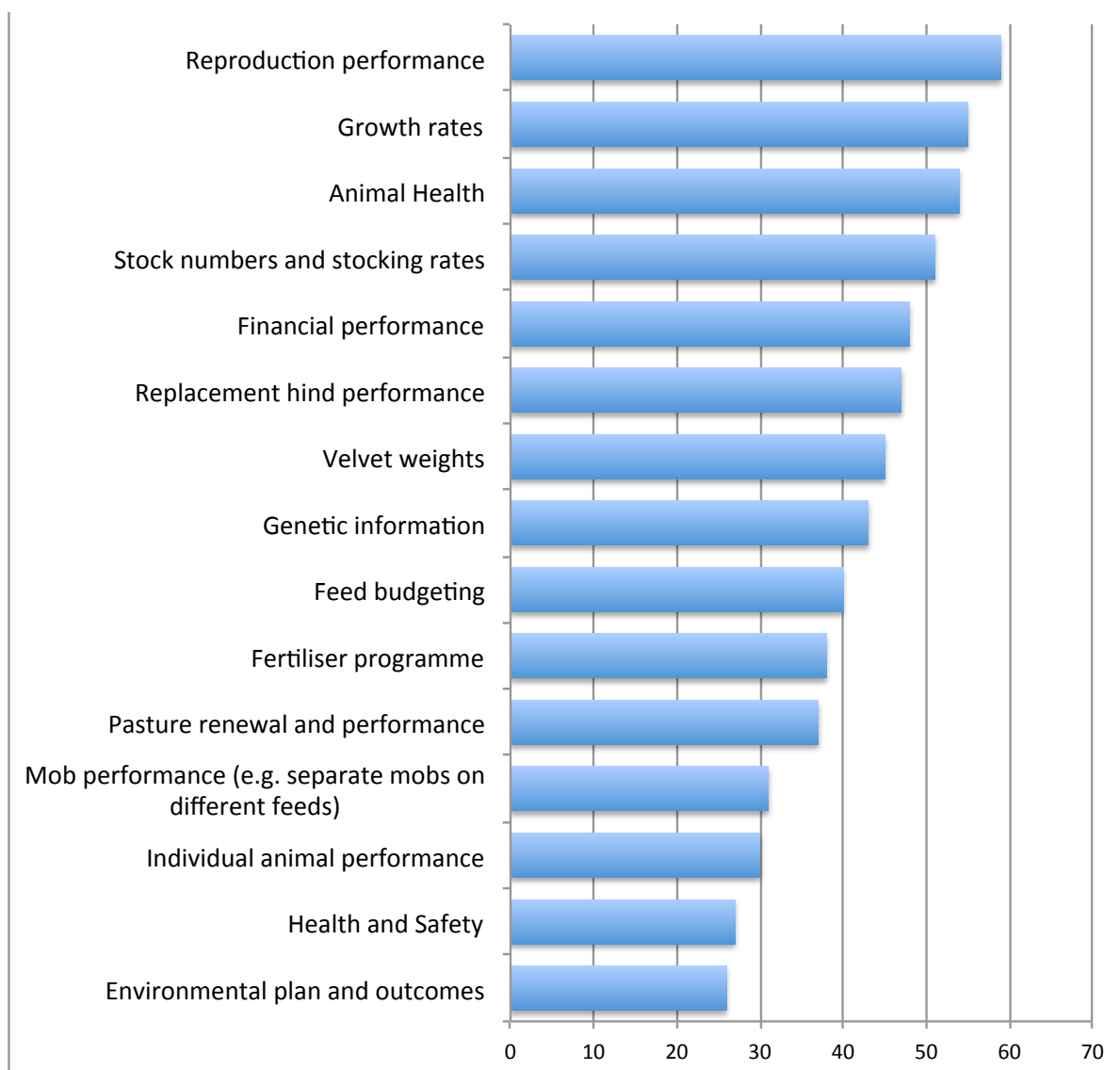
Figure 13: Number of respondents that answered "yes" that they considered for each of the suggested parameter to be useful to record and benchmark

Question 22: What do you consider to be the barriers to farmers using digital systems for recording farm production?

For each of the stated potential barriers, farmers were asked to choose whether they considered it to be a major issue, often an issue, sometimes and issue or not an issue.

Answers varied widely between farmers. These are shown in figure 14.

Dislike of office work

- Not an issue 7%
- Sometimes 29%
- Often 32%
- Major issue 32%

Lack of IT skills

- Not an issue 5%
- Sometimes 28%
- Often 40%
- Major issue 27%

Ideal system not available

- Not an issue 11%
- Sometimes 23%
- Often 45%
- Major issue 21%

Too complicated

- Not an issue 5%
- Sometimes 30%
- Often 47%
- Major issue 18%

Time

- Not an issue 15%
- Sometimes 29%
- Often 29%
- Major issue 27%

Cost

- Not an issue 10%
- Sometimes 33%
- Often 42%
- Major issue 15%

Can't see value in doing it

- Not an issue 15%
- Sometimes 31%
- Often 43%
- Major issue 11%

Figure 14: Percent of respondents that ranked each of the potential barriers for using digital production and benchmarking system into either not an issue, sometimes and issue, often an issue and a major issue.

Discussion

Respondents and demographics

The survey received 78 online responses or which 75 were useable. This is a reasonable number considering the limited ability to promote the survey due to financial constraints. This number was not sufficient for detailed statistical analysis. For example, comparing results based on demographics or performing multivariate analysis to account for confounding variables. However, analysis of the descriptive statistics is able to give enough insight to be able to make some broad recommendations.

While this survey captured only a small percent (approximately 5%) of the approximately 1500 current deer farmers, these farmers accounted for nearly 100,000 of the estimated 850,000 deer currently farmed (11.7%).

To determine whether the sample was a fair representation of deer farmers, demographic results can be compared to the Cinta Report (2012) which surveyed 600 deer farmers. The majority of respondents were either land owners or owner/managers. With only a small number of other staff or investors. This may reflect the family owned nature of deer farms or that those that answered the survey were more likely to have a vested interest in the farm and data. The age range is probably a fair indication of the age range of current deer farmers. The survey did not appear to bias towards younger participants and this also goes against the idea that age is a barrier towards the use of digital technology on farms. The Cinta report found that 90% of respondents were over 40 years of age. While the number in this survey is slightly lower, it is not too dissimilar.

Other demographics in this study were reasonable similar to those of the Cinta report. In the current survey, average deer herd size was larger with a slightly smaller proportion having deer only operations compared to the Cinta report. The representation from farms with a venison versus velvet focus was in similar proportions to the Cinta report.

Attitudes towards target setting, recording and benchmarking

The majority or respondents set targets for their farms regularly, at least once a year. Only 5.8% did not set targets regularly. This indicates that about 95% of deer farmers have an idea of what they want to achieve in at least some areas of their business. Only a small proportion of respondents would be in the early adopter or high achieving bracket of farmers, therefore target setting is important for all levels of farm achievement and is not in itself an indicator of performance. How specific these targets are and the way they are measured may vary between farmers as may the range of different outcomes that were considered important to measure and set targets for. Actual recording of targets or records did not necessarily reflect the fact that farmers had targets for each outcome. For example 80 to 85% of respondents stated that they set targets for pregnancy rate in adult and yearling hinds, however only approximately 70% actually measure and record pregnancy rates. Conversely, approximately 55% set targets for velvet weights whereas over 70% responded that they keep records for velvet weights. Parameters that are recorded for compliance had the greatest discrepancy between target setting and recording. Few farmers set targets for financial performance, whereas all farms that operate as commercial businesses will have financial records as part of their compulsory tax requirements. Similarly Animal Health records are required to be kept to ensure no animal remedy residue enters the food chain. These results suggest that farmer interest and intention is focused more on production, whereas action and recording is to a large extent driven by compulsion. This poses a difficulty for anyone attempting to persuade practice change amongst farmers, particularly in areas such as recording and compliance with health and safety or environmental requirements. Incentive to keep these records is likely to require a high degree of mandatory requirement and is unlikely to be achieved through positive motivation by promoting the benefits of recording. For a farm production recording

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and benchmarking system, it is likely that only those that are motivated to keep records because they see a benefit in it or have a particular passion for assessing their own achievement and progress will adopt any recording system, no matter how user-friendly it is. These benefits will need to be strongly promoted to willing farmers initially but in order for majority farmers to adopt a higher level of recording, the benefits will need to be strongly demonstrated by early users.

The most important information that farmers use for setting production targets is previous performance on their own properties, followed by performance on other farms of a similar type. Farming publications and trusted persons such as veterinarians are considered moderately important and in concurrence with previous research, farm advisors are considered least important of the options listed. This may reflect the number of farms that employ farm advisors and it may be useful to split the responses between those that do and those that do not employ advisors. Although comparison with previous production records was considered the most important criteria for goal setting, most respondents disagreed with the statement that they only need to benchmark against themselves. There is a strong feeling that benchmarking against other farms is necessary to set realistic targets and realise where opportunities are on their properties. Surprisingly very few farmers considered that aiming to be average was a reasonable target. This shows that the majority of farmers want to be above average. The desire to be above average and set targets against other farms can be used as a incentive for the uptake and participation in benchmarking systems. The majority of farmers also agreed with the statement "you can't manage what you don't measure" indicating an acknowledgement that recording is important for achieving targets. This is a positive attitude towards recording for the purposes of improved performance.

A major challenge appears to be adoption of new methods of recording, particularly using digital recording systems. This is reflected in the range of current systems that respondents are using. While most of the respondents used more than one system, the uptake of software such as FarmIQ, Farmax or "Other" was low. Paper and diaries are still very widely used. The only digital recording with a high level of use was accounting software and as discussed above, this probably reflects the compulsory requirement for farm accounts to be generated for tax purposes. Most farmers would employ an accountant to process the financial reports and thus they would need to be able to send financial information in a digital format. There was a surprisingly large number of reasons given for why farmers had changed their system but the majority are happy with the systems that they are currently using. Most farmers appear to have established a system that does a fair job at meeting their requirements. There would need to be a strong incentive to change from a system of relative satisfaction. The majority of the systems in current use do not lend themselves to benchmarking against other farms.

Barriers to change

The question regarding reasons for not using digital recording systems may not have been well designed. All of the reasons proposed had a fairly similar response pattern so it is difficult to determine whether some are more important than others. 32% of respondents considered "Dislike of office work" to be a major barrier. This may be a major factor for many of the other findings in this study. Farmers do not want to spend a lot of time working with complicated systems and would rather be working on the farm making practical decisions. They see the data recording system as a tool to be used to help achieve their goals rather than a process in itself. "Not seeing the value in doing it" was considered the least important factor overall. This finding reflects the answers to earlier questions which indicate that farmers see a high level of value in recording and benchmarking production data. It appears there is perceived value and a desire to record and benchmark but farmers are not convinced that suitable systems exist that overcome all the barriers to use.

System Design

Data recording technology that allows benchmarking needs to be highly incentivised to achieved good uptake. Farmers must consider that the outcomes will be better than what they can achieve with their current systems. The method needs to be familiar and fit with their current beliefs and practices and be simple to use and adopt with ongoing incentives for continued use. Furthermore, the majority of farmers are unlikely to try a new technology until they see it having demonstrated beneficial outcomes on other farms.

Ease of use and technical support were regarded as the most important features for respondents to consider using digital recording systems. If it takes a long time to learn how to operate a system, if it is not intuitive and has to be re-learnt after a period of not using it, farmers are unlikely to persevere. Having a readily available technical support person that can be contacted to rectify issues will increase the chances of farmers continuing to use the system. Along with being simple, respondents wanted the system to integrate and synchronise easily with other systems that they are using. There is an increasing using of electronic recording of weight data through the use of EID ear-tags and readers. A data recording and benchmarking system that integrates with the weight records database would give the farmers greater advantage and improve the useful outputs from both systems. Accounting information is already stored in a digital format on most farms and could be integrated through an importing and syncing option. The software FarmIQ has a high level of integration with other systems allowing a single port of entry into weight information, paddock performance, pasture measurements, feed budgeting, financial reporting and slaughter results. This is probably the most advantageous feature of this product.

The importance of other features varied between respondents. but none of the listed features had a large number of people who considered them not to be important. For example slow internet or offline use was important to some farmers but not others and this more than likely reflects the local internet capabilities on the property. Failing to build offline use into a system would exclude farmers that do not have reliable internet access so the results should not be interpreted as indicating that it is less important to build these capabilities in. Use by staff will be directly influenced by the scale of the operation and whether or not staff performing data management tasks are employed in addition to the owner/manager.

Being low priced was considered very important for about one third of respondents, and there was wide variation in the attitude towards price from the remaining respondents. This may reflect the financial position of the farm or perceived return on investment. Some individuals will be more willing to pay higher price for a system that is able to assist them to get better returns from their business. Price may inhibit individuals from trying a new system. Most software companies offer free trials for their products to get around the barrier of users not wanting to risk paying for a product that may be of no use to them. Meeting all of the requirements for all individuals would be challenging and might explain why there has not be a high level of uptake with currently available systems. There is also a higher cost in designing a system with the capabilities of working offline and integrating with other systems.

Determining exactly what data to cater for is less challenging than meeting the requirements for system functionality. Provided a simple and integrated system can be developed, most data types can be added to the system. However, it is best to have a thorough understanding or what will be included when building the database at the start. It is much more difficult to add new data types after a database has been established and has a reasonable amount of data entered into it. This is particularly important for a highly integrated system. Respondents considered that reproduction performance, growth rates, animal health financial performance, yearling hind performance and velvet weights to be the most useful. Land management details such as environmental management and fertiliser application were considered important by fewer people. One respondent commented that all of the options were important but only some were critical for benchmarking and

driving productivity. The best option would be to design the capability for all types of data at the outset even if these are not used in the initial stages of database use.

Beef and Lamb and DairyNZ have taken the step of providing benchmarking database services to all farmers within their respective industries. This will allow a wider range of farms to enter data and compare themselves with other farms of a similar type. It also allows greater integration with other industry initiatives and extension programmes. For example when facilitators have access to real-time industry performance data from a wide range of farms, they are able to communicate these with farmers at extension events and discussion days. This also ensures greater consistency in the way KPI benchmarks are calculated and reported. The Deer Industry has taken the approach of leaving the physical database development to individual companies, restricting the role of DINZ to informing software providers of the specific requirements and appropriate benchmarking KPIs to use for deer in comparison to other livestock classes. Information such as the nutrient requirements of deer and expected growth rates are made available to these companies so that they can offer accurate outputs in their reports. It is worth examining why Beef and Lamb NZ and Dairy NZ have elected to manage independent database and benchmarking systems, what benefits they perceive from taking this approach and what the farmer feedback is from those that use the industry provided tools.

At the conclusion of the DeerSouth project, a national database had been established and was set to be made available to all deer farmers. If the coding for that database is still in existence it could be a good starting point. It would be prudent to examine the functionality of that database in light of the findings of this study.

Conclusions

Deer Farmers have a high level of interest in setting targets, recording production and benchmarking. Farmers consider previous performance on their own properties and on farms similar to themselves as the most important factors for determining what their targets are.

While benchmarking against themselves is important, farmers consider that it is not adequate to solely focus on own performance and that comparison with other farms within the same year is also necessary to help them set realistic targets and identify potential areas for improvement.

The level of uptake of digital recording of production is low and manual records using paper and diaries are the most common method. Record are more likely to be formally recorded when there is a mandatory requirement to do so. For example financial accounts for tax return purposes.

There are a wide range of reasons for limited uptake of digital production data recording and benchmarking. These reasons vary between farmers. Relative satisfaction with current systems probably provides inertia for change along with the perception that current systems on offer will not provide a significant level of advantage, are too complicated to use or have other limitations.

Benchmarking requires the input of a reasonably large amount of data into a common platform so that fair comparisons can be made.

In order to achieve a high level of voluntary participation in benchmarking farmers must see a strong incentive to enter their data. The most important factors for achieving a high level of uptake are a simple system that is easy to use with good support. It needs to be reasonably priced, integrate well with other systems and give immediate feedback on the situation on the farm by comparing year on year and generating graphs and printable reports. The system should be accessible to all farmers and thus allow for offline use in situations of poor internet connectivity.

A wide range of privately managed digital recording and management options exist. These are not well integrated with each other, except perhaps for FarmIQ and data is not directly comparable or accessible between the systems. There is a relatively small number of deer farms in New Zealand so a high level of participation in a single platform will be required for adequate benchmarking. The deer industry should investigate whether a nationally managed collectively owned database is appropriate similar to those provided by Beef and Lamb NZ and Dairy NZ.

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Rezare Agricultural Software Development Specialists: www.rezare.co.nz