



Dairy Australia

**Sustainability Framework NRM Survey
September 2015**



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Gully planting photo on front cover courtesy of Gillian Hayman

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Executive Summary

Introduction and methodology

The Sustainability Framework NRM Survey provides data on practices being undertaken on dairy farms to minimise impacts on land, soil and water due to farming practices.

Data included in the report is based on responses from 601 dairy farmers who participated in a Computer Assisted Telephone Interview (CATI) between August and September 2015. Survey respondents were chosen randomly from the Dairy Australia levy payer database. Quotas were set by NRM sub region and data was weighted at computer stage to ensure the national result is not disproportionately affected by regions with smaller numbers of dairy farmers.

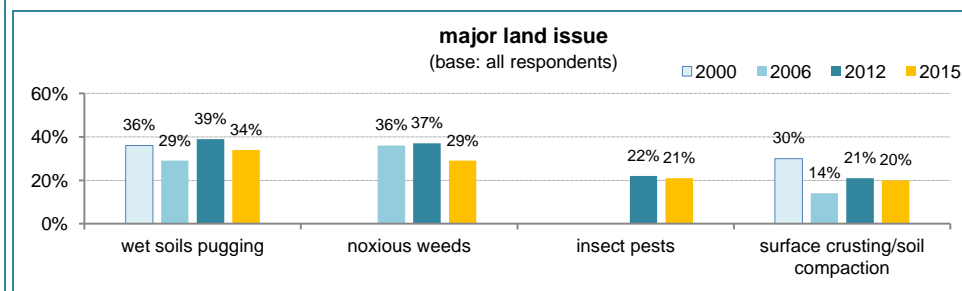
The survey response rate was a high 69%, resulting in a good level of confidence in results. The margin for error on the total sample is $\pm 3.5\%$ but rises to $\pm 12.7\%$ where there are smaller subsamples.

Although this is the first Sustainability Framework NRM survey conducted, several metrics have been measured in past Dairying for Tomorrow surveys and where possible, trend data has been included in this report.

Survey findings

Major land management issues being faced

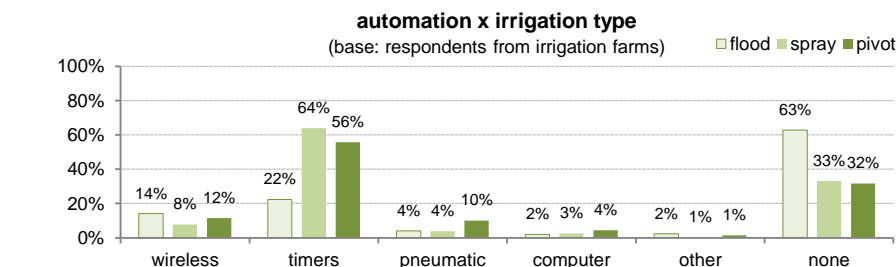
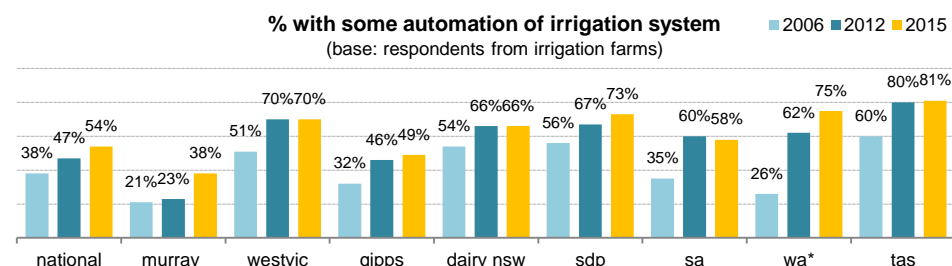
- Wet soils pugging is becoming a more widespread problem, particularly in Tasmania and Gippsland – traditionally wet regions where average stocking rates are increasing.
- Nationally, there has been a significant 8 point fall since 2012 in the proportion of dairy farmers with a noxious weed problem. Where noxious weeds and insect pests are an issue and they are being actively managed, there is no evidence of them becoming a more widespread issue. In Dairy NSW region however, noxious weeds are affecting a growing number of farms but not all those with a problem are managing for them.
- There has been no change in the proportion of dairy farms with surface crusting or soil compaction problems since 2012.



- Statutory requirements have been an issue for a relatively small proportion of respondents to date (infrastructure changes - 16%; ground water bores - 15%; shed renovations - 8%).

Irrigation

- Survey data suggests that on the 59% of dairy farms using irrigation water, the area irrigated and the means by which it is watered has remained similar over the past 9 years. There has however been a considerable rise in the average amount of irrigation water sourced, rising from 442 ML per year in 2006 to 548 ML in 2015. Currently water use is known and recorded each irrigation on 58% of irrigation farms.
- Adoption of automation has continued to rise, with more than half of irrigation farms now using timers or other systems, particularly where they are irrigating with sprinklers or pivots. Other changes (including upgrading delivery structures, increasing farm storage) have been made on 54% of irrigation farms.

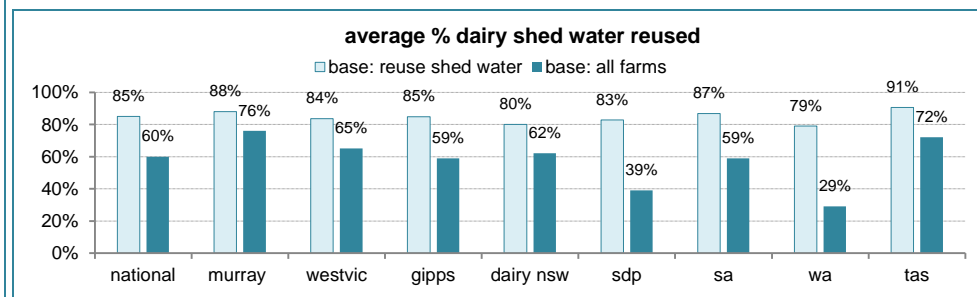


- Decisions on when to irrigate continue to be driven by past experience (mentioned by 67% of irrigators) rather than using specific devices such as tensiometers (10%) or scheduling tools (2%).

Executive Summary

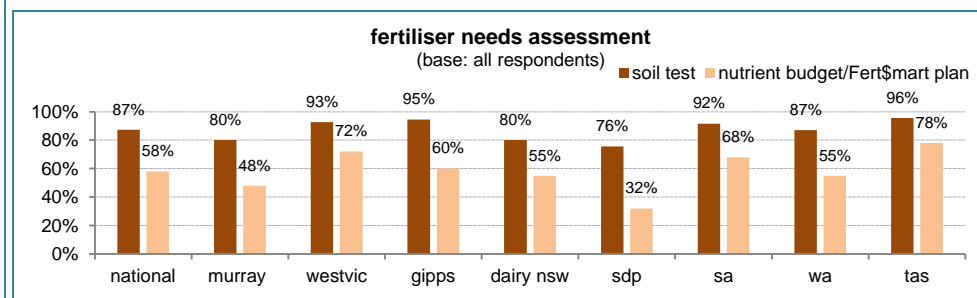
Dairy shed water reuse

- Nationally, 75% of dairy farms recycle water from the dairy shed and a further 5% intend doing so in the near future. The farms not recycling this water are typically those running smaller herds and those in SDP and WA.
- While 85% of water is reused on farms where it is recycled, this equates to a much lower 60% when all farms are taken into consideration (including those that reuse none).



Fertiliser management

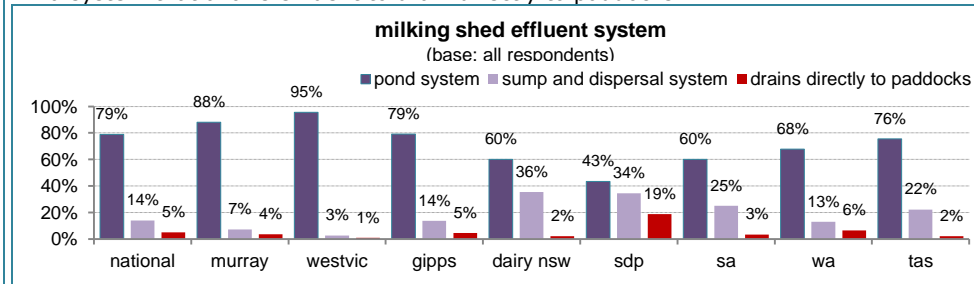
- Dairy farmers are now typically using between 4 and 5 different types of fertilisers on their property compared to between 3 and 4 in 2012. This may be due in part to a substantial increase in the proportion of farms conducting soil tests (from 82% in 2012 to 87%) – with 42% doing so annually – and the fact that 58% now have a nutrient budget or Fert\$mart plan for the farm. It may also be due to the increasing number of dairy farmers now sourcing advice from professionals (up 6 points to 88%).



- There is widespread confidence among dairy farmers in their understanding of soil constraints – regardless of whether they conduct annual soil tests or not.

Farm effluent management

- The proportion of farms with a pond system to capture dairy shed effluent has continued to trend upwards, reaching 79% this year. Nationally, only 4% of farms have a system that allows effluent to drain directly to paddocks.



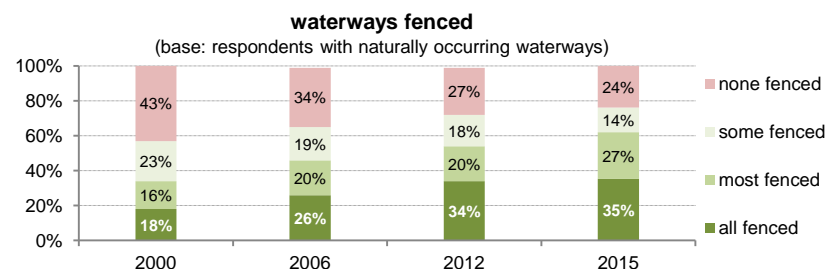
- Solids are removed prior to effluent reaching ponds or the sump on many farms with large to xx-large herds, but is less common where herds are smaller (from 66% of xx-large herds to 29% of small herds).
- A very high 86% of all farms apply effluent to land, but only 18% (of all farms) test the nutrient value of effluent. It is applied to approximately 21% of the farm on average and this proportion equates to 34 hectares.
- One third of dairy farms now have either a permanent (24%) or semi-permanent (9% feedpad) which is typically used when paddocks are wet, in hot weather and/or when there is no feed in the paddock. Only 24% of feedpads are accessed every day (8% of ALL farms). On average, cows remain on feedpads for 4 hours, but this varies from an hour to more than 12 hours. Only 15% of feedpads have a roof.
- In total, 59% of feedpads are dry scraped and do not have a roof, but in the event of rainfall, most effluent washes into a pond or sump system. There are however 17% of feedpads where effluent drains directly to the paddock when it rains. This proportion equates to 6% of ALL dairy farms.
- There is a sizeable proportion of dairy farmers (38%) who would need some information and/or support if they decided to make changes to their effluent system. Of note, 11% of all respondents do not know where to source information.

Land and waterways management

- Less than half of all dairy farms (45%) manage areas for conservation or biodiversity. On average these areas represent 7% of the farm (or 4% of ALL dairy farm land). Data extrapolation suggests that approximately 59,000 hectares are being conserved.

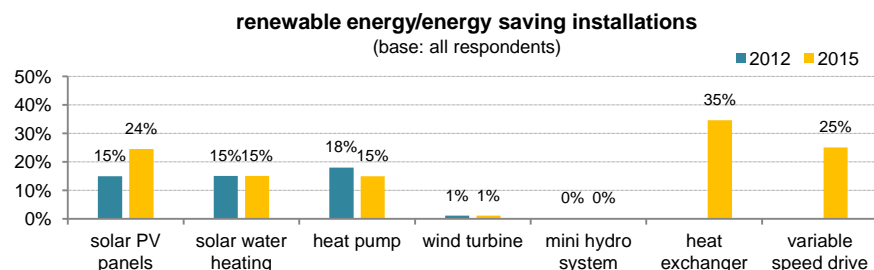
Executive Summary

- Sixty percent (60%) of dairy farms have naturally occurring waterways on their property. Over the past 15 years, the proportion of farms with ALL these waterways fenced has doubled, from 18% to 35%. There has also been significant improvement in the proportion having most waterways fenced (from 16% to 27%). Additionally, 24% of respondents with waterways on their property have plans to undertake more fencing in future. If funding support for fencing is no longer available, more than half of this group will still undertake the fencing planned, but in many cases, the planned work would take longer than currently anticipated.



Renewable energy installations

- Since 2012, there has been a significant increase in the proportion of dairy farms with solar PV panels installed (from 15% to 24%). The average kw of power generated is 10 kw, but there is substantial range – from less than 4 kw to more than 40.
- Heat exchanger units are found on 35% of farms (with a further 10% planning to install them in the short term) and variable speed drives have been installed on 25% (with 12% having plans to do so).



Recycling

- Silage wrap is used on 77% of farms, but only 35% of these farms currently recycle any of the wrapping material. This group recycles a very high 82% of their silage wrap, but this equates to only 28% of ALL silage wrap used. Recycling is set to become more widespread however, with 16% of those using it saying they have plans to do so in the short term.

- Over the past year, 35% of respondents have participated in the Drum Muster program and an additional 29% say they will do so next year. Survey results also reveal that 5% of dairy farms recycle their drums, but not through the Drum Muster program specifically.

Conclusions and recommendations

- Most farms needing to actively manage for noxious weeds and insect pests are doing so and activities are resulting in less widespread weed issues. Additional encouragement to be more pro-active managing weeds may be required in Dairy NSW region however where more farms are experiencing problems.
- The use of timers for spray irrigation and pivots is trending upwards, but irrigation timing decisions continue to be based on dairy farmer experience rather than technology. More could be done to encourage all irrigators to record the amount of water used at each irrigation.
- Many farms are recycling a considerable amount of the water used in the dairy, but there is clearly scope to encourage further adoption of this practice, particularly among those with smaller herds.
- Survey results suggest more dairy farmers are making strategic decisions about fertiliser use, applying the nutrient types needed as indicated by soil test results and recommended by fertiliser sellers and private agronomists. Effluent is being applied to soils on a high proportion of dairy farms, but its nutrient levels are rarely being tested however and clearly this needs to continue to be encouraged.
- The proportion of farms with effluent pond systems is increasing, but there are still a number of farms in SDP allowing effluent to drain directly to the paddocks and further encouragement and incentives may be required in this region. With most farms applying effluent to land without knowing its nutrient value, this is an area for improvement.
- A modest amount of dairy farm land is being managed for conservation and biodiversity. This is probably to be expected however, with economic pressures meaning that as much land as possible needs to be productive.
- Most silage wrap is not currently being recycled and it will be important to ensure dairy farms are aware of options for recycling. Similarly, promoting Drum Muster depot sites will need to continue.
- There has been increased use of solar energy on dairy farms as well as some installation of heat exchange units and variable speed drives. Adoption of renewable energy options is likely to continue and consequently ensuring dairy farmers know where to source the most reliable information on these products will be important.

Main report

1. Introduction and methodology

Introduction

One of the primary objectives outlined in the Australian Dairy Industry Sustainability Framework is to reduce the environmental impact of the industry as a whole. The NRM Survey has been conducted to provide data on several key indicators including the following:

- Land management issues such as soil, noxious weed and pest management
- Irrigation water use efficiencies
- Fertiliser use management
- Farm effluent management
- Managing for conservation and biodiversity
- Using renewable energy
- Recycling and re-use activities

Methodology

- 601 Computer Assisted Telephone Interviews (CATI) were conducted with a random sample of dairy farmers across Australia.
- Contact details for respondents were sourced from the levy-payers database provided by Dairy Australia.
- The randomisation process was computer driven, using specially designed SPSS software, SurveyCraft.
- Quotas were set by sub-region, with the total in each dairy region as follows.

	total	murray	westvic	gipps	dairy nsw
# interviews	601	110	110	110	45

	sdp	sa	wa	tas
# interviews	90	60	31	45

- Data was weighted at computer stage to represent the true geographic distribution of dairy farmers to ensure the national result is not disproportionately affected by sub regions with smaller numbers of dairy farmers.
- Interviews were conducted by MarketMetrics in Melbourne in accordance with Australian Standards.
- Interviewing was conducted from the end of August to the end of September 2015.
- Interviewers fully briefed by DTER prior to commencement and worked from a fully supervised central office.
- Average interview length was 25 minutes
- The overall survey response rate in 2015 was 69%.

Confidence limits

- The margin for error on the whole sample is $\pm 3.5\%$, but it becomes greater where sample size is smaller. The table below provides details:

sample base	margin for error
600	$\pm 3.5\%$
500	$\pm 4.0\%$
200	$\pm 6.4\%$
100	$\pm 9.0\%$
50	$\pm 12.7\%$

2. Definitions and report notes

Throughout this report, reference is made to various herd size segments, defined in the table below:

Herd size	Small	Herd size of less than 150
	Medium	Herd size between 150 – 300
	Large	Herd size between 301 – 500
	X-large	Herd size between 501 – 700
	XX-large	Herd size greater than 700

Sample bases

Throughout this report, bases used for measuring various aspects vary. Readers should note that bases are identified for all report sections, tabulations and charts.

Statistically significant differences

In this report, only statistically significant differences at the 95% confidence level as well as trends in data are commented on. If no reference is made of a difference between segments, the reader can safely assume it is because the difference is not significant.

3. Major land management issues being faced

Questions asked:

Q6. Which of the following are major land management issues for your farm?

Q7. Are you confident you have enough information and support to deal with (read issues from Q6)?

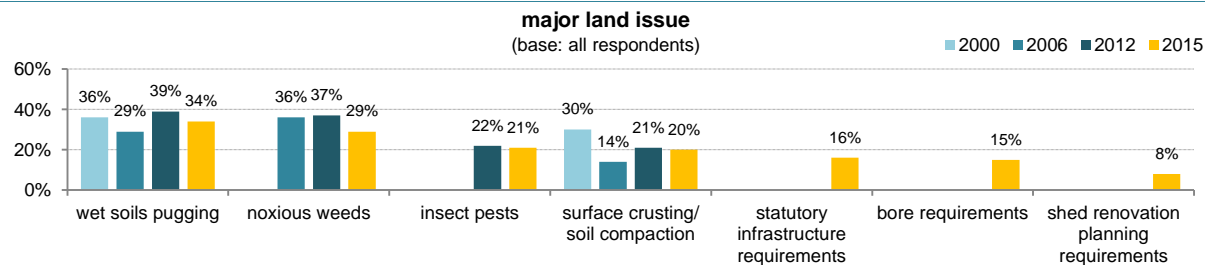
Q10. If not confident: What additional information or support do you require to assist your management of (from Q6)?

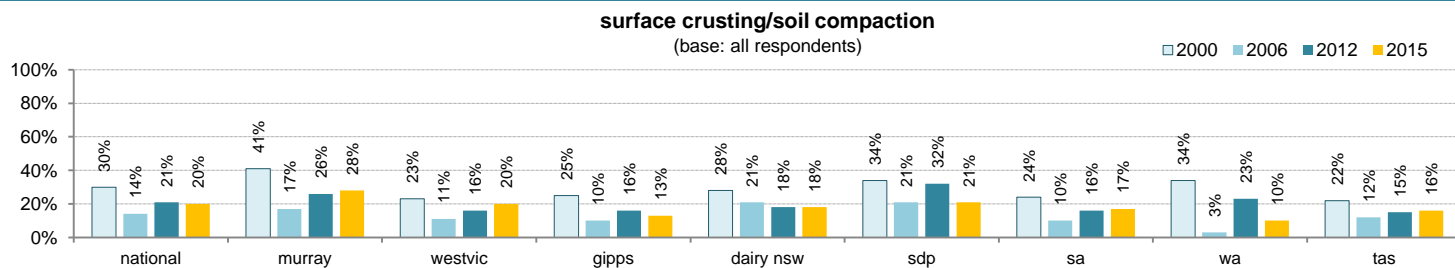
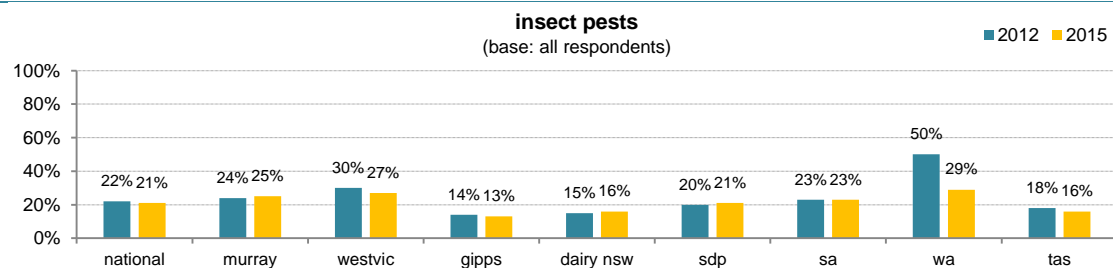
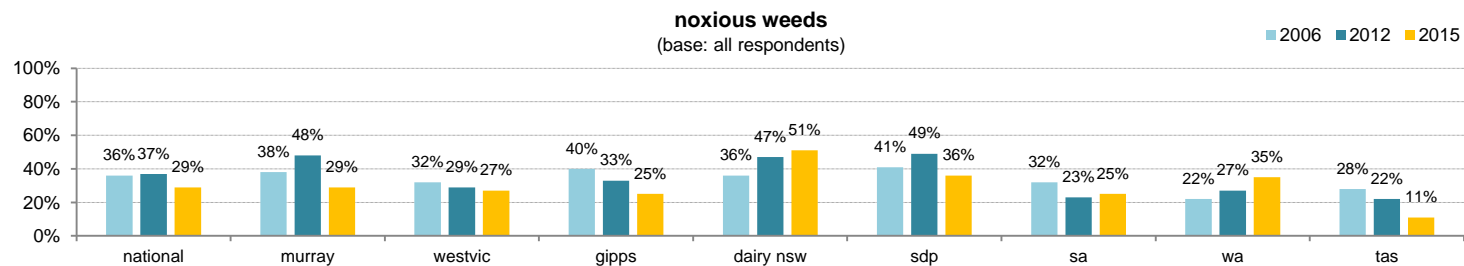
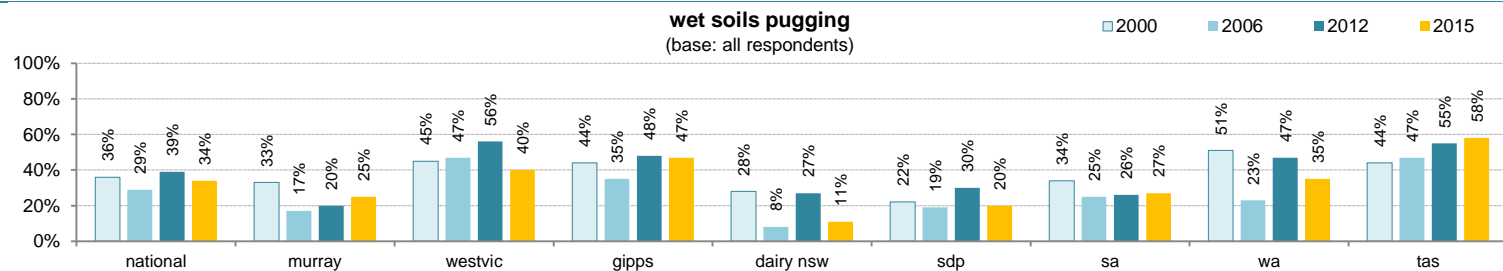
Q8. Are you actively managing the noxious weeds that are a major issue for your farm? **New 2015**

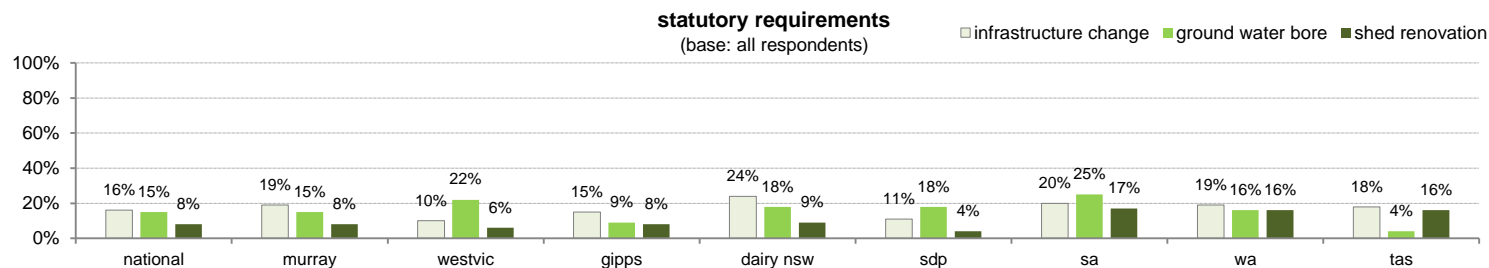
Q9. Are you actively managing insect pests that are a major issue for your farm? **New 2015**

major land management issue	% mentioning (base: all respondents)								
	national (n=601)	murray (n=110)	westvic (n=110)	gipps (n=110)	dairy nsw (n=45)	sdp (n=90)	dairy sa (n=60)	wa (n=31)	tas (n=45)
Wet soils pugging	34%	25%	▼40%	47%	▼11%	20%	27%	35%	58%
Wet soils pugging info/support required	4%	3%	5%	5%	0%	▼1%	3%	6%	9%
Noxious weeds	▼29%	▼29%	27%	25%	51%	36%	25%	35%	11%
Actively managing noxious weeds	28%	29%	26%	25%	44%	31%	25%	35%	11%
Noxious weeds info/support required	4%	5%	2%	3%	16%	9%	2%	10%	0%
Insect pests	21%	25%	27%	13%	16%	21%	23%	29%	16%
Actively managing insect pests	20%	25%	27%	11%	13%	18%	23%	29%	16%
Insect pests info/support required	2%	2%	5%	1%	0%	6%	0%	6%	0%
Surface crusting or soil compaction	20%	28%	20%	13%	18%	21%	17%	10%	16%
Crusting/compacting info/support required	4%	5%	6%	4%	2%	1%	2%	6%	7%
Statutory infrastructure requirements	16%	19%	10%	15%	24%	11%	20%	19%	18%
Statutory info/support required	6%	8%	5%	5%	9%	4%	10%	10%	7%
Ground water bore requirements	15%	15%	22%	9%	18%	18%	25%	16%	4%
Ground bore info/support required	4%	4%	7%	2%	4%	4%	8%	6%	2%
Shed renovation planning requirements	8%	8%	6%	8%	9%	4%	17%	16%	16%
Renovation info/support required	2%	4%	2%	1%	0%	1%	7%	6%	7%
None of the above	26%	29%	23%	26%	24%	29%	22%	19%	22%

▼ significantly lower than 2012







Notable results

- ◆ Among the issues tested, wet soils pugging is the most common particularly in Tasmania, where results continue to trend upwards.
- ◆ Noxious weeds are a challenge for an increasing proportion of Dairy NSW and WA respondents, but becoming less so in Tasmania and Gippsland as well as marginally in WestVic. While all the WA respondents with a noxious weed problem actively manage these weeds, there are some in Dairy NSW who do not.
- ◆ In most regions, proportions of respondents reporting an issue with insect pests has remained similar to 2012. In WA however, insect pests appear to be slightly less widespread currently.
- ◆ Surface crusting or soil compaction is becoming more common in Murray Dairy and WestVic.
- ◆ Despite some issues affecting more dairy farms than in the past, only relatively small proportions would like additional information or support to manage them.
- ◆ Statutory requirements have been an issue for some dairy farmers, with 16% having difficulties with infrastructure changes, 15% with ground water bore requirements and 8% with shed renovation planning requirements.

Implications

Wet soils pugging is becoming a more widespread problem, particularly in Tasmania and Gippsland where stocking rates are increasing (see next section of this report).

Where noxious weeds and insect pests are an issue and they are typically being actively managed, there is no evidence of them becoming a more widespread issue. In Dairy NSW however, noxious weeds are affecting a growing number of farms, but not all are managing for them and consequently it will be worth ensuring dairy farmers in that region are aware of the best control methods.

Although less than 20% of respondents nominate aspects of statutory requirements as an issue, the survey did not identify the proportion of farms undertaking infrastructure changes, dairy shed redevelopment or drilling bores. If this measure had been taken it would have provided insight into the proportion of farms for whom this metric is relevant.

4. Stocking rates and area under crop

Questions asked:

Q5. How many cows will be calved down this financial year – that is 2011 to 2012?

Q2. How many hectares of land do you use for your milking platform – that is grazing land, not including your support blocks?

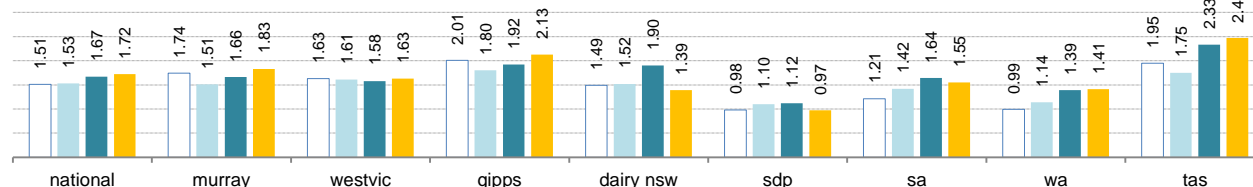
Q4. How many hectares of land did you have under crops during 2014-15?

farm type		% mentioning (base: all respondents)								
		national (n=601)	murray (n=110)	westvic (n=110)	gipps (n=110)	dairy nsw (n=45)	sdp (n=90)	dairy sa (n=60)	wa (n=31)	tas (n=45)
Average stocking rate:										
Irrigation farms	cows/ha	1.82	1.84	1.70	2.34	1.36	1.02	1.79	1.47	2.57
Dryland farms	cows/ha	1.57	1.60	1.59	1.98	1.48	0.92	0.94	1.38	2.06
Total: All farms	cows/ha	1.72	1.83	1.63	2.13	1.39	0.97	1.55	1.41	2.47
Change since 2012 survey		+3%	+10%	+3%	+11%	-27%	-13%	-6%	+2%	+6%
Average area under crop:										
Irrigation farms average	hectares	50	67	17	11	84	83	67	32	4
Dryland farms average	hectares	33	31	14	6	48	133	225	57	9
Total: All farms average	hectares	43	65	15	8	73	106	107	47	5
Average milking platform area:										
Irrigation farms average	hectares	177	165	231	142	199	173	207	233	189
Dryland farms average	hectares	168	116	187	125	144	211	243	265	172
Total: All farms average	hectares	173	186	161	179	171	174	171	189	179
Average milking platform area:										
Irrigation farms average	hectares	227	232	248	153	283	256	274	265	193
Dryland farms average	hectares	201	147	201	131	192	344	468	322	181
Total: All farms average	hectares	216	251	176	187	244	280	278	236	184

average stocking rate (cows/ha milking area)

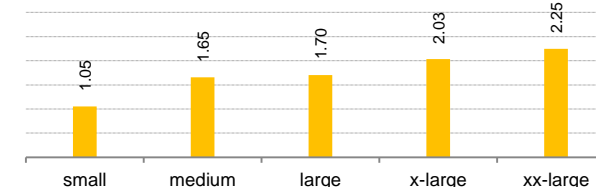
(base: all respondents)

2000 2006 2012 2015



average stocking rate (cows/ha milking area)

(base: all respondents)



Notable results

- Over the past 15 years, stocking rates have risen consistently nationally from 1.51 cows per hectare to 1.72.
- Tasmanian herds average 2.47 milking cows to the hectare while in SDP the average is less than 1 cow per hectare.
- On farms with xx-large herds, stocking rates average 2.25 while on those with small herds the average is 1.05.

Implications

Stocking rates continue to increase on dairy farms even though the rate is fairly slow (1 cow per 5 hectares over the past 15 years).

Stocking rates have reached more than 2 cows per hectare in both Tasmania and Gippsland – the two dairy regions also most likely to nominate wet soil pugging as an issue for their farm.

5. Irrigation issues

5.1 Irrigation farms

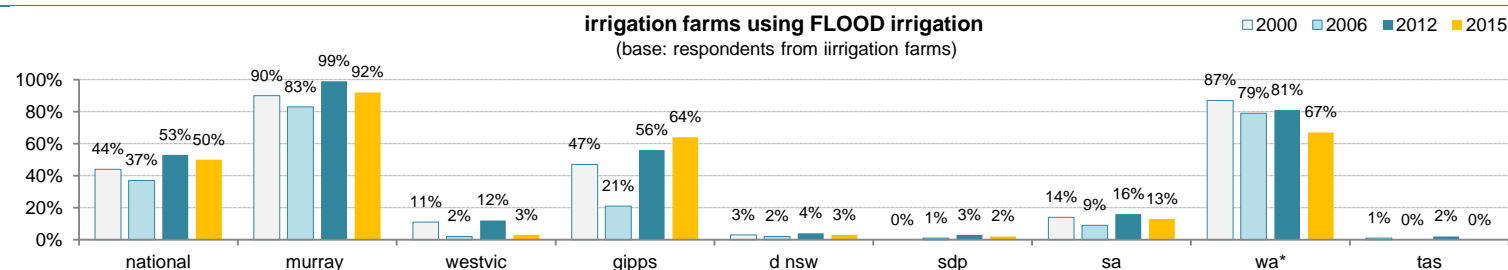
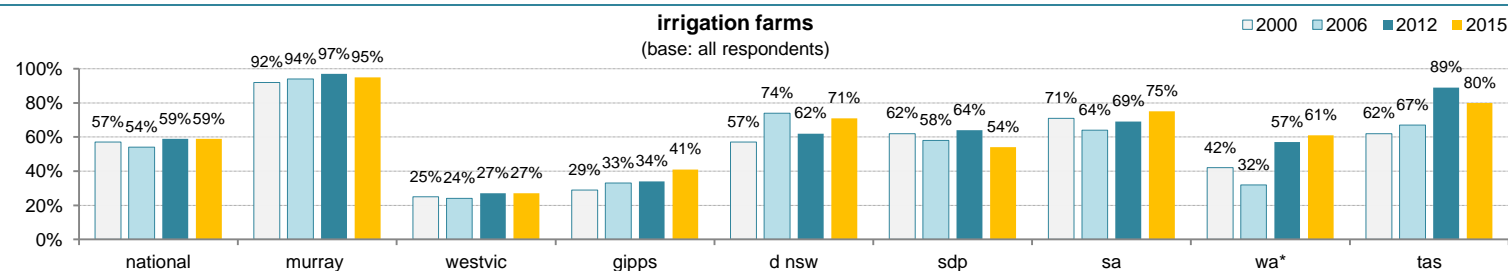
Questions asked:

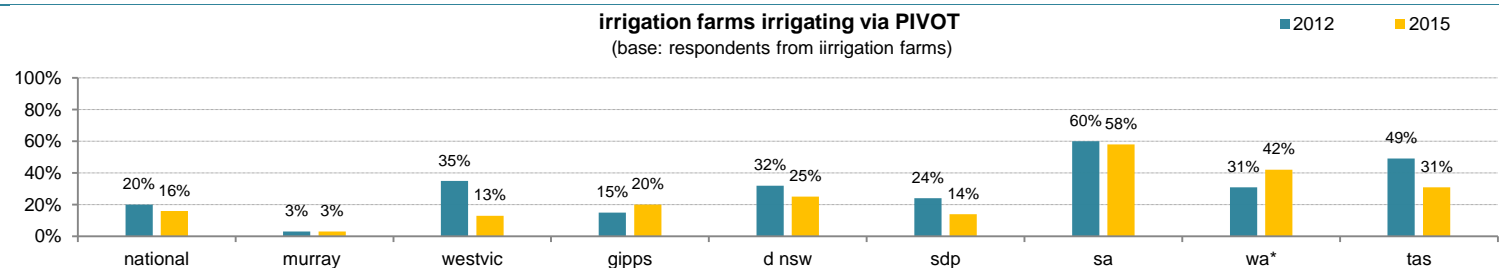
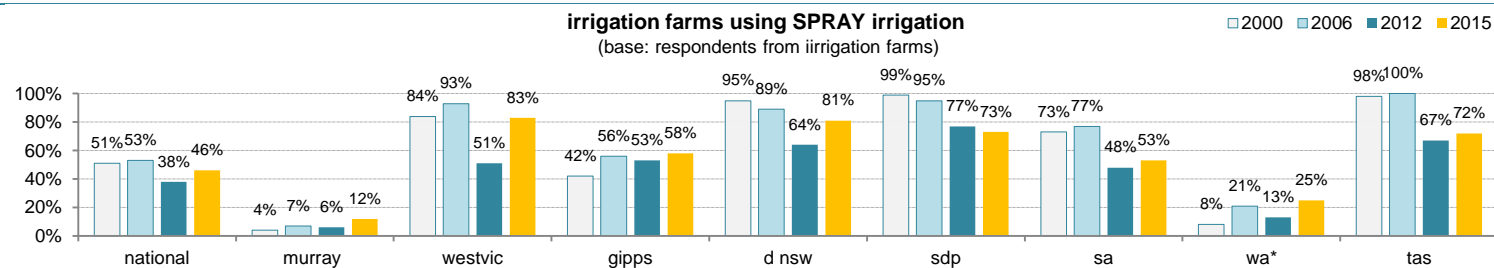
Q3. How many hectares of that land do you normally irrigate – that is with irrigation water, not effluent? Q12. In an average year, how many hectares do you flood irrigate, spray irrigate, irrigate via pivot, other?

farm type	% mentioning (base: all respondents)								
	national (n=601)	murray (n=110)	westvic (n=110)	gipps (n=110)	dairy nsw (n=45)	sdp (n=90)	dairy sa (n=60)	wa (n=31)	tas (n=45)
Irrigation farms	59%	95%	27%	41%	71%	54%	75%	61%	80%
Dryland farms	41%	5%	73%	59%	29%	46%	25%	39%	20%

irrigation type used	% using irrigation type (base: respondents from irrigation farms)								
	national (n=353)	murray (n=104)	westvic (n=30)	gipps (n=45)	dairy nsw (n=32)	sdp (n=49)	dairy sa (n=45)	wa (n=12)*	tas (n=36)
Flood irrigation	50%	92%	3%	64%	3%	2%	13%	67%	0%
Spray irrigation	46%	12%	83%	58%	81%	73%	53%	25%	72%
Irrigation via pivot	16%	3%	13%	20%	25%	14%	58%	42%	31%
Other irrigation	6%	2%	10%	2%	0%	14%	13%	0%	22%
More than one means	18%	9%	9%	44%	9%	3%	37%	34%	25%

*Caution: small sub sample Errors due to rounding





Notable results

- ◆ Nationally there has been little change since 2000 in the proportion of dairy farms using water to irrigate at least some part of the farm.
- ◆ There has been an upward trend in Gippsland over this time however, with a significantly greater proportion of farms irrigating now compared to 15 years ago.
- ◆ Flood irrigation systems continue to be common in Murray Dairy and the MID in Gippsland. In other regions, spray systems are widespread.

Implications

Flood and spray irrigation systems continue to be more common on dairy farms than pivots.

5.2 Proportion of land irrigated and ML water sourced

Questions asked:

Q2. How many hectares of land do you use for your milking platform – that is grazing land, not including your support blocks?

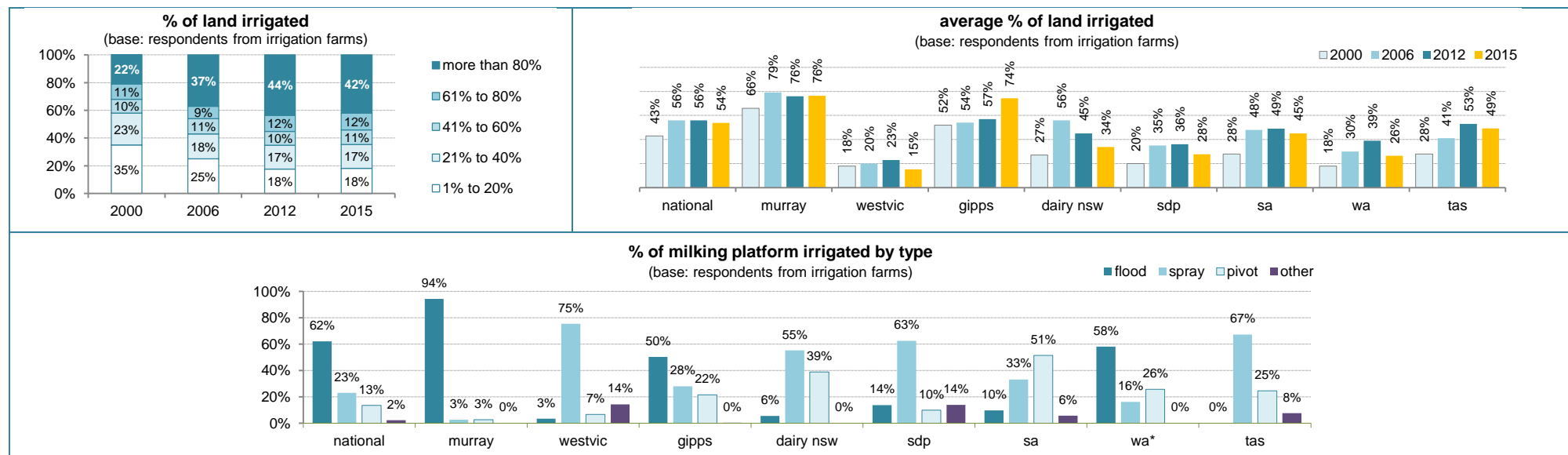
Q3. How many hectares of that land do you normally irrigate – that is with irrigation water, not effluent?

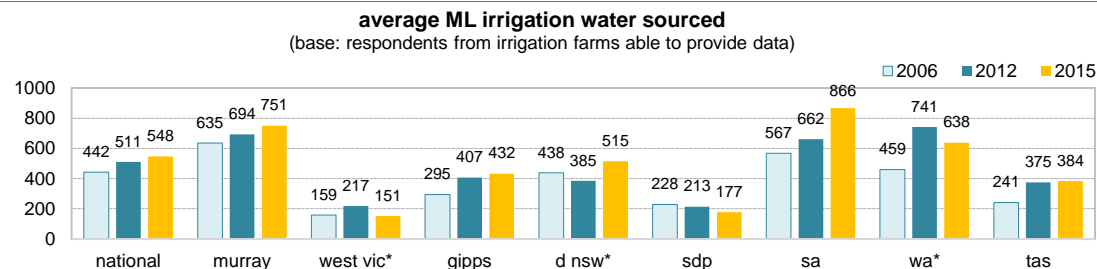
Q15. In an average year, how many hectares do you flood irrigate, spray irrigate, irrigate via pivot, other?

Q11. In total, how many megalitres of water do you source in an average year?

% of land irrigated	average % of land								
	national	murray	westvic	gipps	dairy nsw	sdp	dairy sa	wa	tas
% of all milking herd platform land (including dryland and irrigation)									
Average % of land irrigated	32%	73%	5%	33%	26%	14%	32%	9%	40%
Average % of land flood irrigated	20%	69%	0%	16%	1%	2%	3%	5%	0%
Average % of land spray irrigated	7%	2%	4%	9%	14%	9%	11%	2%	27%
Average % of land irrigated by pivot	4%	2%	0%	7%	10%	1%	17%	2%	10%
Average % of land irrigated by other	1%	0%	1%	0%	0%	2%	2%	0%	3%
% of milking platform land irrigated on irrigation farms only									
Average % of land irrigated	54%	76%	15%	74%	34%	28%	45%	26%*	49%
Ave % of irrig. land flood irrigated	62%	94%	3%	50%	6%	14%	10%	58%*	0%
Ave % of irrig. land spray irrigated	23%	3%	75%	28%	55%	63%	33%	16%*	67%
Ave % of irrig. land irrigated by pivot	13%	3%	7%	22%	39%	10%	51%	26%*	25%
Ave % of irrig. land irrigated by other	2%	0%	14%	0%	0%	14%	6%	0%*	8%

*Caution: small sub sample





Notable results

- ◆ Nationally, approximately one third of the milking platform is irrigated, ranging from only 5% in WestVic to 73% in Murray Dairy.
- ◆ On farms using irrigation, the average land irrigated is 54% - no real change from previous surveys.
- ◆ Across all irrigation farms, 62% of irrigated land is watered by a flood system, but most of this land is in Murray Dairy and the MID. In other regions, spray and pivot systems water more land than other systems. Note: the sample size in WA is too small to draw definite conclusions.
- ◆ The mean volume of water sourced by irrigators has continued to increase, reaching 548 ML of water in an 'average' year.
- ◆ Upward trends in the amount of irrigation water sourced are evident in Murray Dairy, Gippsland and SA.
- ◆ Irrigators in SA and Murray Dairy source the largest average volume of water.

Implications

The amount of land irrigated has not changed over the past few years, nor has the means by which it is irrigated.

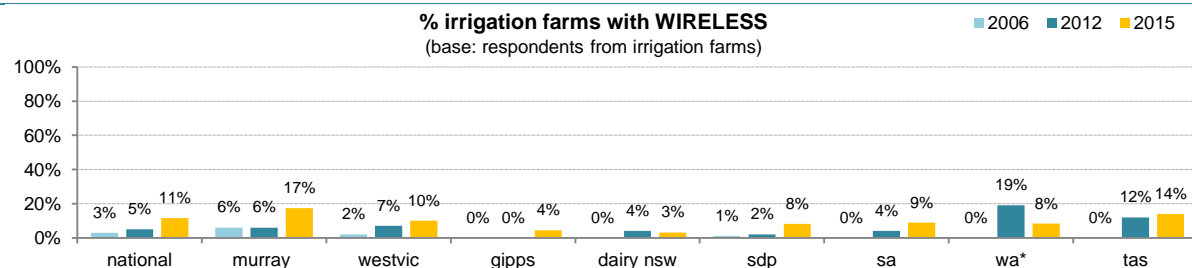
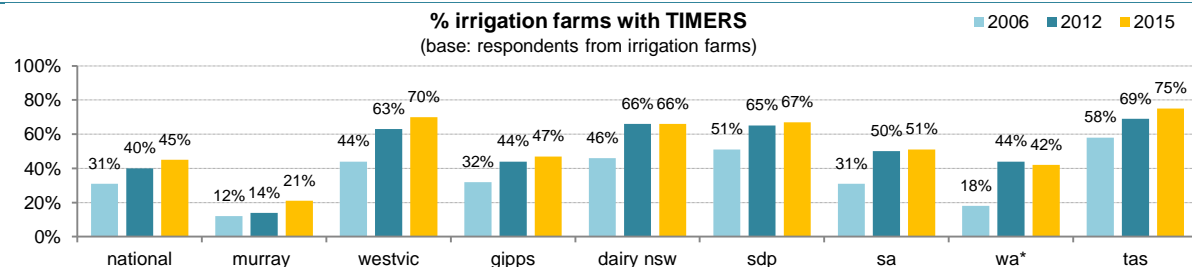
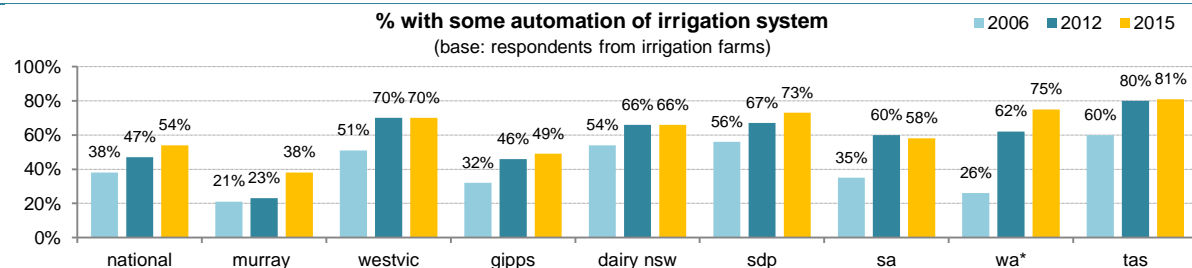
Although the area irrigated has remained similar to previous years (when this metric has been measured), the amount of water applied has been steadily rising.

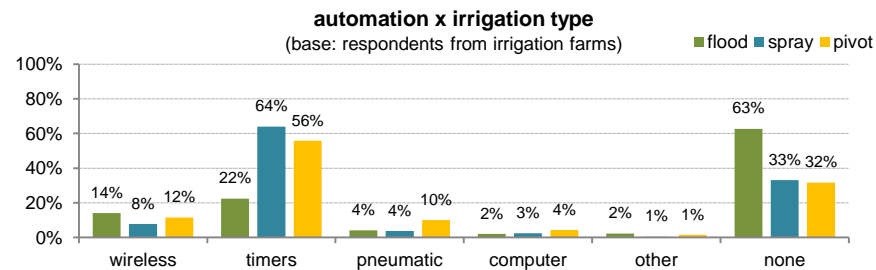
5.3 Irrigation system automation

Question asked: Q13. Does your irrigation system have any of the following automation?

irrigation system automation	% mentioning (base: respondents from irrigation farms)								
	national (n=353)	murray (n=104)	westvic (n=30)	gipps (n=45)	dairy nsw (n=32)	sdp (n=49)	dairy sa (n=45)	wa (n=12)*	tas (n=36)
Timers	45%	21%	70%	47%	66%	67%	51%	42%	75%
Wireless system	▲ 11%	▲ 17%	10%	4%	3%	8%	9%	8%	14%
Pneumatic/air pressure	5%	5%	▲ 13%	2%	0%	8%	2%	17%	6%
Computer/electronically controlled motor/sprinkler	2%	1%	7%	2%	3%	4%	2%	17%	0%
Other	1%	3%	0%	0%	0%	0%	0%	0%	3%
Total: some automation	▲ 54%	▲ 38%	70%	49%	66%	73%	58%	75%	81%
No automation/manual system only	▼ 46%	▼ 62%	30%	51%	34%	27%	42%	25%	19%

▲ significantly higher than 2012 ▼ significantly lower than 2012 *Caution: small sub sample





Notable results

- ◆ The proportion of irrigation farms with some form of automation has continued to trend upwards, reaching 54% this year. This trend is evident in SDP, Gippsland, Murray Dairy and WA (although the sample size in WA is too small to draw definite conclusions).
- ◆ Adoption of automation has increased significantly in Murray Dairy since 2012, but it continues to be the lowest nationally.
- ◆ Timers are now significantly more common on irrigation farms than they were in 2006 (45% compared to 31%) and notably, 64% of spray systems and 56% of pivots now have timers.
- ◆ Only 11% of irrigation farms have a wireless system, but this proportion is significantly higher than in 2006 and is trending upward, notably in Murray Dairy.

Implications

Automated irrigation systems are becoming increasingly more common, with most spray systems and pivots now having timers.

There are still many farms that have manually operated irrigation systems and the next section of this report shows they are used when a dairy farmer believes it is very dry or when the pasture is looking in need of moisture.

5.4 Basis for deciding when to irrigate

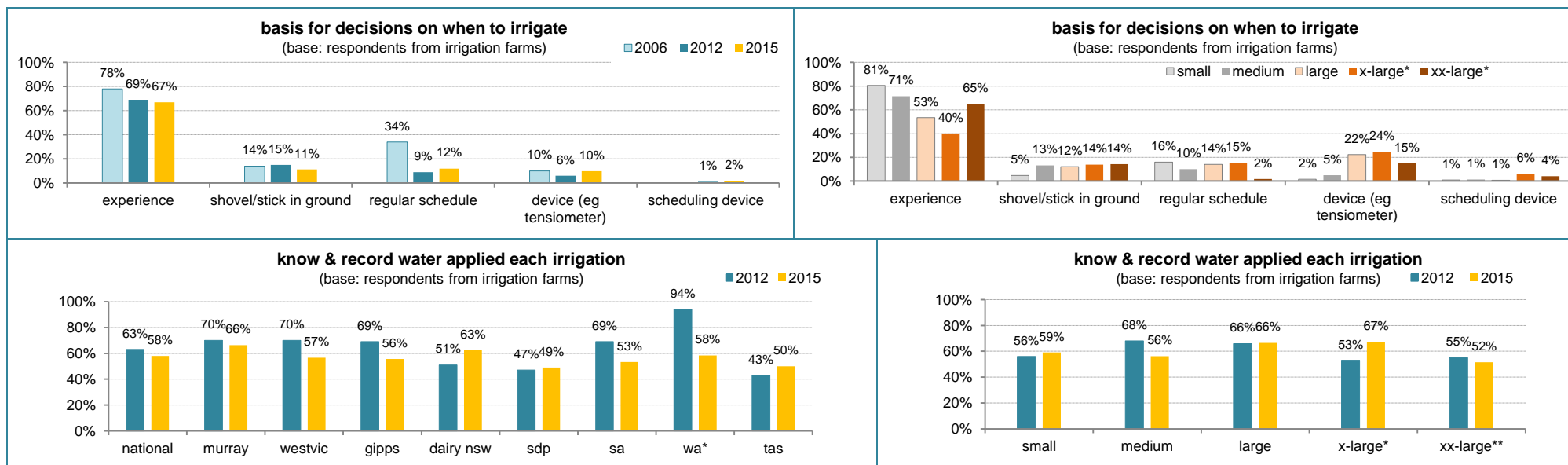
Questions asked:

Q14. Which of the following methods most closely describes how you normally decide when to irrigate?

Q15. Do you know and record how much water you apply each irrigation?

basis for decisions	% mentioning (base: respondents from irrigation farms)								
	national (n=353)	murray (n=104)	westvic (n=30)	gipps (n=45)	dairy nsw (n=32)	sdp (n=49)	dairy sa (n=45)	wa (n=12)*	tas (n=36)
Experience, based on recent climate or appearance of pasture	67%	68%	70%	69%	▼ 53%	78%	53%	75%	64%
Follow regular schedule	12%	▲ 20%	10%	7%	3%	8%	7%	8%	3%
Shovel or stick in ground to indicate soil moisture	11%	▼ 7%	7%	20%	25%	10%	9%	0%	11%
Specific device (e.g. tensiometer)	▲ 10%	▲ 8%	13%	2%	16%	2%	29%	17%	19%
Device for scheduling (e.g. gypsum blocks, Gbug, Aquaflex)	2%	0%	0%	4%	3%	2%	2%	8%	3%
Know and record the amount of water applied at each irrigation	58%	66%	57%	56%	63%	49%	53%	58%	50%

▲ significantly higher than 2012 ▼ significantly lower than 2012 *Caution: small sub sample



Notable results

- ◆ The vast majority of irrigators continue to base their decisions on when to irrigate on experience, recent climate or the appearance of the pasture.
- ◆ Specific devices such as tensiometers are used by only 10% of irrigators and while this is a significant rise since 2012, it is on par with the 2006 result, suggesting the 2012 'dip' was a sampling anomaly.
- ◆ Only 2% of respondents who irrigate have a device for scheduling.
- ◆ In a result similar to 2012, 58% of irrigators say they know and record the amount of water applied each irrigation. There is little difference to this result by region or herd size.

Implications

Adoption levels for technical soil moisture devices remain arguably low, with the majority of irrigators relying on their experience as well as weather conditions to decide when to irrigate.

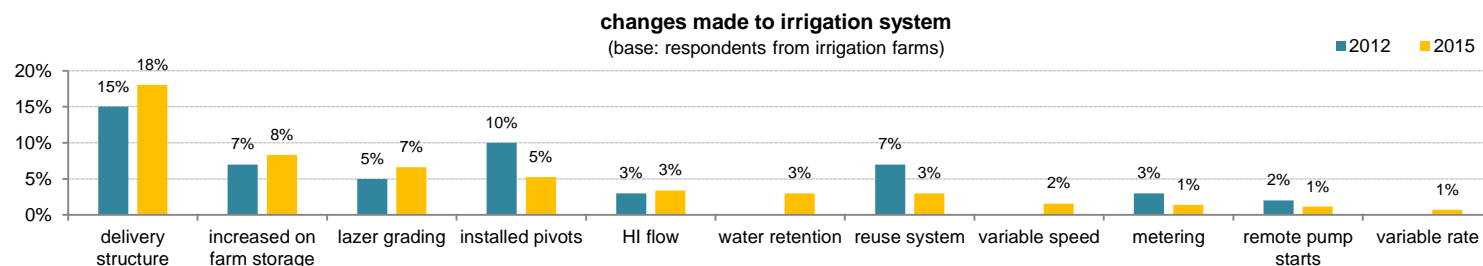
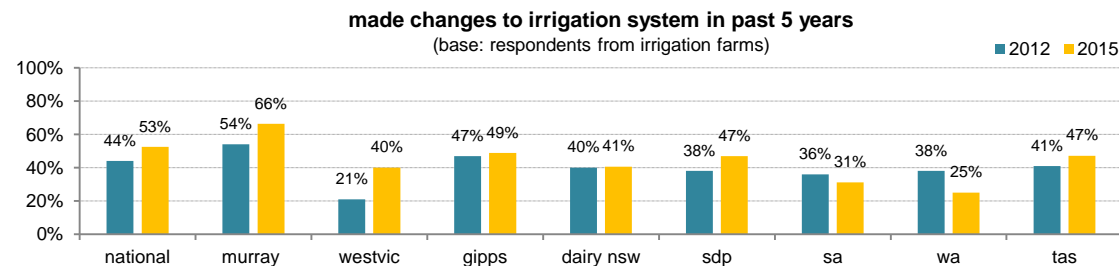
There are still a number of irrigation farms that do not know and record the amount of water used each irrigation and clearly more could be done to encourage this practice.

5.5 Irrigation system changes made over past 5 years

Questions asked: Q16. Have you made changes to your water storage or irrigation systems over the last 5 years? Q17. If yes: What measures have you undertaken?

changes made to irrigation system (main mentions)	% respondents mentioning (base: respondents from irrigation farms)								
	national (n=353)	murray (n=104)	westvic (n=30)	gipps (n=45)	dairy nsw (n=32)	sdp (n=49)	dairy sa (n=45)	wa (n=12)*	tas (n=36)
Made changes	▲ 53%	66%	40%	49%	41%	47%	31%	25%	47%
Delivery structure upgrade	18%	26%	10%	16%	19%	8%	7%	8%	14%
Increased on farm storage	8%	8%	13%	7%	3%	8%	0%	8%	19%
Lazer grading	7%	14%	0%	4%	0%	0%	2%	0%	0%
Installed pivots	▼ 5%	2%	3%	7%	3%	12%	7%	8%	14%
Improve water retention	3%	3%	0%	2%	6%	6%	0%	0%	6%
Reuse system	3%	5%	3%	4%	0%	0%	0%	0%	0%
HI Flow	3%	5%	0%	9%	0%	0%	0%	0%	0%
Variable speed drive on pumps	2%	1%	7%	0%	3%	0%	0%	0%	3%
Metering	1%	1%	3%	0%	0%	2%	0%	0%	6%
Remote pump starts	1%	1%	3%	0%	0%	2%	0%	0%	3%
Variable rate application	1%	1%	3%	0%	0%	0%	0%	0%	0%

▲ significantly higher than 2012 ▼ significantly lower than 2012 *Caution: small sample size



Notable results

- ◆ More than half the respondents from irrigation farms (53%) have made changes to their water storage or irrigation systems over the past 5 years, including an arguably high 66% in Murray Dairy. The national proportion is significantly higher than 2012.
- ◆ Changes have been varied, but typically include an upgrade to the delivery structure.
- ◆ By region, the following changes are the most common:

Murray Dairy:

- delivery structure upgrade (26% of irrigation farms)
- lazer grading (14%)

WestVic Dairy:

- increased on-farm storage (13% of irrigation farms)
- delivery structure upgrade (10%)

GippsDairy:

- delivery structure upgrade (16% of irrigation farms)
- HI Flow (9%)

Dairy NSW:

- delivery structure upgrade (19% of irrigation farms)
- improved water retention (6%)

SDP:

- Installed pivots (12% of irrigation farms)
- delivery structure upgrade (8%)
- increased on-farm storage (8%)

Dairy SA:

- delivery structure upgrade (7% of irrigation farms)
- installed pivots (7%)

Western Dairy (caution, small sub sample):

- delivery structure upgrade (8% of irrigation farms)
- installed pivots (8%)
- increased on-farm storage (8%)

Dairy Tas:

- increased on-farm storage (19% of irrigation farms)
- delivery structure upgrade (14%)
- installed pivots (14%)

Implications

Survey results reveal that irrigation systems are being upgraded over time. The National Dairy Farmer Survey has revealed that investment in irrigation systems is closely linked to profitability, with farmers spending in this area when they are able.

6. Dairy shed water reuse

Questions asked:

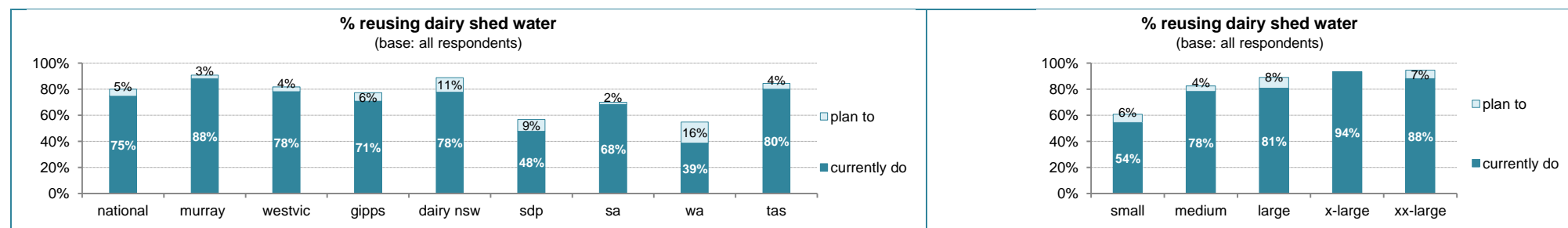
Q18. Do you recycle any water from the dairy shed for reuse on-farm or for washing down or irrigation? *New question 2015*

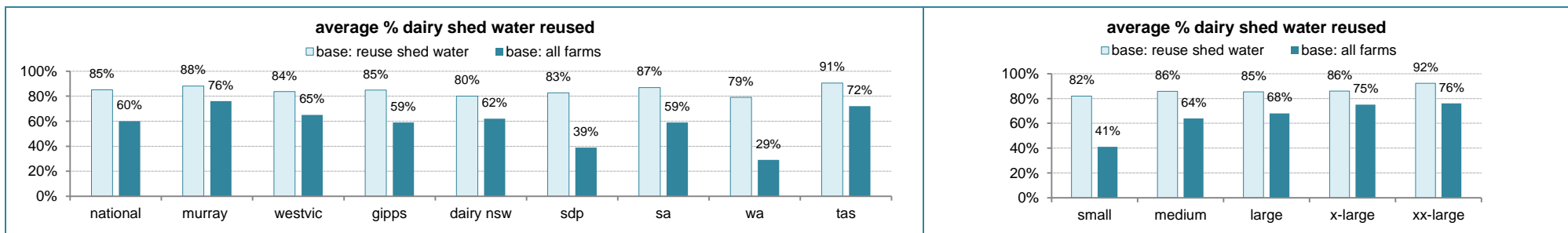
Q19. If yes: Approximately what proportion of water from the dairy shed is re-used for washing down or irrigation? *New question 2015*

dairy shed water reused	% mentioning (base: all respondents)								
	national (n=601)	murray (n=110)	westvic (n=110)	gipps (n=110)	dairy nsw (n=45)	sdp (n=90)	dairy sa (n=60)	wa (n=31)	tas (n=45)
Recycle water from dairy shed	75%	88%	78%	71%	78%	48%	68%	39%	80%
Don't currently recycle water from dairy shed but intend to over coming years	5%	3%	4%	6%	11%	9%	2%	16%	4%
Water not recycled/no intention to do so	20%	9%	18%	23%	11%	43%	30%	45%	16%

% dairy shed water reused	% mentioning (base: respondents reusing dairy shed water)								
	national (n=421)	murray (n=96)	westvic (n=85)	gipps (n=75)	dairy nsw (n=35)	sdp (n=42)	dairy sa (n=41)	wa (n=11)*	tas (n=36)
Up to 10%	2%	3%	2%	3%	0%	0%	0%	0%	3%
10% to 20%	5%	5%	2%	3%	14%	5%	7%	9%	3%
21% to 30%	3%	2%	2%	4%	0%	10%	0%	0%	0%
31% to 40%	1%	0%	2%	1%	0%	0%	2%	0%	0%
41% to 50%	7%	3%	11%	8%	6%	7%	7%	9%	3%
51% to 60%	2%	0%	2%	3%	3%	2%	0%	9%	0%
61% to 70%	2%	0%	4%	0%	6%	2%	0%	0%	3%
71% to 80%	5%	5%	5%	5%	9%	2%	2%	18%	8%
81% to 90%	5%	3%	7%	5%	6%	7%	12%	9%	3%
91% to 99%	0%	0%	0%	1%	0%	0%	0%	0%	0%
100%	69%	78%	62%	67%	57%	64%	68%	45%	78%
Average % dairy shed water recycled	85%	88%	84%	85%	80%	83%	87%	79%	91%
Average % of ALL dairy shed water recycled (including those not recycling)	60%	76%	65%	59%	62%	39%	59%	29%	72%

**Caution: small sub sample*





Notable results

- ◆ Dairy shed water is currently reused on three quarters (75%) of dairy farms, with a further 5% intending to do so in the short term.
- ◆ There is considerable variation in results by region however, from a very high 88% of farms in Murray Dairy and 80% in both Tasmania and the Macalister Irrigation District to a significantly lower 39% in WA and 48% in SDP.
- ◆ A very high percentage (85%) of dairy shed water is reused on those farms where this is done. This equates to 60% of ALL dairy shed water (including those reusing none).
- ◆ Respondents with larger herds are the most likely to reuse water from the dairy while those with small herds are the least likely.

Implications

A substantial amount of the water used in dairy sheds is being recycled, but there is certainly scope for improvement in this measure, particularly on smaller farms and those in WA and SDP.

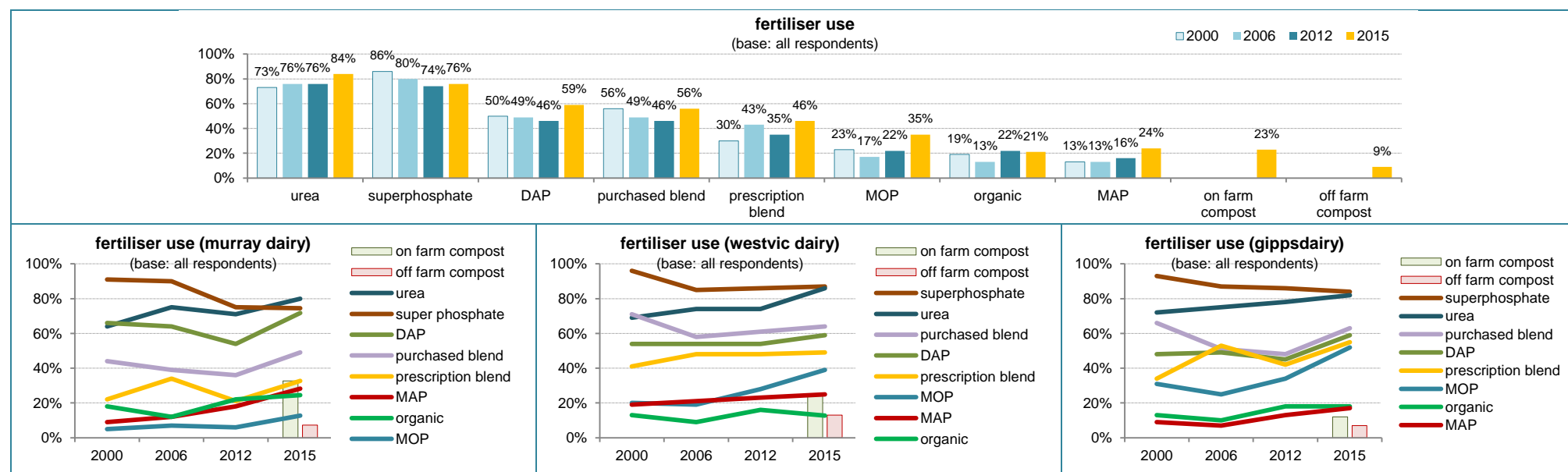
7. Fertiliser management

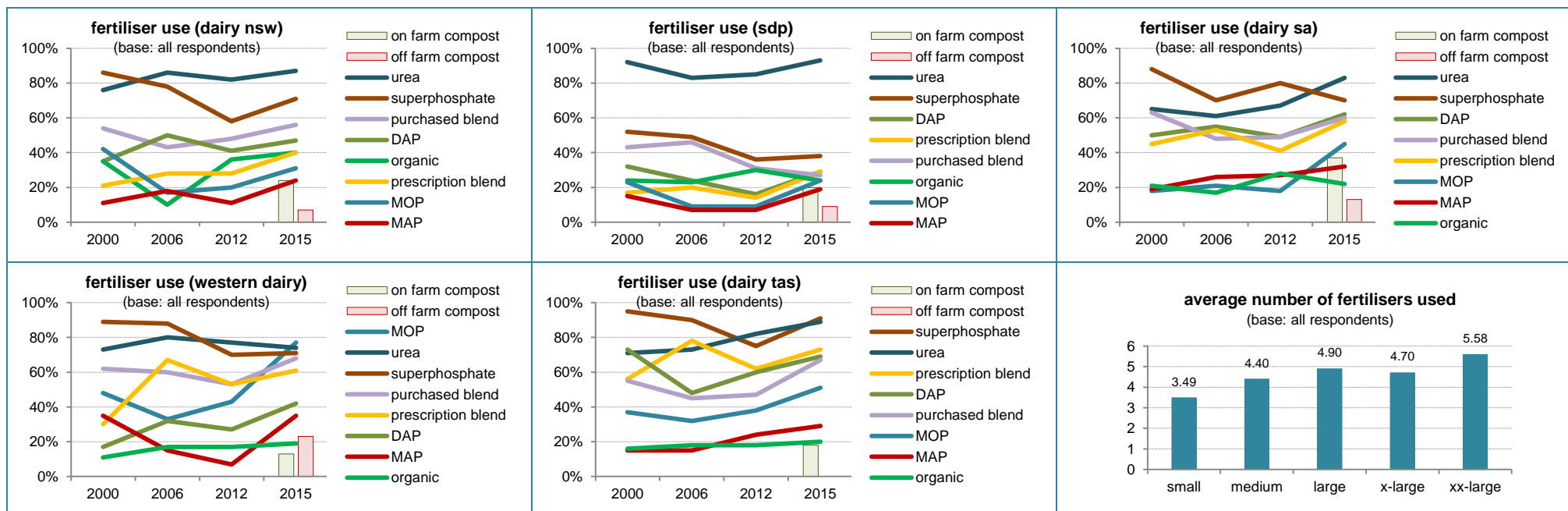
7.1 Fertiliser types used

Question asked: Q20. Which of the following fertilisers have you used on your dairy farm over the past three years?

fertiliser type used	% mentioning (base: all respondents)								
	national (n=601)	murray (n=110)	westvic (n=110)	gipps (n=110)	dairy nsw (n=45)	sdp (n=90)	dairy sa (n=60)	wa (n=31)	tas (n=45)
Urea	84%	80%	86%	82%	87%	93%	83%	74%	89%
Superphosphate	76%	75%	87%	84%	71%	38%	70%	71%	91%
DAP	59%	72%	59%	59%	47%	29%	62%	42%	69%
Off the shelf purchased blend	56%	49%	64%	63%	56%	27%	60%	68%	67%
Prescription blend	46%	33%	49%	55%	40%	29%	58%	61%	73%
Muriate of Potash	35%	13%	39%	52%	31%	24%	45%	77%	51%
MAP	24%	28%	25%	17%	24%	19%	32%	35%	29%
Compost (only ingredients from farm) new 2015	23%	33%	25%	12%	24%	20%	37%	13%	18%
Organic	21%	25%	13%	18%	40%	24%	22%	19%	20%
Compost (includes off farm ingredients) new 2015	9%	7%	13%	7%	7%	9%	13%	23%	0%
None	1%	2%	1%	2%	2%	1%	0%	0%	0%
Average number of fertiliser types used	4.51	4.29	4.72	4.77	4.47	3.31	5.00	5.00	5.13

▲ significantly higher than 2012





Notable results

- ◆ In 2012, the 'average' dairy farmer had used 3.5 different fertilisers in the previous 3 years. In 2015, the average number of fertilisers used has risen to 4.5.
- ◆ Farms with smaller herds use only 3.5 different fertilisers on average, while those with xx-large herds use 5.6.
- ◆ Urea and superphosphate continue to be used extensively.
- ◆ Nationally, there has been a significant increase since 2012 in the proportion of farms applying urea, DAP, 'off the shelf' as well as 'prescription' blends and/or Muriate of Potash.
- ◆ Compost made entirely from ingredients sourced from respondent farms has been used by 23%, but 9% have used other compost that has included ingredients brought in from off- farm. The proportion of WA respondents using compost made with off-farm ingredients (23%) is the highest nationally, while none of the Tasmanian dairy farmers interviewed use off-farm compost.

Implications

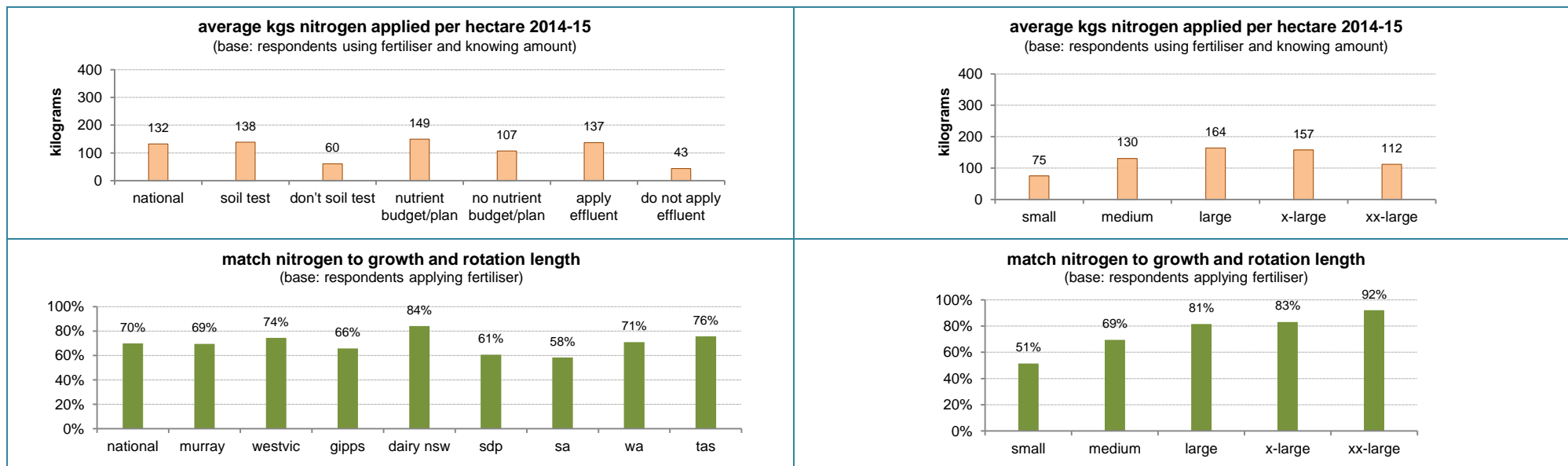
More dairy farmers are now using a wider variety of fertilisers than they have done in the past. This may be due to more dairy farmers conducting soil tests and identifying a need for a particular nutrient or mineral (see Section 7.3).

7.2 Nitrogen application

Question asked: Q21. What was the total amount of nitrogen fertiliser applied for the 2014-15 year? *New question 2015*
 Q22. Do you match your nitrogen applications to plant growth rate and pasture rotation length? *New question 2015*

nitrogen applied 2014-15	average tonnes/kgs per hectare/% mentioning (base: respondents applying nitrogen and able to provide answer)								
	national (n=467)	murray (n=76)	westvic (n=92)	gipps (n=80)	dairy nsw (n=40)	sdp (n=72)	dairy sa (n=40)	wa (n=25)*	tas (n=42)
Average total tonnes applied	29	18	34	27	26	27	30	35	60
Median total tonnes applied	15	10	20	20	13	15	14	22	28
Average kgs applied per hectare	132	77	151	197	101	89	90	118	306
Match nitrogen application to plant growth and pasture rotation length	70%	69%	74%	66%	84%	61%	58%	71%	76%

*Caution small sub sample



Notable results

- ◆ During the 2014-15 year, 93% of respondents applied nitrogen at an average rate of 132 kgs per hectare across the milking platform and cropping areas, or a total of 29 tonnes across the farm.
- ◆ The average rate of nitrogen application in Tasmania (306 kgs per hectare) is substantially higher than in other regions.
- ◆ It is notable that respondents who soil test have applied nitrogen at higher rates on average (138 kgs/ha) than those not testing (60 kgs/ha).
- ◆ Similarly, respondents with a nutrient plan or nutrient budget developed for the farm also applied nitrogen at higher rates (149 kgs/ha) than those without a budget (107 kgs/ha).
- ◆ By herd size, average rates of fertiliser application range from 75 kgs per hectare on farms with small herds to 164 kgs per hectare on farms with between 301 and 500 milking cows.
- ◆ The majority of respondents applying nitrogen fertilisers over the past year match these applications to plant growth rate and pasture rotation length.
- ◆ Respondents with larger herds are significantly more likely than those with smaller herds to match nitrogen application to growth rate and pasture rotation length.

Implications

Nitrogen has been applied on the majority of dairy farms over the past year and survey results suggest higher rates have been applied where soil tests have been conducted.

Matching nitrogen application to plant growth and pasture rotation length is common, particularly on farms with larger herds.

7.2 Fertiliser need assessments

Questions asked:

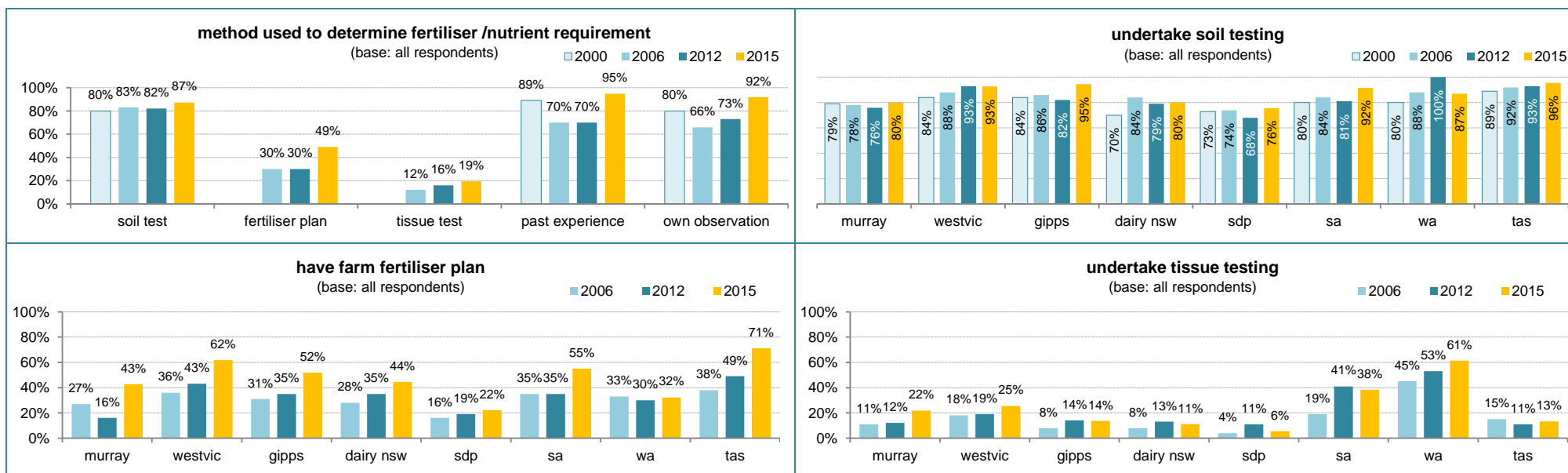
Q23. What methods are used to work out the farm's fertiliser or nutrient requirements – either by yourself or your agronomist or adviser?

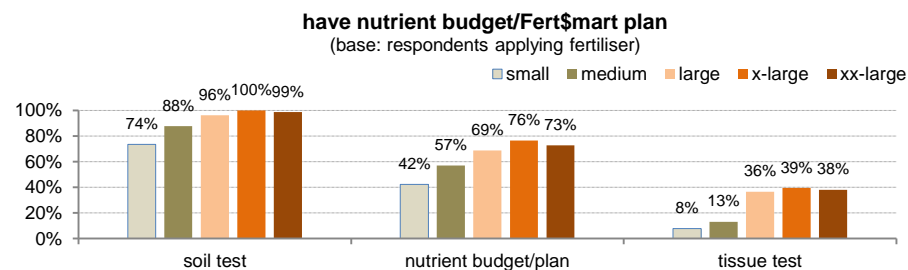
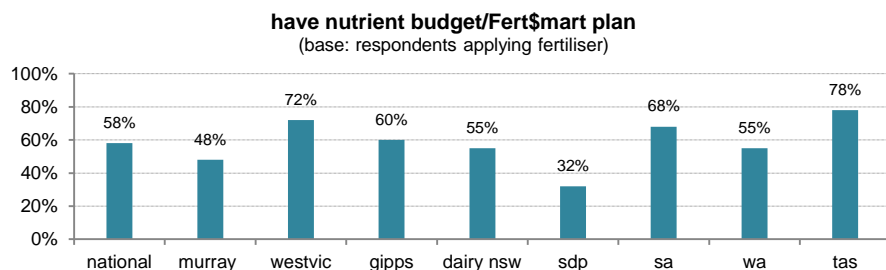
Q27. Do you have a fertiliser or nutrient management plan or Fert\$mart plan for the farm? **New question 2015**

assessment type	% mentioning (base: all respondents)								
	national (n=601)	murray (n=110)	westvic (n=110)	gipps (n=110)	dairy nsw (n=45)	sdp (n=90)	dairy sa (n=60)	wa (n=31)	tas (n=45)
Soil test	▲ 87%	80%	93%	▲ 95%	80%	76%	92%	87%	96%
Use whole farm fertiliser plan or nutrient management budget†	▲ 49%	▲ 43%	▲ 62%	▲ 52%	44%	22%	55%	32%	▲ 71%
Tissue test	19%	▲ 22%	25%	14%	11%	6%	38%	61%	13%
Use own observation	92%	95%	90%	90%	91%	94%	83%	97%	96%
Use past experience	95%	96%	95%	94%	93%	97%	87%	97%	98%
Currently have fertiliser/nutrient plan/Fert\$mart plan	9%	5%	10%	8%	11%	10%	13%	23%	7%
Don't currently have fertiliser/nutrient plan/Fert\$mart plan but plan to	7%	8%	2%	5%	18%	10%	10%	0%	4%
Don't currently have fertiliser/nutrient plan/Fert\$mart plan and no plan	30%	39%	21%	29%	18%	51%	20%	32%	13%
Don't know what a fertiliser/nutrient plan/Fert\$mart plan is	4%	2%	5%	4%	9%	4%	2%	13%	4%
Don't know if farm has a plan	0%	1%	0%	0%	0%	1%	0%	0%	0%
Total: Have whole farm fertiliser or nutrient plan/nutrient management budget or Fert\$mart plan	58%	48%	72%	60%	55%	32%	68%	55%	78%

▲ significantly higher than 2012

†Note: wording change since 2012; may have impacted results





Notable results

- ◆ Since 2012 there has been a significant rise in the proportion of dairy farmers soil testing (up from 82% to 87%). The most widespread increase is seen in Gippsland where there has been a 13 point increase to 95%.
- ◆ Similarly, the proportion of dairy farms with a whole farm fertiliser plan or nutrient management budget has risen significantly. It should be noted however, that in the past, respondents were only asked if they had a nutrient budget for the farm. Interestingly, when respondents who did not say they had a whole farm fertiliser plan or nutrient management budget were asked directly if they had a nutrient management plan or Fert\$mart plan, several answered yes, bringing the total from 49% to 58%.
- ◆ Tissue testing is now being undertaken on 19% of farms, a slight rise since 2012 (16%). There has been a substantial rise in Murray Dairy however, up from 12% to 22%.
- ◆ Respondents with larger herds are more likely than those with smaller herds to undertake soil testing and/or tissue testing as well as having a nutrient management plan or budget for the farm.

Implications

Clearly dairy farmers are learning more about the nutrient needs of their soils and responding by applying the fertilisers more strategically.

While nutrient budgets and plans are becoming more common, there is still room for improvement. This should occur as more dairy farmers participate in Fert\$mart.

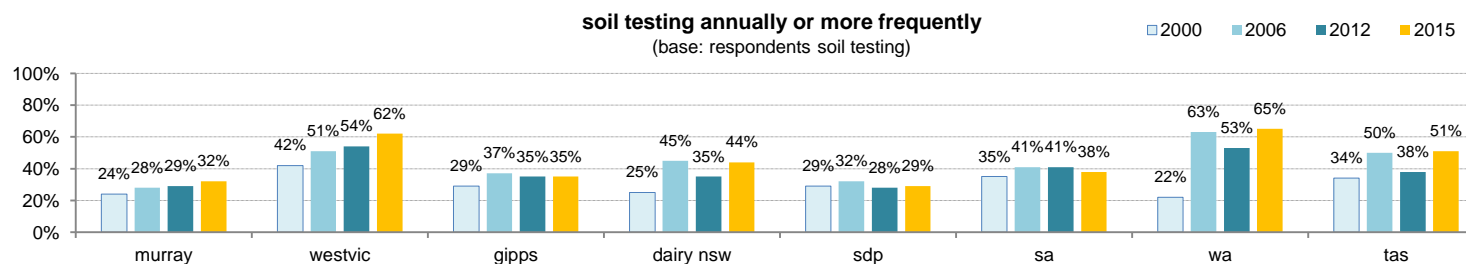
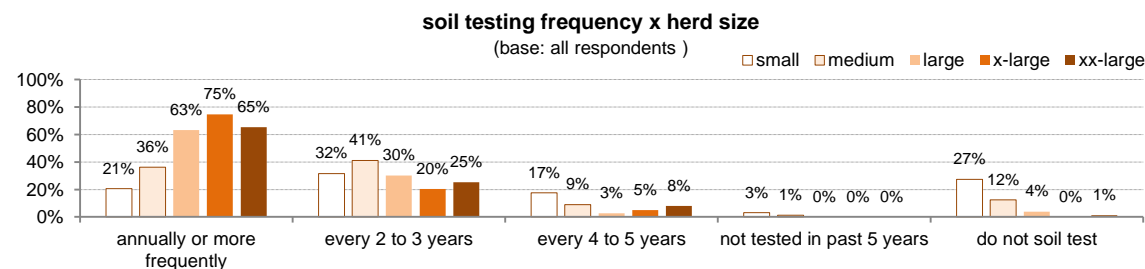
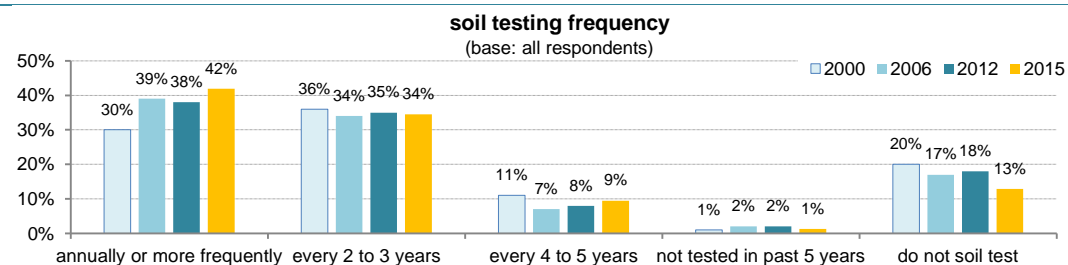
7.3 Soil testing regime

Questions asked:

Q26. How often do you soil test for nutrient levels on your farm?

Soil testing frequency	% mentioning (base: all respondents)								
	national (n=601)	murray (n=110)	westvic (n=110)	gipps (n=110)	dairy nsw (n=45)	sdp (n=90)	dairy sa (n=60)	wa (n=31)	tas (n=45)
Test annually or more frequently	42%	32%	62%	35%	44%	29%	38%	65%	51%
Test every 2 to 3 years	34%	36%	23%	▲ 48%	29%	30%	37%	▼ 16%	36%
Test every 4 to 5 years	9%	10%	7%	10%	4%	14%	15%	6%	9%
Not tested in past 5 years	1%	2%	1%	1%	2%	2%	2%	0%	0%
Do not soil test	▼ 13%	20%	7%	▼ 6%	20%	24%	8%	▲ 13%	4%

▲ significantly higher than 2012 ▼ significantly lower than 2012



Notable results

- ◆ The proportion of ALL dairy farms soil testing for nutrient levels annually or more frequently has trended upwards since 2000.
- ◆ The upward trend is particularly evident in WestVic where 62% now conduct soil tests annually or more frequently, matching the high proportion in WA (65%).
- ◆ Respondents with larger herds are substantially more likely than those with small or medium herds to soil test annually.

Implications

There has been a slight increase over the past 3 years in the proportion of dairy farms conducting annual soil tests, but some regions are less likely to do so than others.

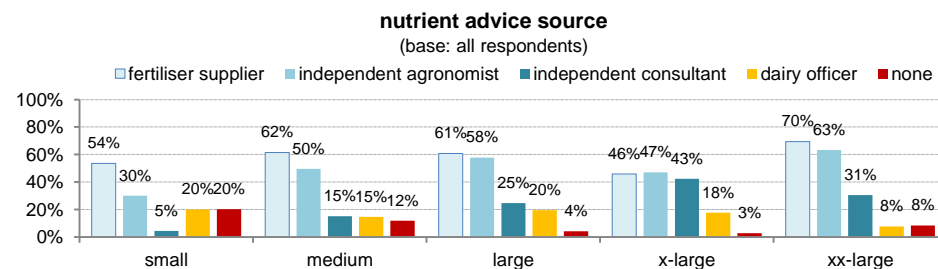
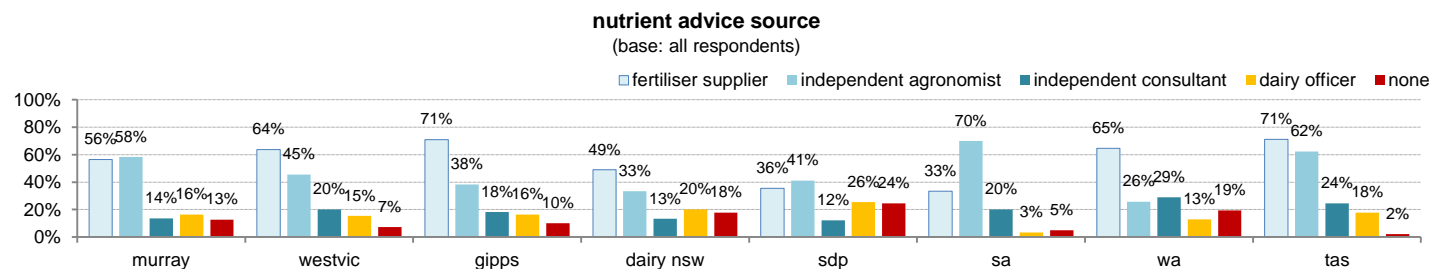
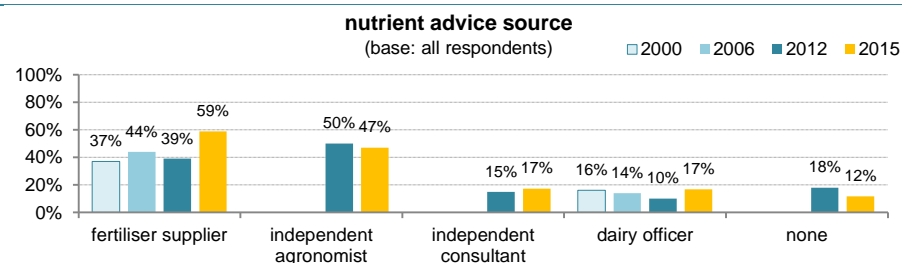
7.4 Sources of advice relating to farm's nutrient requirements

Question asked:

Q25. Do you receive advice from any of the following people to work out the farm's fertiliser or nutrient requirements?

advice source	% mentioning (base: all respondents)								
	national (n=601)	murray (n=110)	westvic (n=110)	gipps (n=110)	dairy nsw (n=45)	sdp (n=90)	dairy sa (n=60)	wa (n=31)	tas (n=45)
Fertiliser supplier	▲ 59%	▲ 56%	▲ 64%	▲ 71%	▲ 49%	36%	33%	65%	71%
Independent agronomist	47%	58%	45%	38%	33%	41%	70%	▼ 26%	▲ 62%
Other independent consultant	17%	14%	20%	18%	13%	12%	20%	29%	24%
Dairy officer	▲ 17%	▲ 16%	15%	16%	20%	26%	3%	13%	▲ 18%
Total: Independent consultant	53%	61%	54%	▼ 43%	▼ 40%	46%	▲ 82%	▼ 39%	▲ 71%
None	▼ 12%	13%	7%	10%	18%	24%	▼ 5%	19%	▼ 2%

▲ significantly higher than 2012 ▼ significantly lower than 2012



Notable results

- ◆ Overall, 88% of dairy farmers source advice on the farm's nutrient requirements from fertiliser suppliers, independent agronomists, independent consultants and/or dairy officers – a significant increase over the past 3 years (from 82%).
- ◆ More than half the respondents (59%) now source nutrient advice from a fertiliser supplier (up significantly from 39%) and 53% use the advice of an independent agronomists and/or consultant.
- ◆ Notably, 20% of respondents with small herds do not source nutrient advice.

Implications

Most dairy farmers seek advice on the farm's nutrient requirements and this is typically from fertiliser suppliers and independent agronomists.

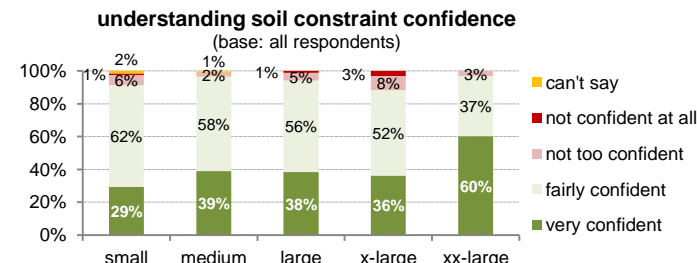
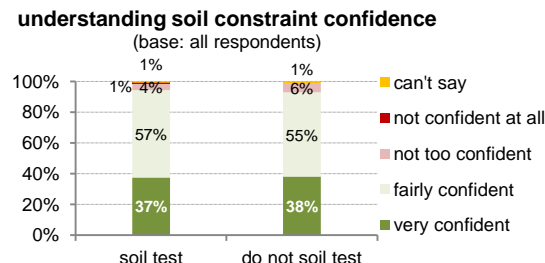
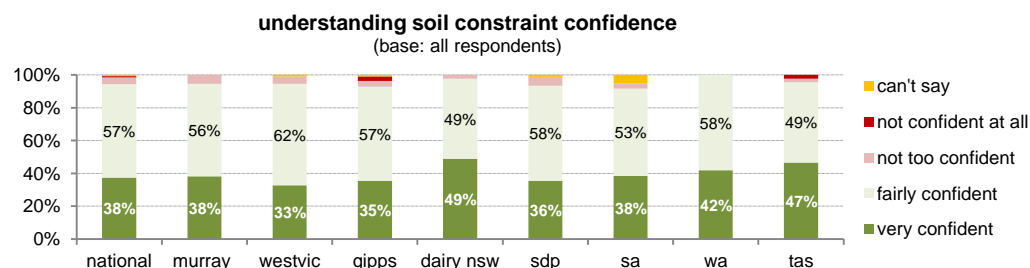
Work done by DTER in the past has revealed that farmers will validate or confirm advice received from these two sources before making decisions on how to proceed. Validation can be sought from a number of avenues and often includes neighbours, leading local farmers, internet, etc.

7.5 Understanding potential soil constraints

Question asked:

Q24. How confident are you that you understand the potential soil constraints on your farm? *New question 2015*

confidence level	% mentioning (base: all respondents)								
	national (n=601)	murray (n=110)	westvic (n=110)	gipps (n=110)	dairy nsw (n=45)	sdp (n=90)	dairy sa (n=60)	wa (n=31)	tas (n=45)
Very confident	38%	38%	33%	35%	49%	36%	38%	42%	47%
Fairly confident	57%	56%	62%	57%	49%	58%	53%	58%	49%
Not too confident	4%	5%	5%	4%	2%	6%	3%	0%	2%
Not confident at all	1%	0%	0%	3%	0%	0%	0%	0%	2%
Can't say	1%	0%	1%	1%	0%	1%	5%	0%	0%
Total: confident	94%	95%	95%	93%	98%	93%	92%	100%	96%
Total: not confident	5%	5%	5%	6%	2%	6%	3%	0%	4%



Notable results

- ◆ There is widespread confidence among survey respondents in their understanding of potential soil constraints on their farm.
- ◆ Of note, there are no significant differences in results by region or whether respondents conduct soil tests on the farm.
- ◆ The proportion of respondents with xx-large herds who are very confident in their understanding of soil constraints on the farm is significantly higher than those with other herd sizes.

Implications

The vast majority of dairy farmers are at least fairly confident in their understanding of the soil constraints of their farm.

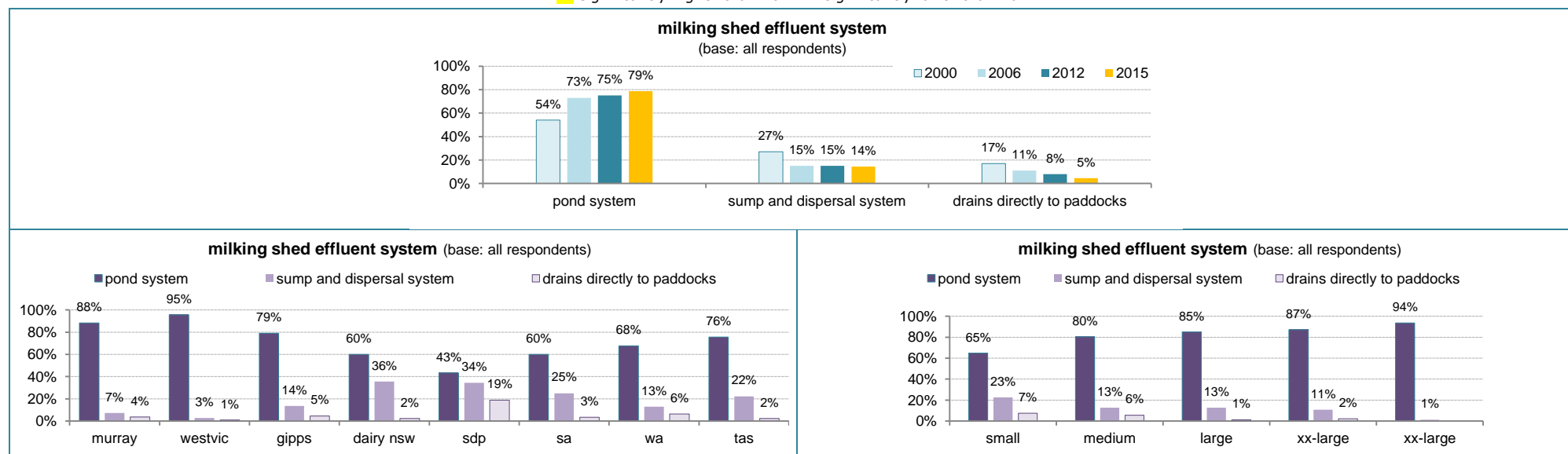
8. Farm effluent management

8.1 Milking shed effluent management

Questions asked: Q28. Which of the following best describes what initially happens to the effluent and run off from the milking shed?

shed effluent management activity	% mentioning (base: all respondents)								
	national (n=601)	murray (n=110)	westvic (n=110)	gipps (n=110)	dairy nsw (n=45)	sdp (n=90)	dairy sa (n=60)	wa (n=31)	tas (n=45)
Pond system, dispersed to selected paddocks	70%	80%	85%	72%	58%	30%	52%	55%	71%
Collected and retained in pond system	8%	8%	10%	7%	2%	13%	8%	13%	4%
Total: pond system	79%	88%	▲ 95%	79%	60%	43%	60%	68%	▲ 76%
Held in sump and dispersal system	14%	7%	3%	14%	36%	34%	25%	13%	22%
Drains directly to paddocks	▼ 5%	4%	1%	5%	▼ 2%	19%	3%	6%	▼ 2%
Other	2%	1%	1%	3%	2%	3%	12%	13%	0%

▲ significantly higher than 2012 ▼ significantly lower than 2012



Notable results

- ◆ An upward trend since 2000 is evident in the proportion of dairy farmers with a pond system for retaining effluent and run off from the milking shed.
- ◆ Only 5% of dairy farms now allow effluent to drain directly to paddocks and most of these farms run small to medium sized herds.

Implications

The installation of pond systems to capture effluent has continued and only a very small proportion of farms now allow dairy effluent to drain directly to surrounding paddocks.

There may be a need to better understand why there is an arguably high proportion of SDP farmers still allowing effluent to drain directly to paddocks and if this is a result of financial issues, then perhaps a scheme can be devised to assist in this area.

8.2 Milking shed effluent management

Questions asked:

Q29. Do you remove any manure solids prior to the effluent going into the pond or direct distribution systems either by ... ? **New 2015**

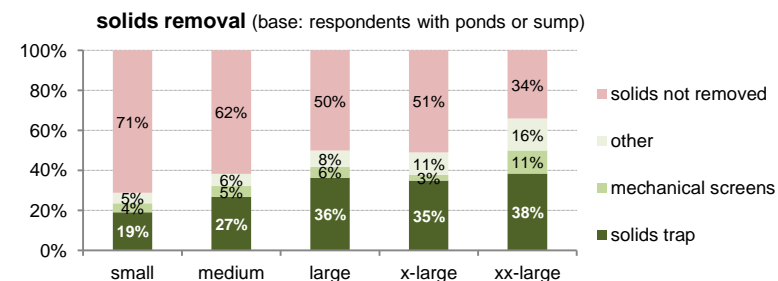
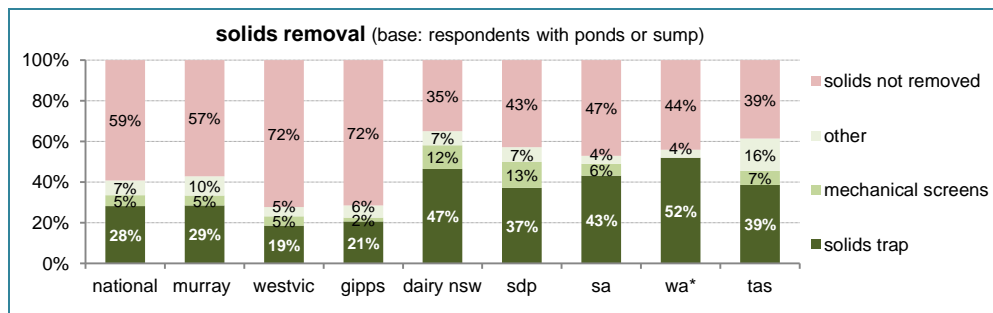
Q30. When do you clean solids out of the sludge pond? **New 2015**

Q31. How do you clean out the sludge pond? **New 2015**

effluent pond systems	% mentioning (base: respondents with effluent pond or sump system)								
	national (n=548)	murray (n=105)	westvic (n=108)	gipps (n=102)	dairy nsw (n=43)	sdp (n=70)	dairy sa (n=51)	wa (n=25)*	tas (n=44)
A trafficable solids trap	28%	29%	19%	21%	47%	37%	43%	52%	39%
Mechanical screens	5%	5%	5%	2%	12%	13%	6%	0%	7%
Other	7%	10%	5%	6%	7%	7%	4%	4%	16%
Do not remove solids	59%	57%	72%	72%	35%	43%	47%	44%	39%

when solids cleaned out/ how sludge pond cleaned	% mentioning (base: respondents with pond system)								
	national (n=455)	murray (n=97)	westvic (n=105)	gipps (n=88)	dairy nsw (n=30)	sdp (n=39)	dairy sa (n=39)	wa (n=23)*	tas (n=34)
When pond is full	40%	45%	34%	35%	57%	36%	31%	65%	35%
Before sludge reaches top/end of de-sludge period	28%	20%	35%	33%	20%	28%	26%	13%	35%
Annually or more frequently	7%	4%	13%	5%	3%	3%	18%	0%	9%
Every few years	5%	6%	8%	6%	0%	5%	0%	0%	0%
As required	5%	7%	5%	5%	3%	5%	3%	9%	3%
Other	4%	6%	1%	5%	3%	5%	5%	4%	9%
Never	10%	11%	4%	13%	13%	18%	18%	9%	9%
Sludge pond cleaned by contractor	65%	65%	83%	66%	37%	31%	49%	43%	65%
Used hired gear	2%	3%	0%	2%	0%	10%	0%	0%	0%
Used own equipment	31%	26%	22%	25%	67%	62%	41%	57%	35%
Other	1%	2%	1%	0%	3%	0%	0%	0%	3%
No need to clean out sludge pond	5%	6%	0%	9%	3%	3%	13%	4%	3%

*Caution: small sub sample



Notable results

- ◆ Among respondents with a pond or sump system, less than half remove manure solids prior to effluent going into the system.
- ◆ Farms with larger herds are the most likely to remove solids.
- ◆ Among respondents with a pond system, sludge is typically removed when the pond is full or when sludge reaches the top or end of the de-sludge period (mentioned by 68%). While approximately one third of respondents with a pond system clean it out themselves (mostly with their own equipment, 65% use a contractor).

Implications

Solids are removed prior to effluent reaching ponds or sumps on many farms with large to xx-large herds but less so where herds are smaller. It is possible these farms find the cost of solid removal systems prohibitive or the need to do so is less great.

Sludge ponds are usually cleaned out by a contractor, but it is often left until the pond is full to do so.

8.3 Applying effluent to land

Questions asked:

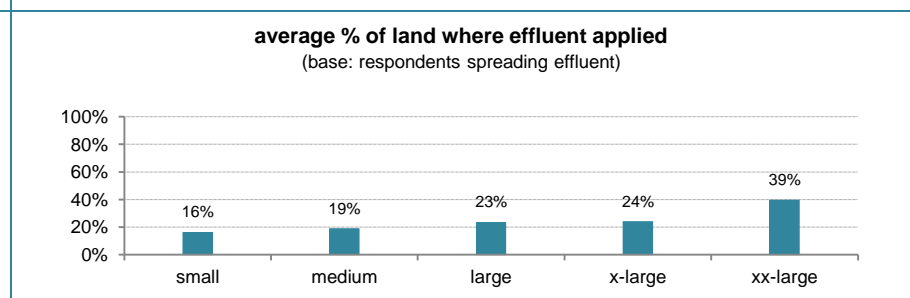
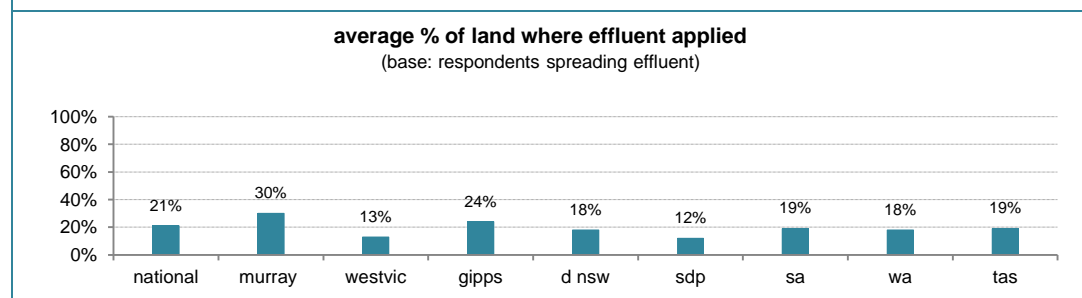
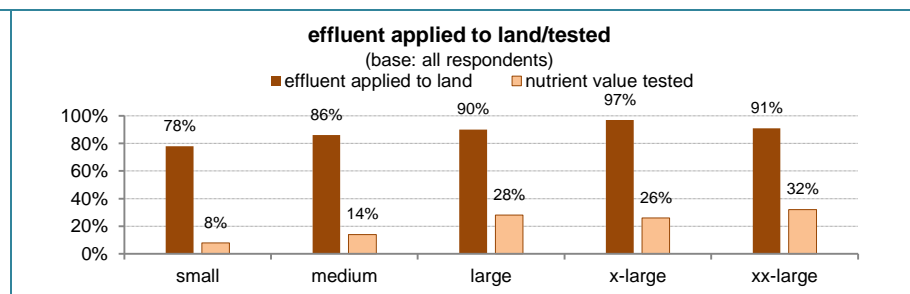
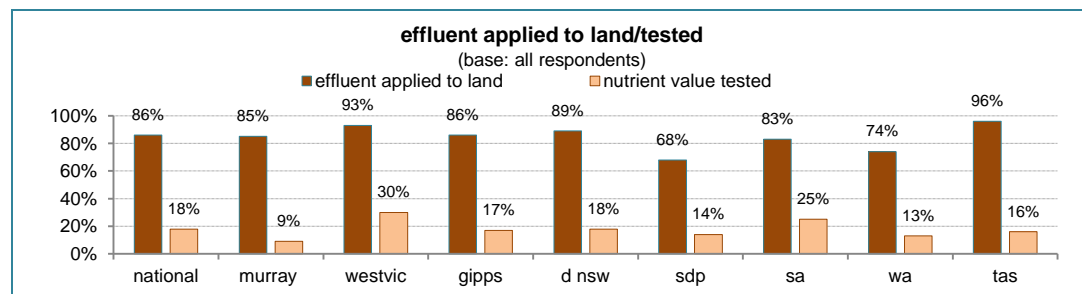
Q32. How many hectares of your farm would have effluent applied in a year? *New question 2015*

Q33. Approximately what proportion of your farm does that represent? *New question 2015*

Q34. Has the nutrient value of your effluent been tested? *New question 2015*

effluent applied	% mentioning (base: all respondents)								
	national (n=601)	murray (n=110)	westvic (n=110)	gipps (n=110)	dairy nsw (n=45)	sdp (n=90)	dairy sa (n=60)	wa (n=31)	tas (n=45)
Apply effluent to land	86%	85%	93%	86%	89%	68%	83%	74%	96%
Nutrient value of effluent tested	18%	9%	30%	17%	18%	14%	25%	13%	16%

effluent applied	% mentioning (base: respondents with pond or sump system)								
	national (n=548)	murray (n=105)	westvic (n=108)	gipps (n=102)	dairy nsw (n=43)	sdp (n=70)	dairy sa (n=51)	wa (n=25)	tas (n=44)
Average hectares with effluent applied	34	52	24	26	38	21	45	33	32
Average % of farm with effluent applied	21%	30%	13%	24%	18%	12%	19%	18%	19%



Notable results

- ◆ A very high 86% of ALL respondents apply effluent to land, but only 18% have the nutrient value tested. This means that 68% of all dairy farmers are applying effluent to land without knowing its nutrient value.
- ◆ Respondents with larger herds are significantly more likely than those with smaller herds to have the nutrient value of effluent tested, but it is still more common among this group NOT to test.
- ◆ On farms where effluent is applied to land, the area covered represents 21% of the farm. This proportion is the equivalent of 13% of land on ALL farms (including those not applying effluent).
- ◆ The area where effluent is applied increases with herd size, from 16% of the farm among those with small herds to 39% of the farm among those with xx-large herds.

Implications

Approximately nine in ten dairy farms apply effluent to land and even though this is typically on a fairly limited amount of the farm, it is done so without fully understanding the nutrient value of the effluent applied. Clearly there is scope to encourage more dairy farmers to conduct these tests.

8.4 Feed pad use

Questions asked:

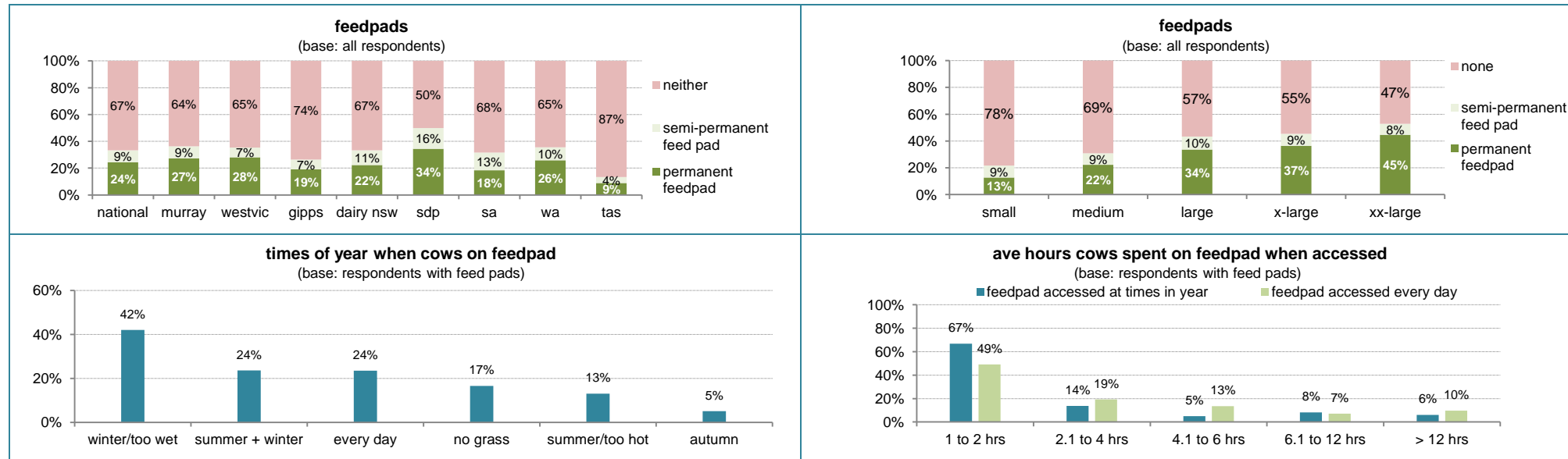
Q35. Do you have either a permanent or semi-permanent feed out area with a compacted or cement surface or feed pad? *New question 2015*

Q41. How long do the cows spend on the feedpad on average? *New question 2015*

feedpad	% mentioning (base: all respondents)								
	national (n=601)	murray (n=110)	westvic (n=110)	gipps (n=110)	dairy nsw (n=45)	sdp (n=90)	dairy sa (n=60)	wa (n=31)	tas (n=45)
Have permanent feedpad	24%	27%	28%	19%	22%	34%	18%	26%	9%
Have semi-permanent feedpad	9%	9%	7%	7%	11%	16%	13%	10%	4%
Do not have either	67%	64%	65%	74%	67%	50%	68%	65%	87%
Total: have permanent/semi-permanent feedpad	33%	36%	35%	26%	33%	50%	32%	35%	13%

feedpad use	% mentioning (base: respondents with feedpad)								
	national (n=204)	murray (n=40)	westvic (n=39)	gipps (n=29)	dairy nsw (n=15)*	sdp (n=45)	dairy sa (n=19)*	wa (n=11)*	tas (n=6)*
Every day	24%	30%	13%	21%	7%	44%	21%	27%	0%
In summer and winter	24%	20%	33%	17%	40%	16%	37%	18%	0%
In summer/when hot	13%	10%	18%	7%	20%	11%	16%	45%	0%
In winter/when too wet	42%	33%	51%	59%	47%	20%	32%	27%	83%
When there is no feed in paddocks	17%	23%	15%	7%	27%	20%	5%	18%	0%
In autumn	5%	5%	5%	3%	7%	2%	16%	18%	0%
Other	10%	10%	5%	14%	13%	11%	11%	18%	17%
Average hours cows are on feedpad	4.2	4.9	2.7	2.6	2.9	7.5	3.4	2.8	9.3

*Caution small sub sample



Notable results

- ◆ One third of respondents have either a permanent (24%) or semi-permanent feedpad (9%). Cows are typically housed on the feedpad when it is winter and/or too wet in the paddocks, but some farms also use the pad when it is hot or when there is insufficient pasture for cows to graze.
- ◆ There is significant variation across the regions in the proportion of farms with feedpads, from a high 50% in SDP (where they are often used daily) to a much lower 13% in Tasmania where they are commonly only used in winter or when it is very wet.
- ◆ When feedpads are being used, the average length of time spent on them is 4.2 hours and up to 7.5 hours in SDP. Although the sample size in Tasmania is too small to draw definite conclusions, results suggest that when it is wet, cows can spend a considerable part of the day on the feedpad.
- ◆ On farms where cows access the feedpad every day, the average stay is 5.9 hours. There is considerable variation however, from 1 hour through to all day. Where cows access the feedpad at certain times of the year, the average stay is 3.9 hours, again ranging from an hour to all day.
- ◆ Farms with larger herds are the most likely to have a feedpad, but few use them for the whole year or for the entire day.

average time on feedpad when accessed	% mentioning (base: respondents with feed pad)				
	small (n=34)	medium (n=84)	large (n=51)	x-large (n=18)*	xx-large (n=16)*
1 to 2 hours	66%	68%	58%	62%	46%
2.1 to 4 hours	12%	15%	15%	7%	31%
4.1 to 6 hours	8%	3%	11%	10%	8%
6.1 to 12 hours	12%	6%	9%	7%	15%
More than 12 hours	1%	8%	7%	14%	0%
Average	3.3	4.0	4.5	5.8	3.8

**Caution small sub sample*

Implications

Only one third of all dairy farms have a feedpad and they are more common on farms with larger herds than those with smaller herds. There is considerable difference across farms in the amount of time herds spend on the feedpad, with few leaving the cows there all day.

8.5 Feed pad effluent management

Questions asked:

Q37. Which of the following best describes what first happens to the effluent and drainage from the feed pads? Is it ... *New question 2015*

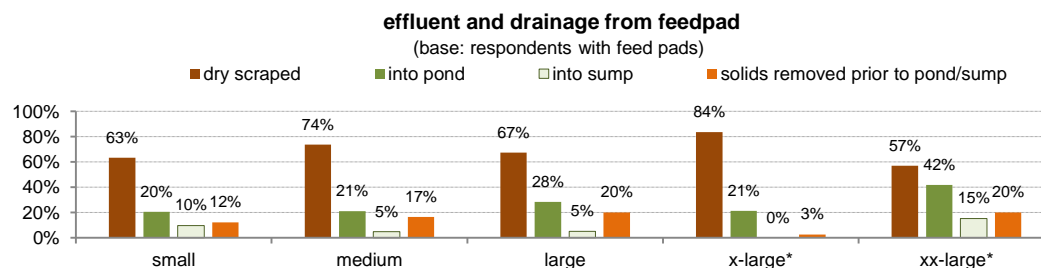
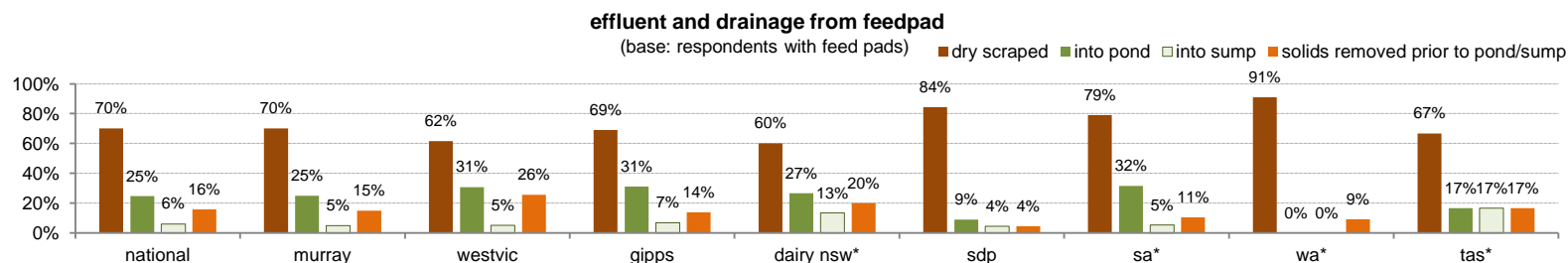
Q38. If system not dry-scraped: Do you remove any manure solids prior to the pond or direct distribution system? *New question 2015*

Q39. Is the feedpad roofed? *New question 2015*

Q40. If feed pad dry scraped and no roof: What happens to run-off from the feedpad during rainfall? *New question 2015*

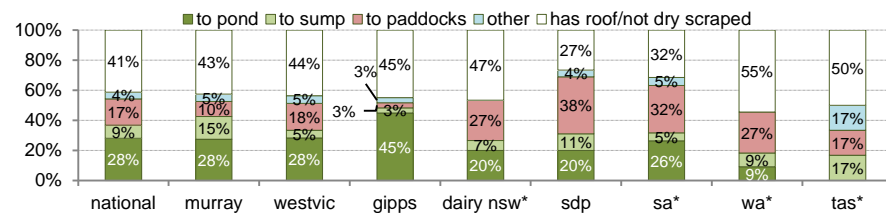
feedpad effluent	% mentioning (base: respondents with feedpad)								
	national (n=203)	murray (n=40)	westvic (n=39)	gipps (n=29)	dairy nsw (n=15)*	sdp (n=44)	dairy sa (n=19)*	wa (n=11)*	tas (n=6)*
Effluent/drainage from feedpad:									
Dry scraped to stockpile	70%	70%	62%	69%	60%	84%	79%	91%	67%
Washed into effluent pond	25%	25%	31%	31%	27%	9%	32%	0%	17%
Washed to sump and direct distribution system (no pond)	6%	5%	5%	7%	13%	4%	5%	0%	17%
Manure solids removed prior to pond/distribution system	16%	15%	26%	14%	20%	4%	11%	9%	17%
Total: dry scraped or solids removed	86%	85%	87%	83%	80%	89%	89%	100%	83%
Aspects of feed pad:									
Feed pad has roof	15%	23%	5%	10%	13%	18%	16%	45%	33%
Feed pad dry-scraped and does not have roof	59%	58%	56%	55%	53%	73%	68%	45%	50%
In event of heavy rainfall if dry scraped and no roof:									
Directed to the effluent pond	28%	28%	28%	45%	20%	20%	26%	9%	0%
Directed to a sump and direct distribution system	9%	15%	5%	3%	7%	11%	5%	9%	17%
Drains to paddocks	17%	10%	18%	3%	27%	38%	32%	27%	17%
Other	4%	5%	5%	3%	0%	4%	5%	0%	17%

*Caution small sub sample



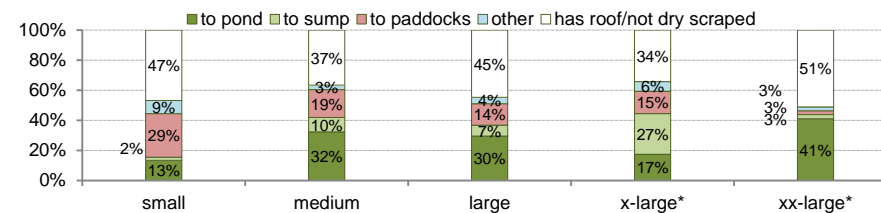
run off in heavy rain from dry scraped feedpads without roof

(base: respondents with feed pad)



run off in heavy rain from dry scraped feedpads without roof

(base: respondents with feed pad)



*Caution small sub sample

Notable results

- ◆ Effluent from the pad is dry scraped to a stockpile on 70% of respondent farms with a feedpad and 16% remove solids prior to them reaching a pond or sump system. Feedpad effluent is collected in a pond in 25% of cases and a sump and dispersal system in 6%.
- ◆ Six in 10 feedpads do not have a roof and are dry scraped and in the event of heavy rainfall, effluent from these feedpads is usually collected in a pond or sump and direct distribution system. 17% however have no mechanism to cope with heavy rainfall and effluent drains directly onto paddocks. This proportion equates to 6% of ALL dairy farms.

Implications

The majority of feedpads are dry scraped and do not have a roof which can cause difficulties for effluent management in heavy rainfall. While most farms with this system have prepared for heavy rain events by ensuring runoff is collected in a pond or sump, there is still an arguably high number where there is the potential for effluent to seep to paddocks.

8.6 Information or support required to make effluent system changes

Questions asked:

Q42. What sort of information or support would you need, if any, if you decided to make changes to your effluent system? *New question 2015*

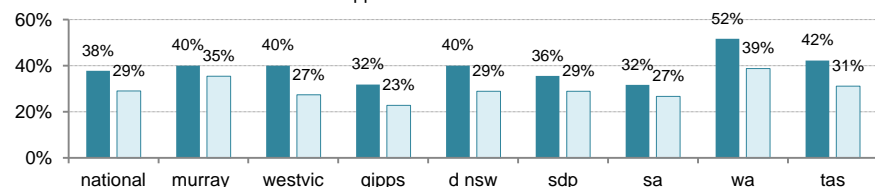
Q43. Do you know where you can source the independent advice and support you might need to change your effluent system? *New question 2015*

information support required (main mentions)	% mentioning (base: all respondents)								
	national (n=601)	murray (n=110)	westvic (n=110)	gipps (n=110)	dairy nsw (n=45)	sdp (n=90)	dairy sa (n=60)	wa (n=31)	tas (n=45)
Need information/support to make changes	38%	40%	40%	32%	40%	36%	32%	52%	42%
Know where independent information/support can be sourced for these changes	29%	35%	27%	23%	29%	29%	27%	39%	31%
Need information/support but do NOT know where to source it	11%	5%	13%	11%	11%	7%	5%	13%	11%
Information/support required:									
Not sure info required, would need input from expert	15%	20%	13%	12%	24%	6%	17%	16%	22%
Best design/system for farm	11%	13%	12%	8%	16%	3%	8%	10%	16%
Meeting EPA requirements/environmental regulations	4%	5%	5%	2%	4%	1%	3%	3%	7%
Funding/grant opportunities	4%	1%	5%	4%	7%	8%	0%	6%	2%
Rate to pump effluent/best way to spread	4%	4%	5%	4%	9%	3%	0%	3%	0%
Pump specifications/equipment required	3%	3%	3%	1%	7%	2%	7%	10%	9%
Pond size/capacity	3%	0%	5%	4%	2%	4%	2%	0%	2%
Cost effective options/costs involved	2%	1%	2%	3%	0%	1%	3%	10%	4%

info/support required to make effluent system changes

(base: all respondents)

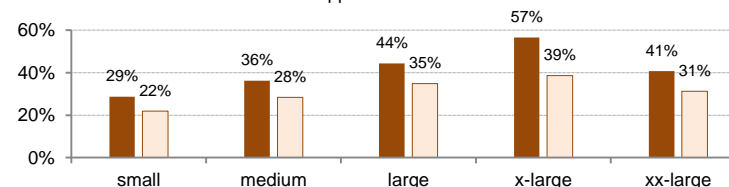
■ need info/support □ know where to source



info/support required to make effluent system changes

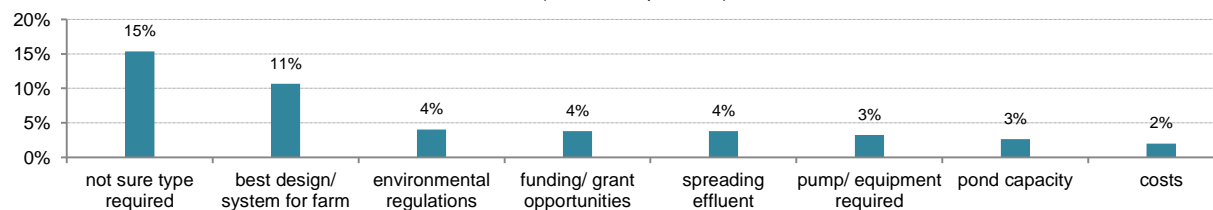
(base: all respondents)

■ need info/support □ know where to source



type of info/support required

(base: all respondents)



Notable results

- ◆ More than one third of all respondents said they would need some additional information before deciding to make changes to their effluent system and almost half this group are unsure of exactly what they would require. Additionally, 11% of ALL respondents needing information or support do not know where to source it.
- ◆ Assistance with the actual design of the system was mentioned by 11% of all respondents, while 4% mentioned meeting environmental requirements, funding or grant opportunities and how best to spread the effluent.
- ◆ Of note 15% of all respondents with xx-large herds mentioned wanting more information on pump specifications and equipment required to manage effluent effectively.

Implications

Survey results reveal that while most dairy farmers are confident in their ability to source information and support as required to upgrade effluent systems, there is a sizeable group that do not even know where to seek assistance. Clearly there is an opportunity to ensure all dairy farmers at least know where to find independent information, particularly on design options, particularly where effluent loads are highest.

9. General farm environment management

9.1 Areas managed for conservation or biodiversity

Questions asked:

Q44. Do you have any areas on the farm that are managed for conservation or biodiversity?

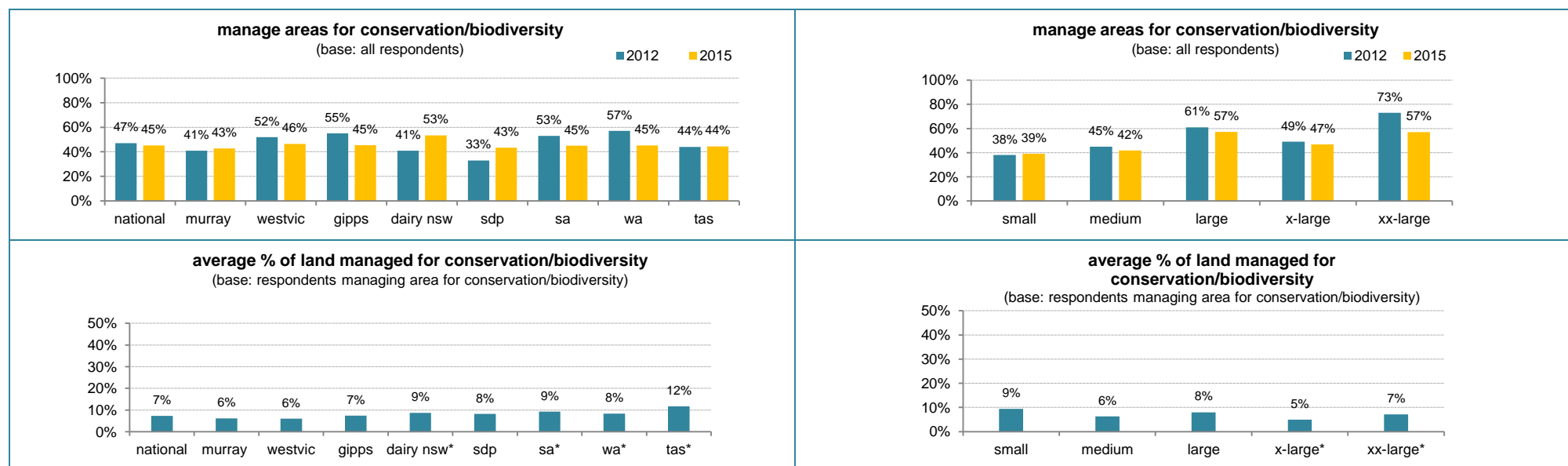
Q45. Approximately what proportion of the farm is managed for conservation and biodiversity?

have areas managed for conservation/ biodiversity	% mentioning (base: all respondents)								
	national (n=601)	murray (n=110)	westvic (n=110)	gipps (n=110)	dairy nsw (n=45)	sdp (n=90)	dairy sa (n=60)	wa (n=31)	tas (n=45)
Have areas managed for conservation/ biodiversity	45%	43%	46%	45%	53%	43%	45%	45%	44%

% farm managed for conservation/ biodiversity	% mentioning (base: respondents managing for conservation/biodiversity and able to provide information)								
	national (n=272)	murray (n=47)	westvic (n=51)	gipps (n=50)	dairy nsw (n=24)*	sdp (n=39)	dairy sa (n=27)*	wa (n=14)*	tas (n=20)*
1% to 4%	25%	33%	28%	20%	25%	26%	26%	14%	5%
5% to 9%	39%	42%	38%	44%	33%	36%	26%	43%	35%
10% to 15%	22%	11%	28%	22%	25%	21%	19%	21%	35%
More than 15%	8%	9%	2%	10%	8%	5%	22%	21%	5%
Average % of farm managed for conservation/biodiversity	7%	6%	6%	7%	9%	8%	9%	8%	12%

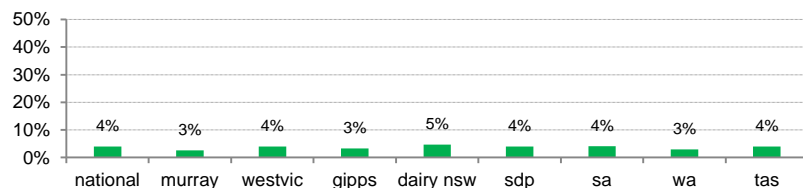
% farm managed for conservation/ biodiversity	% mentioning (base: all respondents)								
	national (n=601)	murray (n=110)	westvic (n=110)	gipps (n=110)	dairy nsw (n=45)	sdp (n=90)	dairy sa (n=60)	wa (n=31)	tas (n=45)
Average % of ALL dairy farm land managed for conservation/biodiversity	4%	3%	4%	3%	5%	4%	4%	3%	4%

*Caution small sub sample



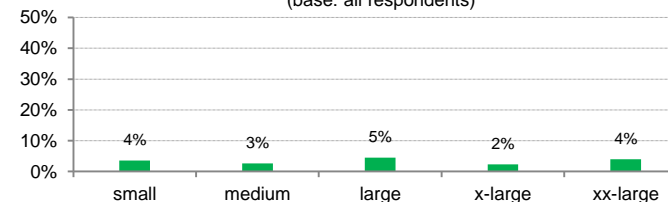
average % of ALL land managed for conservation/biodiversity

(base: all respondents)



average % of ALL land managed for conservation/ biodiversity

(base: all respondents)



Notable results

- ◆ The proportion of dairy farms managing areas for conservation and biosecurity has remained relatively unchanged since 2012 (45%), with no statistically significant variations evident.
- ◆ Where areas are being managed for conservation and biodiversity, they represent an average of 7% of the farm. If ALL farms are considered for this measure, the average farm area managed for conservation and biodiversity is 4%. This equates to approximately 59,000 hectares of land (cautions should be taken with this result however due to limitations of extrapolating numeric survey data).
- ◆ Farms with xx-large herds are the most likely to be managing areas of the farm for conservation and biodiversity, but the average proportion of the farm represented is similar.

Implications

Only a modest amount of dairy land is being managed for conservation and biodiversity. This is probably to be expected however, when economic pressures on dairy farms means that as much land as possible needs to be productive.

9.2 Waterways management

Questions asked:

Q46. Do you have any naturally occurring waterways on your farm such as rivers, creeks or streams?

Q47. If yes: Are the waterways on your farm fenced off from livestock?

Q48. Do you have plans to fence off more waterways in future? *New question 2015*

Q49. If yes: If funding support is not available from natural resource management agencies to undertake this fencing, will you ... *New question 2015*

have naturally occurring waterways	% mentioning (base: all respondents)								
	national (n=601)	murray (n=110)	westvic (n=110)	gipps (n=110)	dairy nsw (n=45)	sdp (n=90)	dairy sa (n=60)	wa (n=31)	tas (n=45)
Have naturally occurring waterways on property	60%	30%	60%	69%	98%	79%	42%	71%	87%

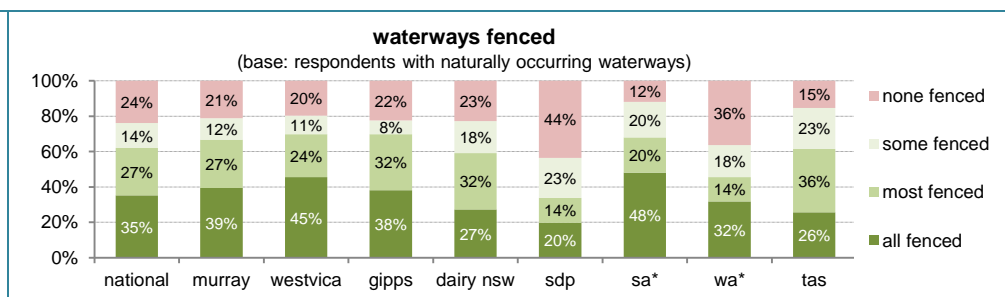
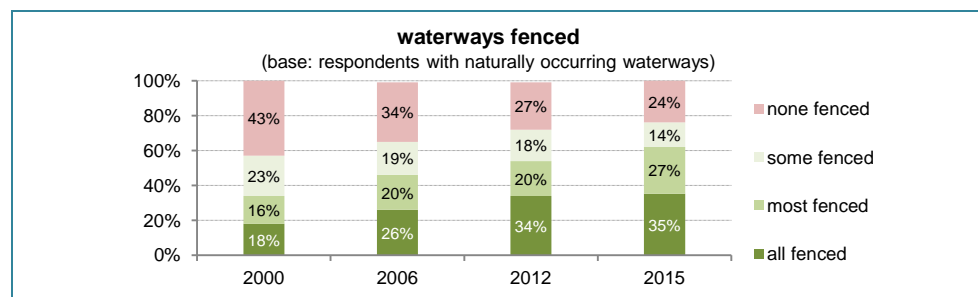
waterways fencing	% mentioning (base: respondents with naturally occurring waterways on their property)								
	national (n=376)	murray (n=33)	westvic (n=66)	gipps (n=76)	dairy nsw (n=44)	sdp (n=71)	dairy sa (n=25)*	wa (n=22)*	tas (n=39)
All waterways fenced	35%	39%	45%	38%	27%	20%	48%	32%	26%
Most waterways fenced	▲ 27%	27%	24%	▲ 32%	32%	14%	20%	14%	36%
Some waterways fenced	14%	12%	11%	8%	18%	23%	20%	18%	23%
No waterways fenced	24%	21%	20%	22%	23%	44%	12%	36%	15%
Total: at least some waterways fenced	76%	79%	80%	78%	77%	56%	88%	64%	85%
Plan to fence more waterways	24%	27%	24%	24%	25%	13%	16%	18%	36%

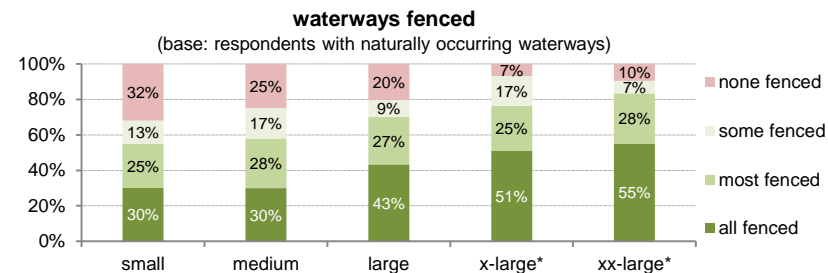
▲ significantly higher than 2012

*Caution small sub sample

likely action if funding support not available	% mentioning (base: plan to fence off more waterways in future; n=85)
Will still undertake fencing in time period planned	18%
Will still undertake fencing, but over longer period	41%
No longer able to undertake fencing	6%
Unsure/depends on farm finances	35%

reasons for not undertaking more fencing (main mentions)	% mentioning (base: no plans to fence off more waterways in future; n=164)
No need (ravine, no stock access, etc)	21%
Minor/seasonal creeks	19%
Cows use waterway to drink/graze	18%
Maintenance/weeds grow around fence	16%
Stock does not access area	12%
Cost of fencing	9%





Notable results

- ◆ Nationally, 60% of respondents have naturally occurring waterways on their properties, ranging from 98% in Dairy NSW to 30% in Murray Dairy.
- ◆ Since 2000, there has been a steady upward trend in the proportion of these farms having *all* the waterways fenced (from 18% to 35%) or *most* fenced (up from 16% to 27%). Conversely proportions having only *some* waterways or *no* waterways fenced has declined steadily over this time.
- ◆ Respondents with larger herds are the most likely to have *all* or *most* of their waterways fenced.
- ◆ Upward trends in proportions with *all* or *most* waterways fenced are likely to continue in future, with a further 24% of respondents with naturally occurring waterways planning to undertake more fencing in future in future.
- ◆ Among this group, 59% will undertake fencing activities even if funding is not available, but in most cases, the rate of fencing will be slower.
- ◆ The survey results reveal some respondents would prefer not to fence off waterways due to them being a stock water source and the potential for weed issues when the land is not grazed. Others have only seasonal or minor watercourses left unfenced.

Implications

Dairy farmers continue to make progress with fencing off waterways and while this activity is likely to continue into the future, it will be at a slower pace if financial and/or labour support options cease.

There are some farms that are still allowing stock to access waterways for drinking and this group may need more information on alternatives and reasons why this practice should be reconsidered.

10. Renewable energy installations

Questions asked:

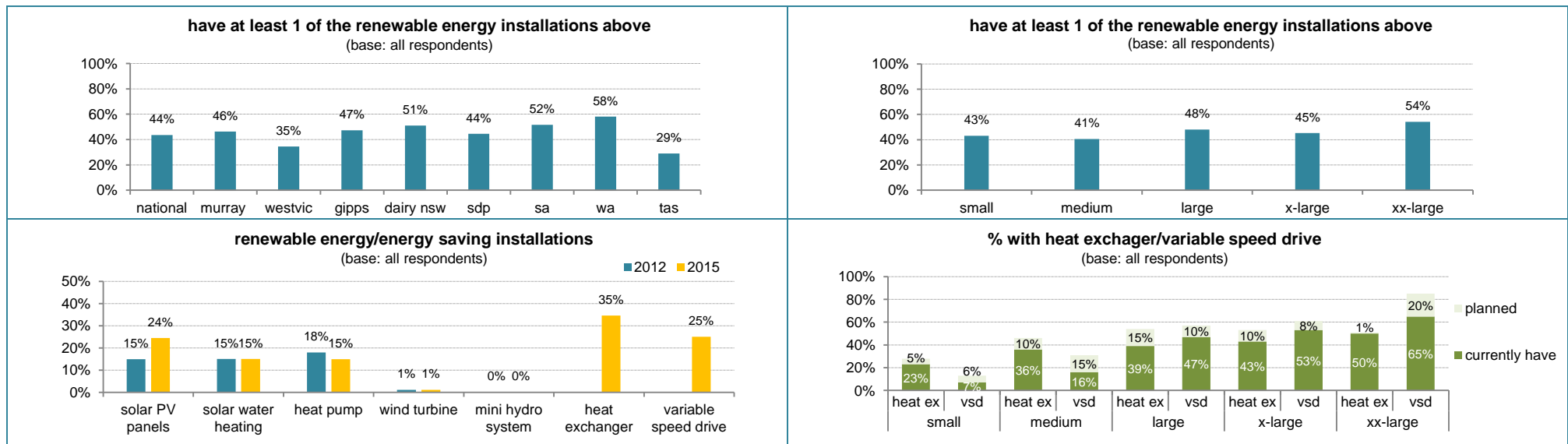
Q51. Do you have any of the following renewable energy installations on your property either at the dairy shed, at irrigation sites or at the home?

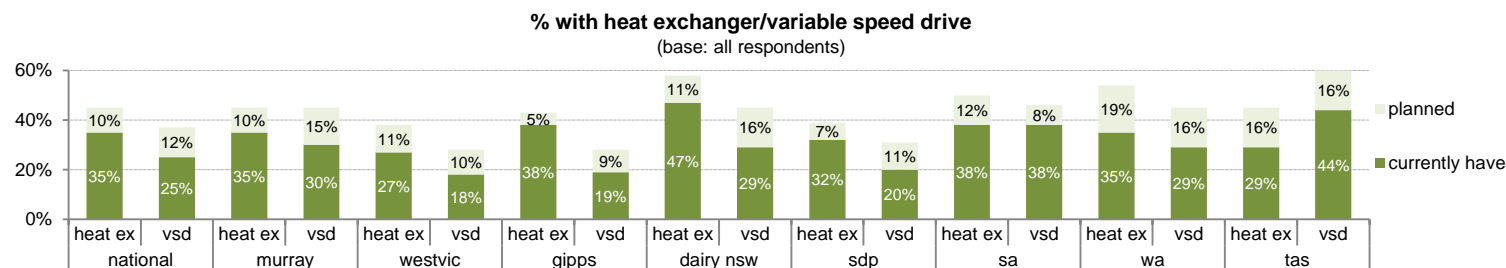
Q52. If mention solar PV panels: How many kilowatts of power do your solar photovoltaic panels generate? *New question 2015*

Q53. Have you installed a variable speed drive or VSD on your property? *New question 2015* Q54. Have you installed heat exchangers on your property? *New question 2015*

renewable energy installations/ energy saving devices	% mentioning (base: all respondents)								
	national (n=601)	murray (n=110)	westvic (n=110)	gipps (n=110)	dairy nsw (n=45)	sdp (n=90)	dairy sa (n=60)	wa (n=31)	tas (n=45)
Have at least one renewable energy installation tested	44%	46%	35%	47%	51%	44%	52%	58%	29%
Solar photovoltaic panels	▲ 24%	▲ 32%	17%	25%	▲ 31%	▲ 30%	▲ 32%	6%	2%
Solar water heating	15%	14%	8%	18%	22%	17%	17%	45%	9%
Wind turbines	1%	0%	4%	1%	0%	1%	0%	0%	0%
Mini hydro systems	0%	0%	0%	0%	0%	0%	0%	3%	0%
Heat pumps (Quantum heat pumps)	15%	15%	16%	18%	11%	8%	15%	10%	18%
No renewable energy installations	56%	54%	65%	53%	49%	56%	48%	42%	71%
Variable speed drive installed	25%	30%	18%	19%	29%	20%	38%	29%	44%
Plan to install variable speed drive in short term	12%	15%	10%	9%	16%	11%	8%	16%	16%
Don't know what variable speed drive is	18%	17%	22%	23%	11%	13%	13%	13%	18%
Heat exchanger installed	35%	35%	27%	38%	47%	32%	38%	35%	29%
Plan to install heat exchangers in short term	10%	10%	11%	5%	11%	7%	12%	19%	16%
Don't know what heat exchanger is	7%	7%	8%	11%	2%	3%	0%	6%	7%

▲ significantly higher than 2012





Notable results

- ◆ The proportion of respondents saying their farm has solar PV panels installed has increased significantly over the past 3 years (from 15% to 24%). There has been little change in the proportion with solar water heating (15%) or heat pumps (15%).
- ◆ Variable speed drives have been installed by 25% of farms, with another 12% planning to do so in the short term. It is notable that 18% of respondents don't know what a variable speed drive is.
- ◆ Currently 35% of farms have a heat exchange unit and a further 10% plan to do so in the foreseeable future. Only 7% of respondents say they do not know what a heat exchange unit is.
- ◆ Respondents with xx-large herds are the most likely to have installed variable speed drives (65%) or a heat exchange unit (50%).
- ◆ It is notable that 35% of respondents from farms with solar PV panels installed do not know the amount of power their system generates. Among those able to provide this information, the average power generated is 10.1 KW, ranging from 1 KW to 45 KW.

solar PV power generated	% mentioning (base: have solar PV panels installed)
Up to 4 kw	17%
4.1 to 8 kw	25%
8.1 to 20 kw	16%
20.1 to 40 kw	5%
More than 40 kw	2%
Don't know	35%
Average kw	10.1

Implications

Installation of solar PV panels on dairy farms is increasing, but there is considerable variation in the size of units being installed. In future, it may be worth exploring how people make decisions about solar installations to determine if they are receiving the right advice.

Heat exchange units and variable speed drives have been installed on some farms and there is evidence that demand for this technology is likely to continue, with at least 10% of farms planning to purchase these systems in the short term. It will be important to ensure that dairy farmers have access to independent information on these technologies.

11. Recycling undertaken

11.1 Silage wrap recycling

Questions asked:

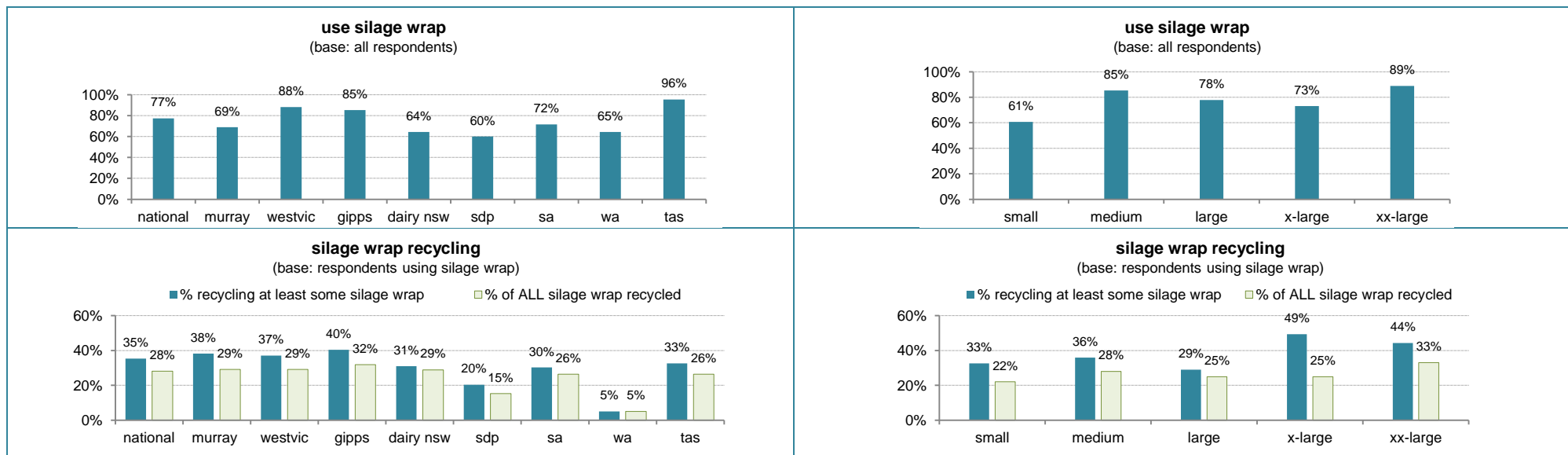
Q55. Do you currently recycle your silage wrap? *New question 2015*

Q56. If yes: Approximately what proportion of your silage wrap is recycled? *New question 2015*

silage wrap use	% mentioning (base: all respondents)								
	national (n=601)	murray (n=110)	westvic (n=110)	gipps (n=110)	dairy nsw (n=45)	sdp (n=90)	dairy sa (n=60)	wa (n=31)	tas (n=45)
Use silage wrap	77%	69%	88%	85%	64%	60%	72%	65%	96%

silage wrap recycling	% mentioning (base: respondents using silage wrap)								
	national (n=151)	murray (n=29)*	westvic (n=36)	gipps (n=38)	dairy nsw (n=9)*	sdp (n=11)*	dairy sa (n=13)*	wa (n=1)*	tas (n=14)*
Currently recycle silage wrap	35%	38%	37%	40%	31%	20%	30%	5%	33%
Don't currently recycle silage wrap but plan to do so in short term	16%	16%	9%	17%	14%	7%	14%	0%	49%
Don't currently recycle silage wrap and no plans to do so	49%	46%	54%	43%	55%	72%	56%	95%	19%
% of ALL silage wrap recycled (includes those not currently recycling it)	28%	29%	29%	32%	29%	15%	26%	5%	26%
Average % of silage wrap recycled by those doing so	82%	80%	78%	85%	93%	75%	87%	100%	81%

*Caution small sub sample



Notable results

- ◆ Currently, 77% of respondents use silage wrap on the farm. Of this group, only 35% actually recycle some of the wrap used.
- ◆ Among respondents who DO recycle silage wrap, the average proportion recycled is a very high 82%. However, this is the equivalent of only 28% of ALL the silage wrap used.
- ◆ On average, respondents with xx-large herds who use silage wrap recycle 33% of ALL the silage wrap – greater than those with other size herds.
- ◆ By region, Gippsland respondents using silage wrap recycle more of it than their counterparts in other regions.

Implications

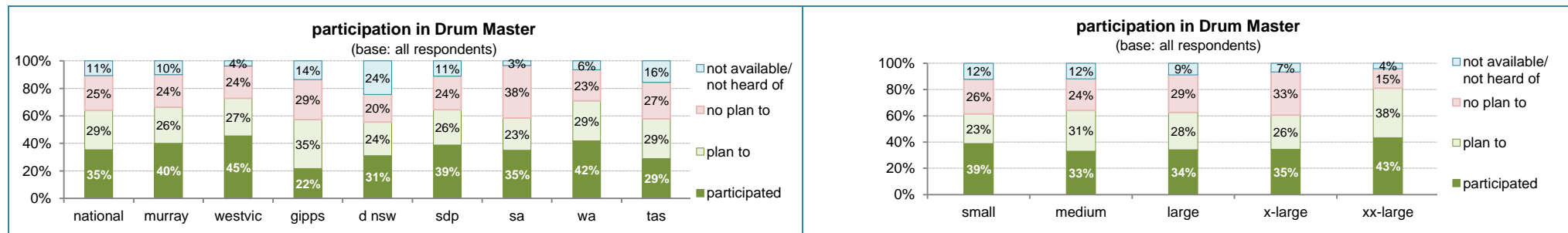
There is clearly scope to increase the amount of silage wrap recycled and it will be important to continually promote this practice as well as ensure dairy farmers know where it can be recycled.

11.2 Participation in Drum Muster program

Question asked:

Q57. Have you participated in the Drum Muster program in the past 12 months? *New question 2015*

participation in Drum Muster	% mentioning (base: all respondents)								
	national (n=601)	murray (n=110)	westvic (n=110)	gipps (n=110)	dairy nsw (n=45)	sdp (n=90)	dairy sa (n=60)	wa (n=31)	tas (n=45)
Yes, participated	35%	40%	45%	22%	31%	39%	35%	42%	29%
No, but plan to do so next year	29%	26%	27%	35%	24%	26%	23%	29%	29%
No and no plans to do so	25%	24%	24%	29%	20%	24%	38%	23%	27%
Not available in our area	7%	5%	2%	10%	18%	7%	3%	3%	11%
Haven't heard of Drum Muster	4%	5%	2%	4%	7%	4%	0%	3%	4%



Notable results

- ◆ While 35% of respondents have participated in the Drum Muster program during the past year, a further 29% plan to do so next year.
- ◆ There are no significant differences to this result by herd size.
- ◆ The following locations are where respondents said they are not serviced by the Drum Muster program:

Victoria:

- North-eastern Victoria
- Northern Irrigation Region
- South Gippsland
- Macallister Irrigation District
- East Gippsland
- West Gippsland
- Terang

New South Wales:

- Hunter
- Far North & Mid North Coasts
- Mid-Coast
- Dungog Gloucester
- Far South Coast
- Darling Downs
- Wide Bay Burnett

South Australia:

- River & Lakes
- South East(Mt Gambier

Western Australia:

- Vasse (South West)

Tasmania:

- North west
- North East

Implications

An arguably low proportion of dairy farmers have participated in the Drum Muster program to date and survey results reveal that there may be a lack of awareness of receival centre locations or an unwillingness to travel too far to access them.

11.3 Other recovery, reuse or recycling practices undertaken

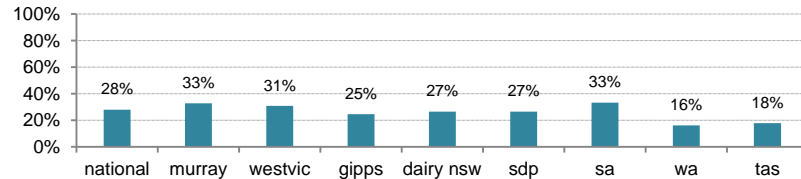
Question asked:

Q58. Do you implement any other recovery, reuse or recycling practices on the farm? *New question 2015*

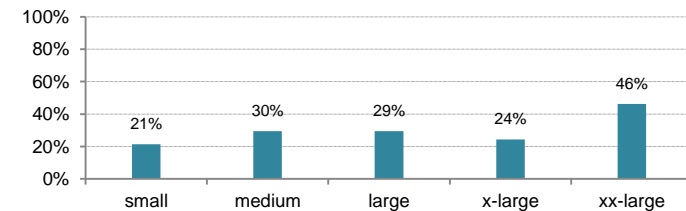
Q59. If yes: What recovery, reuse or recycling practices to you implement? *New question 2015*

other recovery, reuse, recycling (main mentions)	% mentioning (base: all respondents)								
	national (n=601)	murray (n=110)	westvic (n=110)	gipps (n=110)	dairy nsw (n=45)	sdp (n=90)	dairy sa (n=60)	wa (n=31)	tas (n=45)
Total: Implement other recover, reuse, recycling practices	28%	33%	31%	25%	27%	27%	33%	16%	18%
Recycle scrap metal	8%	7%	8%	8%	7%	10%	10%	6%	7%
Recycle drums	5%	3%	5%	7%	7%	2%	3%	6%	0%
Recovery of household products	4%	6%	2%	5%	0%	7%	2%	0%	2%
Recycle water	3%	8%	2%	1%	0%	1%	0%	0%	0%
Recycle plastic	2%	3%	3%	2%	2%	0%	3%	3%	0%
Recycle bins	2%	3%	1%	4%	2%	1%	0%	3%	0%
Use manure	2%	3%	2%	0%	9%	1%	3%	0%	0%
Recycle cardboard/paper	2%	4%	2%	0%	0%	2%	3%	0%	0%
Recycle/reuse timber	1%	2%	2%	1%	0%	1%	3%	0%	0%
Recycle/reuse string/twine	1%	2%	2%	0%	4%	0%	2%	0%	0%
Recovery of chemicals, oil, batteries	1%	1%	1%	1%	0%	3%	2%	0%	0%

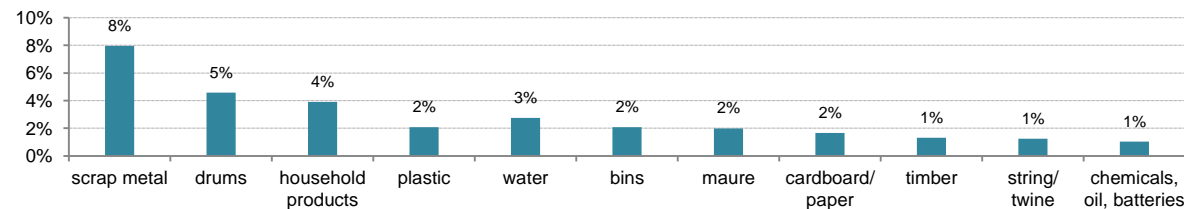
implement other recycling
(base: all respondents)



implement other recycling
(base: all respondents)



other recovery/reuse/recycling
(base: all respondents)



Notable results

- ◆ Only 28% of respondents currently implement recovery, reuse or recycling practice on farm other than recycling silage wrap or drums.
- ◆ Dairy farmers with xx-large herds are the most likely to implement a recovery practice (46%), while those with small herds are the least likely (21%).
- ◆ The most common recovery practice is recycling scrap metal, but this is only undertaken on 8% of dairy farms.

Implications

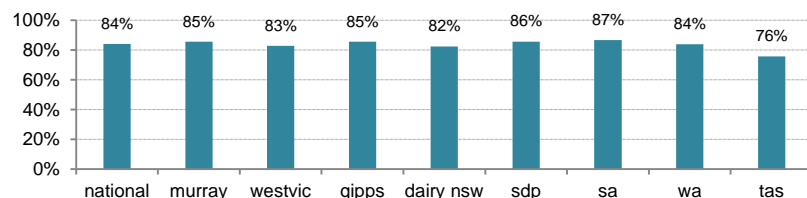
Recycling, recovery and reuse could be encouraged on more dairy farms and it may be worth exploring what needs to be implemented for this to occur.

12. 'Wish list' to improve sustainability of soil, water and biodiversity on the farm

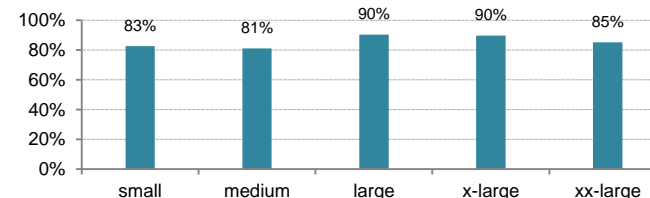
Question asked: Q60. If money and labour were not a problem, what would you like to do to improve the sustainability of the soil, water and biodiversity on your farm? *New question 2015*

activities on wish list (main mentions)	% mentioning (base: all respondents)								
	national (n=601)	murray (n=110)	westvic (n=110)	gipps (n=110)	dairy nsw (n=45)	sdp (n=90)	dairy sa (n=60)	wa (n=31)	tas (n=45)
Total: would like to implement something	84%	85%	83%	85%	82%	86%	87%	84%	76%
Plant more trees/vegetation/shelter banks	15%	13%	24%	16%	13%	4%	13%	6%	13%
Upgrade irrigation	15%	20%	7%	16%	16%	19%	18%	3%	13%
Use more fertilizer	12%	10%	9%	15%	18%	11%	12%	13%	11%
Work on soil fertility	9%	9%	8%	10%	9%	8%	13%	6%	7%
Better use of effluent	9%	6%	6%	12%	13%	9%	12%	16%	4%
Include compost/use more compost	9%	9%	8%	10%	4%	7%	10%	26%	4%
Use renewable energy	8%	8%	9%	10%	7%	7%	7%	3%	7%
Go organic/natural	8%	11%	7%	6%	9%	10%	3%	10%	7%
Improve drainage/lazer	8%	11%	8%	8%	2%	3%	3%	10%	9%
More fencing	8%	3%	10%	7%	16%	6%	2%	6%	18%
Improve pasture	7%	5%	7%	9%	4%	4%	17%	13%	0%
Upgrade/build infrastructure	6%	5%	7%	7%	7%	9%	5%	3%	2%
Increase water storage/access more water	6%	9%	5%	4%	9%	4%	3%	3%	7%
Implement automated systems	5%	11%	0%	4%	11%	2%	3%	0%	2%
Build/upgrade feed pad	5%	2%	5%	5%	9%	4%	3%	0%	7%
Nothing	16%	15%	17%	15%	18%	14%	13%	16%	24%

would like to implement something to improve sustainability
(base: all respondents)



would like to do something to improve sustainability
(base: all respondents)



Notable results

- ◆ A substantial proportion (84%) of dairy farmers would like to implement at least one thing to improve the sustainability of the soil, water and biodiversity of their farm if they weren't constrained by finances or labour.
- ◆ There are no significant differences in this measure by region, herd size or other segment.
- ◆ Respondents typically would like to undertake between 1 and 2 activities, typically planting, improving irrigation systems and/or fertiliser use.
- ◆ Interestingly, 21% of respondents with xx-large herds and 15% with x-large say they would include composting in their system if money and labour were not a problem.

Implications

A sizeable proportion of dairy farmers would like to undertake more planting or improve their irrigation systems. It is possible that if grants or other support options were made available they would stimulate activity.

Appendix: Questionnaire

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<p>Q1. Firstly, which milk company do you supply?</p> <p>Bega/Tatura ----- 1</p> <p>Browns (was Peters and Brown) ----- 2</p> <p>Burra Foods ----- 3</p> <p>Cadburys ----- 4</p> <p>Dairy Farmers/Aus Dairy Farmers Co-op ----- 5</p> <p>Fonterra Milk Australia ----- 6</p> <p>Harvey Fresh ----- 7</p> <p>National Foods/Lion ----- 8</p> <p>Norco ----- 9</p> <p>Murray Goulburn ----- 10</p> <p>Parmalat ----- 11</p> <p>Peters and Brown ----- 12</p> <p>Tasmania Dairy Products ----- 13</p> <p>Tatura Milk ----- 14</p> <p>Warrnambool Cheese & Butter ----- 15</p> <p>Other (specify) ----- 16</p> <p>Q2. How many hectares of land do you use for your milking platform – that is grazing land not including your support blocks? <i>Interviewer note: milking platform – we mean for their milking herd</i></p> <p>Q3. How many (hectares/acres) of that land do you normally irrigate - that is with irrigation water, not effluent?</p> <p>Q4. How many hectares of land did you have under crops during 2014-15?</p> <p>Q5. How many hectares of land did you have under crops during 2014-15?</p> <p>Q6. Which of the following are major land management issues for your farm? <i>Read out</i></p> <p>Q7. Are you confident you have enough information and support to deal with (read issues from Q6)?</p> <p><i>DP note: Loop Q6, Q7, Q8, Q9 and Q10. Need Q7 to be linked to those saying they are not confident rather than have confidence</i></p> <ol style="list-style-type: none"> 1. Wet soils pugging 2. Surface crusting or soil compaction 3. Noxious weeds 4. Insect pests 5. Statutory planning requirements relating to environmental management when it comes to an on-farm infrastructure change or development. This includes things like permit obligations for undertaking any earthworks 6. Planning requirements to renovate the dairy shed 7. Requirements for ground water bores 8. Other (specify) 9. None of the above 	<p>If mention noxious weeds (Q6 = 3), ask Q8:</p> <p>Q8. Are you actively managing the noxious weeds that are a major issue for your farm?</p> <p>Yes ----- 1</p> <p>No ----- 2</p> <p>If mention insect pests (Q6 = 4), ask Q8</p> <p>Q9. Are you actively managing the insect pests that are a major issue for your farm?</p> <p>Yes ----- 1</p> <p>No ----- 2</p> <p>If issue mentioned in Q6, but answered 'no' in Q7, ask Q10. Others go to Q11 if irrigator or to Q18 if dry land</p> <p>Q10. What additional information or support do you require to assist your management of (from Q7)?</p> <p>If irrigate (Q3>0), ask:</p> <p>I have some questions about your water use and irrigation system.</p> <p>Q11. In total, how many megalitres of irrigation water do you source in an average year?</p> <p>Q12. In an average year, how many (hectares/acres) do you ...</p> <ol style="list-style-type: none"> 1. Flood irrigate 2. Spray irrigate 3. Irrigate via pivot 4. Other (specify) <p>Q13. <i>Does your irrigation system have any of the following automation ... read out</i></p> <p>A wireless system ----- 1</p> <p>Timers ----- 2</p> <p>Pneumatic/air pressure ----- 3</p> <p>Other automation (specify) ----- 4</p> <p>No automation/manual system only ----- 5</p> <p>Q14. Which of the following methods most closely describes how you normally decide when to irrigate? Do you ... <i>read out, single response</i></p> <p>Use a shovel or a stick in the ground to indicate soil moisture ----- 1</p> <p>Use a specific device to measure soil moisture (eg. tensiometer, enviroscan) ----- 2</p> <p>Use a device for irrigation scheduling (e.g. Gypsum blocks, Gbug, Aquaflex) ----- 6</p> <p>Use experience, based on recent climate or appearance of pasture ----- 3</p> <p>Follow a regular schedule of irrigation (ie water every so many days) ----- 4</p> <p>Other (specify) ----- 5</p> <p>Q15. Do you know and record how much water you apply each irrigation?</p> <p>Yes ----- 1</p> <p>No ----- 2</p>
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Q16. Have you made changes to your water storage or irrigation system over the last 5 years?

Yes ----- 1 continue

No ----- 2 go to Q18

Q17. What measures have you undertaken?

Increased on farm storage ----- 1

Installation of pivots ----- 2

Remote pump starts ----- 3

HI Flow ----- 4

Delivery infrastructure upgrade ----- 5

Metering ----- 6

Reuse systems ----- 7

Variable rate application ----- 8

Variable speed drive on pumps ----- 9

Other (specify) ----- 10

Ask all:

Q18. Do you recycle any water from the dairy shed for reuse on-farm for washing down or irrigation?

Yes ----- 1 continue

No ----- 2 go to Q19

No, but intend on implementing this over coming years 3 go to Q19

Q19. Approximately what proportion of water from the dairy shed is re-used for washing down or irrigation?

I have some questions to ask about your fertiliser regime

Q20. Which of the following fertilisers have you used on your dairy farm over the past three years? *Read out*

Superphosphate ----- 1

DAP ----- 2

MAP ----- 3

MOP or muriate of potash ----- 4

Urea ----- 5

Standard off the shelf purchased blend (eg hay booster/pasture booster) ----- 6

Prescription blend (made up to specification) ----- 7

Organic (specify types/product name/ingredients) ----- 8

Compost made with only ingredients from your farm ----- 9

Compost made with off farm or imported ingredients or a mixture of ingredients sourced from both on the farm and off the farm ----- 10

Other (specify) ----- 11

None ----- 12

Q21. What was the total amount of nitrogen fertiliser applied for the 2014-15 year? (Interviewer note: estimated amount will do)

Q22. Do you match your nitrogen applications to plant growth rate and pasture rotation length?

Yes ----- 1

No ----- 2

Don't know ----- 3

Q23. What methods are used to work out the farm's fertiliser or nutrient requirements – either by yourself or your agronomist or adviser? Do you ... *read out*

Soil test ----- 1

Tissue test ----- 2

Use a whole farm fertiliser plan or nutrient management budget ----- 3

Use your own observation ----- 4

Use past experience ----- 5

Other (specify) ----- 6

None ----- 7

Q24. How confident are you that you understand the potential soil constraints on your farm? Are you ... *read out*

Very confident ----- 1

Fairly confident ----- 2

Not too confident ----- 3

Not confident at all ----- 4

Can't rate ----- 5

Q25. Do you receive advice from any of the following people to work out the farm's fertiliser or nutrient requirements? *Read out*

A fertiliser supplier/reseller ----- 1

An independent agronomist ----- 2

An independent consultant who is not an agronomist ----- 3

A dairy officer ----- 4

Other (specify) ----- 5

None of the above ----- 6

If soil test (Q23 = 1), ask Q26; others go to Q27:

Q26. How often do you soil test for nutrient levels on your farm? Would that be ... *read out*

Annually (or more frequently) ----- 1

Every 2-3 years ----- 2

Every 4-5 years ----- 3

Have not tested in past 5 years ----- 4

Ask those who use fertilisers (Q20 = not 12) and did not mention budget (Q23 = not 3):

Q27. Do you have a fertiliser or nutrient management plan or Fert\$mart plan for the farm?

Yes ----- 1

No, but plan to soon ----- 2

No and no plans to do ----- 3

Don't know what a nutrient budget or nutrient management plan is ----- 4

Don't know if farm has a plan ----- 5

Ask all:

The next series of questions is about managing farm effluent.

Q28. Which of the following best describes what initially happens to the effluent and run off from the milking shed. Is it ... *Read out*

- Collected in a pond system and then dispersed
to selected paddocks at a suitable time ----- 1 continue
- Collected and then retained in a pond system whenever possible --- 2 continue
- Held in a sump and dispersal system ----- 3 continue
- Or does it drain directly to the paddocks ----- 4 go to Q34
- Other (specify) ----- 5 go to Q34

Q29. Do you remove any manure solids prior to effluent going into the pond or direct distribution systems either by ... *read out*?

- A trafficable solids trap ----- 1
- Mechanical screens ----- 2
- Other (specify) ----- 3
- No, do not remove solids ----- 4
- Don't know ----- 5

Q30. When do you clean solids out of the sludge pond? Is that ... *read out*

- When the sludge pond is full or reaches the top water level ----- 1
- Before the sludge level reaches the top water level or at the end of the
desludge period ----- 2
- Other (specify) ----- 3
- Never ----- 4

Q31. How do you clean out the sludge pond? *Read out*

- Use a contractor ----- 1
- Hire the gear and do it yourself ----- 2
- Have your own equipment and do it yourself ----- 3
- Other (specify) ----- 4

Q32. How many hectares of your farm would have effluent applied in a year?

Q33. Approximately what proportion of the farm does that represent?

Q34. Has the nutrient value of your effluent been tested?

- Yes ----- 1
- No ----- 2

Q35. Do you have either a permanent or semi-permanent feed out area with a compacted or cement surface or feed pad?

- Have permanent feed out area ----- 1 continue
- Have semi-permanent feed out area ----- 2 continue
- No, neither ----- 3 go to Q41

Q36. When is your (permanent/semi-permanent from Q35) feed out area used?

- In summer ----- 1
- In winter ----- 2
- Both summer and winter ----- 3
- When paddocks are too wet ----- 4
- When there is no feed in the paddocks ----- 5
- When it is hot ----- 6
- Other (specify) ----- 7

Q37. Which of the following best describes what first happens to the effluent and drainage from the **feed pads**? Is it ... *Read out*

- Dry scraped to a stockpile ----- 1 go to Q39
- Washed into an effluent pond ----- 2 continue
- Washed to a sump and direct distribution system (no pond) ----- 3 continue
- Other (specify) ----- 4 continue

If system is not dry-scraped (Q37 = not 1), ask Q38

Q38. Do you remove any manure solids prior to the pond or direct distribution system?

- Yes ----- 1
- No ----- 2

Q39. Is the feedpad roofed?

- Yes ----- 1 go to Q41
- No ----- 2 continue

If the feedpad is dry-scraped and has no roof (Q37 = 1 and Q39 = 2), ask Q40. Others with feedpad go to Q41

Q40. What happens to run off from the feedpad during rainfall? *Do not read out*

- Directed to the effluent pond ----- 1
- Directed to a sump and direct distribution system ----- 2
- Drains to paddocks ----- 3
- Other (specify) ----- 4

Q41. How long do the cows spend on the feedpad on average?

Ask all:

Q42. What sort of information or support would you need, if any, if you decided to make changes to your effluent system?

Q43. Do you know where you can source the independent advice and support you might need to change your effluent system? *Interviewer note: there is a list of advisers on Dairy Australia's website.*

- Yes ----- 1
- No, don't know ----- 2

Ask all:

The next few questions are about the general farm environment.

Q44. Do you have any areas on the farm that are managed for conservation or biodiversity?

- Yes ----- 1 continue
- No ----- 2 go to Q46

Q45. Approximately what proportion of the farm is managed for conservation or biosecurity?

Ask all:

Q46. Do you have any naturally occurring waterways on your farm such as rivers, creeks or streams?

Yes ----- 1 continue
No ----- 2 go to Q51

Q47. Are the waterways on your farm fenced off from livestock?

Yes, all ----- 1 go to Q51
Yes, most ----- 2 continue
Some ----- 3 continue
No ----- 4 continue

Q48. Do you have plans to fence off more waterways in future?

Yes ----- 1 continue
No ----- 2 go to Q50

Q49. If funding support is NOT available from natural resource management agencies to undertake this fencing, will you ... *read out*

Still do the fencing in the time frame planned ----- 1
Still do the fencing, but it will have to be done over a longer period ----- 2
Not be able to undertake the fencing ----- 3
Unsure/depends on farm finances ----- 4

If not planning to fence off more waterways in future (Q48 = 2), ask Q50. Others go to Q51

Q50. What is the reason for not planning to fence off more waterways in future?

Ask all:

Q51. Do you have any of the following renewable energy installations on your property either at the dairy shed, at irrigation sites or at the home? *Read out*

Solar photovoltaic panels ----- 1 continue
Solar water heating ----- 2
Wind turbines ----- 3
Mini hydro systems ----- 4
Heat pumps such as Quantum heat pumps ----- 5
(interviewer note: were sold to dairy farmers for \$1 due to renewable energy certificates that came with them)
Other (specify) ----- 6
None ----- 7

If mention solar PV panels (Q51 = 1), ask Q52. Others go to Q53

Q52. How many kilowatts of power do your solar photovoltaic panels generate?

Q53. Have you installed a variable speed drive or VSD on your property?

Yes ----- 1
No, but plan to in the short term ----- 2
No and no plans to do so ----- 3
Don't know what a variable speed drive is ----- 4

Q54. Have you installed heat exchangers on your property?

Yes ----- 1
No, but plan to in the short term ----- 2
No and no plans to do so ----- 3
Don't know what heat exchangers are ----- 4

Ask all:

Q55. Do you currently recycle your silage wrap?

Yes ----- 1 continue
No, but plan to in the short term ----- 2 go to Q57
No and no plans to do so ----- 3 go to Q57
Don't use silage wrap ----- 4 go to Q57

Q56. Approximately what proportion of your silage wrap is recycled?

Ask all:

Q57. Have you participated in the Drum Muster program in the past 12 months?

Yes ----- 1
No, but plan to do so next year ----- 2
No and no plans to do so ----- 3
Not available in our area ----- 4
Haven't heard of the Drum Muster program ----- 5

Q58. Do you implement any other recovery, reuse or recycling practices on the farm?

Yes ----- 1 continue
No ----- 2 go to Q60

Q59. What recovery, reuse or recycling practices do you implement?

Q60. If money and labour were not a problem, what would you like to do to improve the sustainability of the soil, water and biodiversity on your farm?

Ask all:

Q61. Gender *do not ask, simply record*

Male ----- 1
Female ----- 2

Q62. May I ask your age?

Q63. Are you a member of a group that is involved in natural resource management programs?

Yes ----- 1
No ----- 2

Q64. Are you a member of a farmer discussion group?

Yes ----- 1
No ----- 2

Q65. Overall, how do you feel about the future of the dairy industry? Would you say you feel ...

- Very positive ----- 1
- Fairly positive ----- 2
- Fairly negative ----- 3
- Very negative ----- 4
- Neutral / unsure ----- 5

Q66. How would you describe the phase your dairy enterprise is currently in? Is it ... *read out*

- A steady as she goes pattern because it is pretty much where you want it to be - 1
- A steady as she goes pattern because you are unable to expand at the moment - 2
- An expansion phase ----- 3
- A winding down phase----- 4
- A new farm ----- 5
- A farm which has been taken over from parents or other family ----- 6
- Other (specify) ----- 7