

New Zealand Dairy Statistics

2018-19



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1. Introduction

Introduction

Kia ora and welcome to the 2018/19 edition of New Zealand Dairy Statistics

New Zealand Dairy Statistics is the census of the national dairy herd. It provides the largest and most comprehensive range of statistical analyses on current, historic and emerging trends in the New Zealand dairy sector.

The report includes the latest production, herd improvement, animal evaluation and reproduction statistics. Reflected in the 2018/19 statistics is an increasing focus on data-driven agriculture resulting in farming with improved precision. Farmers are making concerted efforts to produce more with less.

In 2018/19, New Zealand reached record milk production per herd and per cow. In recent years we have seen cow numbers stabilise after a period of growth. Farmers are now focusing on productivity and efficiency, as well as continuing to improve their environmental management practices on farm.

Herd testing and artificial breeding continue to play a vital role in improving the quality of the national herd. We have witnessed an increased uptake of these herd improvement services, as farmers seek higher performing and more efficient dairy cows. This is good news for the New Zealand dairy sector as farmers have the ability to better monitor cow health and make faster, more informed decisions on-farm.

The success of our dairy farmers has real benefits for New Zealanders. Currently, the dairy sector employs 46,000 workers.¹ The dairy sector earned New Zealand \$18.1 billion in export revenue for the year to June 2019, and is set to top that next year.²

Dairy provides more money to pay for the essential services that help to improve peoples' quality of life such as education, hospitals, social security, police, national parks and other public services.

Looking to the future, dairy farmers have made commitments as part of the *Dairy Tomorrow* strategy to build the world's most competitive and resilient dairy farms, and to be world leading in animal care. They will do this while continuing to protect our environment, and helping grow vibrant and prosperous communities.



Dr Tim Mackle
Chief Executive
DairyNZ



Wayne McNee
Chief Executive
Livestock Improvement Corporation

This report has been jointly produced by Livestock Improvement Corporation (LIC) and DairyNZ since 2006/7.

LIC is a farmer-owned agritech and herd improvement co-operative that provides a range of services and solutions to improve the productivity and prosperity of farmers.

DairyNZ is the industry organisation representing New Zealand's dairy farmers, funded by farmers through a levy on milksolids.

Data is sourced from the LIC Herd Improvement Database, New Zealand dairy companies, Animal Evaluation database, TB Free New Zealand, Real Estate Institute of New Zealand, and Statistics New Zealand.

¹ *Dairy's Contribution to the New Zealand Economy*, January 2019, DairyNZ Economics Group

² *Situation and Outlook for Primary Industries*, September 2019, Ministry for Primary Industries

Executive summary

New Zealand reached record milk production per cow this year.

New Zealand's dairy sector has long been a global leader in innovation. Today farmers are continuing to draw on a range of tools to enable them to farm more productively and efficiently.

This report shows that cow numbers have remained relatively stable, and the cows we do have are producing more milk than ever.

The trend towards quality over quantity is apparent in the increased uptake of herd improvement services, with farmers using herd testing to monitor cow performance and wellbeing and artificial breeding to make the most of their best genetics, with a view to producing more milk from fewer cows.

Milk Production

Milk production has increased, with milk production per herd and per cow reaching its highest level.

In the 2018/19 season, dairy companies processed 21.2 billion litres of milk containing 1.88 billion kilograms of milksolids – up 2.4% on the previous season. Average milksolids per cow increased by 3.5% to 381kg. Average milksolids per effective hectare (1,081kg) was higher than the three previous seasons and the second highest on record.



Cow Numbers

Cow numbers decreased slightly.

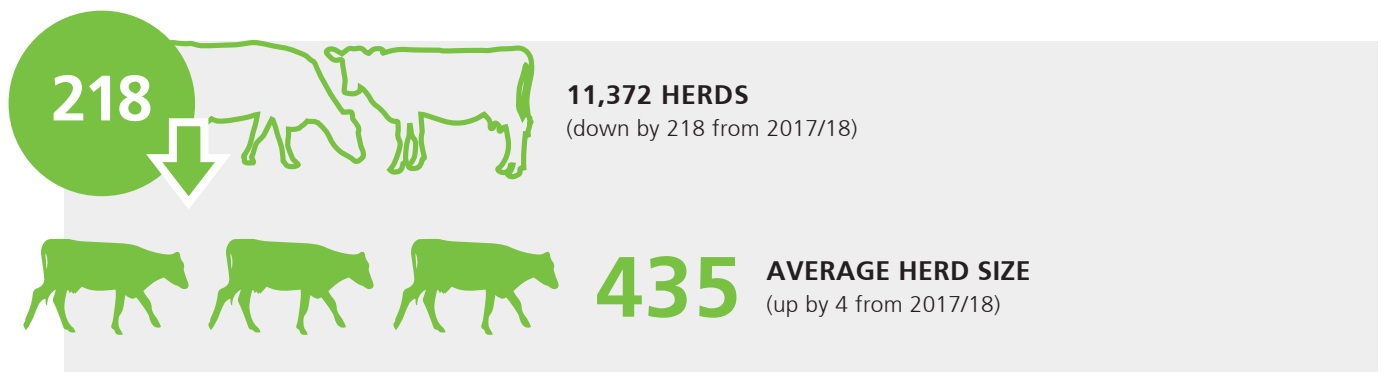
The days of significant cow growth may be over, with farmers continuing to place more focus on productivity and efficiency. The total cow population in 2018/19 was 4.946 million, a decrease of 0.9% from the previous season.



Dairy Herd Size

New Zealand dairy herds are becoming bigger but the number of herds fell slightly.

There were 11,372 dairy herds this season – 218 fewer than the previous season. The average herd size increased by 4 cows to 435.



Herd Improvement

We are continuing to see an increasing uptake in herd improvement services. Farmers are seeking higher performing and more efficient dairy cows through the use of herd testing and artificial breeding (AB).

a) Herd testing – know your cows

The number of cows being herd tested has increased.

Herd testing enables farmers to collect information about individual cows in their herds – this includes information on milk production, milk solid makeup and mastitis. The information gained from herd testing is vital for effective herd management, monitoring cow wellbeing and on-farm decision making.

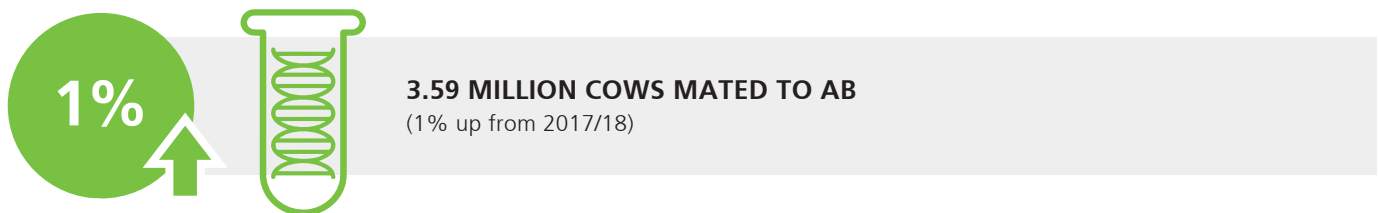
A total of 3.67 million cows were herd tested in 2018/19, up 1.6% from the previous season and the highest on record. Both the percentage of total herds and percentage of total cows herd tested increased.



b) Artificial breeding (AB) – creating genetic and productive gain through the next generation

The number of cows mated to AB has increased.

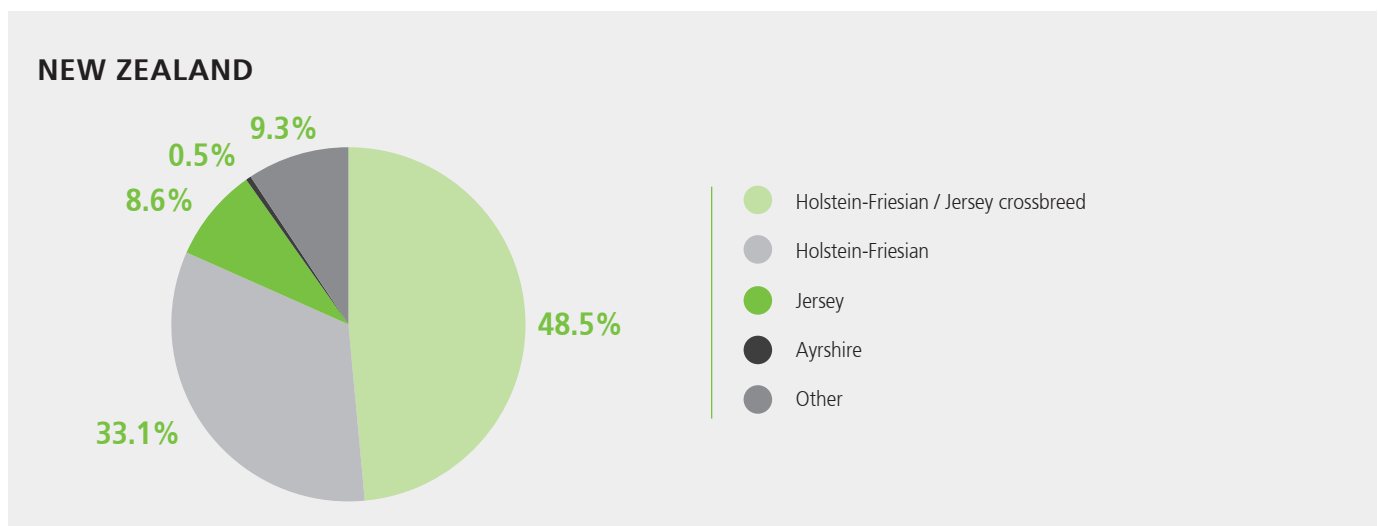
Farmers are identifying every opportunity to maximise the rate of genetic gain. 3.59 million cows were mated to AB in 2018/19. The most significant increase was in the number of yearlings mated to AB which jumped up 11% to 230,497 – the highest in the past nine seasons.



Cow Breed

Almost 50% of cows are Holstein-Friesian/Jersey crossbred.

Farmers are increasingly shifting to crossbred cows to benefit from the efficiencies of hybrid vigour and get the best traits from the two main dairy breeds. 48.5% of cows are Holstein-Friesian/Jersey crossbred, a 0.7% increase from the previous season. 33.1% of cows are Holstein-Friesian, 8.6% are Jersey cows and 9.8% of cows are other breeds.



2. National dairy statistics

A. Industry statistics

i) Production

- Protein at its highest level
- Second highest milksolds production

In 2018/19, dairy companies processed 21.2 billion litres of milk containing 1.88 billion kilograms of milksolds (Table 2.1). Total milksolds increased by 2.4% from the 1.84 billion kilograms processed in the previous season. Since 2013/14 milksolds processed has been in the range of 1.8 to 1.9 billion kilograms.

Table 2.1: Summary of milk production statistics for the last 35 seasons

Season	Milk processed (million litres)	Milkfat processed (million kgs)	Protein processed (million kgs)	Milksolds processed (million kgs)
1984/85	6,965	332	245	578
1985/86	7,326	350	257	609
1986/87	6,385	301	222	524
1987/88	6,921	333	245	579
1988/89	6,533	311	237	541
1989/90	6,868	330	242	572
1990/91	7,077	343	254	599
1991/92	7,454	365	270	637
1992/93	7,629	373	277	651
1993/94	8,603	423	313	736
1994/95	8,633	422	311	733
1995/96	9,325	452	335	788
1996/97	10,339	506	375	880
1997/98	10,651	513	378	891
1998/99	10,563	503	377	880
1999/00	11,630	560	421	981
2000/01	12,925	626	470	1,096
2001/02	13,607	657	495	1,152
2002/03	13,906	676	515	1,191
2003/04	14,599	716	538	1,254
2004/05	14,103	694	519	1,213
2005/06	14,702	724	543	1,267
2006/07	15,134	750	566	1,316
2007/08	14,745	722	548	1,270
2008/09	16,044	791	602	1,393
2009/10	16,483	817	622	1,438
2010/11	17,339	859	654	1,513
2011/12	19,129	954	731	1,685
2012/13	18,883	939	719	1,658
2013/14	20,657	1,034	791	1,825
2014/15	21,253	1,067	823	1,890
2015/16	20,914	1,050	812	1,862
2016/17	20,702	1,042	809	1,851
2017/18	20,724	1,035	804	1,840
2018/19	21,217	1,056	828	1,884

Note: Prior to 1998/99, Table 2.1 consisted of milk production statistics that were processed into export products (i.e., town milk supply was excluded). These statistics on milk, milkfat, protein and milksolds processed were provided by the New Zealand Dairy Board and are no longer available. Consequently, totals from 1998/99 include all milk processed by New Zealand dairy companies, including milk for the domestic market.

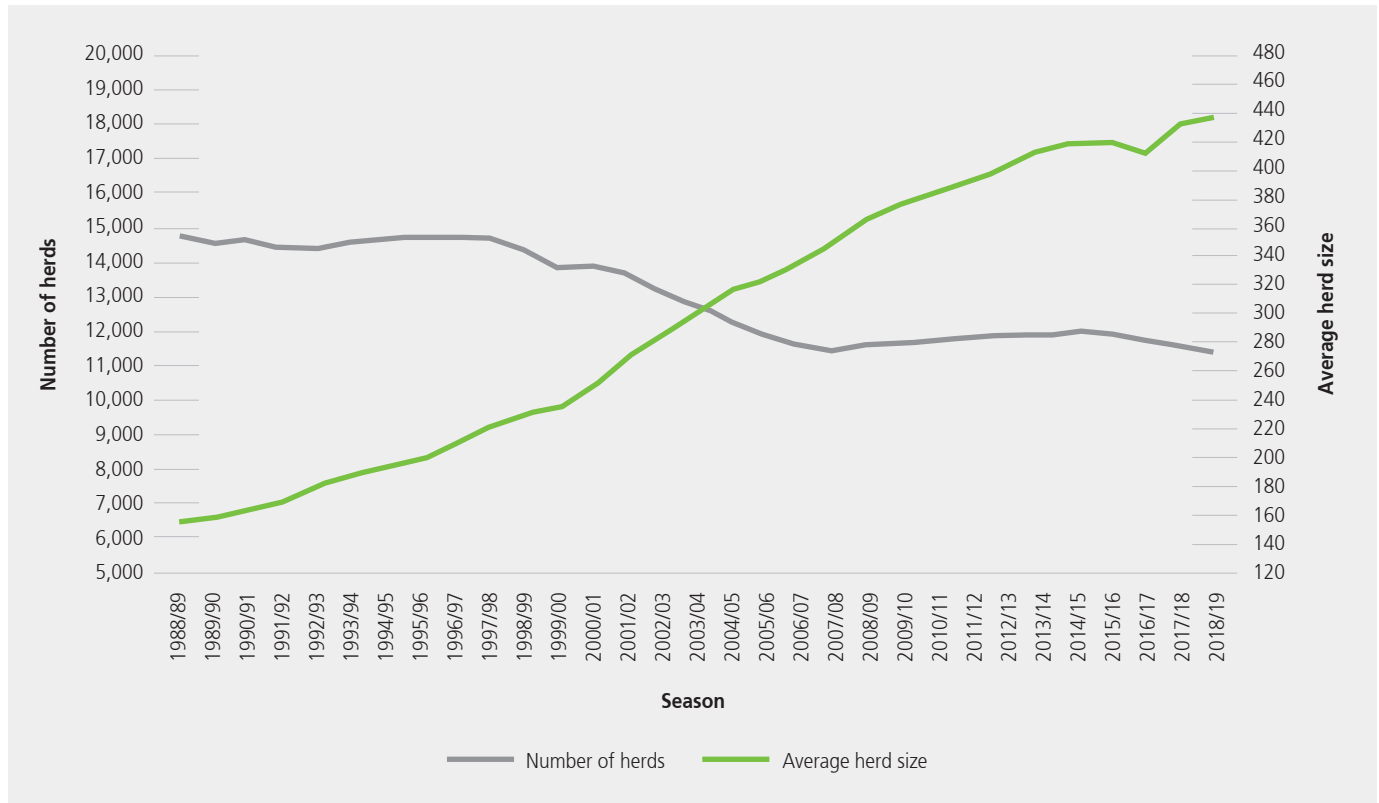
ii) Population

- Number of herds decrease
- Average herd size increases

Between 1997-98 and 2007-08 total herd numbers declined at an average rate of about 300 herds per season (Graph 2.1), before levelling off. The total number of herds in the 2018/19 season decreased by 218 to 11,372. This was the fourth year of easing herd numbers after seven consecutive seasons of small increases.

The average herd size was 435 in 2018/19, which was 4 cows higher than the previous season. The average herd size has almost tripled in the last 30 seasons, and has increased by more than 200 cows in the last 20 seasons. Expansion of the dairy herd in the South Island has contributed to the increase in average herd sizes.

Graph 2.1: Trend in the number of herds and average herd size for the last 30 seasons



The total cow population in the 2018/19 season was 4.946 million (Table 2.2), a small decrease of 0.93% from the previous season. Average farm size increased to 153 effective hectares. A stocking rate of 2.84 cows per hectare was the same as the previous season. Total effective hectares (milking platform with support block excluded) were 1.744 million – a decrease of about 11,500 ha on the previous season.

Table 2.2: Summary of herd statistics since 1975/76

Season	Herds	Total cows	Total effective hectares ^a	Average herd size	Average effective hectares ^b	Average cows per hectare ^b
1975/76	18,442	2,091,950	-	113	-	-
1980/81	16,089	2,027,096	-	126	-	-
1985/86	15,753	2,321,012	1,008,192	147	64	2.30
1990/91	14,685	2,402,145	1,023,545	164	70	2.35
1991/92	14,452	2,438,641	-	169	-	-
1992/93	14,458	2,603,049	1,069,892	180	74	2.43
1993/94	14,597	2,736,452	1,122,509	188	77	2.44
1994/95	14,649	2,830,977	1,175,940	193	80	2.41
1995/96	14,736	2,935,759	1,208,352	199	82	2.43
1996/97	14,741	3,064,523	1,267,726	208	86	2.42
1997/98	14,673	3,222,591	1,276,551	220	87	2.52
1998/99	14,362	3,289,319	1,306,942	229	91	2.52
1999/00	13,861	3,269,362	1,292,566	236	93	2.53
2000/01	13,892	3,485,883	1,329,173	251	96	2.62
2001/02	13,649	3,692,703	1,404,930	271	103	2.63
2002/03	13,140	3,740,637	1,463,281	285	111	2.56
2003/04	12,751	3,851,302	1,421,147	302	111	2.71
2004/05	12,271	3,867,659	1,411,594	315	115	2.74
2005/06	11,883	3,832,145	1,398,966	322	118	2.74
2006/07	11,630	3,916,812	1,412,925	337	121	2.77
2007/08	11,436	4,012,867	1,436,549	351	126	2.79
2008/09	11,618	4,252,881	1,519,117	366	131	2.80
2009/10	11,691	4,396,675	1,563,495	376	134	2.81
2010/11	11,735	4,528,736	1,638,706	386	140	2.76
2011/12	11,798	4,634,226	1,638,546	393	139	2.83
2012/13	11,891	4,784,250	1,677,395	402	141	2.85
2013/14	11,927	4,922,806	1,716,464	413	144	2.87
2014/15	11,970	5,018,333	1,746,156	419	146	2.87
2015/16	11,918	4,997,811	1,751,704	419	147	2.85
2016/17	11,748	4,861,324	1,728,702	414	147	2.81
2017/18	11,590	4,992,914	1,755,148	431	151	2.84
2018/19	11,372	4,946,305	1,743,673	435	153	2.84

- Not available

^a Total effective hectares between 1981/82 and 1999/00 are estimates.

^b Average effective hectares and average cows per hectare for 1981/82 to 1990/91 are based on factory supply herds only.

Note: The number of cows used to calculate the average herd size since 1992/93 includes all cows lactating in that season, whereas in earlier years the number of cows used to produce the average herd size was based only on those cows lactating on 31 December. This change in method has had a small effect on reported cow numbers

B. Herd production statistics

- Milk production per herd and per cow at its highest level

Herd production has increased most years since 1992/93 (Table 2.3), except for the drought years of 1998/99, 2007/08 and 2012/13. The average milksolids per effective hectare of 1,081 kg in 2018/19 was higher than the three previous seasons and the second highest on record. Production per cow increased by 3.5% in 2018/19 to an average of 381 kg milksolids (comprising 214 kg milkfat and 167 kg protein).

Table 2.3: Summary of herd production since 1975/76

Season	Average litres per herd	Average kg milkfat per herd	Average kg protein per herd	Average kg milksolids per herd	Average kg milkfat per effective hectare	Average kg protein per effective hectare	Average kg milksolids per effective hectare	Average litres per cow	Average kg milkfat per cow	Average kg protein per cow	Average kg milksolids per cow
1975/76 ^a	-	15,700	-	-	-	-	-	-	137	-	-
1980/81 ^a	-	18,864	-	-	-	-	-	-	147	-	-
1985/86 ^a	-	23,489	-	-	379	-	-	-	157	-	-
1990/91 ^a	-	24,495	-	-	351	-	-	-	148	-	-
1991/92 ^b	-	26,567	-	-	-	-	-	-	157	-	-
1992/93	554,040	26,982	20,138	47,120	374	279	653	-	148	111	259
1993/94	618,139	30,220	22,458	52,678	407	301	708	-	160	119	278
1994/95	614,203	29,886	22,117	52,002	386	285	671	-	156	115	271
1995/96	663,248	32,050	23,827	55,877	405	300	705	-	163	120	283
1996/97	728,874	35,436	26,387	61,823	425	316	741	-	173	128	301
1997/98	752,399	36,383	26,984	63,367	430	318	748	-	168	124	292
1998/99	735,544	35,047	26,254	61,301	392	292	684	-	147	109	256
1999/00	839,066	40,365	30,396	70,761	439	329	768	-	165	123	288
2000/01	930,047	45,063	33,850	78,914	472	353	825	-	177	133	310
2001/02	996,904	48,137	36,300	84,436	471	353	824	-	175	132	307
2002/03	1,058,307	51,447	39,174	90,621	471	357	828	-	179	136	315
2003/04	1,144,938	56,150	42,171	98,321	509	380	889	3,737	184	138	322
2004/05	1,149,262	56,520	42,305	98,825	494	368	862	3,574	176	132	308
2005/06	1,237,228	60,955	45,705	106,660	520	387	907	3,763	186	139	325
2006/07	1,301,308	64,495	48,687	113,182	534	400	934	3,791	189	142	330
2007/08	1,289,337	63,158	47,876	111,033	498	375	873	3,567	175	132	307
2008/09	1,381,573	68,116	51,850	119,966	524	396	921	3,710	184	139	323
2009/10	1,409,875	69,859	53,184	123,043	519	392	912	3,642	181	137	318
2010/11	1,477,531	73,184	55,762	128,946	524	399	923	3,829	190	144	334
2011/12	1,621,344	80,875	61,936	142,811	582	446	1,028	4,128	206	158	364
2012/13	1,587,980	78,948	60,462	139,410	560	429	988	3,947	196	150	346
2013/14	1,731,985	86,682	66,330	153,012	602	461	1,063	4,196	210	161	371
2014/15	1,775,501	89,152	68,734	157,886	611	471	1,082	4,235	213	164	377
2015/16	1,754,836	88,132	68,091	156,223	600	463	1,063	4,185	210	162	372
2016/17	1,762,152	88,667	68,892	157,560	603	468	1,071	4,259	214	167	381
2017/18	1,788,051	89,320	69,413	158,733	590	458	1,048	4,151	207	161	368
2018/19	1,865,731	92,868	72,806	165,674	606	475	1,081	4,290	214	167	381

- Not available

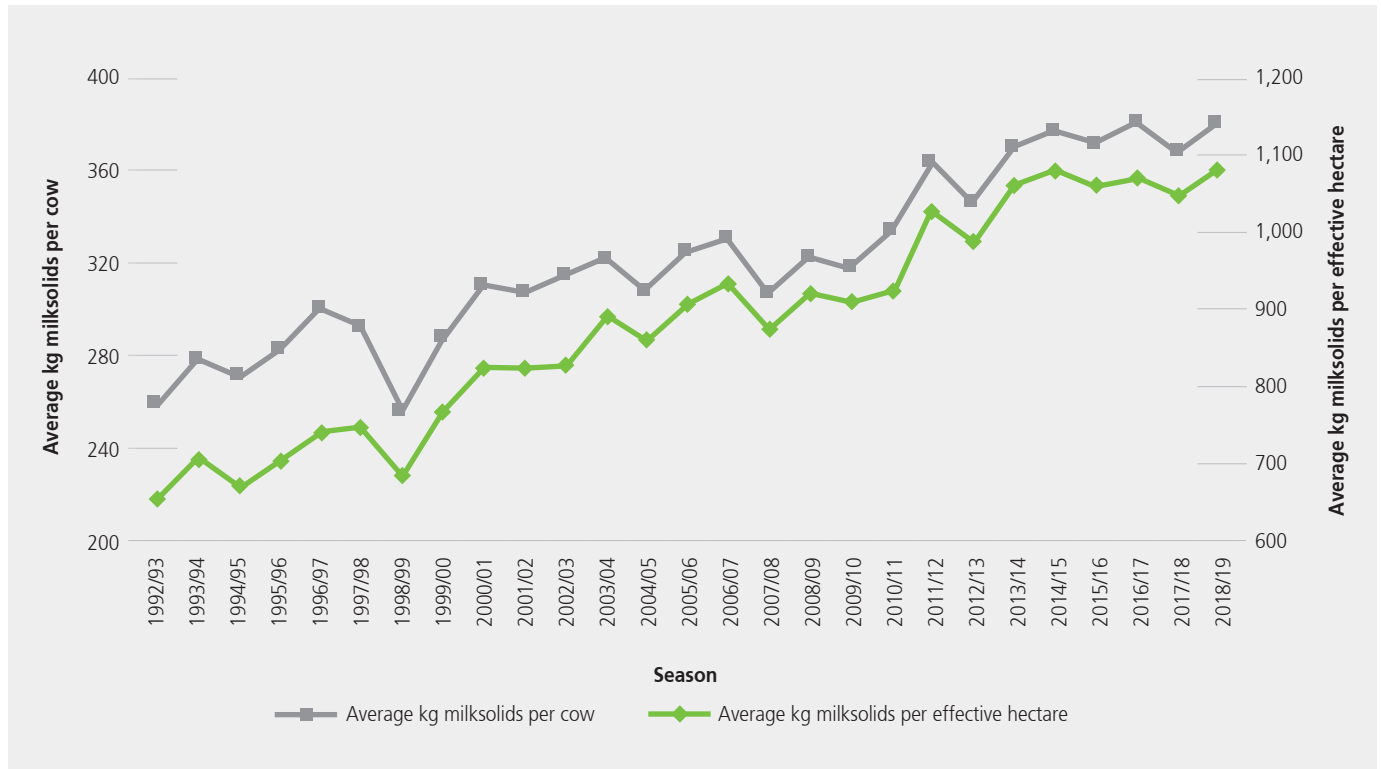
^a Figures prior to 1991/92 exclude town milk herds

^b 1991/92 figures include some town milk herds

i) Production per cow and per hectare

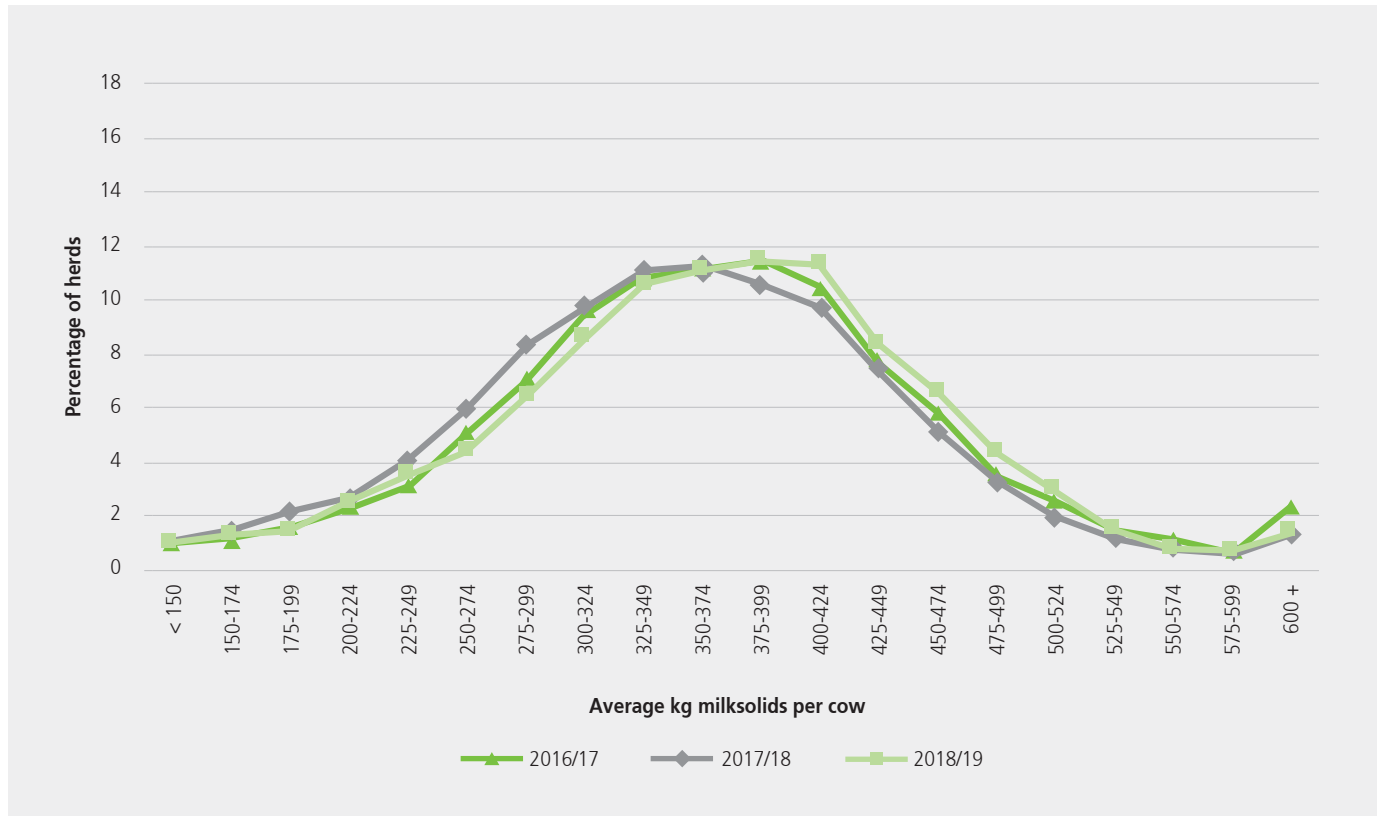
Average milksolids per cow in 2018/19 was 381 kg, compared with 368 kg last season (Graph 2.2). Average milk production per hectare was 1,081 kg – higher than the previous three seasons. Variations from season to season are masked by the considerable effect of the weather on each season's actual production. For example, widespread drought in 2012/13 caused milk production to decline while in 2013/14, favourable pasture growth conditions, coupled with increased supplementary feed use, enabled high milk production.

Graph 2.2: Milksolids production per cow and per effective hectare since 1992/93



Average production per cow varies considerably from farm to farm. This variation is caused by many factors, including temperature, rainfall, soil fertility, stocking rate, the genetic merit of the herd, level of supplementary feed and farm management practice. Graph 2.3 shows the distribution of milksolids production in 2018/19 compared with the previous two seasons. Two-thirds of herds recorded milksolids production between 300 and 450 kilograms per cow. Thirty-eight per cent of the herds had an average production of over 400 kilograms milksolids per cow, compared with 31% in the previous season and 36% in 2016/17. In 2018/19, seven per cent of herds recorded over 500 kg milksolids/cow.

Graph 2.3: Distribution of herds by milksolids production per cow for the last three seasons



ii) Herd size distribution

- 12% of herds have 750 or more cows

Fifty percent (5,657) of herds have between 150 and 400 cows (Table 2.4). In 2018/19, 3,536 (31%) had 500 or more cows, 1,511 (13%) had 750 or more cows, and 623 (5%) had 1,000 cows or more. Averages of milkfat, protein and milksolids per cow, by herd size, are also included in Table 2.4.

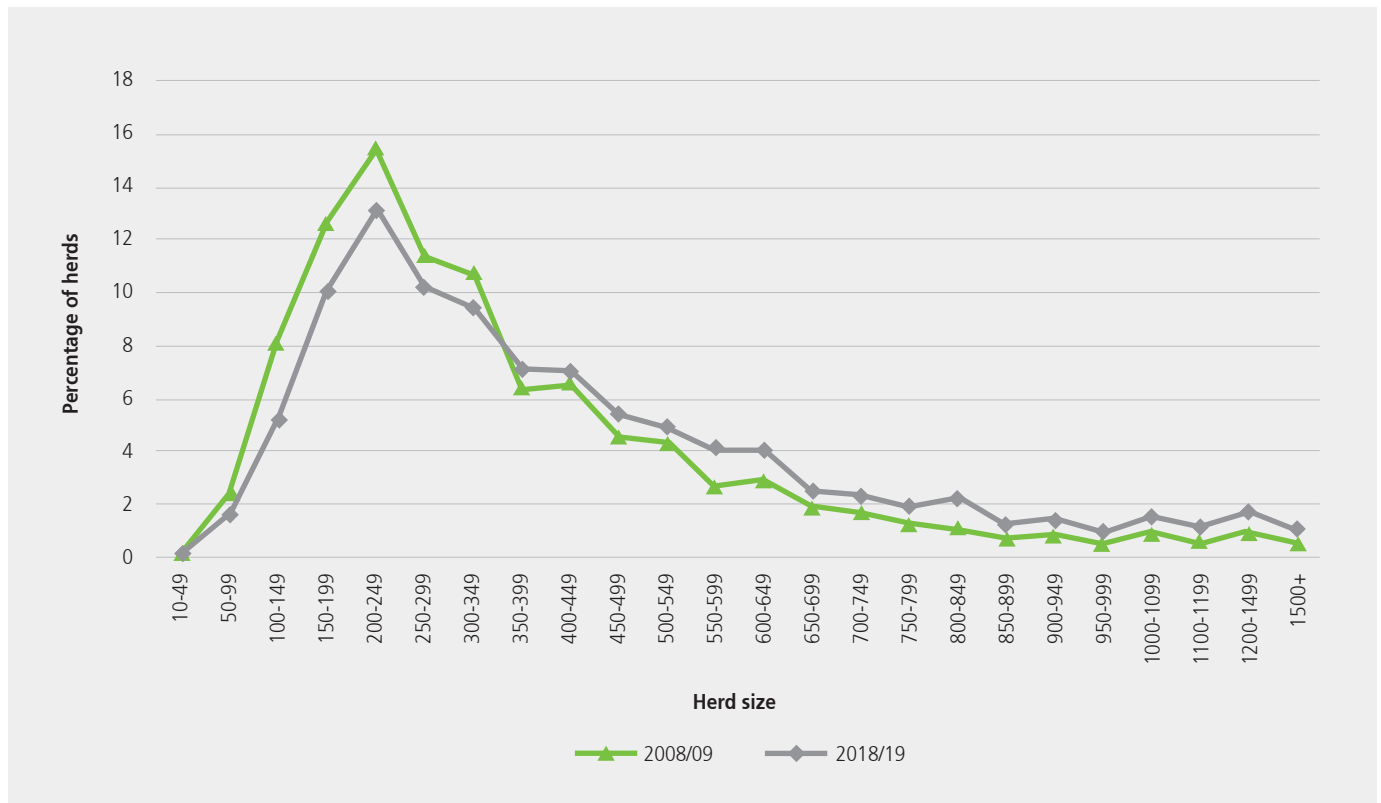
Aside from the 190 herds with fewer than 100 animals, the average milksolids per cow varies between 319 kg (herds with 100-149 cows) and 410 kg (herds with 800-849 cows).

Table 2.4: Average production per cow by herd size in 2018/19

Herd size	Number of herds	Percentage of herds	Number of cows	Percentage of cows	Average kg milkfat per cow	Average kg protein per cow	Average kg milksolids per cow
10-49	8	0.1	304	0.0	278	218	496
50-99	182	1.6	14,627	0.3	137	107	244
100-149	591	5.2	74,256	1.5	180	139	319
150-199	1,133	10.0	196,223	4.0	196	152	348
200-249	1,486	13.1	328,735	6.6	204	158	362
250-299	1,160	10.2	313,077	6.3	207	161	368
300-349	1,073	9.4	342,413	6.9	210	163	372
350-399	805	7.1	297,148	6.0	213	166	379
400-449	792	7.0	330,465	6.7	216	169	385
450-499	606	5.3	282,857	5.7	213	167	380
500-549	560	4.9	288,917	5.8	220	172	391
550-599	464	4.1	263,802	5.3	218	172	390
600-649	457	4.0	281,545	5.7	223	175	398
650-699	282	2.5	188,113	3.8	226	179	405
700-749	262	2.3	187,295	3.8	221	175	397
750-799	215	1.9	164,277	3.3	228	179	407
800-849	252	2.2	204,836	4.1	229	181	410
850-899	144	1.3	124,419	2.5	224	177	401
900-949	166	1.5	151,889	3.1	225	177	402
950-999	111	1.0	107,088	2.2	220	174	394
1000-1099	175	1.5	179,314	3.6	222	176	398
1100-1199	132	1.2	148,937	3.0	214	169	383
1200-1499	193	1.7	249,524	5.0	211	168	379
1500+	123	1.1	226,244	4.6	182	143	325
Total/Avg	11,372		4,946,305		214	167	381

The herd size distribution presented in Graph 2.4 shows an increase in herds with 350 cows or more and a decrease in herds with fewer than 350 cows compared with 2008/09. The most common herd size remains in the range 200 to 249 cows (comprising 13.1% of herds in 2018/19, compared with 15.4% in 2008/09).

Graph 2.4: Herd size distribution for 2018/19 compared with 2008/09



3. Regional dairy statistics

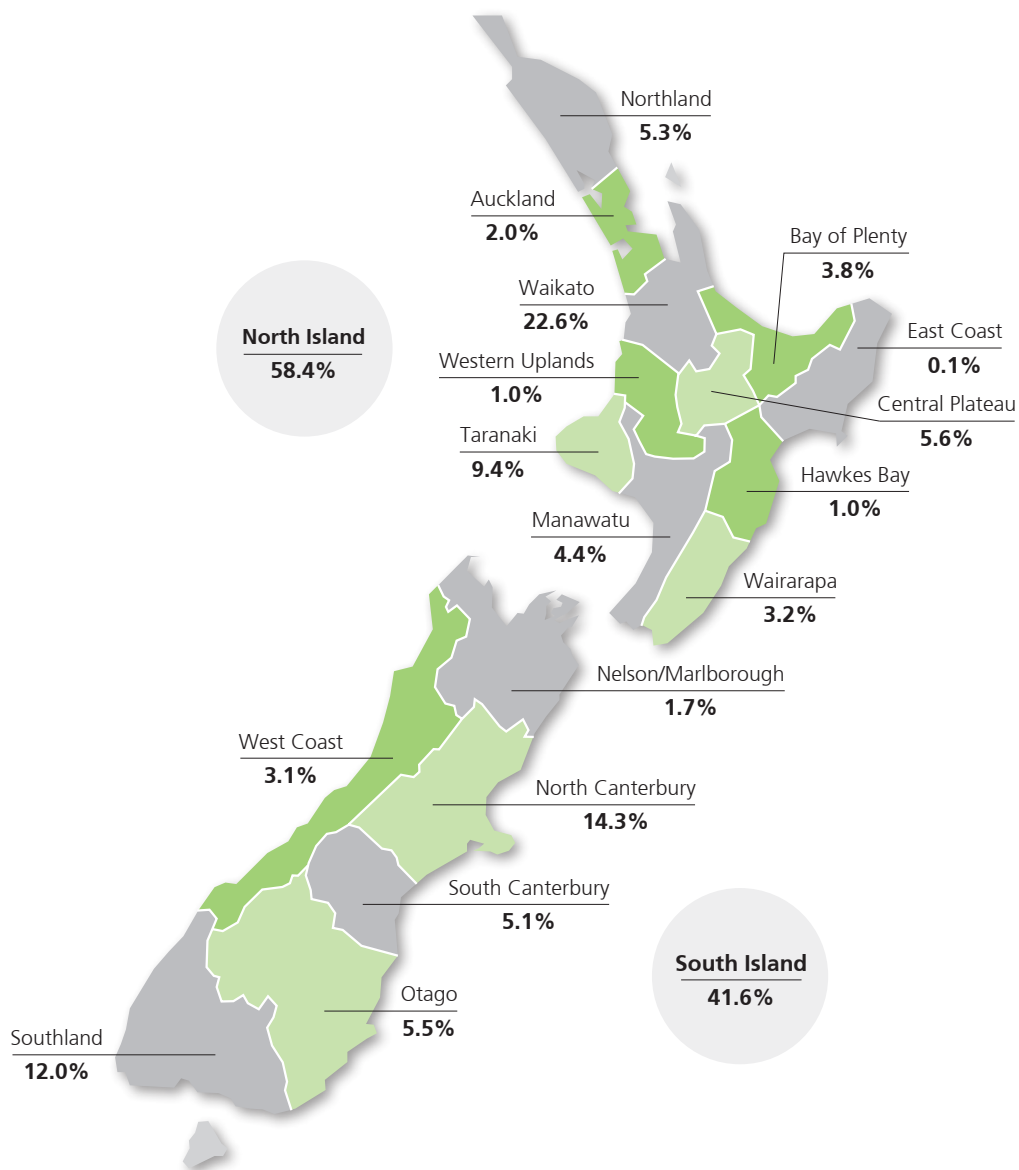
A. Regions

- 72% of dairy herds are located in the North Island
- 42% of dairy cows are located in the South Island

The majority of dairy herds (71.7%) are located in the North Island, with the greatest concentration (28.6%) situated in the Waikato region. Taranaki, with 14.0% of dairy herds, is the next largest region.

Although South Island dairy herds account for 28.3% of the national total, they contain 41.6% of all cows milked (Graph 3.1). Twenty-three per cent of all dairy cows are located in the Waikato region, followed by North Canterbury (14.3%), Southland (12.0%) and Taranaki (9.4%).

Graph 3.1: Regional distribution of dairy cows in 2018/19



- 2 million cows in the South Island
- Largest average herd size (804) in North Canterbury

Farms in the South Island are, on average, larger than those in the North Island (both in terms of farm area and cow numbers, see Table 3.1). The average herd size in both islands increased this season. Within the South Island, North Canterbury has the largest average herd size (804 cows). In the North Island, Hawkes Bay has the largest average herd size of 663 cows. The smallest average herd sizes are in Auckland, Taranaki, and Northland, averaging 281, 294 and 322 cows respectively. North and South Canterbury have the highest average cows per hectare (3.44 and 3.41 respectively). The regions with the lowest average cows per hectare are the West Coast (2.21) and Northland (2.27).

Table 3.1: Herd analysis by region in 2018/19

<i>Farming region</i>	<i>Total herds</i>	<i>Percentage of herds</i>	<i>Total cows</i>	<i>Percentage of cows</i>	<i>Total effective hectares</i>	<i>Percentage of effective hectares</i>	<i>Average herd size</i>	<i>Average effective hectares</i>	<i>Average cows per hectare</i>
Northland	820	7.2	264,142	5.3	116,407	6.7	322	142	2.27
Auckland	354	3.1	99,367	2.0	40,937	2.3	281	116	2.43
Waikato	3,249	28.6	1,117,207	22.6	381,098	21.9	344	117	2.93
Bay of Plenty	538	4.7	189,854	3.8	67,078	3.8	353	125	2.83
Central Plateau	490	4.3	278,569	5.6	103,760	6.0	569	212	2.68
Western Uplands	90	0.8	48,173	1.0	18,758	1.1	535	208	2.57
East Coast	9	0.1	5,884	0.1	2,155	0.1	654	239	2.73
Hawkes Bay	72	0.6	47,746	1.0	16,384	0.9	663	228	2.91
Taranaki	1,588	14.0	466,701	9.4	168,580	9.7	294	106	2.77
Manawatu	530	4.7	216,293	4.4	80,831	4.6	408	153	2.68
Wairarapa	416	3.7	156,612	3.2	57,469	3.3	376	138	2.73
North Island	8,156	71.7	2,890,548	58.4	1,053,457	60.4	354	129	2.74
Nelson/Marlborough	214	1.9	82,269	1.7	29,322	1.7	384	137	2.81
West Coast	372	3.3	153,077	3.1	69,382	4.0	411	187	2.21
North Canterbury	880	7.7	707,559	14.3	205,632	11.8	804	234	3.44
South Canterbury	320	2.8	251,119	5.1	73,571	4.2	785	230	3.41
Otago	445	3.9	269,746	5.5	91,473	5.2	606	206	2.95
Southland	985	8.7	591,987	12.0	220,837	12.7	601	224	2.68
South Island	3,216	28.3	2,055,757	41.6	690,216	39.6	639	215	2.98
New Zealand	11,372		4,946,305		1,743,673		435	153	2.84

- *Highest average production per herd recorded in North Canterbury*

South Island farms have, on average, higher herd production than herds in the North Island, with North Canterbury recording the highest average herd production at 343,199 kilograms of milksolids (Table 3.2). This reflects a combination of larger herd sizes, a high stocking rate, and high kilograms of milksolids per cow. In the North Island, Hawkes Bay recorded the highest average herd production of 234,216 kilograms of milksolids, reflecting large herd sizes.

In 2018/19, average production per effective hectare and production per cow was higher in the South Island than in the North Island. North Canterbury recorded the highest average milksolids per hectare in the South Island (1,469 kg), while Taranaki had the highest average milksolids production per hectare in the North Island (1,092 kg).

North Canterbury also had the highest average milksolids per cow (427 kg). In the North Island, Taranaki had the highest average milksolids per cow (394 kg).

Table 3.2: Herd production analysis by region in 2018/19

<i>Farming region</i>	<i>Total kg milksolids</i>	<i>Percent milk-solids</i>	<i>Average litres per herd</i>	<i>Average kg milkfat per herd</i>	<i>Average kg protein per herd</i>	<i>Average kg milksolids per herd</i>	<i>Average kg milkfat per effective hectare</i>	<i>Average kg protein per effective hectare</i>	<i>Average kg milksolids per effective hectare</i>	<i>Average kg milkfat per cow</i>	<i>Average kg protein per cow</i>	<i>Average kg milksolids per cow</i>
Northland	83,951,784	4.5	1,167,386	57,573	44,807	102,380	406	316	721	179	139	318
Auckland	34,678,403	1.8	1,129,265	54,856	43,105	97,962	474	373	847	195	154	349
Waikato	406,472,769	21.6	1,420,948	70,363	54,744	125,107	600	467	1,067	205	159	364
Bay of Plenty	63,098,577	3.3	1,343,013	66,000	51,283	117,284	529	411	941	187	145	332
Central Plateau	100,818,100	5.4	2,349,698	116,021	89,731	205,751	548	424	972	204	158	362
Western Uplands	14,043,974	0.7	1,734,356	88,227	67,817	156,044	423	325	749	165	127	292
East Coast	1,624,521	0.1	2,028,816	101,051	79,451	180,502	422	332	754	155	122	276
Hawkes Bay	16,863,553	0.9	2,664,201	129,988	104,228	234,216	571	458	1,029	196	157	353
Taranaki	184,053,652	9.8	1,279,381	65,214	50,689	115,903	614	477	1,092	222	172	394
Manawatu	82,886,713	4.4	1,801,727	87,494	68,896	156,390	574	452	1,025	214	169	383
Wairarapa	57,341,323	3.0	1,540,480	77,791	60,048	137,840	563	435	998	207	160	366
North Island	1,045,833,369	55.5	1,451,833	72,106	56,122	128,229	558	435	993	203	158	362
Nelson/ Marlborough	29,372,862	1.6	1,524,352	77,653	59,604	137,256	567	435	1,002	202	155	357
West Coast	51,714,656	2.7	1,517,931	78,646	60,372	139,018	422	324	745	191	147	338
North Canterbury	302,015,009	16.0	3,868,756	191,214	151,985	343,199	818	650	1,469	238	189	427
South Canterbury	103,312,149	5.5	3,612,356	179,991	142,859	322,850	783	621	1,404	229	182	411
Otago	104,285,331	5.5	2,628,850	130,971	103,378	234,349	637	503	1,140	216	171	387
Southland	247,506,646	13.1	2,796,706	140,072	111,204	251,276	625	496	1,121	233	185	418
South Island	838,206,653	44.5	2,915,402	145,520	115,117	260,636	678	536	1,214	228	180	408
New Zealand	1,884,040,021	100.0	1,865,731	92,868	72,806	165,674	606	475	1,081	214	167	381

B. Districts

South Taranaki continues to be the district with the most herds (955) followed by Matamata-Piako (877) (Table 3.3). The Southland district has the most cows (441,717), followed by Ashburton (358,609). Ashburton in North Canterbury has the highest average herd size with 873 cows followed by MacKenzie in South Canterbury with 859 cows. The number of owner-operators and sharemilkers is included in Table 3.3. Sixty-six per cent of herds are run as owner-operators, while 34% of herds are sharemilkers of various types (Table 3.5). The remainder are largely herds with contract milkers.

Table 3.3: Herd analysis by district in 2018/19

Region	District	Total herds	Number of owner-operators	Number of contract milkers	Number of share-milkers	Total cows	Total effective hectares	Average herd size	Average effective hectares	Average cows per hectare
Northland	Far North	237	171	14	52	73,167	32,617	309	138	2.24
	Whangarei	276	156	33	78	92,042	38,585	333	140	2.39
	Kaipara	307	211	38	54	98,933	45,205	322	147	2.19
Auckland	Rodney	127	77	13	37	36,605	16,270	288	128	2.25
	Manukau / Papakura	14	8	.	6	2,900	1,202	207	86	2.41
	Franklin	213	113	18	80	59,862	23,465	281	110	2.55
Waikato	Waikato	636	343	86	205	212,411	76,849	334	121	2.76
	Hamilton City	16	10	1	5	4,348	1,568	272	98	2.77
	Waipa	532	288	86	156	196,130	63,240	369	119	3.10
	Otorohanga	358	195	43	120	135,625	47,257	379	132	2.87
	Thames-Coromandel	83	41	21	21	26,046	9,504	314	115	2.74
	Hauraki	375	198	72	104	110,479	40,399	295	108	2.73
	Matamata-Piako	877	431	112	333	277,424	89,561	316	102	3.10
South Waikato	372	172	76	123	154,744	52,720	416	142	2.94	
Bay of Plenty	Western Bay of Plenty	181	102	41	38	65,918	23,157	364	128	2.85
	Tauranga	13	5	2	6	5,300	2,177	408	167	2.43
	Kawerau / Whakatane	278	175	35	65	96,562	33,796	347	122	2.86
	Opotiki	66	37	7	21	22,074	7,948	334	120	2.78
Central Plateau	Taupo	179	106	40	33	137,808	52,023	770	291	2.65
	Rotorua	311	177	47	87	140,761	51,737	453	166	2.72
Western Uplands	Waitomo	61	39	3	18	34,461	13,233	565	217	2.60
	Ruapehu	29	16	2	11	13,712	5,525	473	191	2.48
East Coast	Gisborne / Wairoa	9	6	3	.	5,884	2,155	654	239	2.73
Hawkes Bay	Napier / Hastings	30	23	2	5	16,787	6,349	560	212	2.64
	Central Hawkes Bay	42	32	5	5	30,959	10,035	737	239	3.09
Taranaki	New Plymouth	399	228	45	126	107,248	41,013	269	103	2.61
	Stratford	234	141	21	72	58,442	22,054	250	94	2.65
	South Taranaki	955	494	121	335	301,011	105,513	315	110	2.85
Manawatu	Wanganui	19	12	2	5	7,484	3,051	394	161	2.45
	Rangitikei	87	60	14	13	42,709	15,657	491	180	2.73
	Manawatu	247	149	29	69	95,947	36,259	388	147	2.65
	Palmerston North City	46	34	4	7	20,708	7,821	450	170	2.65
	Horowhenua	115	83	7	24	44,327	16,010	385	139	2.77
	Kapiti Coast / Upper Hutt	16	12	1	3	5,118	2,033	320	127	2.52
Wairarapa	Tararua	272	164	35	72	92,193	34,871	339	128	2.64
	Masterton	17	7	3	7	8,166	2,791	480	164	2.93
	Carterton	48	36	6	6	19,718	7,379	411	154	2.67
	South Wairarapa	79	44	16	18	36,535	12,428	462	157	2.94
North Island		8,156	4,596	1,104	2,420	2,890,548	1,053,457	354	129	2.74

(table 3.3 continued)

<i>Region</i>	<i>District</i>	<i>Total herds</i>	<i>Number of owner-operators</i>	<i>Number of contract milkers</i>	<i>Number of share-milkers</i>	<i>Total cows</i>	<i>Total effective hectares</i>	<i>Average herd size</i>	<i>Average effective hectares</i>	<i>Average cows per hectare</i>
Nelson/ Marlborough	Marlborough	52	38	1	12	17,263	5,809	332	112	2.97
	Kaikoura	21	10	2	9	9,366	3,074	446	146	3.05
	Tasman / Nelson City	141	106	13	22	55,640	20,439	395	145	2.72
West Coast	Buller	128	97	10	21	51,181	22,099	400	173	2.32
	Grey	89	60	9	20	41,816	18,276	470	205	2.29
	Westland	155	116	8	31	60,080	29,007	388	187	2.07
North Canterbury	Hurunui	94	67	12	15	77,127	23,400	821	249	3.30
	Waimakariri	103	64	12	27	68,794	20,466	668	199	3.36
	Christchurch City	36	26	7	3	28,099	8,544	781	237	3.29
	Banks Peninsula	6	3	.	3	1,841	813	307	136	2.26
	Selwyn	230	152	33	45	173,089	51,131	753	222	3.39
	Ashburton	411	226	59	126	358,609	101,278	873	246	3.54
South Canterbury	Timaru	179	124	11	44	132,540	37,678	740	210	3.52
	MacKenzie	17	10	.	7	14,602	5,320	859	313	2.74
	Waimate	124	66	6	52	103,977	30,572	839	247	3.40
Otago	Waitaki	145	69	17	59	105,162	31,535	725	217	3.33
	Dunedin City	65	37	2	26	27,895	9,416	429	145	2.96
	Clutha	203	109	16	57	110,972	40,407	547	199	2.75
	Central Otago / Lakes	32	23	2	6	25,717	10,115	804	316	2.54
Southland	Gore	161	88	15	55	91,584	36,001	569	224	2.54
	Invercargill	104	55	16	32	58,686	21,519	564	207	2.73
	Southland	720	365	105	239	441,717	163,317	613	227	2.70
South Island		3,216	1,911	356	911	2,055,757	690,216	639	215	2.98
New Zealand		11,372	6,507	1,460	3,331	4,946,305	1,743,673	435	153	2.84

Ashburton had the highest average production per herd with 376,051 kilograms of milksolids followed by Hurunui with 364,976 kilograms of milksolids (Table 3.4). Ashburton district also had the highest average milksolids per effective hectare with 1,526 kilograms. Hurunui recorded the highest production per cow (445 kilograms of milksolids). Within the North Island districts, Taupo has the highest milksolids production per herd with an average of 271,921 kilograms of milksolids. Of all the North Island districts, Masterton and South Waikato produced the highest average kilograms of milksolids per hectare (1,259 and 1,179 respectively). Masterton produced the highest average kilograms of milksolids per cow (430).

Table 3.4: Herd production analysis by district in 2018/19

Region	District	Average litres per herd	Average kg milkfat per herd	Average kg protein per herd	Average kg milksolids per herd	Average kg milkfat per effective hectare	Average kg protein per effective hectare	Average kg milksolids per effective hectare	Average kg milkfat per cow	Average kg protein per cow	Average kg milksolids per cow	
Northland	Far North	1,109,277	54,410	42,463	96,873	395	309	704	176	138	314	
	Whangarei	1,262,572	62,638	48,640	111,277	448	348	796	188	146	334	
	Kaipara	1,126,670	55,463	43,170	98,633	377	293	670	172	134	306	
Auckland	Rodney / Auckland	1,065,137	53,047	41,011	94,058	414	320	734	184	142	326	
	Manukau / Papakura	846,548	39,444	31,667	71,111	459	369	828	190	153	343	
	Franklin	1,186,083	56,948	45,106	102,054	517	409	926	203	160	363	
Waikato	Waikato	1,338,601	65,967	51,303	117,270	546	425	971	198	154	351	
	Hamilton City	1,108,794	54,555	42,174	96,729	557	430	987	201	155	356	
	Waipa	1,541,880	76,349	59,420	135,768	642	500	1,142	207	161	368	
	Otorohanga	1,523,192	76,076	58,973	135,049	576	447	1,023	201	156	356	
	Thames-Coromandel	1,124,287	55,856	43,317	99,173	488	378	866	178	138	316	
	Hauraki	1,111,297	54,911	42,803	97,714	510	397	907	186	145	332	
	Matamata-Piako	1,326,322	66,024	51,246	117,270	647	502	1,148	209	162	371	
	South Waikato	1,905,238	93,542	73,246	166,787	660	517	1,177	225	176	401	
	Bay of Plenty	Western Bay of Plenty	1,316,639	65,982	50,710	116,692	516	396	912	181	139	320
		Tauranga	1,268,173	64,181	49,627	113,807	383	296	680	157	122	279
Kawerau / Whakatane		1,396,461	67,998	53,047	121,045	559	436	996	196	153	348	
	Opotiki	1,204,953	57,995	45,752	103,747	482	380	862	173	137	310	
Central Plateau	Taupo	3,088,900	153,518	118,403	271,921	528	407	936	199	154	353	
	Rotorua	1,924,240	94,438	73,228	167,666	568	440	1,008	209	162	370	
Western Uplands	Waitomo	1,743,909	88,912	68,346	157,258	410	315	725	157	121	278	
	Ruapehu	1,714,262	86,788	66,703	153,491	456	350	806	184	141	325	
East Coast	Gisborne / Wairoa	2,028,816	101,051	79,451	180,502	422	332	754	155	122	276	
Hawkes Bay	Napier / Hastings	2,135,180	105,333	82,760	188,093	498	391	889	188	148	336	
	Central Hawkes Bay	3,042,072	147,600	119,562	267,161	618	500	1,118	200	162	362	
Taranaki	New Plymouth	1,111,202	56,879	43,755	100,634	553	426	979	212	163	374	
	Stratford	1,083,060	54,581	42,502	97,084	579	451	1,030	219	170	389	
	South Taranaki	1,397,751	71,301	55,592	126,893	645	503	1,149	226	176	403	
Manawatu	Wanganui	1,631,447	76,191	61,312	137,503	474	382	856	193	156	349	
	Rangitikei	2,070,884	101,602	79,683	181,284	565	443	1,007	207	162	369	
	Manawatu	1,712,024	83,555	65,615	149,171	569	447	1,016	215	169	384	
	Palmerston North City	2,093,899	102,133	79,936	182,069	601	470	1,071	227	178	404	
	Horowhenua	1,769,230	84,886	67,284	152,170	610	483	1,093	220	175	395	
	Kapiti Coast / Upper Hutt	1,318,737	61,669	49,740	111,409	485	391	877	193	155	348	
Wairarapa	Tararua	1,380,977	69,952	53,727	123,679	546	419	965	206	159	365	
	Masterton	2,370,526	115,867	90,824	206,691	706	553	1,259	241	189	430	
	Carterton	1,698,859	84,057	65,361	149,419	547	425	972	205	159	364	
	South Wairarapa	1,814,805	92,782	71,962	164,744	590	457	1,047	201	156	356	
North Island		1,451,833	72,106	56,122	128,229	558	435	993	203	158	362	

(table 3.4 continued)

Region	District	Average litres per herd	Average kg milkfat per herd	Average kg protein per herd	Average kg milksolids per herd	Average kg milkfat per effective hectare	Average kg protein per effective hectare	Average kg milksolids per effective hectare	Average kg milkfat per cow	Average kg protein per cow	Average kg milksolids per cow
Nelson/ Marlborough	Marlborough	1,404,375	70,281	53,891	124,172	629	482	1,112	212	162	374
	Kaikoura	2,019,238	102,269	78,865	181,134	699	539	1,237	229	177	406
	Tasman/Nelson City	1,494,892	76,705	58,842	135,547	529	406	935	194	149	343
West Coast	Buller	1,457,003	74,394	57,393	131,787	431	332	763	186	144	330
	Grey	1,794,910	92,206	71,117	163,323	449	346	795	196	151	348
	Westland	1,409,206	74,372	56,662	131,034	397	303	700	192	146	338
North Canterbury	Hurunui	4,109,960	204,380	160,595	364,976	821	645	1,466	249	196	445
	Waimakariri	3,241,592	156,375	125,427	281,802	787	631	1,418	234	188	422
	Christchurch City	3,772,033	188,121	149,806	337,927	793	631	1,424	241	192	433
	Banks Peninsula	1,387,966	70,603	54,008	124,611	521	399	920	230	176	406
	Selwyn	3,498,824	172,389	137,228	309,617	775	617	1,393	229	182	411
	Ashburton	4,222,469	209,500	166,551	376,051	850	676	1,526	240	191	431
South Canterbury	Timaru	3,454,738	171,341	136,166	307,507	814	647	1,461	231	184	415
	MacKenzie	3,936,936	197,852	156,114	353,967	632	499	1,131	230	182	412
	Waimate	3,795,386	190,029	150,705	340,734	771	611	1,382	227	180	406
Otago	Waitaki	3,165,259	159,042	125,891	284,933	731	579	1,310	219	174	393
	Dunedin City	1,856,195	91,538	72,214	163,751	632	499	1,130	213	168	382
	Clutha	2,366,049	116,411	91,739	208,150	585	461	1,046	213	168	381
	Central Otago / Lakes	3,434,841	176,232	138,512	314,744	558	438	996	219	172	392
Southland	Gore	2,469,349	124,535	97,772	222,307	557	437	994	219	172	391
	Invercargill	2,668,714	132,512	105,833	238,345	640	511	1,152	235	188	422
	Southland	2,888,394	144,638	114,983	259,621	638	507	1,145	236	187	423
South Island		2,915,402	145,520	115,117	260,636	678	536	1,214	228	180	408
New Zealand		1,865,731	92,868	72,806	165,674	606	475	1,081	214	167	381

Note: Districts with fewer than four herds have been added to a neighbouring district to preserve anonymity

C. Operating structures

The main operating structures found on New Zealand dairy farms are owner operator, sharemilker and, to a lesser extent, contract milker.

Owner operators are farmers who own and operate their own farms, or who employ a manager to operate the farm for a fixed wage. Owner-operators receive all the farm income, although they may pay wages. Owner operators comprise the largest group of all operating structures, being 57% of all herds.

Contract milkers (13% of herds) are contracted to milk a herd at a set price per kilogram of milksolids produced. The rate is set according to the amount of farm work done.

Sharemilking has traditionally been the first step to farm ownership. Sharemilking involves operating a farm on behalf of the farm owner for an agreed share of the farm receipts (as opposed to a set wage). Two types of sharemilking agreement are commonly used: Variable order sharemilking and 50/50 or herd owning sharemilking agreements.

Herd owning sharemilkers (also called 50/50) own the herd and any plant and equipment (other than the milking plant) needed to farm the property. The sharemilker is usually responsible for milk harvesting expenses, labour, stock-related expenses, and general farm work and maintenance. The owner is usually responsible for expenses related to maintaining the property. The percentage quoted in a 50/50 sharemilking agreement usually refers to the proportion of milk income the sharemilker receives. While this percentage is most commonly 50%, it can range from 45% to 55%. Under the 50/50 agreement the sharemilker receives the agreed percentage of milk income plus the majority of income from stock sales, and the farm owner receives the remaining percentage of milk income.

Unlike the 50/50 agreement, where the owner may have little to do with farm management, a variable order sharemilking agreement often sees the owner retain some involvement in the management of the farm. The variable order sharemilking agreement involves the farm owner retaining ownership of the herd and bearing more of the farm costs, such as animal health and breeding. The amount of farm work required by the sharemilker is determined by the individual agreement, with responsibility ranging from herd management only to carrying out all farm work.

- 57% of all herds are operated as owner-operators
- 58% of all sharemilkers are 50/50 sharemilkers

The number of herds farmed, average herd size, effective area and number of cows per hectare for each of the main operating structures are shown in Table 3.5. Twenty-nine per cent (3,331) of New Zealand dairy herds operated under a sharemilking agreement in 2018/19, this was an increase in numbers by 172 herds from the previous season. Owner-operators now number 6,507 reflecting a movement away from sharemilking, particularly variable order, to contract milking with greater certainty of milk income. Fifty-eight per cent (1,919) of all sharemilkers have 50/50 agreements. The majority of the variable order sharemilkers are between 20-29%. Contract milkers account for 13% of herds.

Table 3.5: Herd analysis by operating structure in 2018/19

Operating structure	Number of herds	Percentage of herds	Average herd size	Average effective hectares	Average cows per effective hectare
Owner-operators	6,507	57.2	428	154	2.79
Contract milkers	1,460	12.8	471	160	2.95
Sharemilkers:					
less than 20%	138	1.2	726	240	3.02
20-29%	589	5.2	454	158	2.87
30-49%	159	1.4	417	145	2.88
50/50	1,919	16.9	398	138	2.88
over 50%	526	4.6	443	156	2.84
All sharemilkers	3,331	29.3	430	149	2.88
Unknown	74	0.7			
All farms	11,372	100	434	153	2.84

Herd production in each of the main operating structure groups is shown in Table 3.6. The table shows that, on average, sharemilkers on less than 20% agreements have the highest production.

Table 3.6: Herd production analysis by operating structure in 2018/19

Operating structure	Average litres per herd	Average kg milkfat per herd	Average kg milksolids per herd	Average kg milkfat per effective hectare	Average kg milksolids per effective hectare	Average kg milkfat per cow	Average kg milksolids per cow
Owner-operators	1,819,371	90,354	161,257	589	1,051	211	376
Contract Milkers	2,056,184	102,531	182,805	642	1,144	218	388
Sharemilkers:							
less than 20%	3,578,281	178,589	320,258	744	1,335	246	441
20-29%	1,954,898	97,788	174,496	618	1,102	215	384
30-49%	1,795,000	89,838	160,008	619	1,102	215	383
50/50	1,695,304	84,980	151,333	615	1,095	213	380
over 50%	1,924,871	95,080	170,154	609	1,090	215	384
All Sharemilkers	1,860,226	92,950	165,814	623	1,112	216	386
All farms	1,862,019	92,693	165,385	606	1,081	213	381

Changes to the operating structure in the last ten seasons have seen the percentage of sharemilkers, including 50/50 sharemilkers, decrease. Table 3.7 shows the percentage of herds in each operating structure type, whereas Table 3.8 gives the actual number of herds. Sharemilkers have declined from 35% in 2009/10 to 29% of herds in 2018/19. For the last two seasons contract milkers are shown separately. Prior to this they were included in the Owner-operator category.

Table 3.7: Trend in the percentage of herds in each operating structure for the last 10 seasons

Operating structure	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Owner-operators	65.1	65.4	65.8	64.6	65.5	67.3	69.8	72.4	59.9	57.2
Contract Milkers									12.4	12.8
Sharemilkers:										
less than 20%	1.3	2.0	2.0	1.9	1.7	1.5	1.3	1.1	1.1	1.2
20-29%	10.5	10.9	9.9	9.6	9.7	8.8	6.9	5.0	5.1	5.2
30-49%	1.7	2.3	1.6	1.4	1.5	1.4	1.5	1.3	1.4	1.4
50/50	19.7	19.2	18.8	18.7	18.5	17.1	16.8	16.4	15.9	16.9
over 50%	1.4	0.2	1.8	3.5	2.9	3.6	3.5	3.5	3.7	4.6
All sharemilkers	34.6	34.6	34.2	35.2	34.2	32.4	30.0	27.3	27.3	29.3
Other/Unknown	0.3	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.4	0.7

Table 3.8: Trend in the number of herds in each operating structure for the last 10 seasons

Operating structure	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Owner-operators	7,616	7,677	7,764	7,679	7,812	8,059	8,315	8,503	6,940	6,507
Contract Milkers									1,440	1,460
Sharemilkers:										
less than 20%	147	233	234	224	206	179	153	134	122	138
20-29%	1,222	1,274	1,173	1,140	1,151	1,050	821	586	595	589
30-49%	200	273	193	170	177	171	174	157	161	159
50/50	2,303	2,249	2,218	2,229	2,201	2,050	2,001	1,925	1,848	1,919
over 50%	169	29	216	417	346	429	421	406	433	526
All sharemilkers	4,041	4,058	4,034	4,180	4,081	3,879	3,570	3,208	3,159	3,331
Other/Unknown	34	0	0	32	34	32	33	37	51	74
Total	11,691	11,735	11,798	11,891	11,927	11,970	11,918	11,748	11,590	11,372

Table 3.9 compares the number (and percentage) of owner-operators with sharemilkers by region in 2018/19. In the South Island there were more variable order sharemilkers than 50/50 sharemilkers, while the opposite was the case in the North Island.

Table 3.9: Operating structure by region in 2018/19

<i>Farming region</i>	<i>Owner-operators</i>	<i>Owner-operators %</i>	<i>Contract milkers</i>	<i>Contract milkers %</i>	<i>All share-milkers</i>	<i>All share-milkers %</i>	<i>50/50 share-milkers</i>	<i>50/50 share-milkers %</i>	<i>Variable order share-milkers</i>	<i>Variable order share-milkers %</i>	<i>Total herds (excl. unknown)</i>
Northland	538	8.3	85	5.8	184	5.5	120	6.3	64	4.5	807
Auckland	198	3.0	31	2.1	123	3.7	80	4.2	43	3.0	352
Waikato	1,678	25.8	497	34.0	1,067	32.0	732	38.1	335	23.7	3,242
Bay of Plenty	319	4.9	85	5.8	130	3.9	77	4.0	53	3.8	534
Central Plateau	283	4.3	87	6.0	120	3.6	79	4.1	41	2.9	490
Western Uplands	55	0.8	5	0.3	29	0.9	16	0.8	13	0.9	89
East Coast	6	0.1	3	0.2	0	0.0	0	0.0	0	0.0	9
Hawkes Bay	55	0.8	7	0.5	10	0.3	8	0.4	2	0.1	72
Taranaki	863	13.3	187	12.8	533	16.0	288	15.0	245	17.4	1,583
Manawatu	350	5.4	57	3.9	121	3.6	65	3.4	56	4.0	528
Wairarapa	251	3.9	60	4.1	103	3.1	57	3.0	46	3.3	414
North Island	4,596	70.6	1,104	75.6	2,420	72.7	1,522	79.3	898	63.6	8,120
Nelson/ Marlborough	154	2.4	16	1.1	43	1.3	24	1.3	19	1.3	213
West Coast	273	4.2	27	1.8	72	2.2	33	1.7	39	2.8	372
North Canterbury	538	8.3	123	8.4	219	6.6	105	5.5	114	8.1	880
South Canterbury	200	3.1	17	1.2	103	3.1	28	1.5	75	5.3	320
Otago	238	3.7	37	2.5	148	4.4	58	3.0	90	6.4	423
Southland	508	7.8	136	9.3	326	9.8	149	7.8	177	12.5	970
South Island	1,911	29.4	356	24.4	911	27.3	397	20.7	514	36.4	3,178
New Zealand	6,507	100.0	1,460	100.0	3,331	100.0	1,919	100.0	1,412	100.0	11,298

Table 3.10 shows the number and percentage of owner-operators, contract milkers and sharemilkers by herd size.

Table 3.10: Operating structure by herd size in 2018/19

<i>Herd size</i>	<i>Owner-operators</i>	<i>Owner-operators %</i>	<i>Contract milkers</i>	<i>Contract milkers %</i>	<i>All share-milkers</i>	<i>All share-milkers %</i>	<i>50/50 share-milkers</i>	<i>50/50 share-milkers %</i>	<i>Variable order share-milkers</i>	<i>Variable order share-milkers %</i>	<i>Number of herds (excl. unknown)</i>	<i>Percentage of herds</i>
10-49	7	0.1	0	0.0	0	0.0	0	0.0	0	0.0	7	0.1
50-99	164	2.5	3	0.2	15	0.5	6	0.3	9	0.6	182	1.6
100-149	441	6.8	20	1.4	126	3.8	69	3.6	57	4.0	587	5.2
150-199	727	11.2	83	5.7	318	9.5	213	11.1	105	7.4	1,128	10.0
200-249	859	13.2	173	11.8	446	13.4	285	14.9	161	11.4	1,478	13.1
250-299	629	9.7	166	11.4	361	10.8	236	12.3	125	8.9	1,156	10.2
300-349	563	8.7	143	9.8	364	10.9	226	11.8	138	9.8	1,070	9.5
350-399	424	6.5	127	8.7	249	7.5	145	7.6	104	7.4	800	7.1
400-449	411	6.3	132	9.0	244	7.3	152	7.9	92	6.5	787	7.0
450-499	319	4.9	86	5.9	196	5.9	95	5.0	101	7.2	601	5.3
500-549	279	4.3	91	6.2	182	5.5	91	4.7	91	6.4	552	4.9
550-599	229	3.5	84	5.8	145	4.4	81	4.2	64	4.5	458	4.1
600-649	244	3.7	76	5.2	133	4.0	66	3.4	67	4.7	453	4.0
650-699	165	2.5	35	2.4	81	2.4	41	2.1	40	2.8	281	2.5
700-749	140	2.2	45	3.1	76	2.3	43	2.2	33	2.3	261	2.3
750-799	122	1.9	30	2.1	62	1.9	30	1.6	32	2.3	214	1.9
800-849	149	2.3	23	1.6	78	2.3	31	1.6	47	3.3	250	2.2
850-899	73	1.1	22	1.5	45	1.4	25	1.3	20	1.4	140	1.2
900-949	101	1.6	28	1.9	35	1.1	17	0.9	18	1.3	164	1.5
950-999	70	1.1	14	1.0	27	0.8	10	0.5	17	1.2	111	1.0
1000-1099	98	1.5	22	1.5	54	1.6	24	1.3	30	2.1	174	1.5
1100-1199	83	1.3	18	1.2	31	0.9	12	0.6	19	1.3	132	1.2
1200-1499	132	2.0	20	1.4	38	1.1	11	0.6	27	1.9	190	1.7
1500+	78	1.2	19	1.3	25	0.8	10	0.5	15	1.1	122	1.1
Total/Avg	6,507	100.0	1,460	100.0	3,331	100.0	1,919	100.0	1,412	100.0	11,298	100.0

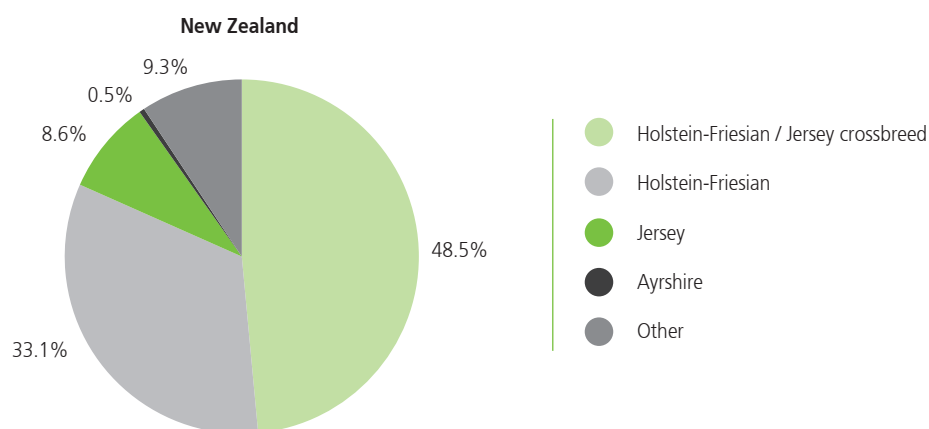
D. Breed breakdown

Three types of dairy cattle dominate the dairy cow inseminations carried out in New Zealand, as recorded on the LIC National Database: Holstein-Friesian, Jersey, and Holstein-Friesian/Jersey crossbreed.

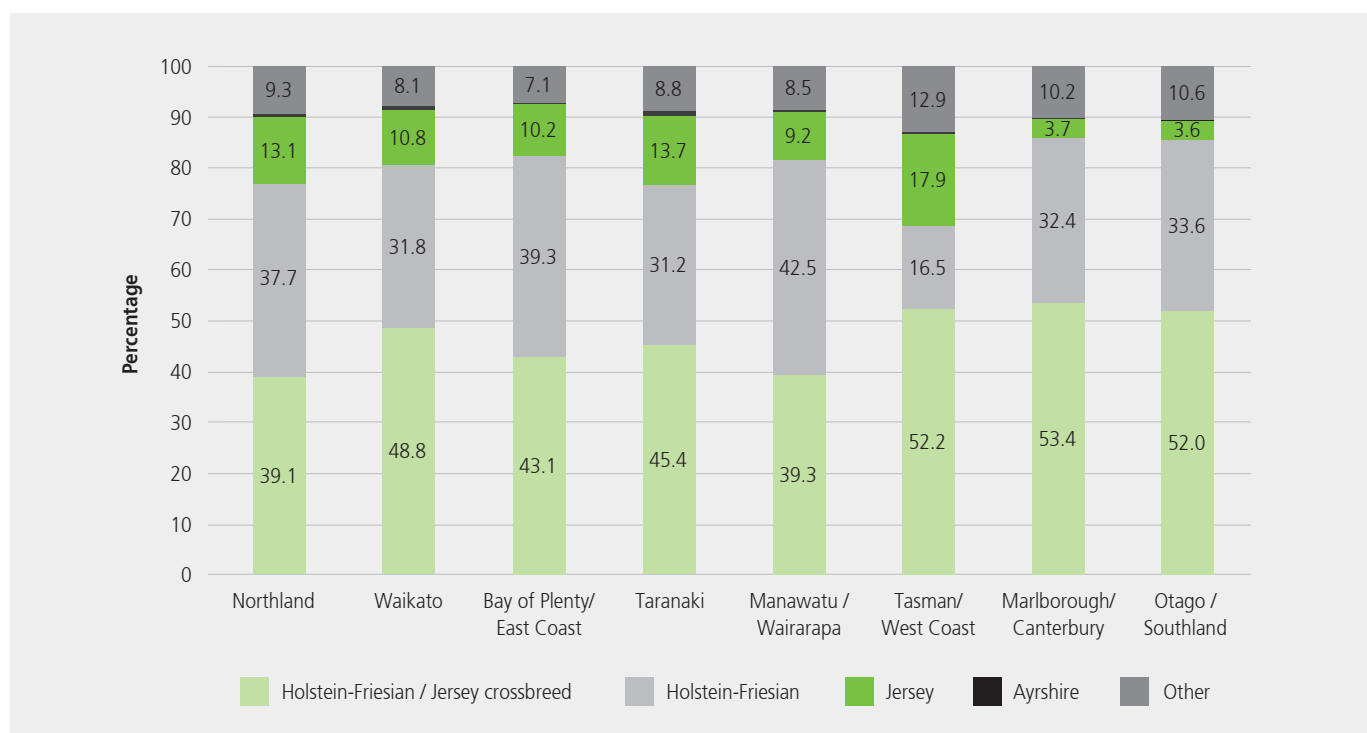
The Jersey breed dominated the national dairy herd until the late 1960s. By 1970, Holstein-Friesian was the dominant dairy breed in New Zealand, because of changes in farm management practices and farmers raising larger numbers of dairy calves for beef. Of the other breeds of cattle used to inseminate dairy cows, the main beef breed currently in use is Polled Hereford. Other beef breeds used to a lesser degree include Angus, Belgian Blue, Simmental and Wagyu. Other breeds of dairy cattle present in smaller numbers in New Zealand include Milking Shorthorn, Guernsey and Brown Swiss. Holstein-Friesian/Jersey Crossbreed now makes up a large proportion of the national dairy herd.

The percentages of the major dairy breed categories for New Zealand and each region are shown in Graphs 3.2 and 3.3. Percentages are given for Holstein-Friesian, Jersey, Holstein-Friesian/Jersey crossbreed and Ayrshire cows with the remaining breeds and crossbreeds grouped into "Other". Holstein-Friesian/Jersey crossbreed is now the prevalent breed category in all regions except the Manawatu/Wairarapa, where Holstein-Friesian remains prevalent. The Manawatu/Wairarapa region continues to have the highest percentage of Holstein-Friesian cows (43%) followed by Bay of Plenty/East Coast (39%). Tasman/West Coast has the highest proportion of Jerseys (18%) followed by Taranaki (14%). Marlborough/Canterbury has the highest proportion of Holstein-Friesian/Jersey crossbreeds (53%), followed by Tasman/West Coast (52%) and Otago/Southland (also at 52%).

Graph 3.2: Breed category percentages of cows for New Zealand in 2018/19



Graph 3.3: Breed category percentages of cows by region in 2018/19



4. Herd improvement

A. Use of herd testing

Herd testing enables farmers to collect information about individual cows in their herds. The information gained from herd testing is vital for effective herd management and decision making. Farmers are able to benchmark animal performance within herd, within region, and nationally.

Farmers currently have the choice of two herd testing service providers (CRV AmBreed and LIC), and are able to choose the frequency of testing. Data used in the following analysis includes figures from both herd test providers.

Herd testing involves the collection of individual milk samples from animals in the herd. A full herd test provides information on milk volumes, milkfat and protein yields, and somatic cell counts.

Herd testing provides an overall picture of the production of the herd, and enables the mastitis status to be monitored. More specifically, herd test information identifies low-producing cows (for culling or drying off), high producers (for breeding), and cows with mastitis (for therapy or culling).

- 74% of cows were herd-tested in 2018/19

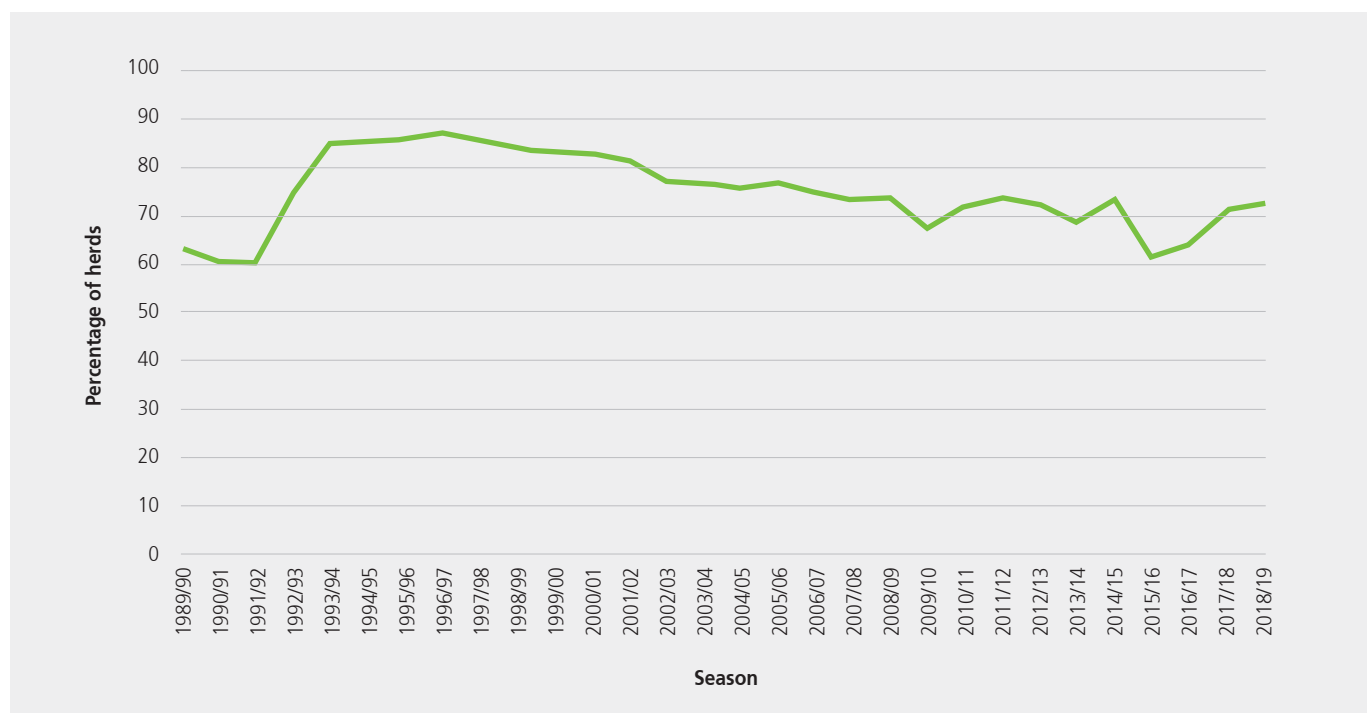
The percentage of total herds and the percentage of total cows using herd testing both increased in 2018/19. The percentage of herds, testing at 72.8% in 2018/19, was about 11% higher than in 2015/16 (Table 4.1). A total of 3.67 million cows were herd-tested in 2018/19 – the highest on record.

Table 4.1: Trend in the use of herd testing services for the last 20 seasons

Season	Number of herds herd-tested	Total herds	% of total herds	Number of cows herd-tested (000)	Total cows (000)	% of total cows
1999/00	11,521	13,861	83.1	2,806	3,269	85.8
2000/01	11,472	13,892	82.6	2,942	3,486	84.4
2001/02	11,113	13,649	81.4	2,974	3,693	80.5
2002/03	10,113	13,140	77.0	2,855	3,741	76.3
2003/04	9,772	12,751	76.6	2,842	3,851	73.8
2004/05	9,306	12,271	75.8	2,811	3,868	72.7
2005/06	9,082	11,883	76.4	2,846	3,832	74.3
2006/07	8,692	11,630	74.7	2,791	3,917	71.2
2007/08	8,405	11,436	73.5	2,871	4,013	71.5
2008/09	8,589	11,618	73.9	3,040	4,253	71.5
2009/10	7,870	11,691	67.3	2,812	4,397	64.0
2010/11	8,409	11,735	71.7	3,186	4,529	70.4
2011/12	8,673	11,798	73.5	3,362	4,634	72.6
2012/13	8,585	11,891	72.2	3,426	4,784	71.6
2013/14	8,188	11,927	68.7	3,294	4,923	66.9
2014/15	8,724	11,970	72.9	3,654	5,018	72.8
2015/16	7,316	11,908	61.4	3,030	4,998	60.6
2016/17	7,557	11,748	64.3	3,206	4,861	65.9
2017/18	8,242	11,590	71.1	3,615	4,993	72.4
2018/19	8,280	11,372	72.8	3,672	4,946	74.2

The trend in the percentage of total herds using herd testing shows a continued increase over the past three seasons, back to the levels between 2010-11 and 2014-15 (Graph 4.1).

Graph 4.1: Trend in the percentage of herds testing for the last 30 seasons



The regional uptake of herd testing services in 2018/19 is shown in Table 4.2, where the number of cows tested refers to all cows tested at least once in the season. All regions recorded between 65 and 78 per cent of herds being tested (with the exception of East Coast). Taranaki and Hawkes Bay had the highest percentage of herds using herd testing (78%). Taranaki had the highest percentage of cows herd tested (79.5%).

Table 4.2: Use of herd testing by region in 2018/19

Farming Region	Herds tested	Total herds	Percentage of total herds tested	Cows tested	Total cows	Percentage of total cows tested	Average herd size tested	Average herd size
Northland	561	820	68.4	198,147	264,142	75.0	353	322
Auckland	231	354	65.3	67,662	99,367	68.1	293	281
Waikato	2,343	3,249	72.1	823,345	1,117,207	73.7	351	344
Bay of Plenty	382	538	71.0	134,782	189,854	71.0	353	353
Central Plateau	340	490	69.4	186,141	278,569	66.8	547	569
Western Uplands	62	90	68.9	32,041	48,173	66.5	517	535
East Coast	4	9	44.4	1,994	5,884	33.9	499	654
Hawkes Bay	56	72	77.8	36,368	47,746	76.2	649	663
Taranaki	1,241	1,588	78.1	371,091	466,701	79.5	299	294
Manawatu	375	530	70.8	160,725	216,293	74.3	429	408
Wairarapa	320	416	76.9	116,745	156,612	74.5	365	376
Nelson/Marlborough	158	214	73.8	58,250	82,269	70.8	369	384
West Coast	245	372	65.9	102,624	153,077	67.0	419	411
North Canterbury	668	880	75.9	549,606	707,559	77.7	823	804
South Canterbury	230	320	71.9	184,527	251,119	73.5	802	785
Otago	335	445	75.3	212,404	269,746	78.7	634	606
Southland	729	985	74.0	435,877	591,987	73.6	598	601
New Zealand	8,280	11,372	72.8	3,672,329	4,946,305	74.2	444	435

Note: Table includes figures from both herd test providers

B. Herd test averages

The lactation yield figures in this section are for herd-tested cows. Seasonal and breed averages (parts i and iii) are calculated on lactation yields for herds tested four or more times during the season. Monthly averages (part ii) are calculated on lactation yields for herds tested at least once during the season, and only cows that lactated for 100 days or more were included in the herd test averages. These figures are different to the average milksolids figures given in Chapters 2 and 3 (national and regional dairy statistics, respectively), which were based on all herds supplying a dairy company (regardless of whether herd testing was used) and represented the average production per cow as supplied to the dairy company.

Days-in-milk (herd testing) information is the number of days from the start of lactation to the calculated end of lactation. The start of lactation is four days from calving (with a maximum of 60 days between the estimated start of lactation and the first herd test). The end of lactation is the last herd test date plus 15 days. The inclusion of herds with fewer than four tests reduces the calculated average lactation length: therefore, the number of days-in-milk, calculated using this method, does not necessarily reflect the average lactation length of dairy cows.

The days-in-milk (production) figure is the number of days from the estimated start of lactation to the estimated end of lactation (reported since 1997/98). The results are derived from seasonal supplier tanker pick-up information, adjusted for calving spread. The days-in-milk (production) methodology provides a more accurate measure of the average lactation length of dairy cows than the herd-testing methodology.

i) Seasonal averages

- Southland has the highest milkfat, protein and milksolids production (kg/cow)
- West Coast has the highest milkfat, protein and milksolids percentages

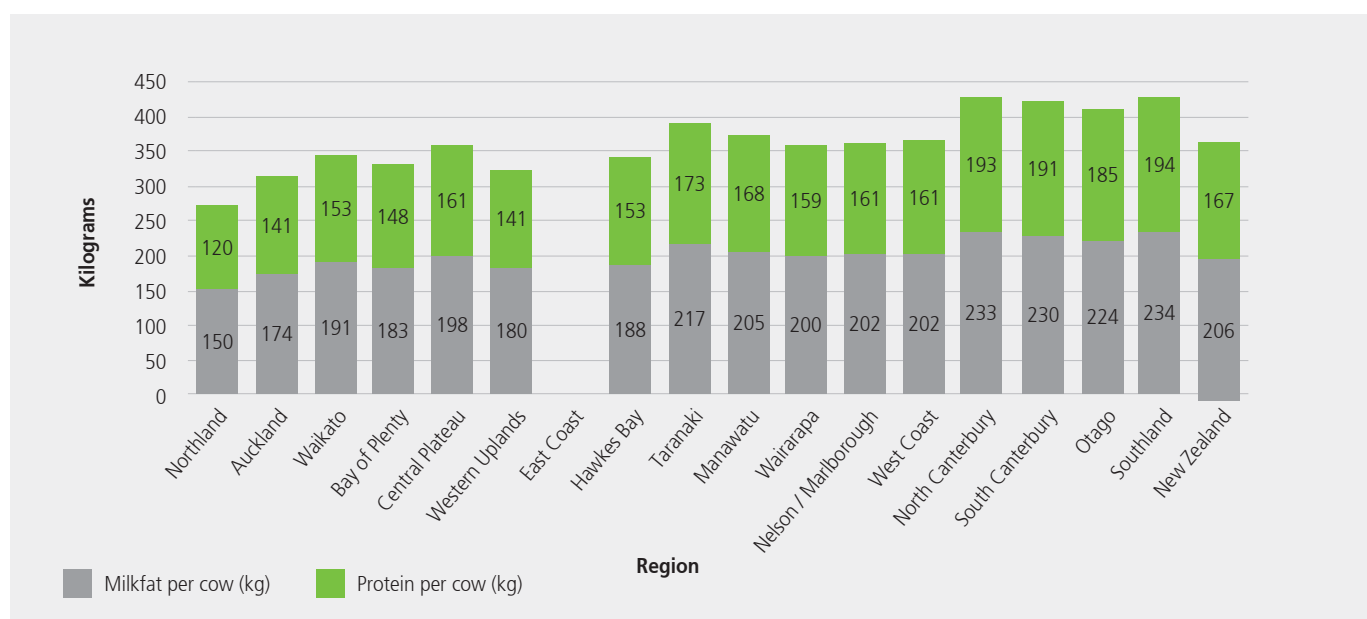
The average per-cow statistics for each region are summarised in Table 4.3. North Canterbury recorded the highest per cow milk volume (5,051 litres), while Southland recorded the highest milkfat (234 kg), protein (194 kg) and milksolids (428 kg), of cows herd tested. West Coast recorded the highest percentage for milkfat (54.98%), protein (3.97%) and milksolids (8.95%). Herds in Taranaki and North Canterbury recorded the lowest average somatic cells (161,000 cells/ml).

Table 4.3: Season herd test averages per cow by region in 2018/19

Region	Milk (litres)	Milkfat (kg)	Milkfat (%)	Protein (kg)	Protein (%)	Milksolids (kg)	Milksolids (%)	Days in milk (herd testing)	Days in milk (production)	Somatic cell count (000 cells/millilitre)
Northland	3,174	150	4.74	120	3.77	270	8.51	189	269	220
Auckland	3,779	174	4.60	141	3.72	314	8.32	191	270	198
Waikato	4,029	191	4.74	153	3.80	344	8.54	216	268	172
Bay of Plenty	3,925	183	4.66	148	3.76	331	8.43	219	269	191
Central Plateau	4,252	198	4.67	161	3.78	359	8.44	215	262	180
Western Uplands	3,613	180	4.98	141	3.91	321	8.89	221	264	192
East Coast										
Hawkes Bay	4,002	188	4.71	153	3.82	341	8.53	213	273	204
Taranaki	4,422	217	4.90	173	3.92	390	8.82	223	270	161
Manawatu	4,456	205	4.61	168	3.76	373	8.36	213	274	198
Wairarapa	4,157	200	4.81	159	3.82	359	8.63	221	272	192
Nelson/Marlborough	4,190	202	4.81	161	3.85	363	8.66	219	270	170
West Coast	4,060	202	4.98	161	3.97	364	8.95	223	269	177
North Canterbury	5,051	233	4.61	193	3.82	426	8.43	225	283	161
South Canterbury	4,946	230	4.64	191	3.87	421	8.51	222	281	164
Otago	4,776	224	4.69	185	3.88	409	8.57	228	273	174
Southland	4,963	234	4.71	194	3.91	428	8.62	229	273	165
New Zealand	4,359	206	4.72	167	3.84	373	8.56	218	271	175

The 2018/19 milkfat and protein lactation regional averages for herd-tested cows (Graph 4.2) show some variability in figures among regions, with Southland recording the highest milkfat and protein per cow (234 and 194 kg respectively) and Northland the lowest milkfat and protein per cow (150 and 120 kg respectively).

Graph 4.2: Average milkfat and protein production per cow by region in 2018/19



• Herd test averages generally increase in 2018/19

Milk production (litres) per cow for 2018/19 increased on the previous three seasons (Table 4.4). Milksolids increased from 362 kilograms in 2017/18 to 373 in 2018/19. The percentage of milksolids remained steady compared with 2017/18 with milkfat percentage decreasing and protein percentage increasing.

The average herd somatic cell count decreased to 175,000 cells/millilitre for 2018/19 – the first time on record that the somatic cell count has been this low. Average days in milk (production) at 271 in 2018/19 was the lowest since 2013/14.

Table 4.4: Trend in the national herd test averages for the last 20 seasons

Season	Milk (litres)	Milkfat (kg)	Milkfat (%)	Protein (kg)	Protein (%)	Milksolids (kg)	Milksolids (%)	Days in milk (herd testing)	Days in milk (production)	Somatic cell count (000 cells/millilitre)
1999/00	3,601	169	4.69	130	3.58	299	8.30	221	263	193
2000/01	3,706	173	4.68	134	3.59	307	8.28	224	268	196
2001/02	3,791	176	4.64	138	3.61	314	8.28	227	268 ^a	210
2002/03	3,736	175	4.68	138	3.66	313	8.38	219	-	213
2003/04	3,871	184	4.75	142	3.64	326	8.42	224	265	220
2004/05	3,812	181	4.75	140	3.66	321	8.42	225	265	229
2005/06	3,951	186	4.72	146	3.68	332	8.40	227	266	213
2006/07	4,014	191	4.85	150	3.76	341	8.50	230	267	232
2007/08	3,987	187	4.68	148	3.70	334	8.38	225	252	246
2008/09	4,043	190	4.70	150	3.72	340	8.42	228	266	253
2009/10	4,097	194	4.73	154	3.76	348	8.48	227	260	235
2010/11	4,101	194	4.73	154	3.75	348	8.48	229	274	232
2011/12	4,409	210	4.77	167	3.80	378	8.56	235	275	204
2012/13	4,386	207	4.72	166	3.79	373	8.51	227	258	204
2013/14	4,480	212	4.74	170	3.80	383	8.54	229	266	187
2014/15	4,379	209	4.78	168	3.84	378	8.63	226	273	182
2015/16	4,311	204	4.73	165	3.84	369	8.57	225	276	187
2016/17	4,323	206	4.77	167	3.87	374	8.64	229	276	183
2017/18	4,217	201	4.75	161	3.82	362	8.57	219	274	185
2018/19	4,359	206	4.72	167	3.84	373	8.56	218	271	175

- Not available

^a Average excludes Northland, Taranaki and Wellington/Hawkes Bay

ii) Monthly averages

• Peak milk in October

The seasonal average figures presented in Table 4.5 are calculated using national monthly herd test averages, and are therefore affected by the number of samples processed. Statistics for May, June, and July are based on far fewer cows than the statistics for the other months, as only a few herds (generally winter milk herds) test in these months. Differences in climate between regions (which in turn can affect the mating period), available feed, and cow condition are reflected in differing months of peak production.

All cows herd tested in each month were included, provided they were tested at least once during the season (Table 4.5). Average peak cow production occurs between August and October, with most regions peaking in September or October.

Table 4.5: Monthly herd test averages by region in 2018/19

Average litres of milk per cow per day

Farming region	2018 Jun	Jul	Aug	Sep	Oct	Nov	Dec	2019 Jan	Feb	Mar	Apr	May	Season average
Northland	16.52	18.32	19.80	19.39	18.60	16.94	15.62	13.26	11.27	10.27	9.61	16.02	15.36
Auckland	19.02	17.39	20.37	22.89	21.44	20.08	18.08	15.91	11.99	11.02	10.57	17.24	17.37
Waikato	18.31	19.99	21.66	23.22	22.98	20.21	18.28	16.24	13.40	10.46	10.65	17.47	17.60
Bay of Plenty	22.15	13.92	22.22	21.84	21.83	19.73	18.02	14.92	13.24	9.79	9.93	15.47	16.58
Central Plateau	14.72	18.20	24.85	23.56	24.97	21.49	21.01	17.65	15.02	10.97	10.82	14.41	18.42
Western Uplands	.	.	25.15	20.54	22.24	19.15	17.73	14.55	12.26	9.03	9.02	8.34	15.83
East Coast	.	.	.	22.36	.	18.00	15.19	14.30	.	9.04	9.87	.	14.44
Hawkes Bay	15.95	14.58	20.65	22.11	23.33	20.37	18.05	17.24	15.61	12.79	11.91	14.54	17.73
Taranaki	19.75	20.85	22.69	24.68	24.43	21.46	19.97	17.62	15.08	12.51	12.04	14.81	18.69
Manawatu	19.17	18.08	21.78	24.93	24.96	22.69	21.36	18.65	16.02	13.80	12.58	15.01	19.59
Wairarapa	16.62	17.92	19.73	22.55	23.91	21.31	19.33	16.81	14.75	12.90	10.66	12.81	17.69
Nelson/Marlborough	.	13.22	.	23.86	24.56	22.43	18.97	17.52	14.67	11.89	11.46	11.12	18.10
West Coast	16.94	10.79	.	23.36	23.62	20.73	19.36	15.36	15.01	11.82	10.61	10.32	17.10
North Canterbury	17.81	22.32	21.72	26.22	26.43	24.51	22.77	20.55	19.14	16.45	14.55	12.51	20.75
South Canterbury	21.24	22.79	24.66	25.28	27.07	23.58	22.02	19.95	18.82	16.64	13.88	12.16	20.49
Otago	17.13	19.64	27.52	26.58	25.90	23.54	20.51	18.60	17.01	14.28	11.88	11.30	19.18
Southland	16.50	17.07	21.91	27.05	26.37	24.04	22.18	19.44	18.52	16.35	13.66	12.13	20.14
New Zealand¹	17.76	19.24	21.44	23.81	24.63	21.60	20.15	17.64	15.70	13.09	12.19	13.57	18.65

Average kg of milkfat per cow per day

Farming region	2018 Jun	Jul	Aug	Sep	Oct	Nov	Dec	2019 Jan	Feb	Mar	Apr	May	Season average
Northland	0.81	0.87	0.91	0.91	0.87	0.82	0.76	0.66	0.61	0.58	0.58	0.80	0.77
Auckland	0.88	0.77	0.92	1.02	0.96	0.92	0.85	0.76	0.62	0.60	0.62	0.89	0.84
Waikato	0.90	0.94	1.00	1.07	1.05	0.96	0.87	0.80	0.71	0.60	0.64	0.91	0.89
Bay of Plenty	0.94	0.77	1.01	0.98	1.00	0.92	0.84	0.74	0.68	0.56	0.58	0.87	0.82
Central Plateau	0.73	0.86	1.09	1.08	1.11	0.99	0.96	0.85	0.76	0.62	0.64	0.77	0.91
Western Uplands	.	.	1.23	0.99	1.04	0.91	0.86	0.76	0.66	0.54	0.56	0.53	0.83
East Coast	.	.	.	0.92	.	0.84	0.68	0.69	.	0.47	0.59	.	0.72
Hawkes Bay	0.80	0.75	0.91	1.00	1.04	0.96	0.86	0.83	0.78	0.69	0.67	0.73	0.87
Taranaki	1.05	1.02	1.06	1.15	1.14	1.06	0.98	0.90	0.81	0.72	0.73	0.84	0.97
Manawatu	0.94	0.86	0.99	1.11	1.11	1.03	0.98	0.87	0.81	0.72	0.71	0.82	0.95
Wairarapa	0.89	0.86	0.99	1.04	1.11	1.02	0.93	0.83	0.77	0.72	0.64	0.70	0.90
Nelson/Marlborough	.	0.66	.	1.08	1.12	1.06	0.90	0.86	0.77	0.69	0.69	0.62	0.92
West Coast	0.99	0.55	.	1.07	1.10	1.00	0.94	0.78	0.80	0.68	0.67	0.67	0.90
North Canterbury	0.85	1.00	0.99	1.17	1.18	1.12	1.04	0.96	0.94	0.86	0.82	0.72	1.01
South Canterbury	1.03	0.99	1.06	1.15	1.18	1.10	1.01	0.92	0.94	0.87	0.80	0.71	1.00
Otago	0.93	0.97	1.29	1.21	1.16	1.08	0.95	0.89	0.84	0.77	0.70	0.69	0.96
Southland	0.91	0.84	1.05	1.23	1.19	1.11	1.01	0.94	0.92	0.86	0.79	0.73	1.00
New Zealand¹	0.87	0.91	0.99	1.09	1.12	1.02	0.95	0.86	0.81	0.72	0.72	0.77	0.93

Average kg of protein per cow per day

Farming region	2018							2019					Season average
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	
Northland	0.64	0.71	0.75	0.74	0.71	0.65	0.60	0.51	0.45	0.44	0.44	0.64	0.61
Auckland	0.74	0.64	0.75	0.85	0.81	0.76	0.70	0.60	0.47	0.46	0.48	0.70	0.68
Waikato	0.73	0.79	0.83	0.88	0.88	0.78	0.70	0.62	0.53	0.45	0.48	0.72	0.70
Bay of Plenty	0.87	0.58	0.84	0.82	0.82	0.75	0.68	0.57	0.52	0.42	0.45	0.65	0.65
Central Plateau	0.59	0.70	0.92	0.89	0.94	0.81	0.79	0.67	0.58	0.46	0.49	0.64	0.72
Western Uplands	.	.	1.02	0.79	0.85	0.74	0.67	0.58	0.49	0.39	0.42	0.40	0.64
East Coast	.	.	.	0.84	.	0.69	0.56	0.56	.	0.38	0.47	.	0.58
Hawkes Bay	0.66	0.62	0.73	0.85	0.90	0.77	0.70	0.66	0.61	0.54	0.53	0.61	0.71
Taranaki	0.80	0.84	0.88	0.96	0.96	0.85	0.79	0.70	0.61	0.53	0.56	0.66	0.76
Manawatu	0.76	0.71	0.84	0.93	0.94	0.85	0.80	0.70	0.62	0.56	0.55	0.66	0.76
Wairarapa	0.69	0.70	0.80	0.85	0.91	0.81	0.74	0.65	0.58	0.55	0.48	0.55	0.71
Nelson/Marlborough	.	0.55	.	0.92	0.93	0.85	0.72	0.67	0.58	0.51	0.53	0.51	0.72
West Coast	0.79	0.49	.	0.91	0.91	0.80	0.74	0.61	0.62	0.51	0.51	0.51	0.70
North Canterbury	0.72	0.84	0.82	0.99	1.00	0.92	0.87	0.80	0.76	0.69	0.66	0.59	0.84
South Canterbury	0.89	0.85	0.92	0.97	1.03	0.90	0.85	0.78	0.76	0.70	0.64	0.57	0.83
Otago	0.69	0.80	1.07	1.02	0.99	0.89	0.78	0.73	0.68	0.61	0.56	0.54	0.78
Southland	0.73	0.67	0.87	1.04	1.01	0.93	0.85	0.76	0.75	0.70	0.63	0.58	0.82
New Zealand¹	0.70	0.75	0.82	0.91	0.94	0.83	0.77	0.68	0.62	0.56	0.56	0.62	0.75

Average somatic cell count (000 cells per millilitre)

Farming region	2018							2019					Season average
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	
Northland	210	236	196	195	187	179	193	222	257	283	305	250	220
Auckland	212	212	188	171	176	163	183	188	227	247	281	203	198
Waikato	199	242	179	152	148	136	156	170	188	220	214	210	172
Bay of Plenty	208	257	188	183	165	151	161	194	212	231	249	224	191
Central Plateau	394	205	185	150	156	146	155	181	181	230	216	266	180
Western Uplands	.	.	154	162	154	143	171	180	222	250	270	230	192
East Coast	.	.	.	156	.	301	219	281	.	379	298	.	291
Hawkes Bay	241	262	135	190	175	171	200	176	238	247	233	237	204
Taranaki	273	197	169	141	138	134	139	150	174	199	205	213	161
Manawatu	255	235	222	178	180	168	176	184	217	238	241	226	198
Wairarapa	213	204	266	170	153	160	165	190	216	223	248	237	192
Nelson/Marlborough	.	126	.	138	134	150	149	154	190	214	218	230	170
West Coast	274	1196	.	167	139	151	148	186	177	214	226	231	177
North Canterbury	208	178	209	144	153	159	145	161	159	165	174	204	161
South Canterbury	252	228	333	152	162	163	154	150	155	167	176	206	164
Otago	522	367	172	179	163	166	155	166	159	184	192	223	174
Southland	306	307	196	164	161	158	147	166	155	162	178	197	165
New Zealand¹	230	233	188	159	156	151	155	171	182	203	206	214	175

¹ Volume weighted averages

iii) Breed category averages

- *Holstein-Friesian cows produce the highest litres and milksolids (kg) production*

Herd test statistics by breed category (Table 4.6) include cows herd tested four or more times during the season.

On average, Holstein-Friesian cows produced a higher volume of milk than other breeds. This season they also produced the highest protein (kg) and milksolids (kg). Jerseys have the highest milkfat and protein percentages. For all breeds except Holstein-Friesians, five-year-old cows produced more milksolids (kg) than any other age group.

A crossbreed is defined as having at most 13/16 of any one breed. For example, a Holstein-Friesian/Jersey crossbreed may be 13/16 Holstein-Friesian, 2/16 Jersey and 1/16 Ayrshire.

Table 4.6: Herd test averages by breed category and cow age in 2018/19

Holstein-Friesian

Age	Cows tested	Days in milk	Milk (litres)	Milkfat (kg)	Protein (kg)	Milksolids (kg)	Milkfat (%)	Protein (%)	Milksolids (%)
2	198,140	225	3,729	166.2	141.1	307.3	4.50	3.80	8.30
3	182,064	219	4,508	198.4	170.5	368.8	4.44	3.79	8.23
4	149,156	218	4,908	215.5	184.8	400.3	4.43	3.78	8.21
5	113,882	218	5,110	224.4	190.8	415.2	4.43	3.75	8.18
6	93,096	217	5,146	226.2	190.7	416.9	4.44	3.72	8.16
7	65,976	215	5,058	222.4	187.1	409.5	4.44	3.71	8.15
8	41,797	211	4,910	215.8	180.4	396.2	4.43	3.69	8.12
9	28,909	209	4,755	208.2	173.0	381.1	4.41	3.65	8.06
10+	38,169	205	4,365	193.9	157.9	351.8	4.47	3.63	8.10
Total	911,189	218	4,605	202.9	172.2	375.2	4.45	3.76	8.21

Jersey

Age	Cows tested	Days in milk	Milk (litres)	Milkfat (kg)	Protein (kg)	Milksolids (kg)	Milkfat (%)	Protein (%)	Milksolids (%)
2	45,581	226	2,703	150.0	111.3	261.3	5.58	4.13	9.71
3	42,465	222	3,202	179.5	134.4	314.0	5.64	4.21	9.85
4	40,553	220	3,503	195.3	146.8	342.1	5.60	4.20	9.80
5	34,550	221	3,649	205.0	153.1	358.1	5.65	4.21	9.86
6	30,272	219	3,650	202.7	152.3	355.0	5.59	4.18	9.77
7	22,194	217	3,619	199.2	150.0	349.2	5.53	4.16	9.69
8	14,585	214	3,561	193.3	146.3	339.5	5.45	4.12	9.57
9	11,245	212	3,384	186.8	139.2	326.0	5.55	4.13	9.68
10+	14,220	208	3,171	175.1	129.7	304.8	5.55	4.10	9.65
Total	255,665	220	3,337	185.5	138.9	324.4	5.59	4.17	9.76

Holstein-Friesian/Jersey crossbreed

Age	Cows tested	Days in milk	Milk (litres)	Milkfat (kg)	Protein (kg)	Milksolids (kg)	Milkfat (%)	Protein (%)	Milksolids (%)
2	318,200	225	3,423	167.6	135.4	303.0	4.94	3.97	8.91
3	279,634	219	4,115	200.6	163.6	364.2	4.92	3.99	8.91
4	253,457	219	4,462	219.7	178.0	397.6	4.97	4.00	8.97
5	206,535	218	4,683	229.4	185.0	414.4	4.94	3.97	8.91
6	162,184	217	4,690	228.4	184.1	412.5	4.91	3.94	8.85
7	117,221	216	4,638	225.0	180.9	405.9	4.89	3.92	8.81
8	75,036	214	4,516	219.0	175.0	394.0	4.89	3.89	8.78
9	52,519	211	4,359	211.9	167.9	379.9	4.90	3.87	8.77
10+	57,620	206	4,042	197.4	154.5	351.9	4.92	3.84	8.76
Total	1,522,406	219	4,232	206.8	166.9	373.7	4.93	3.96	8.89

Ayrshire

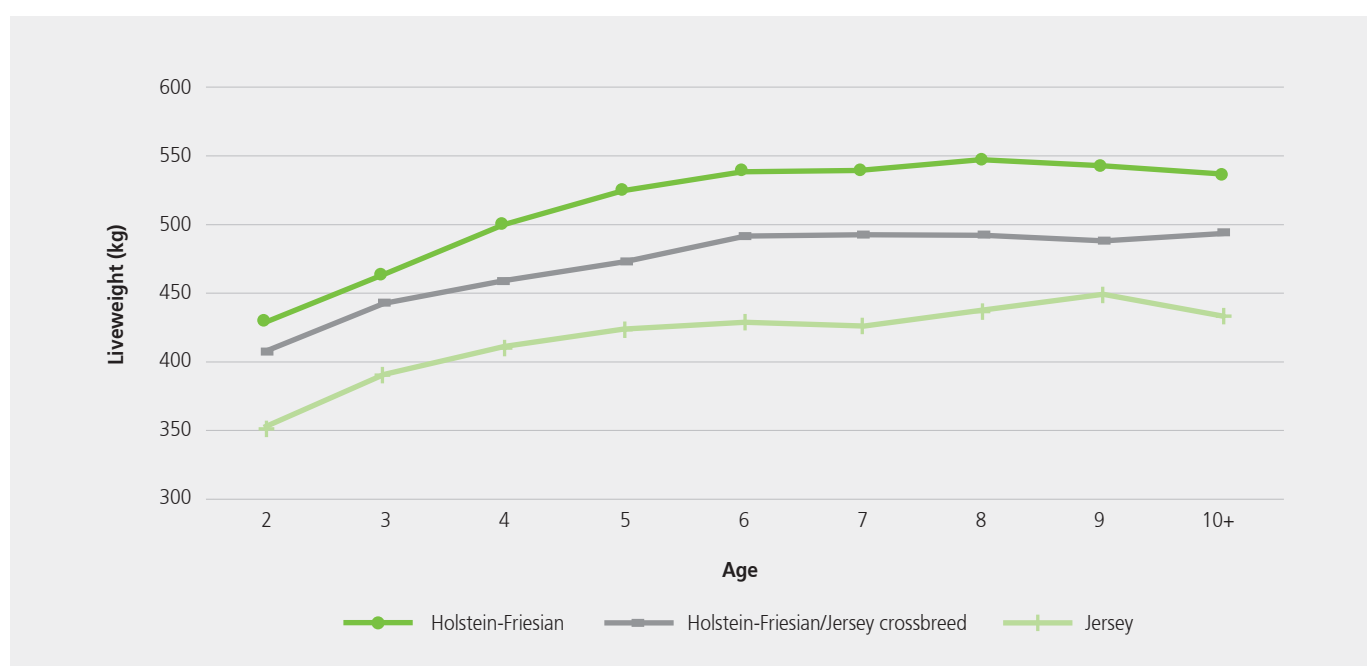
Age	Cows tested	Days in milk	Milk (litres)	Milkfat (kg)	Protein (kg)	Milksolids (kg)	Milkfat (%)	Protein (%)	Milksolids (%)
2	2,554	231	3,319	145.6	118.6	264.2	4.41	3.58	7.99
3	2,284	225	3,932	170.2	141.7	311.9	4.35	3.60	7.95
4	2,214	226	4,319	187.1	155.0	342.0	4.35	3.59	7.94
5	1,878	224	4,481	195.2	160.8	356.0	4.38	3.59	7.97
6	1,620	224	4,495	194.7	161.1	355.8	4.34	3.58	7.92
7	1,297	219	4,387	189.4	157.2	346.6	4.33	3.59	7.92
8	975	217	4,255	183.4	151.9	335.3	4.32	3.57	7.89
9	633	216	4,201	182.0	149.6	331.6	4.35	3.57	7.92
10+	915	205	3,758	163.1	133.9	297.0	4.36	3.57	7.93
Total	14,370	223	4,081	177.2	146.3	323.4	4.36	3.59	7.95

Holstein-Friesians have the highest average liveweight across all ages for the breeds shown in Table 4.7. In contrast, Jerseys have the lowest average liveweight at all ages. Liveweight by age and breed is illustrated in Graph 4.3.

Table 4.7: Liveweight by age and by breed category of cow in 2018/19

Age	Holstein-Friesian		Jersey		Holstein-Friesian/Jersey crossbreed	
	Average liveweight (kg)	Number of cows	Average liveweight (kg)	Number of cows	Average liveweight (kg)	Number of cows
2	429	12,577	351	5,003	406	24,911
3	463	3,336	391	981	442	6,619
4	499	2,192	411	766	459	5,776
5	524	1,676	423	671	473	4,603
6	539	1,535	428	631	490	3,515
7	540	980	425	372	492	2,353
8	547	631	437	209	492	1,457
9	542	389	448	126	486	1,143
10+	536	475	434	177	493	1,099
Weighted Avg	492		406		456	

Graph 4.3: Liveweight by age and by breed category of cow in 2018/19



C. Artificial Breeding (AB) statistics

- 3.59 million cows to AB in 2018/19

All artificial inseminations are recorded on the LIC Herd Improvement Database. Table 4.8 provides a summary of cows mated to AB for the last nine seasons. The percentage of cows to AB at 72.5% in 2018/19 was higher than the previous season (71.5%). 3.59 million cows were mated to AB in 2018/19 (Graph 4.4). The number of yearlings to AB increased (11%) to 230,497 from 207,394 in the previous season (Table 4.8) and is the highest in the past nine seasons.

Table 4.8: Trend in Artificial Breeding use for the last nine seasons by region: Cows and yearlings to AB

Cows to AB

Region	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Northland	171,390	180,615	192,066	190,785	188,887	178,521	175,397	174,589	172,301
Auckland	70,730	73,516	76,013	74,961	75,070	68,754	69,918	66,330	64,468
Waikato	817,660	837,380	867,180	843,758	835,426	792,672	782,259	783,030	789,866
Bay of Plenty	138,554	136,183	137,806	139,262	141,394	134,733	127,063	126,445	125,356
Central Plateau	132,040	143,101	160,005	157,294	164,093	168,407	177,653	181,982	181,769
Western Uplands	25,415	25,136	28,427	28,256	28,163	25,143	25,764	26,257	28,382
East Coast	714	1,474	2,240	2,025	2,450	2,703	2,283	2,588	975
Hawkes Bay	32,338	34,433	36,878	38,851	40,145	34,375	32,076	35,780	36,077
Taranaki	389,668	392,236	396,646	395,722	396,760	371,247	358,147	356,631	356,435
Manawatu	141,879	151,327	160,485	155,417	159,631	155,641	150,140	148,158	147,948
Wairarapa	128,243	133,934	133,086	135,131	130,870	120,007	114,472	115,694	115,332
Nelson/Marlborough	67,256	68,986	68,423	65,670	65,629	63,613	61,112	61,409	61,606
West Coast	96,423	96,049	98,182	103,085	107,056	105,142	98,711	97,689	95,486
North Canterbury	411,344	455,981	502,449	524,567	539,260	549,647	566,958	579,275	588,114
South Canterbury	141,565	154,917	171,235	183,195	184,241	187,341	187,901	189,284	197,560
Otago	170,412	175,922	180,320	178,088	192,118	189,911	189,665	196,805	191,550
Southland	366,399	381,678	367,641	379,911	404,233	405,102	414,283	427,837	431,942
New Zealand	3,302,030	3,442,868	3,579,082	3,595,978	3,655,426	3,552,959	3,533,802	3,569,783	3,585,167

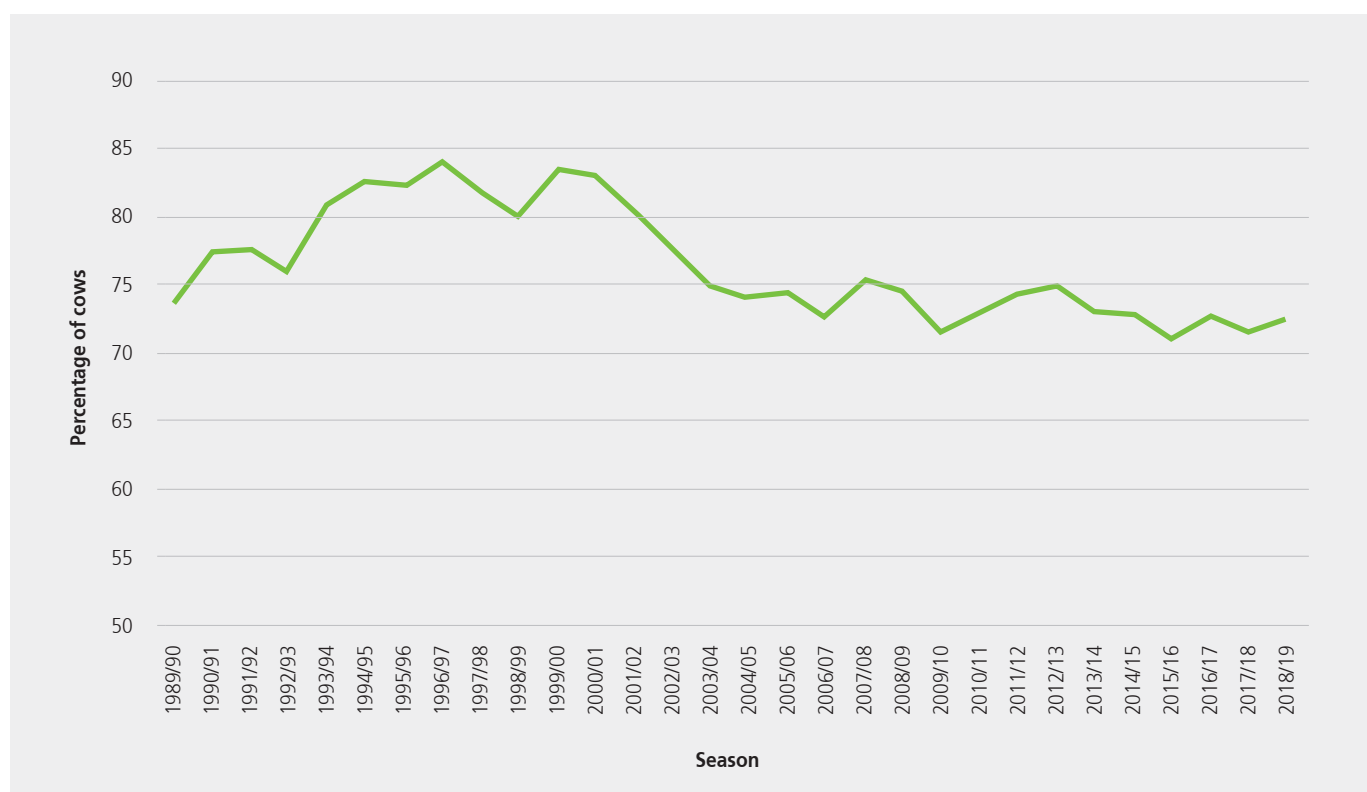
Percentage of cows to AB

Region	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Northland	62.3	64.6	67.2	67.0	66.2	63.7	65.2	64.2	65.2
Auckland	63.9	67.1	67.9	67.6	65.8	61.8	67.0	62.9	64.9
Waikato	72.0	73.5	75.5	72.4	71.2	68.8	70.0	68.9	70.7
Bay of Plenty	72.1	71.1	71.4	70.5	70.4	67.8	66.4	64.5	66.0
Central Plateau	55.8	59.8	64.8	62.4	62.6	62.9	65.5	64.8	65.3
Western Uplands	63.9	64.2	67.5	63.2	60.9	53.8	58.4	54.6	58.9
East Coast	15.1	30.7	45.7	43.6	52.2	45.9	38.2	44.0	16.6
Hawkes Bay	69.3	73.7	77.2	80.2	82.1	70.5	70.2	73.9	75.6
Taranaki	80.0	81.0	80.9	80.2	79.9	76.2	75.7	74.7	76.4
Manawatu	66.6	71.3	74.7	70.7	72.6	70.4	70.5	67.2	68.4
Wairarapa	77.9	80.3	78.9	79.8	77.4	72.2	71.2	71.3	73.6
Nelson/Marlborough	79.3	81.7	79.4	74.1	74.8	74.0	71.8	73.8	74.9
West Coast	66.4	65.4	66.5	68.6	68.8	66.5	63.4	63.4	62.4
North Canterbury	80.4	81.5	82.7	79.7	79.9	79.7	84.3	82.6	83.1
South Canterbury	76.8	80.2	78.4	78.4	76.1	78.0	80.8	75.4	78.7
Otago	80.1	76.2	76.1	70.8	72.8	72.4	73.9	73.5	71.0
Southland	75.7	75.5	69.1	69.0	70.5	70.4	73.6	73.4	73.0
New Zealand	72.9	74.3	74.8	73.0	72.8	71.1	72.7	71.5	72.5

Yearlings to AB

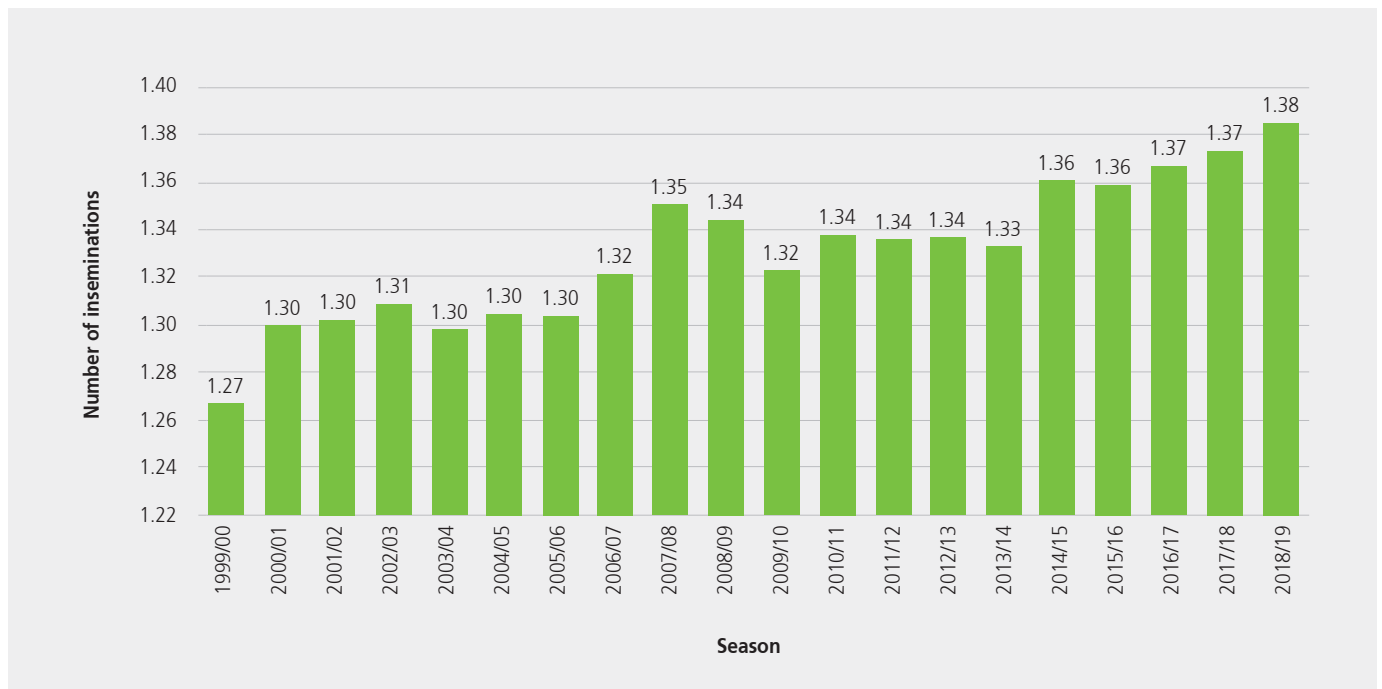
Region	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Northland	8,744	9,637	10,377	11,876	11,160	8,912	9,665	9,858	10,430
Auckland	3,073	3,170	2,994	3,622	3,754	2,593	2,706	2,943	2,760
Waikato	18,676	23,609	26,144	28,667	25,827	18,358	18,685	19,506	19,803
Bay of Plenty	7,871	7,461	8,373	9,375	9,411	8,032	7,205	7,750	7,440
Central Plateau	2,704	4,118	4,533	5,343	6,798	3,833	4,439	4,685	6,333
Western Uplands	1,048	1,577	2,066	2,344	1,697	2,106	1,779	1,786	2,150
East Coast	2	0	0	60	69	60	126	152	0
Hawkes Bay	1,986	2,025	3,725	2,955	2,532	1,441	1,609	2,794	2,523
Taranaki	5,191	6,458	7,651	7,920	6,652	4,292	3,800	3,848	4,639
Manawatu	4,717	6,341	7,119	8,575	8,850	5,482	6,352	6,013	6,788
Wairarapa	4,055	4,537	4,721	5,792	5,172	4,630	4,649	4,497	4,837
Nelson/Marlborough	4,006	4,826	4,874	5,012	4,082	3,210	3,597	4,246	4,513
West Coast	3,706	4,481	3,760	5,201	4,269	3,573	4,569	4,889	4,966
North Canterbury	29,168	36,916	43,063	48,312	47,250	36,328	42,882	56,143	64,421
South Canterbury	14,808	18,151	23,201	25,707	25,731	17,724	19,428	21,429	22,876
Otago	15,754	16,392	16,974	20,490	20,306	16,918	17,326	21,754	24,434
Southland	22,947	27,266	29,161	35,522	37,415	26,372	28,353	35,101	41,584
New Zealand	148,456	176,965	198,736	226,773	220,975	163,864	177,170	207,394	230,497

Graph 4.4: Trend in the percentage of cows to Artificial Breeding for the last 30 seasons



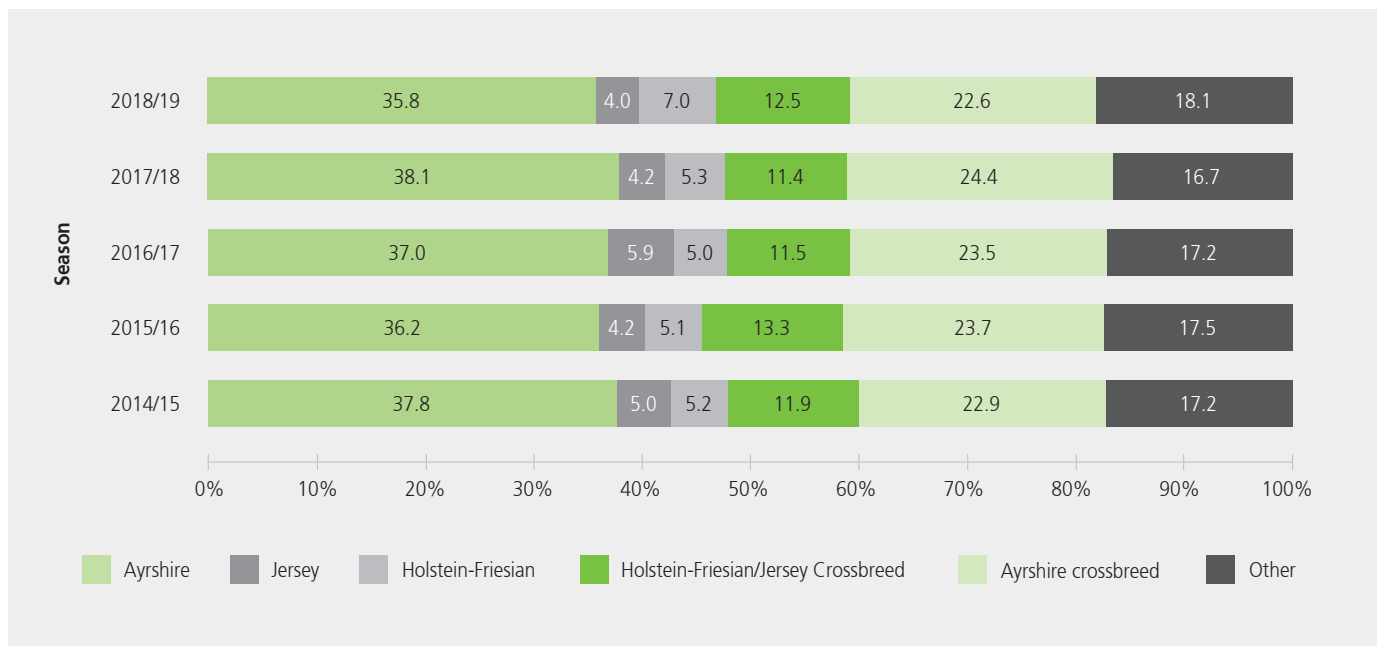
In 2018/19 the average number of inseminations per cow (1.38) (recorded on the LIC Herd Improvement Database) is the highest in the last 20 seasons (Graph 4.5).

Graph 4.5: Average number of inseminations per cow for the last 20 seasons

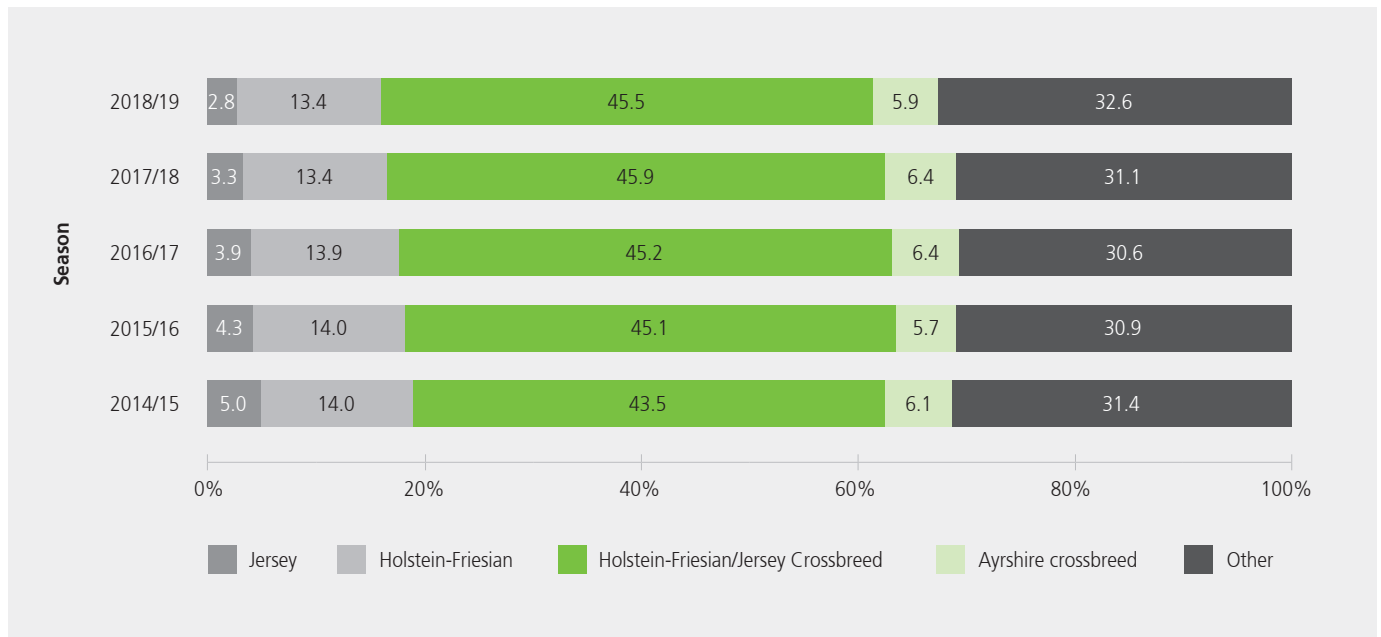


The use of Ayrshire, Holstein-Friesian and Jersey semen over different cow breeds for the past five seasons is shown in the graphs below. Ayrshire semen use over Ayrshire cows is 36% (Graph 4.6). Holstein-Friesian/Jersey Crossbreed semen is used predominantly over Holstein-Friesian/Jersey crosses (Graph 4.7). The use of Jersey semen illustrated in Graph 4.8 is predominately over Jersey cows. Holstein-Friesian semen use is spread evenly across many breeds. The use of Holstein-Friesian semen over other breeds is similar to previous seasons (Graph 4.9).

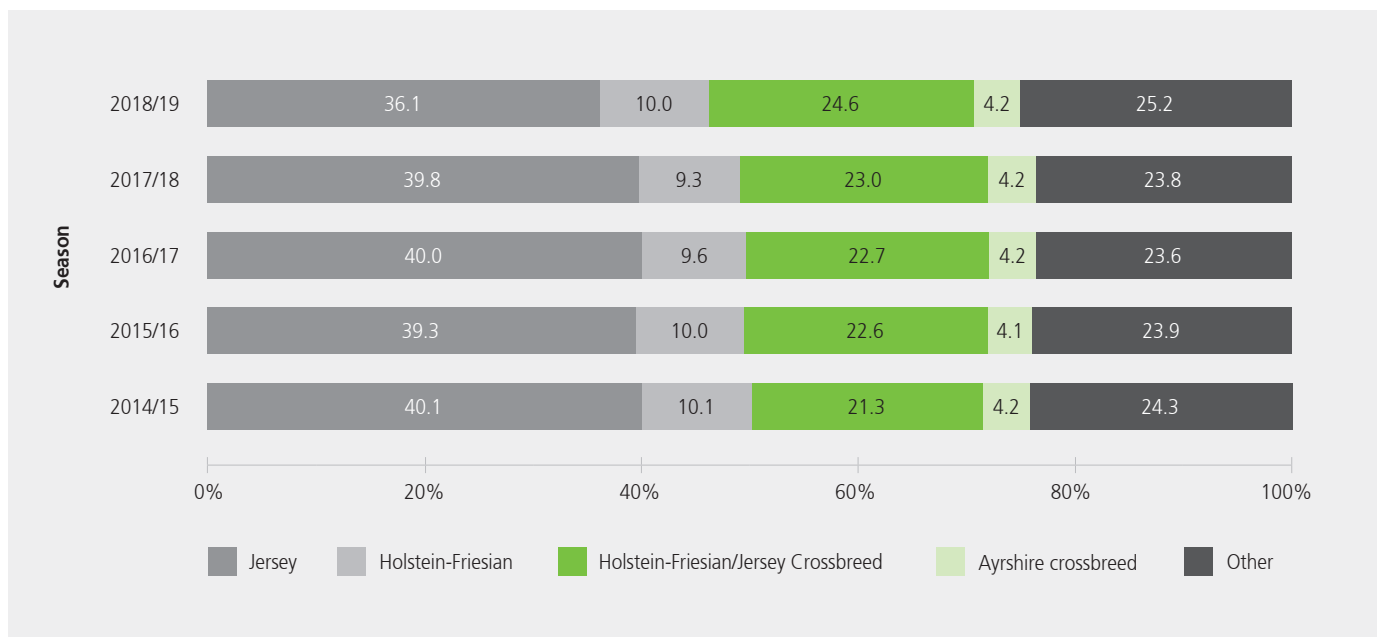
Graph 4.6: Ayrshire semen usage (%) over breed category for the last five seasons



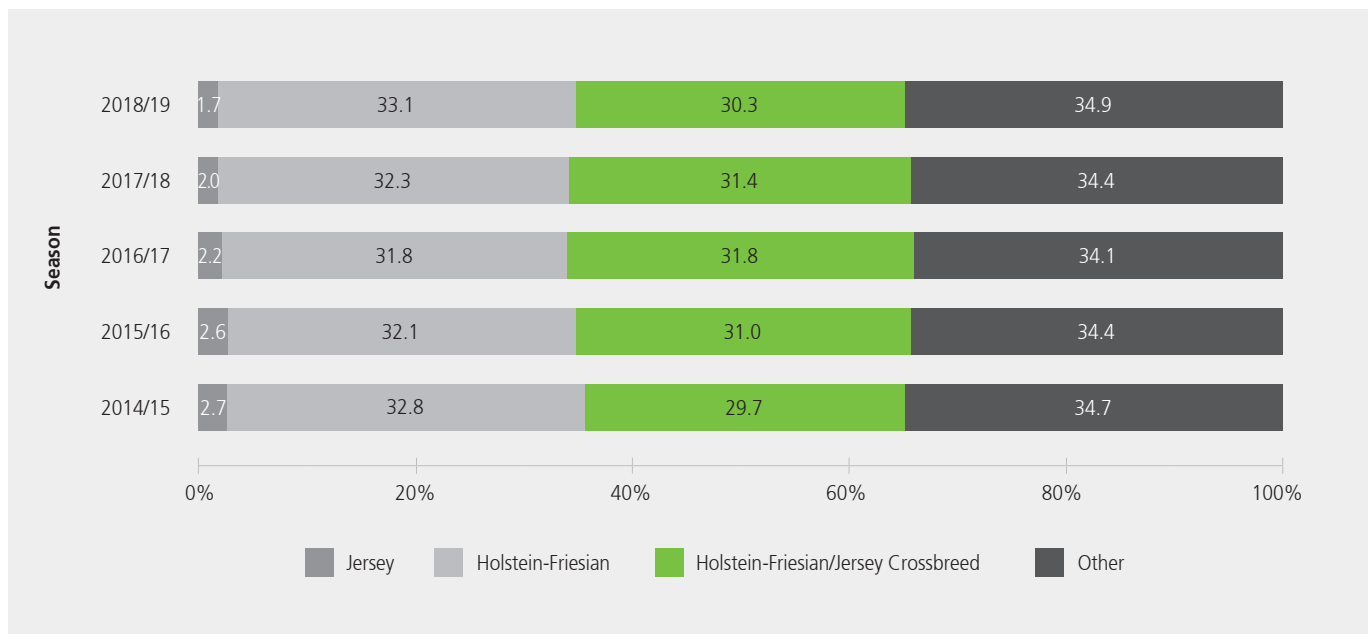
Graph 4.7: Holstein-Friesian / Jersey Crossbreed semen usage (%) over breed category for the last five seasons



Graph 4.8: Jersey semen usage (%) over breed category for the last five seasons

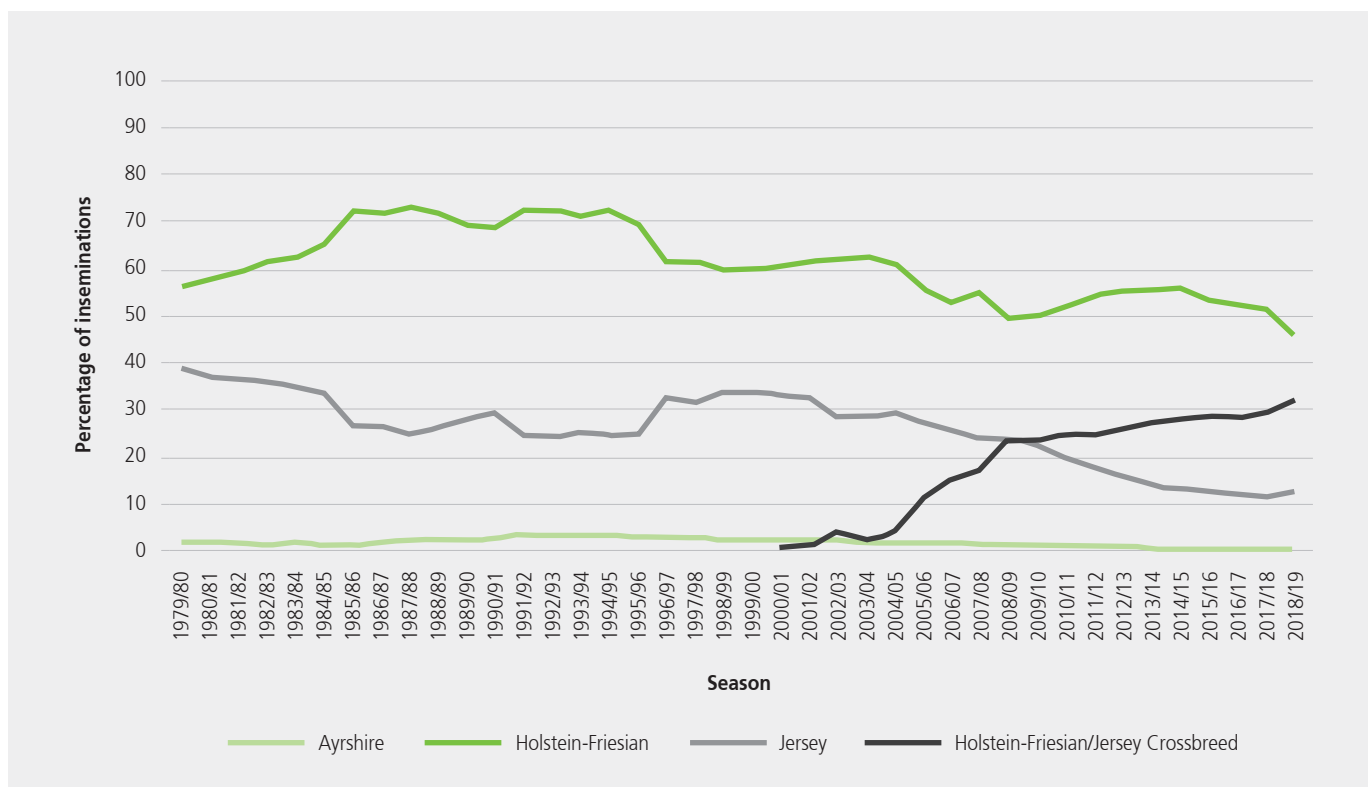


Graph 4.9: Holstein-Friesian semen usage (%) over breed category for the last five seasons



The percentage of inseminations for each breed category (Holstein-Friesian, Jersey, Holstein-Friesian/Jersey Crossbred, and Ayrshire), as recorded on the LIC Herd Improvement Database, is shown in Graph 4.10. The percentage of inseminations for Holstein-Friesian/Jersey Crossbred and Jerseys increased slightly compared with the previous season, while the percentage of inseminations for Holstein-Friesians dropped.

Graph 4.10: Trend in the percentage of inseminations of each breed category for the last 40 seasons



D. Herd Reproduction

Reproductive performance is a key determinant of farm productivity. The 6-week in-calf rate is the best overall measure of herd reproductive performance and is used to compare performance between herds and to monitor national performance.

The not-in-calf rate at end of mating is important at a herd level, but is not suitable for comparison between herds due to differences in length of mating period.

Actual 6-week in-calf rate (Detailed Fertility Focus Reports) is calculated for herds with sufficient early aged pregnancy test records (at least 80% of cows in the herd, and at least 80% of all pregnancy test results are less than or equal to 122 days pregnant, or non-pregnant).

The 6-week in-calf rate for herds without sufficient early aged pregnancy test records is estimated from calving and mating data (Intermediate Fertility Focus Reports).

The statistics in this section are for LIC MINDA (herd management system) recording herds only.

There has been a trend towards more early aged pregnancy testing and thus more actual results are available from Detailed Fertility Focus Reports, since the launch of the DairyNZ InCalf programme in 2008/09. The number of herds with detailed reports has increased from 354 in 2008/09 to 4,206 in 2018/19 (Table 4.9).

The mean actual 6-week in-calf rate at 67.5% is slightly higher than the previous season. The mean estimated 6-week in-calf rates are 2-4% lower than the mean actual 6-week in-calf rate, but a similar trend is evident.

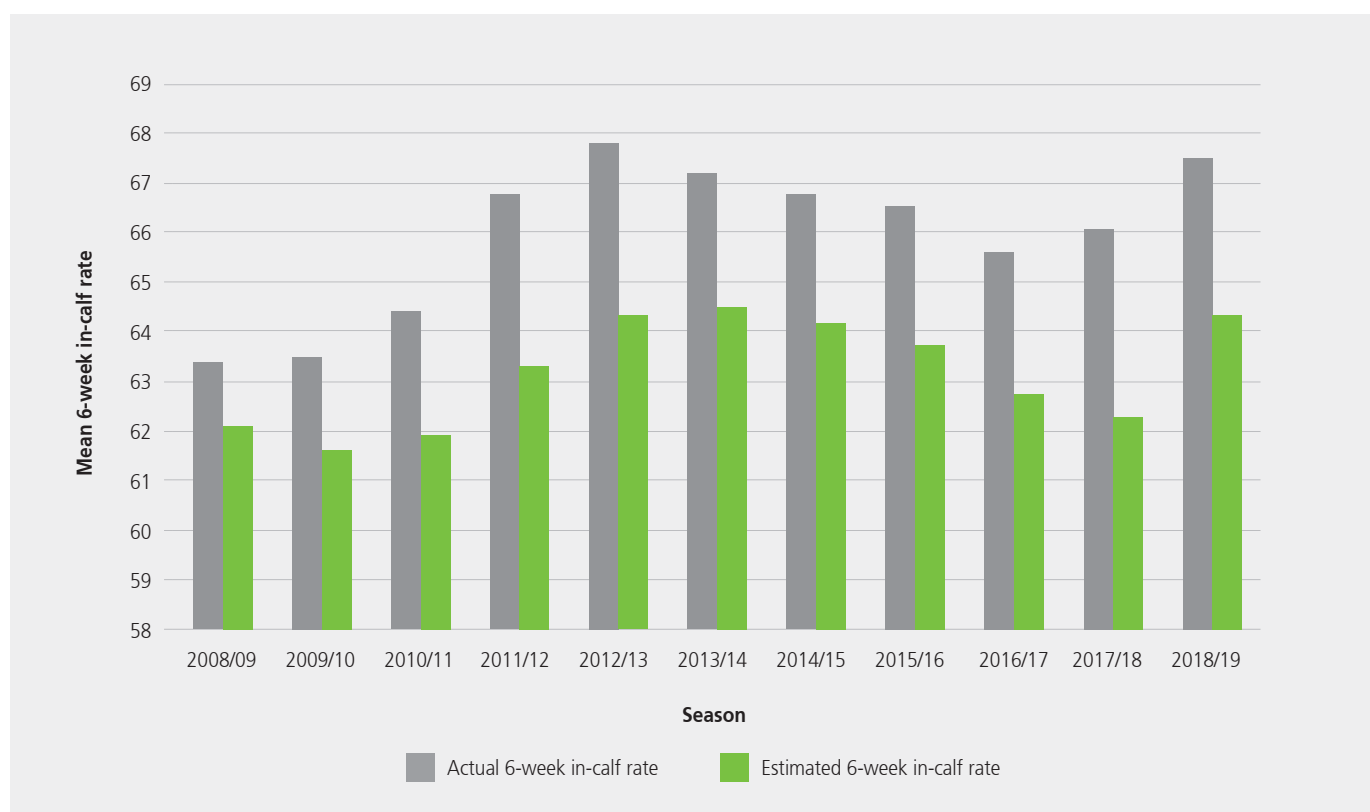
The mean 3-week submission rate and mean conception rate in 2018/19 are also higher compared with the previous season. Conception rates are not available for Intermediate Fertility Focus Reports.

Table 4.9: Mean herd reproductive performance since 2008/09

Mating season	Actual				Estimated		
	Number of herds	Mean 6-week in-calf rate (%)	Mean 3-week submission rate (%)	Mean conception rate (%)	Number of herds	Mean 6-week in-calf rate (%)	Mean 3-week submission rate (%)
2008/09	354	63.4	78.5	50.1	4,872	62.1	72.7
2009/10	712	63.5	77.5	51.0	4,749	61.6	72.2
2010/11	982	64.4	78.7	50.7	4,090	61.9	72.6
2011/12	1,341	66.8	80.7	52.2	4,051	63.3	76.0
2012/13	1,862	67.8	81.6	52.9	4,034	64.3	76.6
2013/14	2,363	67.2	80.8	52.5	3,874	64.5	76.5
2014/15	2,895	66.8	81.1	52.6	3,918	64.2	76.2
2015/16	3,646	66.5	80.0	52.4	4,778	63.7	75.0
2016/17	3,857	65.6	77.9	51.6	4,427	62.7	72.1
2017/18	4,264	66.1	78.6	51.9	4,314	62.3	72.3
2018/19	4,206	67.5	80.7	54.1	3,869	64.3	76.0

Note: Results for 2008/09 and 2009/10 are based on the first version of the Fertility Focus Report software. Results from 2010/11 onwards are from an improved version.

Graph 4.11: Mean actual and estimated 6-week in-calf rate since 2008/09



Note: Results for 2008/09 and 2009/10 are based on the first version of the Fertility Focus Report software. Results from 2010/11 onwards are from the improved version.

Mean actual 6-week in-calf rate by region ranged between 65.9% (Hawkes Bay / Manawatu / Wairarapa) and 70.0% (Taranaki) in 2018/19 (Table 4.10). West Coast/Nelson/Marlborough and Otago/Southland recorded slight decreases over the previous season.

Table 4.10: Mean 6-week in-calf rate by farming region for the last three seasons.

Farming region	Actual						Estimated					
	2016/17		2017/18		2018/19		2016/17		2017/18		2018/19	
	Number of herds	Mean 6-week in-calf rate (%)	Number of herds	Mean 6-week in-calf rate (%)	Number of herds	Mean 6-week in-calf rate (%)	Number of herds	Mean 6-week in-calf rate (%)	Number of herds	Mean 6-week in-calf rate (%)	Number of herds	Mean 6-week in-calf rate (%)
Northland / Auckland	193	64.6	257	64.6	207	68.2	485	60.5	521	60.9	390	62.5
Waikato / Western Uplands	1,065	66.1	1,198	66.6	1,128	69.0	1,370	62.3	1,302	62.4	1,191	64.6
BoP / Central Plateau / East Coast	335	64.6	343	64.8	373	66.6	398	62.5	402	61.9	354	63.8
Hawkes Bay / Manawatu / Wairarapa	341	62.8	406	63.3	345	65.9	352	61.6	371	60.7	309	62.8
Taranaki	308	67.1	383	66.9	371	70.0	973	63.8	886	63.0	877	65.6
West Coast / Nelson / Marlborough	139	68.5	128	68.9	143	68.3	297	64.5	296	63.4	284	64.9
North & South Canterbury	735	65.5	783	65.5	815	66.0	218	63.4	200	62.1	178	63.7
Otago / Southland	740	65.8	766	67.6	824	66.8	323	63.8	336	63.6	286	63.9

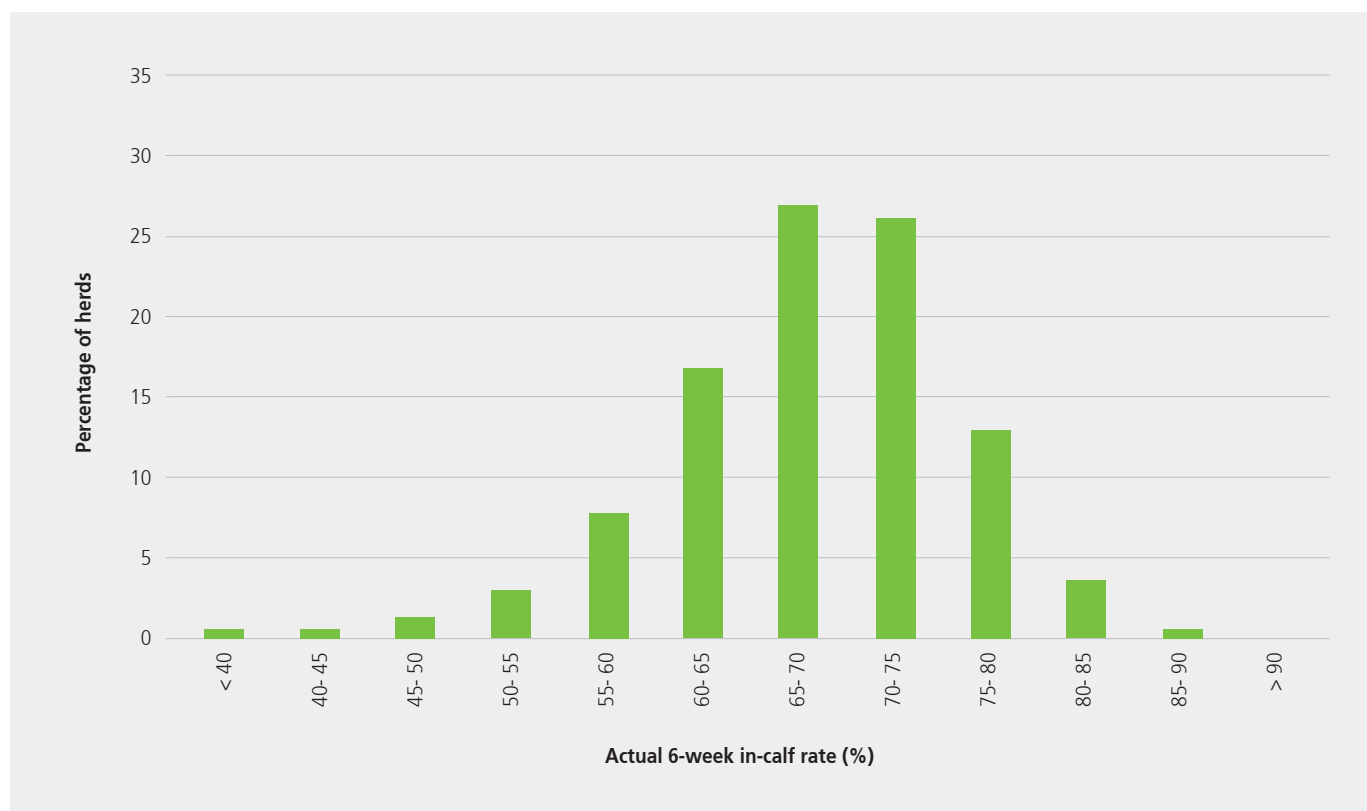
Note: Results reported in this table are from an improved version of the Fertility Focus Report software and will differ from earlier publications.

In 2018/19, 50% of herds had an actual 6-week in-calf rate of 68% or higher and 10% had an in-calf rate of 77% or higher (Table 4.11). Ten per cent of herds had 6-week-in-calf rate of 58% or lower.

Table 4.11: Actual 6-week in-calf rate in 2018/19

	Number of herds	Median	Top 10%	Top 25%	Bottom 25%	Bottom 10%
6-week in-calf rate	4,206	68	> 77	> 73	< 63	< 58

Graph 4.12: Distribution of actual 6-week in-calf rate in 2018/19

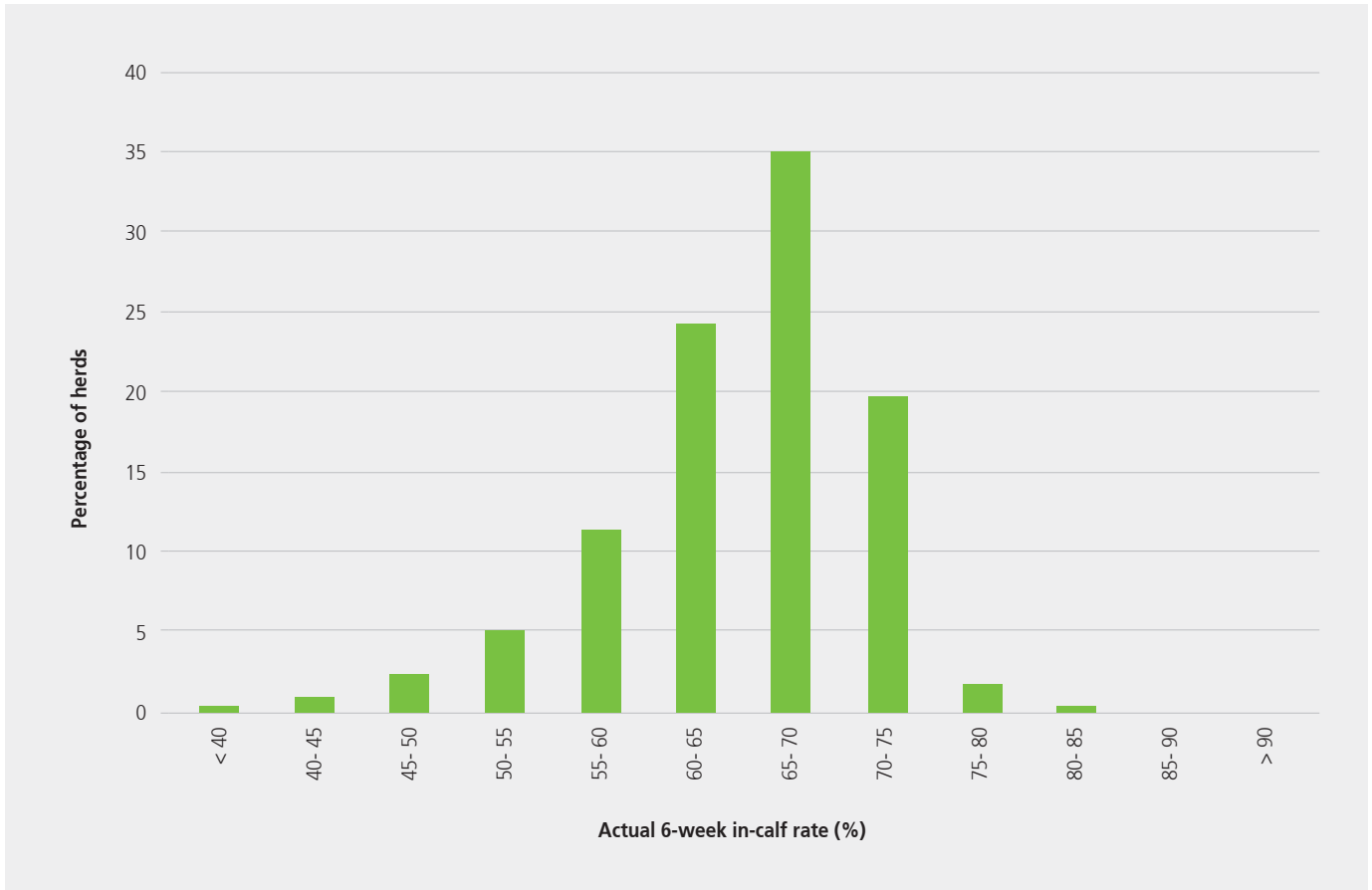


The distribution of estimated 6-week in-calf rates is tighter than the actual results reflecting that estimates tend towards the mean. This is because estimates for low performing herds tend to be overestimated, while estimates for high performing herds tend to be underestimated. In 2018/19, 50% of herds had an estimated 6-week in-calf rate of 65% or higher and 10% of herds had an estimated 6-week in-calf rate of 72% or higher (Table 4.12). Ten per cent of herds had an in-calf rate of 56% or lower.

Table 4.12: Estimated 6-week in-calf rate in 2018/19

	Number of herds	Median	Top 10%	Top 25%	Bottom 25%	Bottom 10%
6-week in-calf rate	3,869	65	> 72	> 69	< 61	< 56

Graph 4.13: Distribution of estimated 6-week in-calf rate in 2018/19



E. Calving

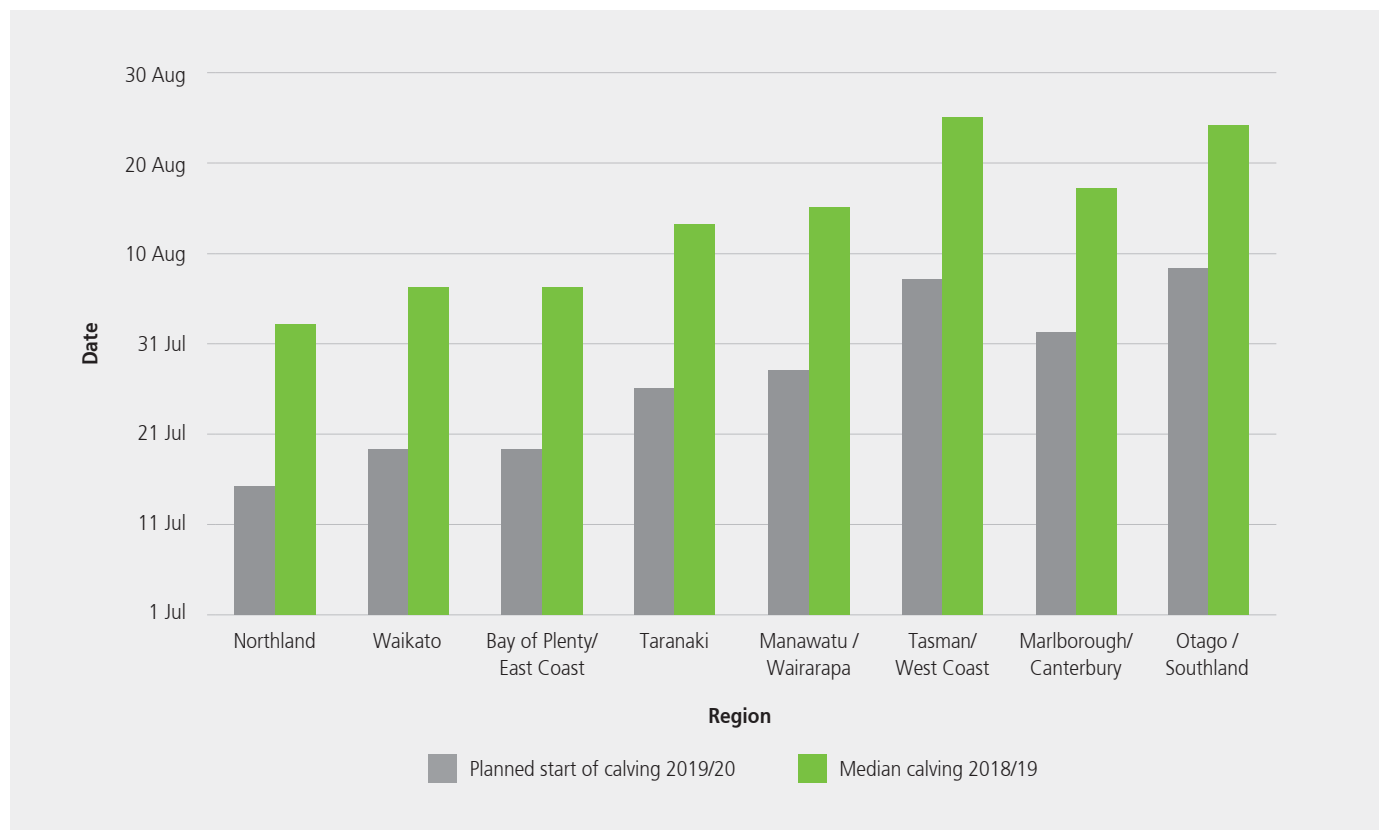
i) Planned start of calving and median calving dates

The trend in calving dates within and between regions is best shown by the "planned start of calving" date. The planned start of calving date is 282 days from the date that mating is started in the herd. The farmer has control over, and the ability to change, the start of mating.

Mating and calving information is recorded on the LIC Herd Improvement Database for approximately 85% of all herds.

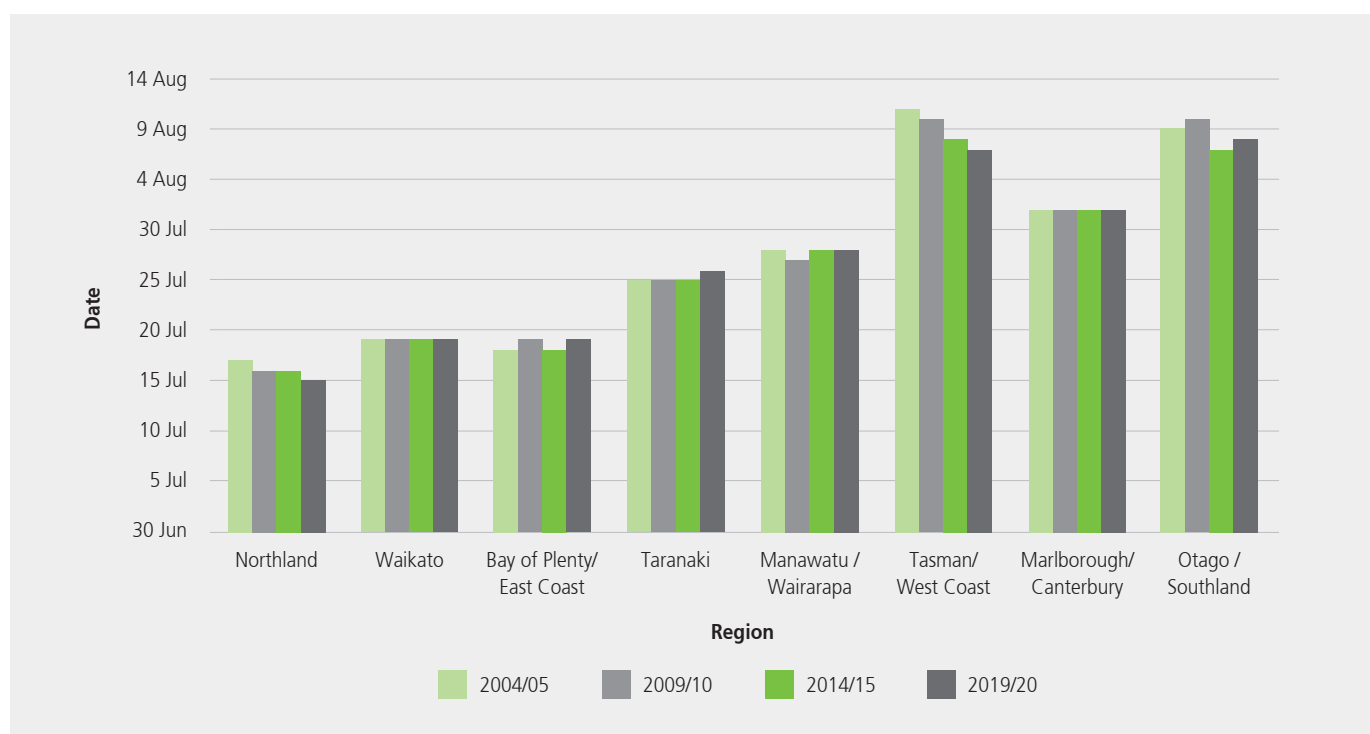
The median calving date (the date that occupies the middle position after the dates are arranged in ascending order) is used as an indicator of actual calving spread. The forecast planned start of calving and actual median calving dates for cows (excluding first calvers) for the 2018/19 season are shown in Graph 4.14.

Graph 4.14: Planned start of calving and median calving dates for cows (excluding first calvers) by region



The planned start of calving for five-yearly intervals since 2003/04 is shown in Graph 4.15. The trend is for an earlier planned start of calving for Tasman / Westland and Northland. Other regions have a similar planned start of calving compared with five and ten years ago.

Graph 4.15: Trend in planned start of calving dates for cows (excluding first calvers) by region



ii) Calving interval

The calving interval for a herd tested cow is the number of days between her calving date in the current season and her calving date in the preceding season. No interval is calculated for first-calving heifers. The average calving interval is based on all recorded calving dates for herd tested cows calving during the period from 1 June to 30 November. All records where pregnancy was terminated were excluded.

Table 4.13: Mean calving interval by breed since 2000/01

season	All breeds		Holstein-Friesian		Jersey		Friesian/Jersey Cross		Ayrshire	
	Average number of days	Number of records	Average number of days	Number of records	Average number of days	Number of records	Average number of days	Number of records	Average number of days	Number of records
2000/01	368.2	2,075,300	368.4	1,120,489	368.4	355,463	367.7	491,090	369.3	25,941
2001/02	368.3	2,093,134	368.7	1,091,334	367.8	363,278	367.7	526,610	369.7	25,572
2002/03	368.4	2,109,651	368.6	1,068,842	368.3	365,913	368.0	562,974	369.4	24,175
2003/04	369.0	2,181,103	369.4	1,067,677	368.2	375,598	368.6	620,523	368.9	23,642
2004/05	369.5	2,210,747	370.1	1,040,243	368.8	383,759	369.0	666,562	370.6	23,169
2005/06	367.8	2,241,175	368.2	1,013,546	367.7	390,971	367.4	706,441	368.2	23,129
2006/07	368.9	2,260,512	369.3	1,002,099	369.0	387,357	368.2	739,493	370.4	22,785
2007/08	369.9	2,349,042	370.4	985,422	369.7	366,954	369.5	853,422	371.0	21,239
2008/09	370.1	2,359,392	371.0	953,577	368.9	359,509	369.5	891,949	371.9	19,948
2009/10	368.7	2,477,122	369.1	972,118	368.3	361,329	368.5	980,435	369.3	16,745
2010/11	368.6	2,628,672	369.2	1,000,637	368.2	364,664	368.2	1,088,976	370.5	19,719
2011/12	368.3	2,807,333	368.5	1,030,006	368.0	370,877	368.2	1,213,169	369.1	20,164
2012/13	368.8	2,927,817	368.7	1,323,053	368.4	370,796	368.7	1,323,053	369.5	20,643
2013/14	368.4	3,054,915	368.8	1,051,940	368.2	366,500	368.2	1,427,255	369.8	20,337
2014/15	368.4	3,087,517	368.9	1,037,413	367.8	350,376	368.1	1,478,464	368.9	18,949
2015/16	369.5	3,063,466	370.0	1,002,362	368.5	327,521	369.4	1,515,761	370.0	17,358
2016/17	370.9	3,102,833	371.6	1,010,574	370.3	310,334	370.7	1,553,638	370.8	16,162
2017/18	368.6	3,088,021	369.3	1,011,453	367.8	293,988	368.4	1,557,077	369.9	15,086

F. Animal Evaluation

The genetic merit of New Zealand dairy cows and sires is estimated using statistical methods which allow simultaneous evaluation of cows and sires of all breeds, using all recorded relationships. The structure of the national herd reveals large numbers of crossbred cows, and large numbers of herds with mixed breeds. For this reason the national evaluation system is designed to compare animals irrespective of breed, both nationally and within herd, to assist farmers to select the most profitable animals for the future.

There are two types of evaluations calculated for New Zealand dairy animals:

- Trait evaluations** are estimates of an animal's genetic merit (Breeding Values) for individual traits including milkfat, protein, volume, liveweight, somatic cell, fertility, body condition score and residual survival. There are also estimates of an animal's lifetime productive ability (Production Values) for milkfat, protein, volume, somatic cell and liveweight.
- Economic evaluations** combine an animal's individual trait evaluations to estimate its comparative ability to convert feed into profit, through breeding replacements (Breeding Worth) and lifetime production (Production Worth).

For each economic index, Economic Values are calculated for the relevant traits. For Breeding Worth, the Economic Values represent the net income per unit of feed from breeding replacements with a one unit genetic improvement in the trait. For Production Worth, the Economic Values represent the net income per unit of feed from milking cows with a one unit improved productive ability in the trait. In each case the base unit of feed is 5 tonnes of dry matter in average quality pasture.

The profit-related traits are combined into a single economic index. For example,

Breeding Worth	=	Milkfat BV	x	\$EV (Milkfat)	+
		Protein BV	x	\$EV (Protein)	+
		Milk BV	x	\$EV (Milk)	+
		Liveweight BV	x	\$EV (Liveweight)	+
		Somatic Cell BV	x	\$EV (Somatic cell)	+
		Fertility BV	x	\$EV (Fertility)	+
		Body Cond. Score BV	x	\$EV (Body Cond. Score)	+
		Residual Survival BV	x	\$EV (Residual Survival)	

where: BV = Breeding Value for each trait

\$EV = economic value for each trait for breeding replacements

Production Worth is calculated using Production Values for the 3 production traits, somatic cell and liveweight, multiplied by the respective economic values.

Animal Evaluation ranks animals in terms of their expected profit per unit of feed consumed.

The economic values for 2019 are presented below (Table 4.14). The economic values are reviewed annually and therefore may change from year to year. More recently, the movement in EVs has been highly influenced by the fluctuation in milk price and the increasing value for milkfat compared to protein (i.e. increasing Value Component Ratio, or VCR).

Table 4.14: Economic values used from 18 February 2019

	Milkfat (\$/kg)	Protein (\$/kg)	Milk (\$/kg)	Liveweight (\$/kg)	Somatic Cell (\$/score)	Fertility (\$/%)	Body Cond. Score (\$/score)	Residual Survival (\$/day)
Breeding Worth	3.49	4.38	-0.09	-1.30	-37.27	5.89	96.27	0.11
Production Worth	4.68	4.01	-0.10	-1.49	-37.80	-	-	-

The information for all Animal Evaluation statistics was sourced from cows and sires recorded on the LIC Database as at 25 May 2019. The evaluations were conducted with reference to a genetic base of cows born in 2005. For more information on economic values, follow these links - lic.co.nz/about/animal-evaluation and dairynz.co.nz/animal/animal-evaluation.

i) Sire Evaluations

Table 4.15 shows the Breeding Values (BV) and Breeding Worth (BW) by breed, of all bulls born in 2014, first proven in the 2018/19 season with a BW Reliability of 75% or greater. Reliability of BW is reported on a scale from 0% to 99%. 0% is the case where there are no performance records for any related animal used in the bull's evaluation. 99% is the case where the bull has a very large number of performance-recorded daughters.

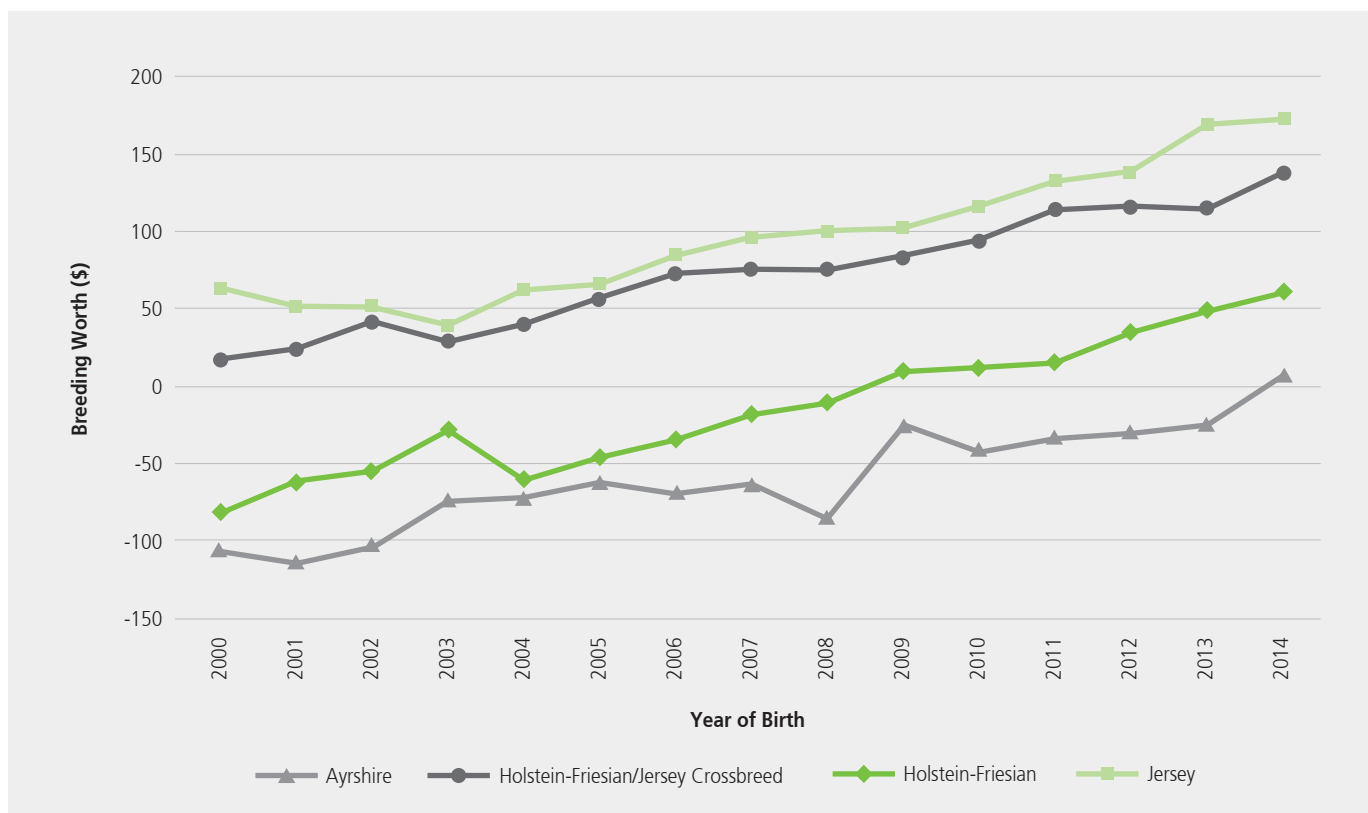
Table 4.15: Average Breeding Values and Breeding Worth of 2014 born bulls (BW reliability of 75% or greater)

Breed category	Milk Fat BV	Protein BV	Milk Volume BV	Liveweight BV	Somatic Cell BV	Fertility BV	Body Condition Score BV	Residual Survival BV	Breeding Worth	Number of Bulls
Ayrshire	2.0	11.6	596.0	13.4	-0.3	2.8	0.0	-12.0	7.2	2
Friesian	19.8	28.8	784.2	45.3	0.1	-0.3	0.0	17.0	61.6	180
Jersey	10.9	-0.2	-454.8	-54.4	-0.1	0.8	0.1	42.6	173.1	67
Cross	19.3	17.0	198.6	-6.3	0.0	0.6	0.0	22.7	138.7	93

(Evaluation date: 25 May 2019)

The genetic trend of all proven dairy bulls is shown in Graph 4.16.

Graph 4.16: Genetic trend of proven dairy bulls by year of birth (BW reliability of 75% or greater)



(Evaluation date: 25 May 2019)

Young bulls are initially selected for use in Artificial Breeding based on the genetic merit of their sire and dam and/or genomic indices. These young sires are then progeny tested to estimate their Breeding Worth more accurately via the performance of their daughters. Each year some progeny tested bulls are returned to service for use as proven sires.

Table 4.16 shows the number of sires, by birth year and breed category, for which the Reliability of the BW was at least 75%. The information in this table is updated every year for all age groups to include older bulls that have now been proven in New Zealand.

Table 4.16 Number of Sires by birth year and breed category (reliability of BW 75% or greater, includes overseas bulls)

Year of birth	Number of sires	Friesian	Jersey	Ayrshire	Cross	Other breeds
2000	531	289	136	32	67	7
2001	539	262	162	33	74	8
2002	539	273	164	24	73	5
2003	524	262	151	38	69	4
2004	546	269	158	27	91	1
2005	520	241	162	18	94	5
2006	520	249	159	28	82	2
2007	336	163	100	25	44	4
2008	358	161	107	20	68	2
2009	354	159	115	18	61	1
2010	331	166	85	18	60	2
2011	377	183	106	18	70	
2012	375	171	95	11	97	
2013	390	183	90	13	104	
2014	342	180	67	2	93	
Grand Total	6,582	3,211	1,857	325	1,147	41

(Evaluation date: 25 May 2019)

ii) Cow Evaluations

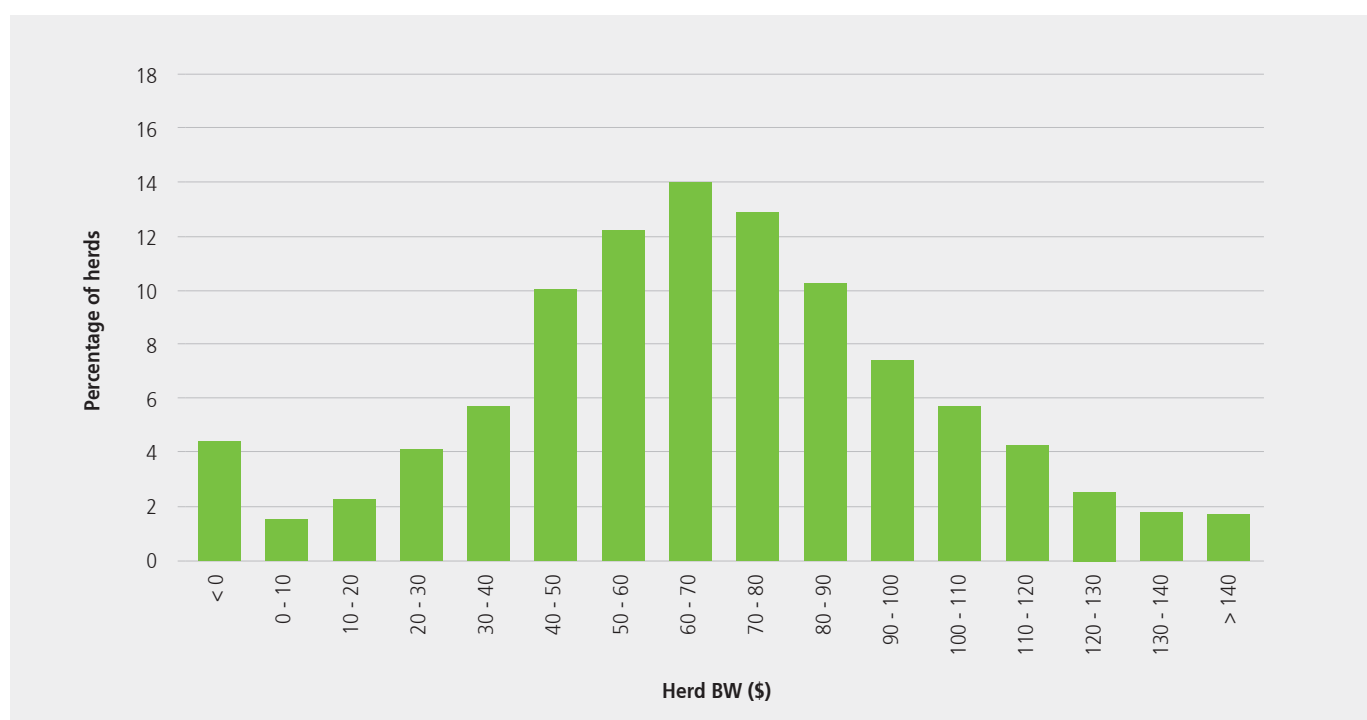
The Breeding Worth for herds presented below (Table 4.17 and Graph 4.17) is based on cows of the users of herd testing services, in herds with at least 80 cows, in the 2018/19 season. Table 4.17 shows that 50% of these herds had a BW of 66 or above and 25% of these herds had a BW of 88 or above.

Table 4.17: Herd Breeding Worth in 2018/19

	Median	Top 5%	Top 10%	Top 25%	Bottom 25%	Bottom 10%	Bottom 5%
Herd BW	66	>126	>111	>88	<45	<20	<2

(Evaluation date: 25 May 2019)

Graph 4.17: Distribution of Herd Breeding Worth in 2018/19



(Evaluation date: 25 May 2019)

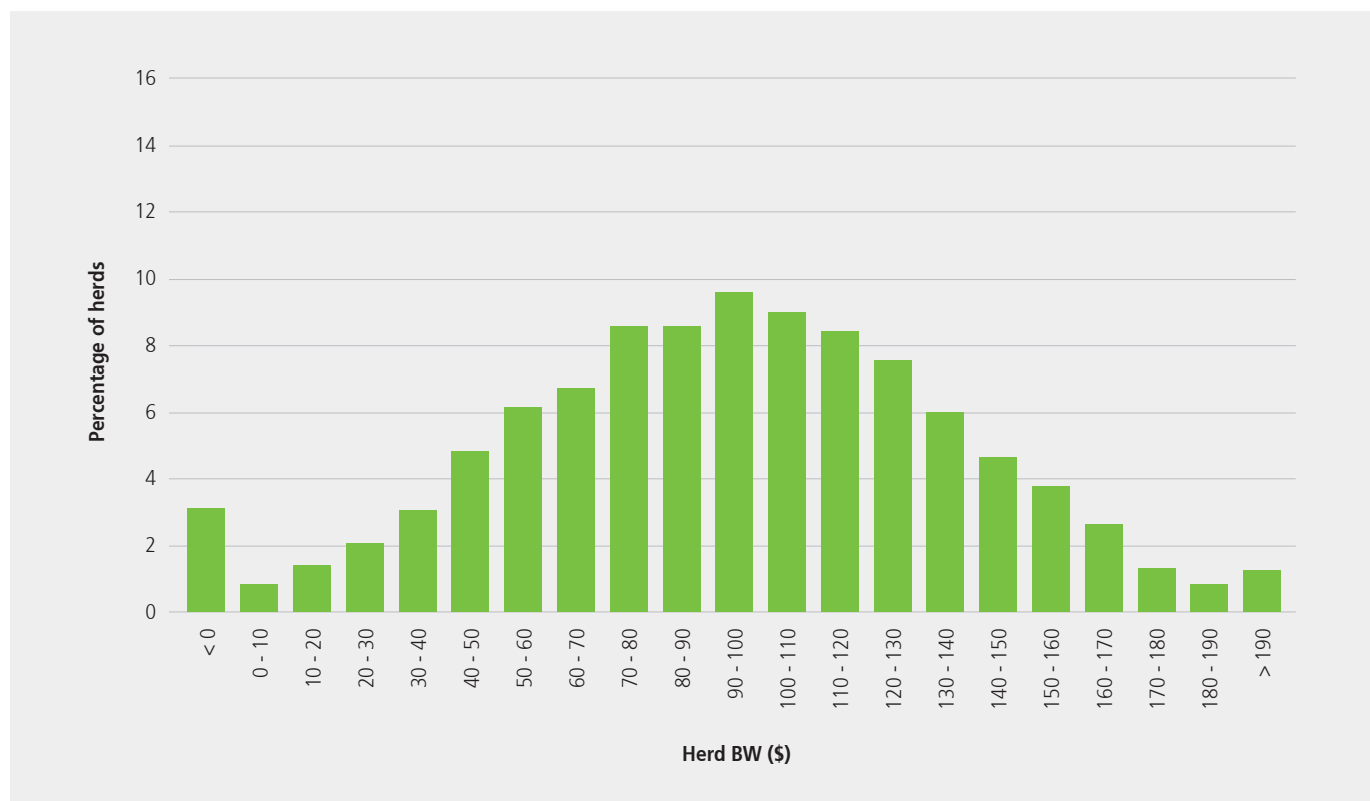
The Production Worth (PW) for herds presented below (Table 4.18 and Graph 4.18) is based on cows of the users of herd testing services, in herds with at least 80 cows, in the 2018/19 season. Table 4.18 shows that 50% of these herds had a PW of 93 or above and 25% of these herds had a PW of 123 or above.

Table 4.18: Herd Production Worth in 2018/19

	Median	Top 5%	Top 10%	Top 25%	Bottom 25%	Bottom 10%	Bottom 5%
Herd PW	93	>166	>150	>123	<62	<34	<14

(Evaluation date: 25 May 2019)

Graph 4.18: Distribution of Herd Production Worth in 2018/19



(Evaluation date: 25 May 2019)

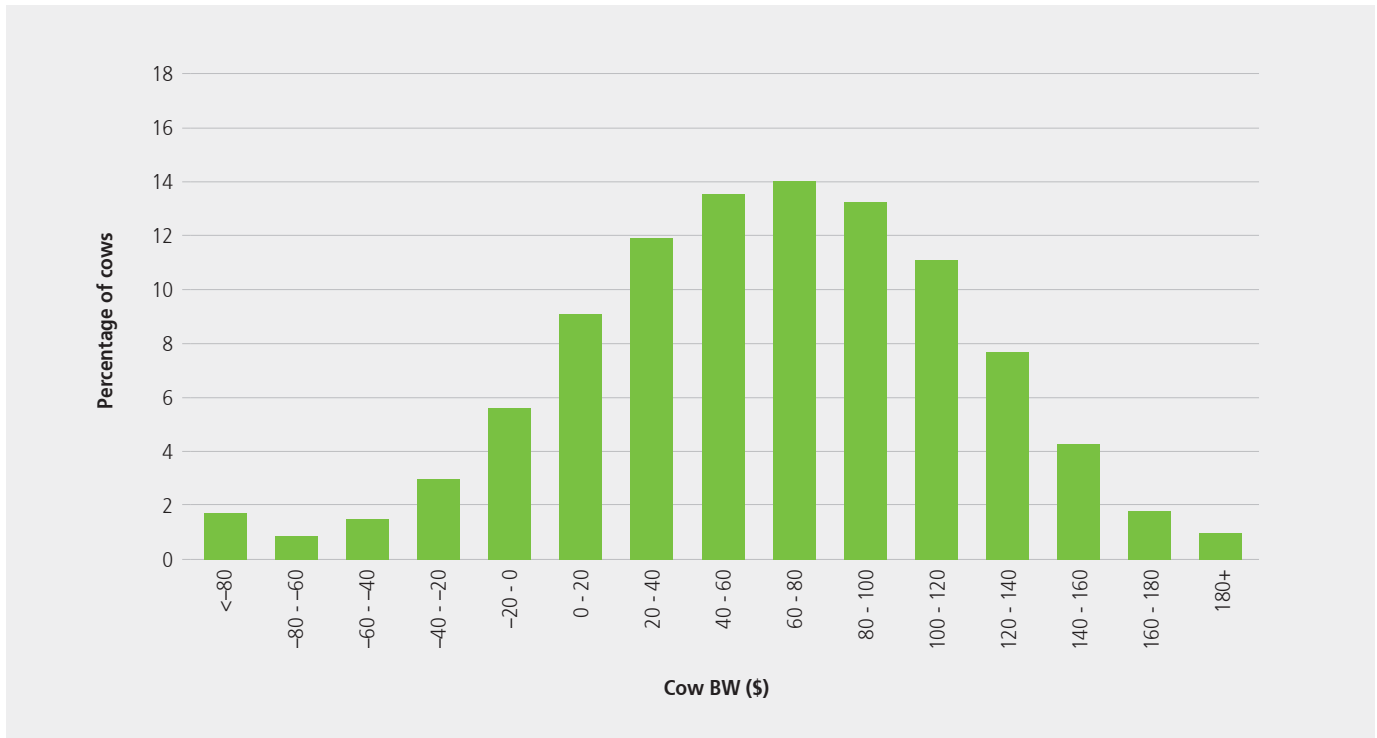
The Breeding Worth (BW) for cows presented below (Table 4.19 and Graph 4.19) is based on all cows of the users of herd testing services, in herds with at least 80 cows, and signed up for herd testing in the 2018/19 season. Table 4.19 shows that 50% of these cows had a BW of 66 or above and that 25% of these cows had a BW of 103 or above.

Table 4.19: Cow Breeding Worth in 2018/19

	Median	Top 5%	Top 10%	Top 25%	Bottom 25%	Bottom 10%	Bottom 5%
Cow BW	66	> 152	> 134	> 103	< 28	< -4	< -25

(Evaluation date: 25 May 2019)

Graph 4.19: Distribution of Cow Breeding Worth in 2018/19



(Evaluation date: 25 May 2019)

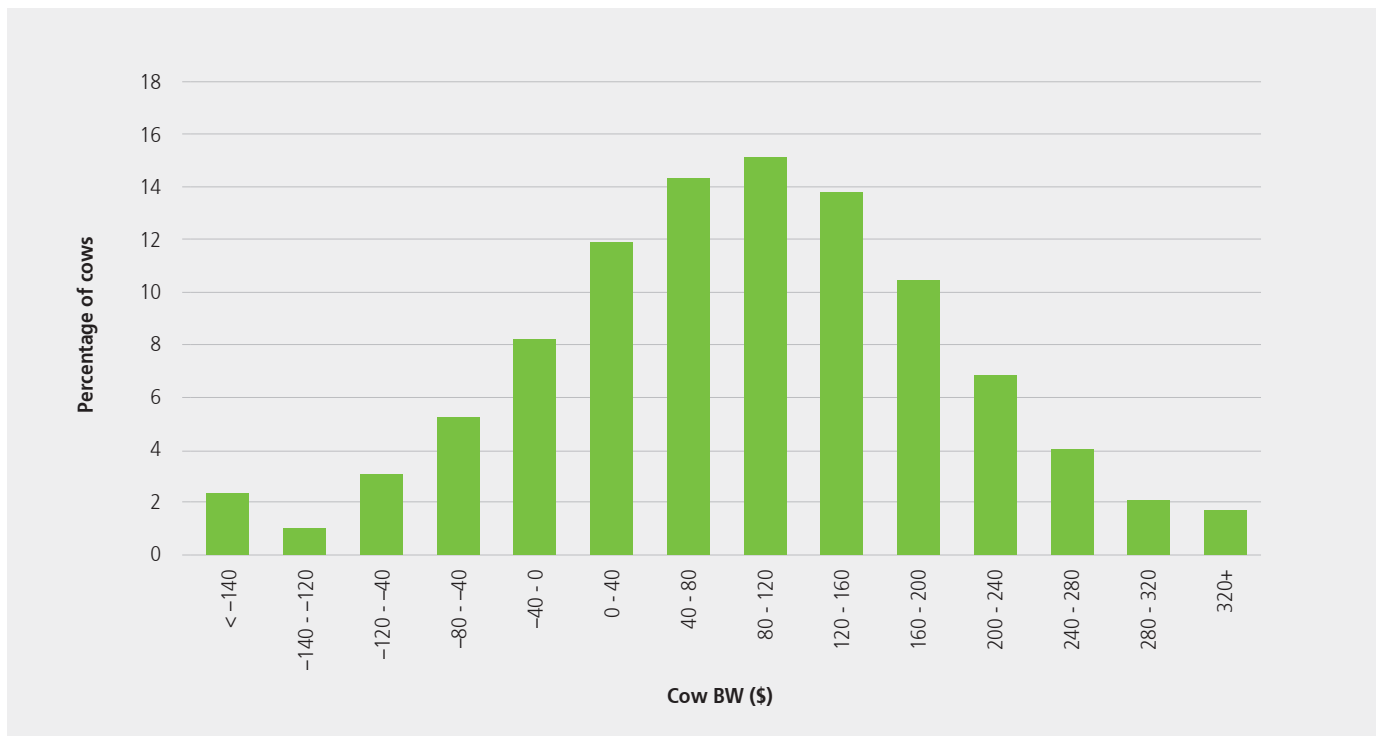
The Production Worth (PW) for cows presented below (Table 4.20 and Graph 4.20) is based on cows of the users of herd testing services, in herds with at least 80 cows, in the 2018/19 season. Table 4.20 shows that 50% of these cows had a PW of 93 or above and that 25% of these cows had a PW of 164 or above.

Table 4.20: Cow Production Worth in 2018/19

	Median	Top 5%	Top 10%	Top 25%	Bottom 25%	Bottom 10%	Bottom 5%
Cow PW	93	> 276	> 231	> 164	< 23	< -43	< -83

(Evaluation date: 25 May 2019)

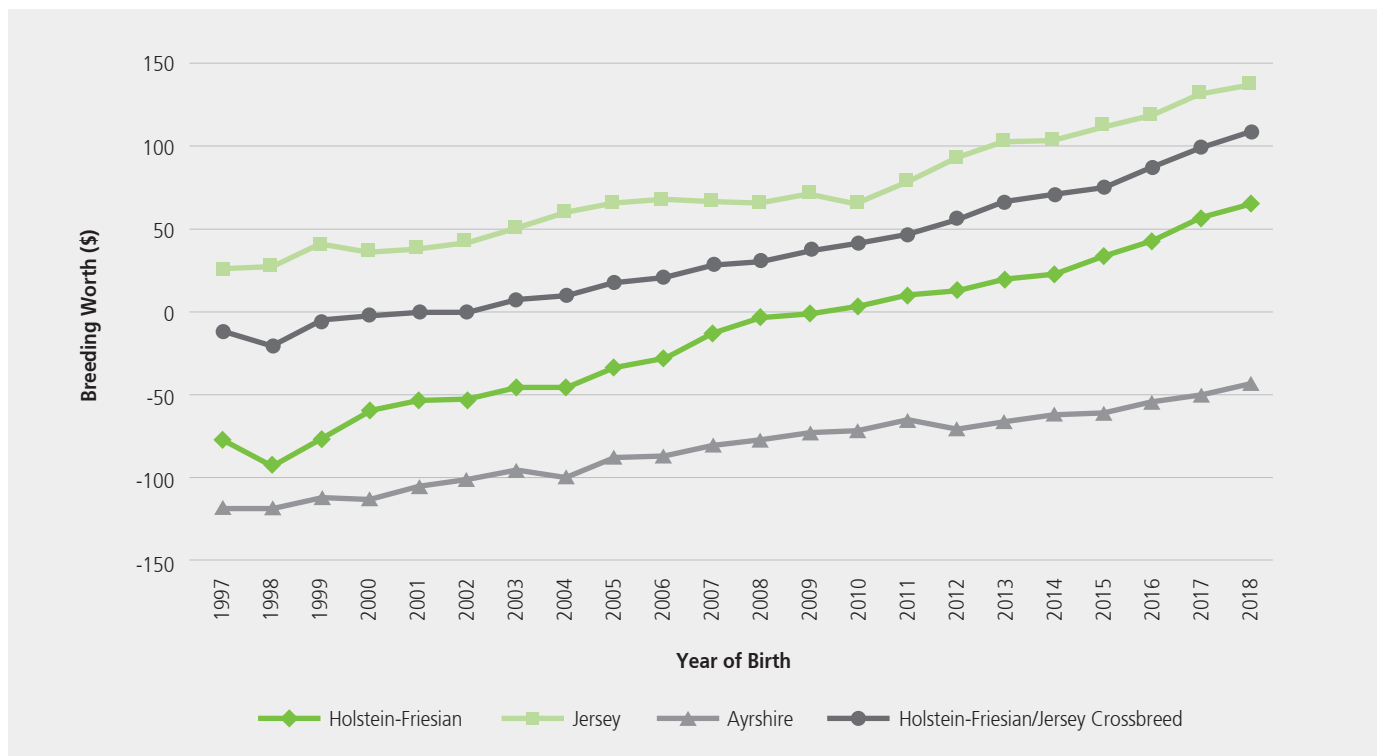
Graph 4.20: Distribution of Cow Production Worth in 2018/19



(Evaluation date: 25 May 2019)

The genetic trend for cows is based on all cows (alive or dead) recorded on the LIC Database in the 2018/19 season. Also included are the estimated BW and PW for replacement stock (2017 and 2018 born animals). All evaluations can be compared across breeds. The genetic trend for BW by breed is presented in Graph 4.21. The Breeding Worth for all breed categories has increased over time.

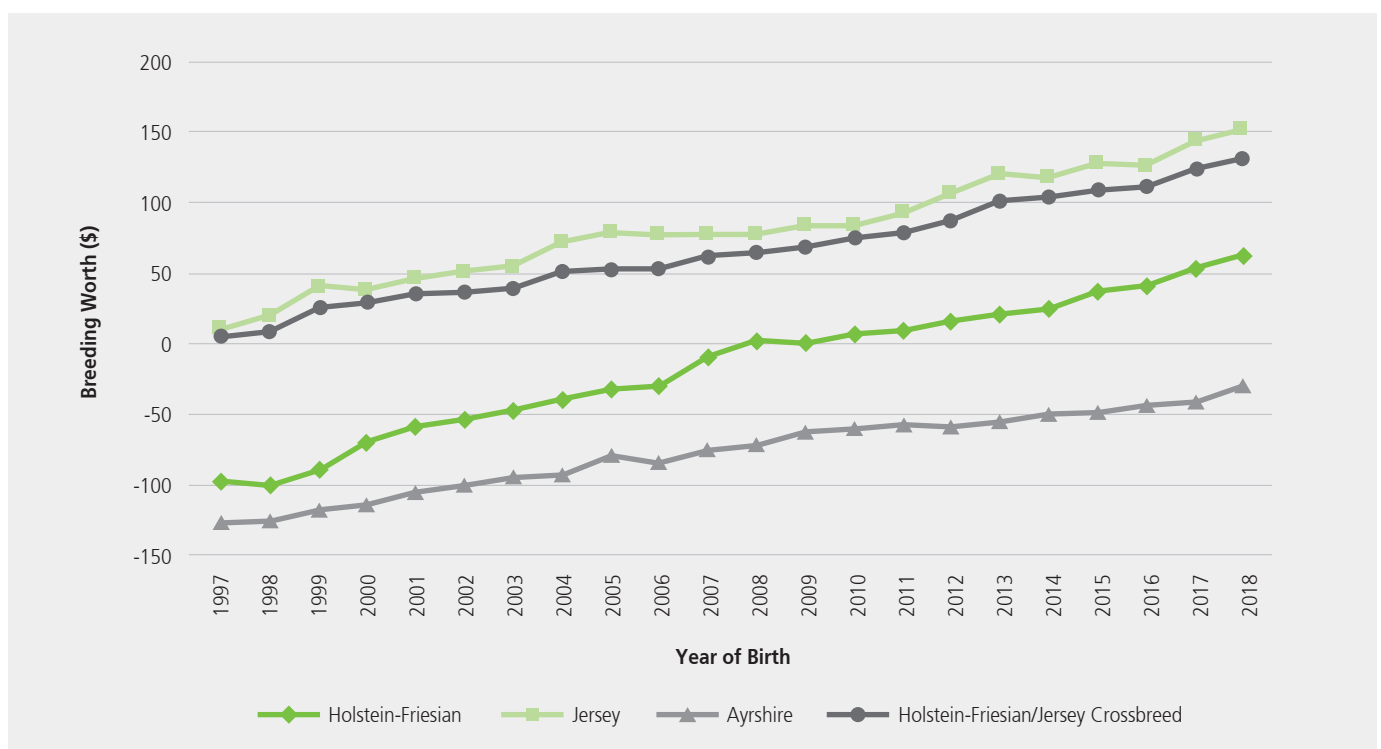
Graph 4.21: Trend in Breeding Worth for all cows



(Evaluation date: 25 May 2019)

The trend for PW by breed is presented in Graph 4.22. The increasing value of milkfat has resulted in a favourable outcome for Jersey animals. For the first time the increased value on milkfat provides a greater advantage than heterosis (hybrid vigour), an attribute only expressed in crossbreds animals.

Graph 4.22: Trend in Production Worth for all cows



(Evaluation date: 25 May 2019)

Table 4.21 shows the average BVs and BW by breed category, of all current 2016 born cows. The Jersey cows had the highest average BW at 119.8. Holstein Friesian cows had the highest milkfat, protein, and milk volume BVs. All evaluations are comparable across breeds.

Table 4.21: Average Breeding Worth and Breeding Values of all current cows born in 2016 by breed category.

Breed	BW \$	Milkfat BV (kg)	Protein BV (kg)	Milk Volume BV (l)	Liveweight BV (kg)	Somatic Cell BV (score)	Fertility BV (%)	Body Cond. Score (score)	Residual Survival BV (days)	Cow Numbers
Holstein-Friesian	44	13.1	19.1	540	31.6	0	0.3	0.02	5	343,288
Jersey	119.8	3.5	-5.5	-532	-48.2	-0.12	0.9	0.09	5	77,345
Ayrshire	-51.5	-6.6	-0.5	90	6.2	-0.21	-3.2	-0.11	96	4,569
HF/J Crossbred	87.9	10.5	10	102	-0.7	-0.08	0.8	0.07	-4	474,509
Guernsey	-235.5	-26.3	-20.9	-545	33.5	0.04	-7.5	-0.22	96	48
Milking Shorthorn	-154.6	-27.3	-14.8	-298	16.3	-0.2	-2.8	0.02	105	229
Brown Swiss	-173.1	-20	-7.5	-197	50	-0.36	-8.4	-0.02	143	103
Other	48.5	5.4	7.2	86	3.3	-0.11	0	0.04	8	42,968
Weighted Average	72.0	10.5	11.9	208.5	7.4	-0.06	0.6	0.05	1.1	943,059

(Evaluation date: 25 May 2019)

Survivability is measured by the percentage of cows that have a lactation recorded for consecutive years. In the 2018/19 season, survivability was higher than the previous year for all age groups except 7-8 year-olds. The value in the "2-3 years" column is the percentage of cows that were milking as two-year-olds in the 2017/18 season and are now milking as three-year-olds in the 2018/19 season. Table 4.22 shows that for the 2018/19 season the highest percentage of survival is in animals aged 2-3 years (86.3%), followed by animals aged 3-4 years (85.5%) and 4-5 years (85.0%).

Table 4.22: Survivability percentages since 1996/97

Season	Percentage (%) of age group surviving to next lactation						
	2-3 years	3-4 years	4-5 years	5-6 years	6-7 years	7-8 years	8-9 years
1996/97	84.9	85.1	84.8	81.6	78.2	74.2	69.0
1997/98	85.9	86.7	85.6	81.9	77.7	73.9	68.3
1998/99	84.5	86.1	85.8	83.0	80.0	75.5	70.5
1999/00	84.1	86.2	85.8	82.8	80.7	76.3	70.8
2000/01	85.3	86.7	86.5	83.2	80.1	76.5	71.7
2001/02	85.6	88.4	86.8	84.3	80.8	77.1	73.5
2002/03	85.7	85.9	86.6	83.8	80.8	76.0	71.2
2003/04	85.2	86.9	86.0	83.0	78.7	74.8	69.4
2004/05	85.7	87.3	86.7	82.7	79.7	74.6	69.6
2005/06	85.0	87.5	87.6	84.2	79.7	76.7	70.6
2006/07	84.8	87.8	88.2	84.7	79.5	74.9	71.2
2007/08	84.0	87.6	87.2	84.1	80.0	74.9	69.5
2008/09	86.8	87.7	87.5	83.4	80.2	76.1	70.7
2009/10	87.0	87.2	86.3	82.2	77.6	72.9	67.3
2010/11	86.2	87.2	86.0	81.1	76.8	71.2	65.7
2011/12	87.3	87.7	86.8	81.5	76.8	72.2	65.6
2012/13	87.6	89.2	87.9	82.7	77.9	71.6	66.1
2013/14	87.6	87.4	86.3	82.0	77.2	71.5	64.3
2014/15	86.9	85.7	84.7	80.8	75.7	70.5	64.1
2015/16	87.0	87.1	84.2	79.5	74.9	69.1	62.9
2016/17	84.1	84.5	83.4	78.9	74.2	69.1	63.2
2017/18	85.2	85.0	84.1	79.8	73.9	69.6	63.5
2018/19	86.3	85.5	85.0	80.5	75.1	68.8	64.2

5. Prices received

A. Milk prices

Up until the end of the 2000/01 season, dairy farmers received payment from the New Zealand Dairy Board through a system of advance and final payouts via dairy companies. Seasonal supply dairy companies passed on the Dairy Board advance payout to their suppliers, in addition to a margin based on dairy company efficiency, product mix and investment policies; together known as the total payout.

The introduction of the *Dairy Industry Restructuring Act 2001* opened the way for New Zealand's largest dairy companies, Kiwi Co-operative Dairy Company (Kiwi) and New Zealand Dairy Group (NZDG) to merge with the Dairy Board to form Fonterra. Further, the Act allowed the smaller dairy companies, such as Tatua and Westland, to remain separate co-operatives. Consequently, the historic payment system became redundant. Tatua and Westland have now established commercial arrangements for the sale of dairy products.

Payments to seasonal supply farmers are based on the "A+B±C" system, which incorporates payments for milkfat (A) and protein (B) with adjustments for milk volume (C). The payment system for winter milk supply varies between companies. Some winter milk payment systems are based on the milk volume only, whereas other payment systems are similar to seasonal supply payment systems, which incorporate components of milkfat, protein, and volume.

- **\$6.35 average dairy co-operative payout**

The weighted average dairy co-operative total payout (per kilogram of milksolids) received by dairy farmers from seasonal supply milk is shown in Table 5.1 (weightings are based on the number of herds supplying each dairy co-operative). The average payout is given in both nominal and inflation-adjusted dollars using the Consumers Price Index. The average dairy co-operative payout of \$6.35 per kg milksolids in 2018/19 was lower than the previous season (\$6.68) and similar to the decade average milk payout of \$6.38.

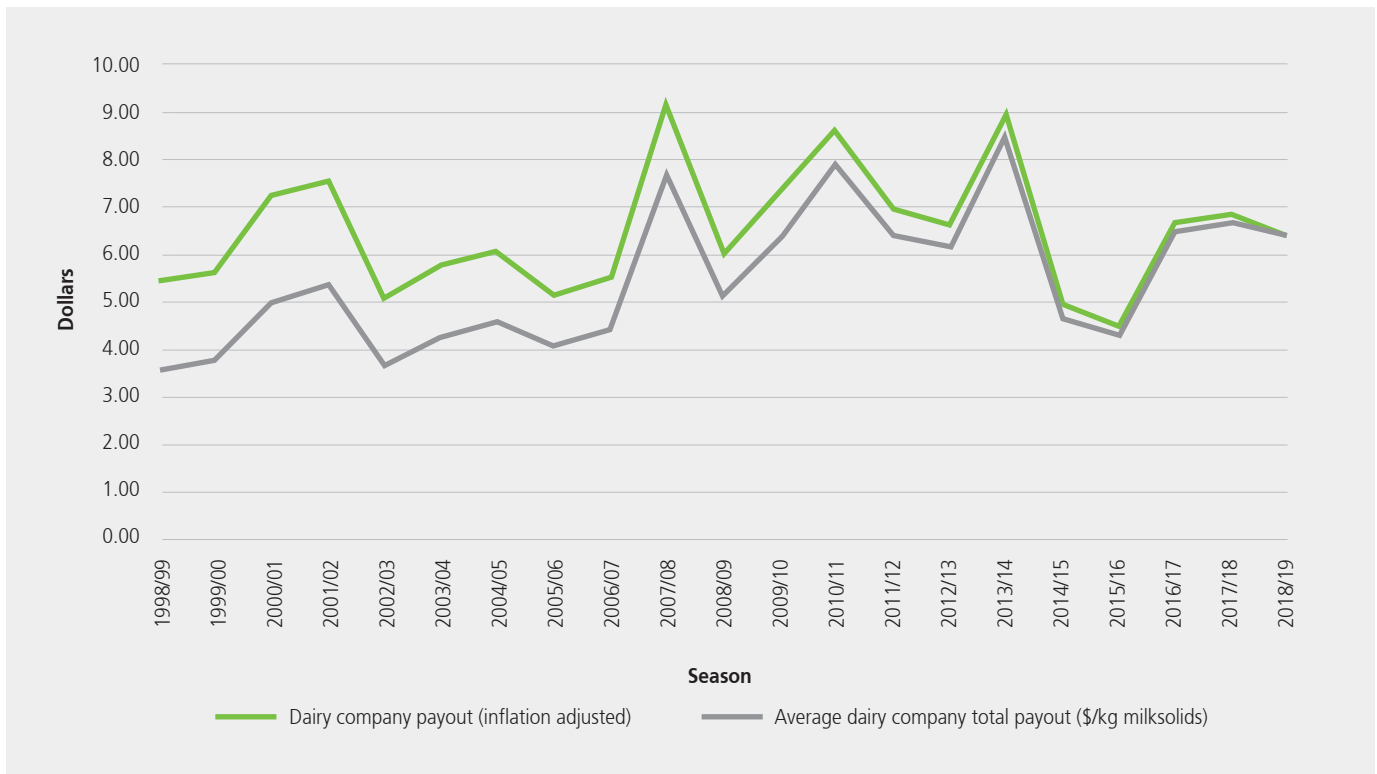
Table 5.1: Trend in prices received for milksolids for the last 20 seasons

Season	Average Dairy Co-operative total payout (\$/kg milksolids)	Dairy Co-operative payout (inflation-adjusted) ^a
1999/00	3.78	5.63
2000/01	5.01	7.24
2001/02	5.35	7.52
2002/03	3.66	5.07
2003/04	4.25	5.75
2004/05	4.58	6.03
2005/06	4.10	5.19
2006/07	4.46	5.53
2007/08	7.67	9.16
2008/09	5.14	6.01
2009/10	6.37	7.34
2010/11	7.89	8.63
2011/12	6.40	6.93
2012/13	6.18	6.65
2013/14	8.47	8.97
2014/15	4.69	4.94
2015/16	4.30	4.51
2016/17	6.47	6.68
2017/18	6.68	6.79
2018/19	6.35	6.35

^a Weighted to give real dollar values using the Consumers Price Index for the end of the June quarter. Sourced from Statistics New Zealand; excludes dairy co-operative retentions and deduction for DairyNZ Levy.

Note: from 2009/10 average dairy co-operative payout is from Fonterra, Tatua, and Westland. This includes Fonterra dividend payments.

Graph 5.1: Trend in milksolids payout to dairy farmers for the last 20 seasons



B. Dairy farm land prices

- Dairy farm land price per hectare decreases

Prior to 2011/12 Table 5.2 used data from Quotable Value (QV) on a calendar year. Dairy farm land sales are now based on data provided by the Real Estate Institute of New Zealand (REINZ) on a seasonal basis. Raw data provided by REINZ has been weighted by the number of farms in each region. The farms sold are considered to be economic units.

The weighted average sale price of dairy farms increased to \$5.13 million in 2018/19 from the previous season (\$4.94 million) (Table 5.2). Farms sold were 14 hectares larger on average than sales in 2017/18. The weighted average sale price per hectare of \$36,846 decreased 3.1% on the previous season.

Table 5.2: Trend in dairy land sale values since 2009/10

Season	Number of dairy farms sold	Weighted average sale price (\$)	Inflation Adjusted average sale price (\$)	Weighted average land area (ha)	Weighted average sale price/ha (\$)	Inflation adjusted average sale price/ha (\$)	Weighted average sale price/KgMS (\$)	CPI
2009/10	90	4,113,264	4,737,599	130	31,653	36,457	39	896
2010/11	143	4,119,017	4,502,993	126	32,735	35,787	38	944
2011/12	157	4,514,365	4,888,588	139	32,376	35,060	41	953
2012/13	197	4,375,251	4,708,299	130	33,557	36,111	36	959
2013/14	312	5,174,010	5,476,491	142	36,369	38,495	42	975
2014/15	244	5,228,018	5,511,047	132	39,577	41,720	44	979
2015/16	192	5,381,697	5,649,960	169	36,557	38,379	39	983
2016/17	217	4,808,676	4,962,554	151	37,835	39,046	40	1,000
2017/18	226	4,935,487	5,018,151	130	38,015	38,652	40	1,015
2018/19	148	5,125,837	5,125,837	144	36,846	36,846	38	1,032

Source: Real Estate Institute of New Zealand (REINZ), Statistics New Zealand, DairyNZ

Note: Number of dairy farms sold is for a season (01-Jun to 31-May) and excludes support blocks and non-economic units. Figures have been weighted by the number of dairy farms in each region.

6. Disease Control

A. Tuberculosis (Tb) control

Control of *Mycobacterium bovis* (Tb) over the agricultural industry is managed by TBfree New Zealand, whose primary objective is to manage Tb to reduce the number of infected herds and to prevent Tb vector free areas becoming vector risk areas. The status of a vector area is determined by the prevalence of wild animals (e.g., possums and ferrets) that are considered a source of infection.

The number of infected dairy herds in 2018/19 was 27 (Table 6.1). The number of Tuberculous dairy cattle decreased from 112 in 2016/17 to 28 in 2017/18 and now to 8 in 2018/19.

The West Coast had the greatest number of infected herds (23) and all of the Tb dairy cattle in 2018/19.

Table 6.1: Tuberculosis (Tb) testing and results in 2018/19

Region	Vector Status	Number of infected Dairy herds at 30 June 2019	Number of Dairy Cattle Primary Tested in 2018/19	Number of tuberculous ^a dairy cattle
Northland	Free	0	77,548	0
Auckland	Free	0	22,858	0
Waikato	Free	1	479,058	0
	Risk	0	13,383	0
Bay of Plenty	Free	0	72,774	0
	Risk	0	6,609	0
Gisborne	Free	0	1,660	0
Hawke's Bay	Free	0	16,064	0
	Risk	1	27,271	0
Taranaki	Free	0	136,796	0
Manawatu/Wanganui	Free	0	110,727	0
	Risk	0	7,183	0
Wellington	Free	0	9,082	0
	Risk	0	56,470	0
North Island	Free	1	926,567	0
	Risk	1	110,916	0
North Island	Total	2	1,037,483	-
Marlborough	Free	0	7,636	0
	Risk	0	2,615	0
Tasman/Nelson	Free	0	11,387	0
	Risk	0	12,645	0
West Coast	Free	0	5,589	0
	Risk	23	222,545	8
Canterbury	Free	2	275,462	0
	Risk	0	114,446	0
Otago	Free	0	79,667	0
	Risk	0	135,268	0
Southland	Free	0	190,397	0
	Risk	0	32,728	0
South Island	Free	2	570,138	0
	Risk	23	520,247	8
South Island	Total	25	1,090,385	8
New Zealand	Free	3	1,496,705	0
	Risk	24	631,163	8
New Zealand	Total	27	2,127,868	8

Sourced from TBfree New Zealand

^a Tuberculous animals include lesioned reactor cattle and lesioned cull cattle

Appendix 1: Farming regions and districts

The following map shows the six LIC regions and the farming regions used in all analyses presented in this report. The list of districts, which follow local authority boundaries (except in Auckland, Christchurch and Banks Peninsula), within each region is also given.

1 Northland

Far North
Whangarei
Kaipara

2 Auckland

Rodney
North Shore
Waitakere
Auckland
Manukau
Papakura
Franklin

3 Waikato

Thames/Coromandel
Hauraki
Waikato
Matamata/Piako
Hamilton
Waipa
Otorohanga
South Waikato

4 Bay of Plenty

Western Bay of Plenty
Tauranga
Whakatane
Kawerau
Opotiki

5 Central Plateau

Rotorua
Taupo

6 Western Uplands

Waitomo
Ruapehu

7 East Coast

Gisborne
Wairoa

8 Hawkes Bay

Hastings
Napier
Central Hawkes Bay

9 Taranaki

New Plymouth
Stratford
South Taranaki

10 Manawatu

Wanganui
Rangitikei
Manawatu
Palmerston North
Horowhenua
Kapiti
Porirua
Upper Hutt
Lower Hutt
Wellington

11 Wairarapa

Tararua
Masterton
Carterton
South Wairarapa

12 Nelson/Marlborough

Tasman
Nelson
Marlborough
Kaikoura

13 West Coast

Buller
Grey
Westland

14 North Canterbury

Hurunui
Waimakariri
Christchurch
Banks Peninsula
Selwyn
Ashburton

15 South Canterbury

Timaru
Mackenzie
Waimate

16 Otago

Waitaki
Central Otago
Queenstown/Lakes
Dunedin
Clutha

17 Southland

Southland
Gore
Invercargill

