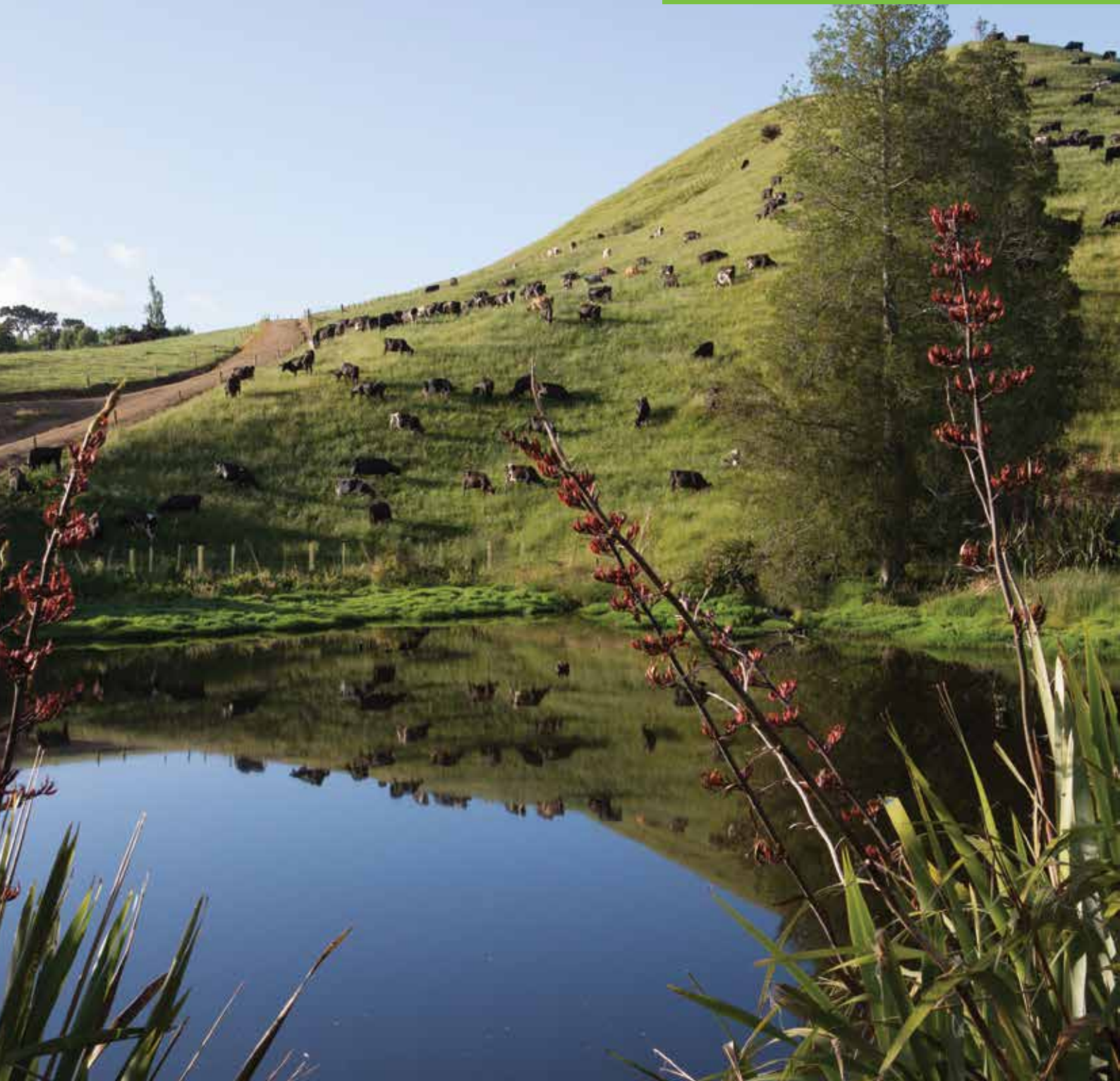


# *New Zealand Dairy Statistics 2017-18*



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# 1. Introduction

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The purpose of New Zealand Dairy Statistics is to provide statistical information related to the New Zealand Dairy Industry. Funding is provided by Livestock Improvement Corporation (LIC) and DairyNZ Incorporated (dairy farmer levy). Contributors include New Zealand Animal Evaluation Limited.

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.

*New Zealand Dairy Statistics 2017/18* is a report that shows historical information up to and including the 2017/18 season. Data for seasons prior to 2006/07 were released under *Dairy Statistics* from 1988/89 to 2005/06, *Annual Report (Livestock Improvement Division)* in 1987/88, *Livestock Improvement Report* from 1984/85 to 1986/87, and *New Zealand Dairy Board Farm Production Report* up to 1983/84.

Prior to 1991/92 the information for the Dairy Statistics publication was obtained primarily from the analysis of the New Zealand Dairy Industry Cow Census (an annual survey of all dairy farmers).

As of March 2002, LIC became a user-owned co-operative, with responsibility for farm production activities and, in particular, dairy herd improvement and herd records.

LIC's activities can broadly be described as genetics, information and advice. Services provided to farmers include farm management information, automation technologies, herd testing and artificial breeding services, DNA analysis, a farm advisory service, research to improve farm profitability, statistical information related to the New Zealand dairy industry, and herd recording on the LIC Database. For more information, visit [www.lic.co.nz](http://www.lic.co.nz).

DairyNZ is the industry organisation representing New Zealand's dairy farmers, funded by farmers through a levy on milksolids. DairyNZ's purpose is to deliver a better future for New Zealand dairy farmers. For more information, visit [www.dairynz.co.nz](http://www.dairynz.co.nz).

## 2. National dairy statistics

### A. Industry statistics

#### i) Production

- *Third year of easing milksolids*

In 2017/18, dairy companies processed 20.7 billion litres of milk containing 1.84 billion kilograms of milksolids (Table 2.1). Despite the similar litres processed, total milksolids decreased by 0.6% from the 1.85 billion kilograms processed in the previous season. Since 2013/14 milksolids 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)	Milksolids processed (million kgs)
1983/84	6,733	324	239	564
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

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 milksolids 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.

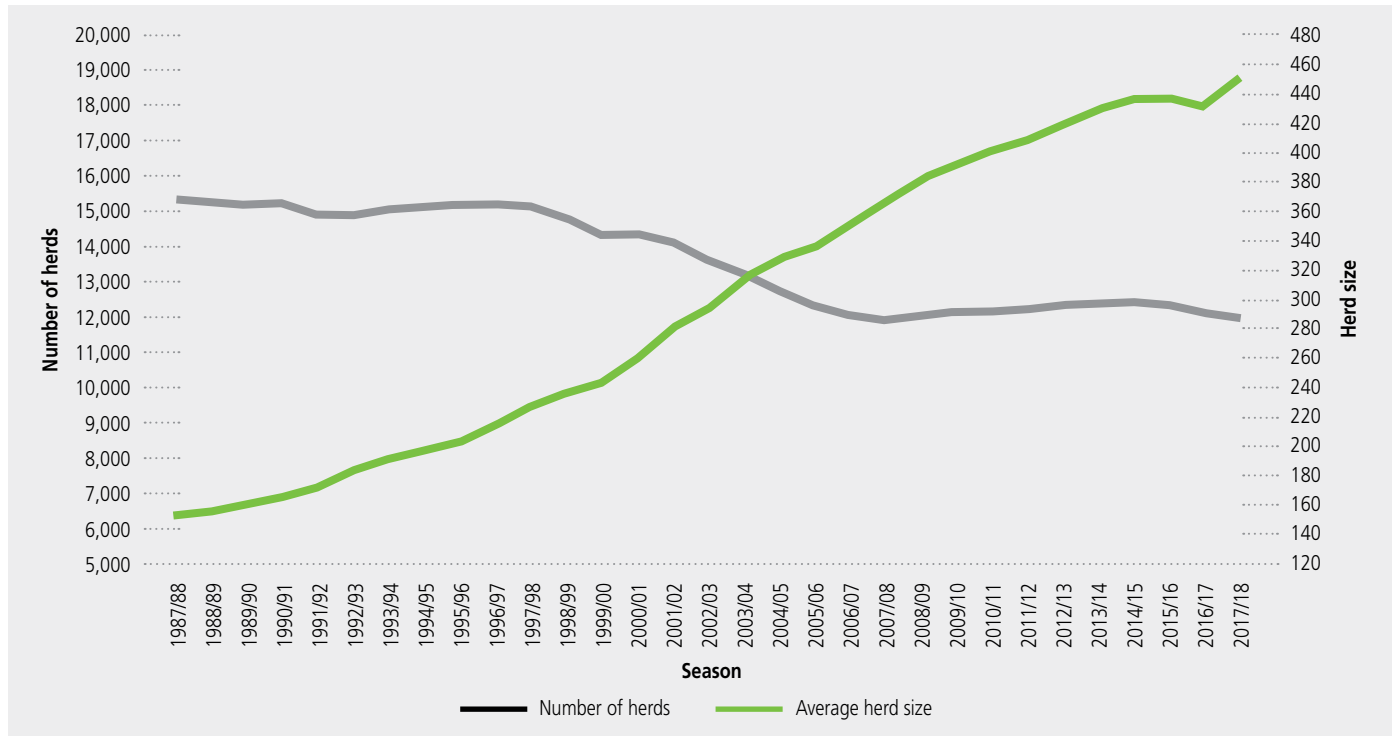
## ii) Population

- 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 2017/18 season decreased by 158 to 11,590. This was the third year of easing herd numbers after seven consecutive seasons of small increases.

The average herd size was 431 in 2017/18, which was 17 cows higher than the previous season. The average herd size has 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 2017/18 season was 4.99 million (Table 2.2), an increase of 2.7% from the previous season. Average farm size increased to 151 effective hectares. A stocking rate of 2.84 cows per hectare was similar to 2015/16. Total effective hectares (milking platform with support block excluded) were 1.755 million – an increase of about 26,000 ha on the previous season.

**Table 2.2: Summary of herd statistics since 1975/76**

Season	Herds	Total cows	Total effective hectares <sup>a</sup>	Average herd size	Average effective hectares <sup>b</sup>	Average cows per hectare <sup>b</sup>
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

- Not available

<sup>a</sup> Total effective hectares between 1981/82 and 1999/00 are estimates.

<sup>b</sup> 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 eases

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 1,048 kg in 2017/18 was lower than the four previous seasons. Production per cow decreased by 3.4% in 2017/18 to an average of 368 kg milksolids (comprising 207 kg milkfat and 161 kg protein). The decline in per cow milk production reflects the difficult spring experienced in 2017.

**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 <sup>a</sup>	-	15,700	-	-	-	-	-	-	137	-	-
1980/81 <sup>a</sup>	-	18,864	-	-	-	-	-	-	147	-	-
1985/86 <sup>a</sup>	-	23,489	-	-	379	-	-	-	157	-	-
1990/91 <sup>a</sup>	-	24,495	-	-	351	-	-	-	148	-	-
1991/92 <sup>b</sup>	-	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

- Not available

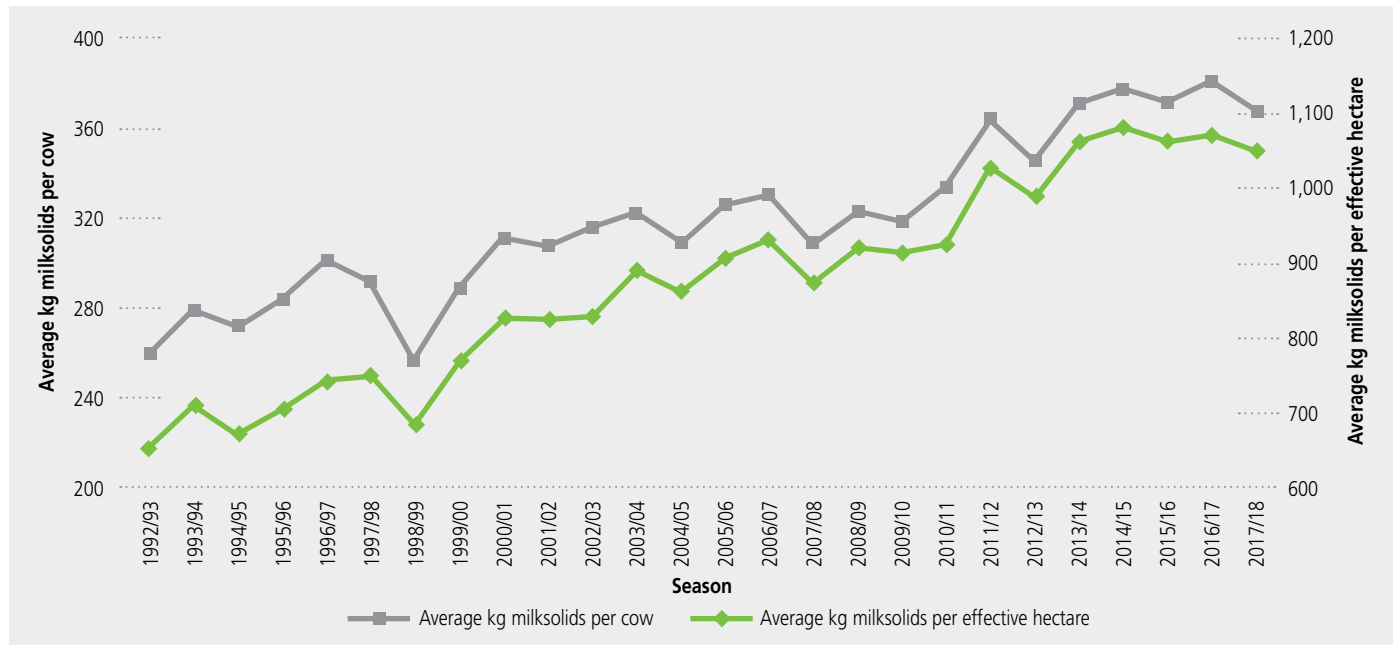
<sup>a</sup> Figures prior to 1991/92 exclude town milk herds

<sup>b</sup> 1991/92 figures include some town milk herds

### i) Production per cow and per hectare

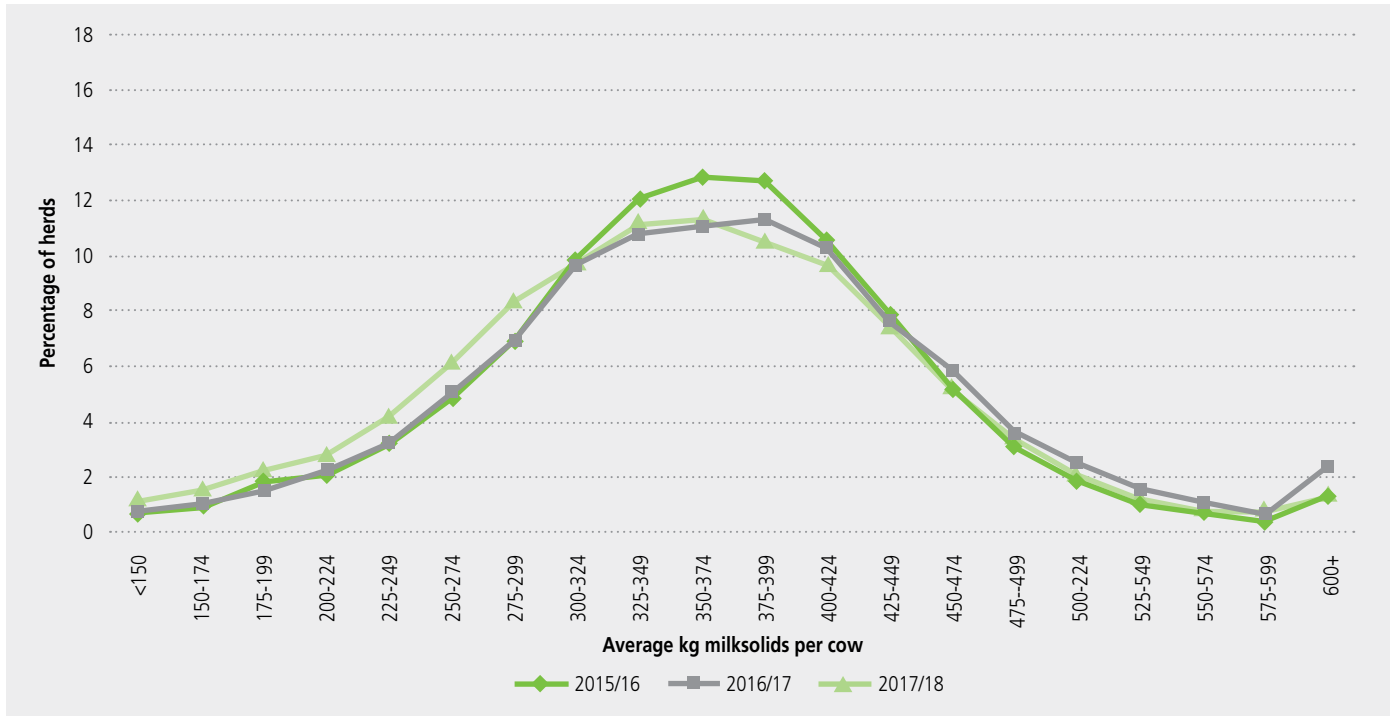
Average milksolids per cow in 2017/18 was 368 kg, compared with 381 kg last season (Graph 2.2). Average milk production per hectare was 1,048 kg – lower than the previous four seasons. Variations from season to season are masked by the considerable effect of the weather on each season’s actual production. 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 2017/18 compared with the previous two seasons. Two-thirds of herds recorded milksolids production between 250 and 400 kilograms per cow. Thirty-one per cent of the herds had an average production of over 400 kilograms milksolids per cow, compared with 36% in the previous season and 32% in 2015/16. In 2017/18, six 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 (5,810) of herds have between 100 and 349 cows (Table 2.4). In 2017/18, 3,406 (29%) had 500 or more cows, 1,383 (12%) had 750 or more cows, and 548 (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.

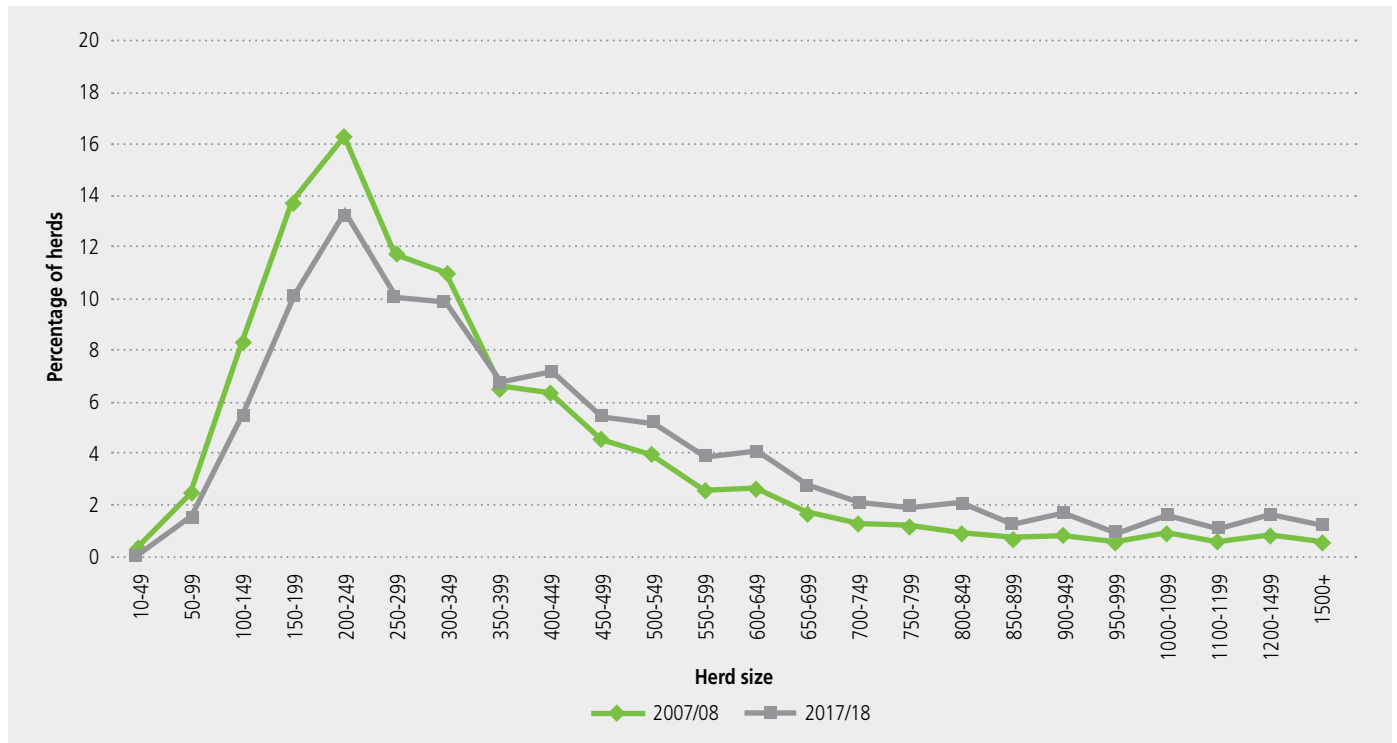
Aside from the 164 herds with fewer than 100 animals, the average milksolids per cow varies between 298 kg (herds with 100-149 cows) and 395 kg (herds with 800-899 cows).

**Table 2.4: Average production per cow by herd size in 2017/18**

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	4	0.0	114	0.0	232	178	410
50-99	160	1.4	13,988	0.3	135	103	238
100-149	660	5.7	78,920	1.6	169	129	298
150-199	1,210	10.4	202,744	4.1	190	145	336
200-249	1,592	13.7	341,331	6.8	197	150	347
250-299	1,171	10.1	312,575	6.3	198	152	350
300-349	1,177	10.2	362,856	7.3	203	155	358
350-399	780	6.7	287,248	5.8	207	159	366
400-449	828	7.1	343,044	6.9	207	160	368
450-499	602	5.2	289,609	5.8	213	165	377
500-549	595	5.1	306,277	6.1	215	167	383
550-599	435	3.8	251,145	5.0	215	167	382
600-649	453	3.9	288,939	5.8	219	171	389
650-699	277	2.4	207,105	4.1	219	172	392
700-749	263	2.3	173,128	3.5	220	173	393
750-799	207	1.8	163,500	3.3	220	173	392
800-849	227	2.0	189,499	3.8	222	174	395
850-899	140	1.2	118,157	2.4	221	173	395
900-949	165	1.4	170,815	3.4	217	171	388
950-999	96	0.8	94,511	1.9	219	171	390
1000-1099	168	1.4	187,121	3.7	215	169	384
1100-1199	118	1.0	134,181	2.7	211	167	378
1200-1499	181	1.6	234,627	4.7	206	162	368
1500+	81	0.7	241,480	4.8	171	134	305
<b>Total/Avg</b>	<b>11,590</b>		<b>4,992,914</b>		<b>207</b>	<b>161</b>	<b>368</b>

The herd size distribution presented in Graph 2.4 shows an increase in larger herds (400+ cows) and a decrease in herds with fewer than 350 cows compared with 2007/08. The most common herd size remains in the range 200 to 249 cows (comprising 13.3% of herds in 2017/18, compared with 16.3% in 2007/08).

**Graph 2.4: Herd size distribution for 2017/18 compared with 2007/08**



# 3. Regional dairy statistics

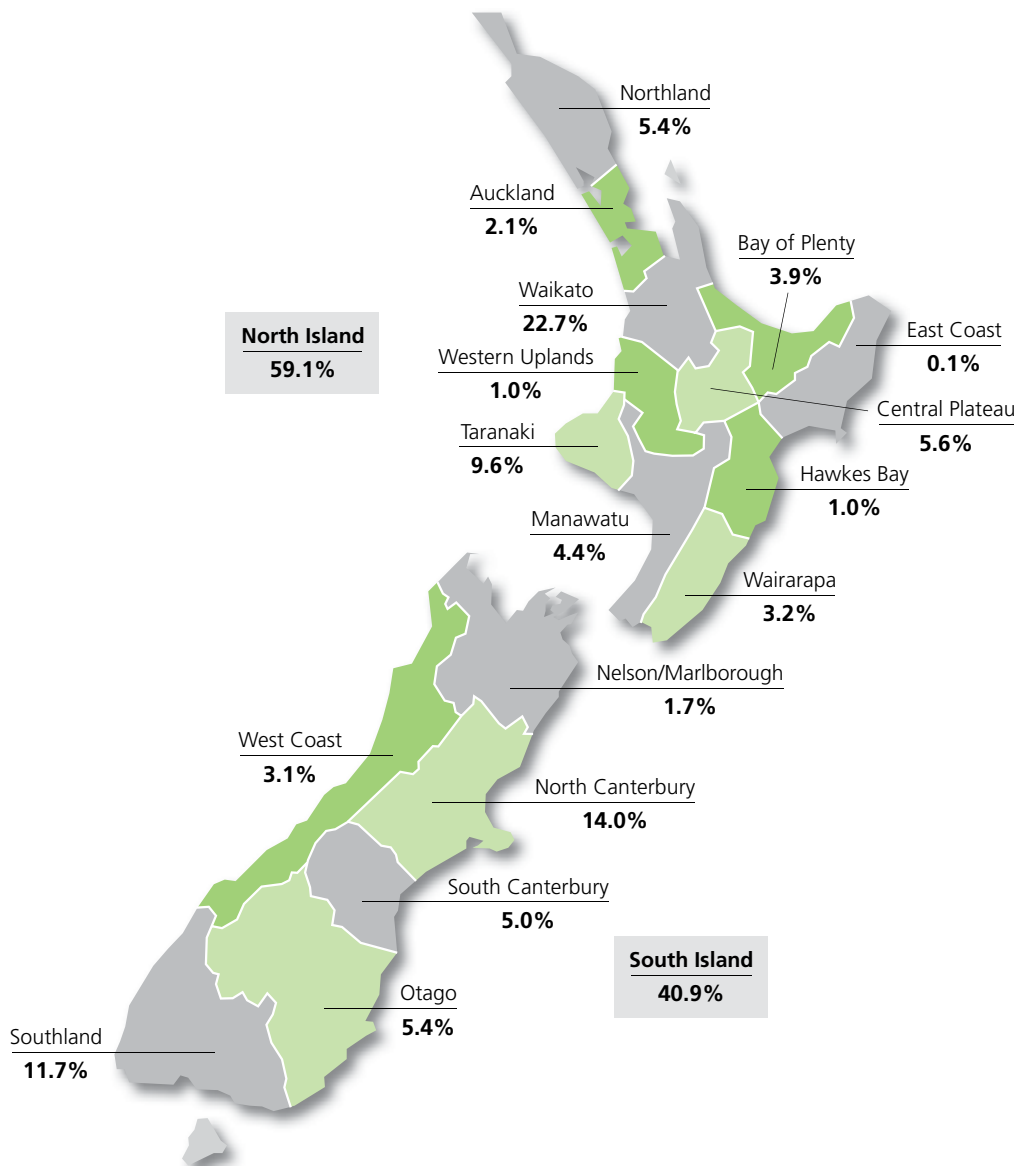
## A. Region

- 72% of dairy herds located in the North Island
- 41% of dairy cows located in the South Island

The majority of dairy herds (72.3%) are located in the North Island, with the greatest concentration (28.7%) situated in the Waikato region. Taranaki, with 14.0% of dairy herds, is the next largest region.

Although South Island dairy herds account for 27.7% of the national total, they contain 40.9% 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 (14.0%), Southland (11.7%) and Taranaki (9.6%).

Graph 3.1: Regional distribution of dairy cows in 2017/18



- 2 million cows in the South Island
- Largest average herd size (803) 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 (803 cows). In the North Island, Hawkes Bay has the largest average herd size of 664 cows. The smallest average herd sizes are in Auckland, Taranaki, and Northland, averaging 273, 295 and 319 cows respectively. South and North Canterbury have the highest average cows per hectare (3.44 and 3.43 respectively). The regions with the lowest average cows per hectare are the West Coast (2.21) and Northland (2.28).

**Table 3.1: Herd analysis by region in 2017/18**

Farming region	Total herds	Percentage of herds	Total cows	Percentage of cows	Total effective hectares	Percentage of effective hectares	Average herd size	Average effective hectares	Average cows per hectare
Northland	853	7.4	271,945	5.4	119,220	6.8	319	140	2.28
Auckland	387	3.3	105,514	2.1	43,619	2.5	273	113	2.42
Waikato	3,322	28.7	1,135,822	22.7	384,529	21.9	342	116	2.95
Bay of Plenty	558	4.8	195,887	3.9	68,800	3.9	351	123	2.85
Central Plateau	492	4.2	280,707	5.6	101,756	5.8	571	207	2.76
Western Uplands	90	0.8	48,120	1.0	18,916	1.1	535	210	2.54
East Coast	9	0.1	5,887	0.1	2,155	0.1	654	239	2.73
Hawkes Bay	73	0.6	48,444	1.0	16,959	1.0	664	232	2.86
Taranaki	1,620	14.0	477,311	9.6	170,451	9.7	295	105	2.80
Manawatu	539	4.7	220,434	4.4	80,874	4.6	409	150	2.73
Wairarapa	434	3.7	162,151	3.2	59,259	3.4	374	137	2.74
<b>North Island</b>	<b>8,377</b>	<b>72.3</b>	<b>2,952,222</b>	<b>59.1</b>	<b>1,066,538</b>	<b>60.8</b>	<b>352</b>	<b>127</b>	<b>2.77</b>
Nelson/Marlborough	220	1.9	83,157	1.7	28,810	1.6	378	131	2.89
West Coast	375	3.2	154,058	3.1	69,861	4.0	411	186	2.21
North Canterbury	874	7.5	701,464	14.0	204,227	11.6	803	234	3.43
South Canterbury	317	2.7	250,899	5.0	72,931	4.2	791	230	3.44
Otago	445	3.8	267,874	5.4	91,438	5.2	602	205	2.93
Southland	982	8.5	583,240	11.7	221,343	12.6	594	225	2.64
<b>South Island</b>	<b>3,213</b>	<b>27.7</b>	<b>2,040,692</b>	<b>40.9</b>	<b>688,610</b>	<b>39.2</b>	<b>635</b>	<b>214</b>	<b>2.96</b>
<b>New Zealand</b>	<b>11,590</b>		<b>4,992,914</b>		<b>1,755,148</b>		<b>431</b>	<b>151</b>	<b>2.84</b>



- *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 331,739 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 233,664 kilograms of milksolids, reflecting large herd sizes.

In 2017/18, 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 (1,420 kg), while Waikato had the highest average milksolids production per hectare in the North Island (1,057 kg).

North Canterbury also had the highest average milksolids per cow (413 kg). In the North Island, Central Plateau had the highest average milksolids per cow (369 kg).

**Table 3.2: Herd production analysis by region in 2017/18**

<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	87,754,903	4.8	1,169,139	58,206	44,672	102,878	416	320	736	183	140	323
Auckland	35,237,970	1.9	1,047,891	51,372	39,682	91,054	456	352	808	188	146	334
Waikato	406,512,723	22.1	1,387,467	69,317	53,053	122,370	599	458	1,057	203	155	358
Bay of Plenty	64,707,630	3.5	1,332,690	65,496	50,468	115,963	531	409	941	187	144	330
Central Plateau	103,510,114	5.6	2,396,613	119,035	91,351	210,386	576	442	1,017	209	160	369
Western Uplands	13,734,806	0.7	1,687,876	86,819	65,790	152,609	413	313	726	162	123	285
East Coast	1,625,110	0.1	2,058,278	101,871	78,697	180,568	425	329	754	156	120	276
Hawkes Bay	17,057,507	0.9	2,662,304	130,699	102,966	233,664	563	443	1,006	197	155	352
Taranaki	165,618,825	9.0	1,127,057	58,068	44,166	102,234	552	420	972	197	150	347
Manawatu	78,754,677	4.3	1,674,569	82,380	63,732	146,113	549	425	974	201	156	357
Wairarapa	55,315,320	3.0	1,423,041	72,281	55,173	127,455	529	404	933	193	148	341
<b>North Island</b>	<b>1,029,829,584</b>	<b>56.0</b>	<b>1,390,182</b>	<b>69,599</b>	<b>53,337</b>	<b>122,935</b>	<b>547</b>	<b>419</b>	<b>966</b>	<b>197</b>	<b>151</b>	<b>349</b>
Nelson/Marlborough	29,166,396	1.6	1,467,144	75,341	57,233	132,575	575	437	1,012	199	151	351
West Coast	49,791,033	2.7	1,440,389	75,749	57,027	132,776	407	306	713	184	139	323
North Canterbury	289,940,204	15.8	3,754,732	184,746	146,993	331,739	791	629	1,420	230	183	413
South Canterbury	98,477,041	5.4	3,485,163	173,059	137,594	310,653	752	598	1,350	219	174	392
Otago	104,752,593	5.7	2,646,412	131,288	104,112	235,399	639	507	1,146	218	173	391
Southland	237,757,357	12.9	2,699,540	134,891	107,225	242,115	598	476	1,074	227	181	408
<b>South Island</b>	<b>809,884,624</b>	<b>44.0</b>	<b>2,825,382</b>	<b>140,739</b>	<b>111,326</b>	<b>252,065</b>	<b>657</b>	<b>519</b>	<b>1,176</b>	<b>222</b>	<b>175</b>	<b>397</b>
<b>New Zealand</b>	<b>1,839,714,208</b>	<b>100.0</b>	<b>1,788,051</b>	<b>89,320</b>	<b>69,413</b>	<b>158,733</b>	<b>590</b>	<b>458</b>	<b>1,048</b>	<b>207</b>	<b>161</b>	<b>368</b>

## B. District

South Taranaki continues to be the district with the most herds (969) followed by Matamata-Piako (902) (Table 3.3). The Southland district has the most cows (430,703), followed by Ashburton (357,381). Ashburton in North Canterbury has the highest average herd size with 872 cows followed by MacKenzie in South Canterbury with 865 cows. The number of owner-operators and sharemilkers is included in Table 3.3. Sixty per cent of herds are run as owner-operators, while 27% 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 2017/18**

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	251	178	17	56	76,042	33,582	303	134	2.26
	Whangarei	284	167	31	77	93,930	39,312	331	138	2.39
	Kaipara	318	227	33	56	101,973	46,326	321	146	2.20
Auckland	Rodney	144	95	8	40	39,966	17,962	278	125	2.23
	Manukau / Papakura	17	10	.	7	3,785	1,502	223	88	2.52
	Franklin	226	124	20	78	61,763	24,155	273	107	2.56
Waikato	Waikato	648	369	87	189	217,787	77,536	336	120	2.81
	Hamilton City	18	10	1	7	5,512	1,970	306	109	2.80
	Waipa	547	306	83	157	200,733	64,546	367	118	3.11
	Otorohanga	361	204	47	110	134,970	46,905	374	130	2.88
	Thames-Coromandel	88	52	20	16	26,499	9,869	301	112	2.69
	Hauraki	381	214	72	94	111,513	40,236	293	106	2.77
	Matamata-Piako	902	470	111	320	282,364	90,776	313	101	3.11
	South Waikato	377	183	77	116	156,444	52,691	415	140	2.97
Bay of Plenty	Western Bay of Plenty	188	107	41	39	67,535	23,837	359	127	2.83
	Tauranga	13	5	4	4	5,268	1,982	405	152	2.66
	Kawerau / Whakatane	291	193	39	58	99,525	35,000	342	120	2.84
	Opotiki	66	37	8	21	23,559	7,981	357	121	2.95
Central Plateau	Taupo	176	110	36	30	137,684	49,779	782	283	2.77
	Rotorua	316	186	44	85	143,023	51,977	453	164	2.75
Western Uplands	Waitomo	61	43	1	17	34,039	13,173	558	216	2.58
	Ruapehu	29	16	2	11	14,081	5,743	486	198	2.45
East Coast	Gisborne / Wairoa	9	6	3	.	5,887	2,155	654	239	2.73
Hawkes Bay	Napier / Hastings	30	24	2	4	17,173	6,559	572	219	2.62
	Central Hawkes Bay	43	34	3	5	31,271	10,400	727	242	3.01
Taranaki	New Plymouth	410	241	44	125	109,548	41,531	267	101	2.64
	Stratford	241	152	22	67	60,490	22,771	251	94	2.66
	South Taranaki	969	523	127	319	307,273	106,149	317	110	2.89
Manawatu	Wanganui	19	13	1	5	7,836	2,951	412	155	2.66
	Rangitikei	87	62	16	9	42,547	16,018	489	184	2.66
	Manawatu	250	168	19	63	97,486	35,620	390	142	2.74
	Palmerston North City	49	36	4	8	21,758	7,880	444	161	2.76
	Horowhenua	116	82	10	23	45,447	16,243	392	140	2.80
	Kapiti Coast / Upper Hutt	18	13	1	3	5,360	2,162	298	120	2.48
Wairarapa	Tararua	288	187	30	69	97,315	36,315	338	126	2.68
	Masterton	17	8	4	5	8,303	2,921	488	172	2.84
	Carterton	50	38	9	3	20,067	7,519	401	150	2.67
	South Wairarapa	79	48	17	14	36,466	12,504	462	158	2.92
<b>North Island</b>		<b>8,377</b>	<b>4,941</b>	<b>1,094</b>	<b>2,310</b>	<b>2,952,222</b>	<b>1,066,538</b>	<b>352</b>	<b>127</b>	<b>2.77</b>

(table 3.3 continued)

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
Nelson/Marlborough	Marlborough	52	38	1	12	17,069	5,727	328	110	2.98
	Kaikoura	21	12	2	7	9,230	2,938	440	140	3.14
	Tasman / Nelson City	147	116	10	20	56,858	20,145	387	137	2.82
West Coast	Buller	129	97	11	21	51,384	22,137	398	172	2.32
	Grey	89	61	6	22	42,598	18,706	479	210	2.28
	Westland	157	117	6	34	60,076	29,018	383	185	2.07
North Canterbury	Hurunui	93	66	13	14	77,388	23,142	832	249	3.34
	Waimakariri	104	74	7	23	70,700	20,488	680	197	3.45
	Christchurch City	33	23	5	5	25,686	7,433	778	225	3.46
	Banks Peninsula	6	3	.	3	1,885	813	314	136	2.32
	Selwyn	228	155	29	44	168,424	50,580	739	222	3.33
	Ashburton	410	243	63	104	357,381	101,771	872	248	3.51
South Canterbury	Timaru	179	126	13	40	135,456	38,039	757	213	3.56
	MacKenzie	16	9	2	5	13,833	5,058	865	316	2.73
	Waimate	122	65	8	49	101,610	29,833	833	245	3.41
Otago	Waitaki	146	76	11	59	105,270	31,075	721	213	3.39
	Dunedin City	65	36	2	27	28,146	9,811	433	151	2.87
	Clutha	203	118	20	49	109,997	40,846	542	201	2.69
	Central Otago / Lakes	31	23	2	6	24,461	9,706	789	313	2.52
Southland	Gore	163	92	19	51	93,715	36,357	575	223	2.58
	Invercargill	104	59	12	33	58,822	21,932	566	211	2.68
	Southland	715	390	104	221	430,703	163,054	602	228	2.64
<b>South Island</b>		<b>3,213</b>	<b>1,999</b>	<b>346</b>	<b>849</b>	<b>2,040,692</b>	<b>688,610</b>	<b>635</b>	<b>214</b>	<b>2.96</b>
<b>New Zealand</b>		<b>11,590</b>	<b>6,940</b>	<b>1,440</b>	<b>3,159</b>	<b>4,992,914</b>	<b>1,755,148</b>	<b>431</b>	<b>151</b>	<b>2.84</b>

Ashburton had the highest average production per herd with 365,312 kilograms of milksolids followed by MacKenzie with 363,632 kilograms of milksolids (Table 3.4). Ashburton district also had the highest average milksolids per effective hectare with 1,472 kilograms. Hurunui and MacKenzie recorded the highest production per cow (430 and 421 kg of milksolids respectively). Within, the North Island districts, Taupo has the highest milksolids production per herd with an average of 281,799 kilograms of milksolids. Of all the North Island districts, South Waikato and Masterton produced the highest average kilograms of milksolids per hectare (1,189 and 1,153 respectively). Masterton and South Waikato produced the highest average kilograms of milksolids per cow (405 and 400 respectively).

**Table 3.4: Herd production analysis by district in 2017/18**

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	1,120,282	55,392	42,664	98,056	414	319	733	183	141	324
	Whangarei	1,289,109	64,469	49,425	113,894	466	357	823	195	149	344
	Kaipara	1,100,559	54,833	42,014	96,846	376	288	665	171	131	302
Auckland	Rodney / Auckland	973,509	48,994	37,233	86,228	393	298	691	177	134	311
	Manukau / Papakura	831,603	39,226	30,628	69,854	444	347	791	176	138	314
	Franklin	1,111,554	53,801	41,924	95,724	503	392	896	197	153	350
Waikato	Waikato	1,293,716	64,565	49,171	113,736	540	411	951	192	146	338
	Hamilton City	1,239,063	60,654	46,615	107,269	554	426	980	198	152	350
	Waipa	1,510,802	75,119	57,739	132,858	637	489	1,126	205	157	362
	Otorohanga	1,485,569	74,723	57,091	131,814	575	439	1,014	200	153	353
	Thames-Coromandel	1,072,960	54,104	41,077	95,181	482	366	849	180	136	316
	Hauraki	1,066,766	53,292	40,733	94,025	505	386	890	182	139	321
	Matamata-Piako	1,297,037	65,298	49,779	115,076	649	495	1,143	209	159	368
	South Waikato	1,896,686	93,665	72,448	166,114	670	518	1,189	226	175	400
	Bay of Plenty	Western Bay of Plenty	1,345,113	67,089	51,266	118,355	529	404	933	187	143
	Tauranga	1,365,365	69,401	52,094	121,495	455	342	797	171	129	300
	Kawerau / Whakatane	1,349,580	65,776	50,854	116,630	547	423	970	192	149	341
	Opotiki	1,216,397	58,953	46,171	105,123	488	382	869	165	129	295
	Central Plateau	Taupo	3,188,463	159,612	122,187	281,799	564	432	996	204	156
	Rotorua	1,955,583	96,436	74,176	170,612	586	451	1,037	213	164	377
	Western Uplands	Waitomo	1,722,789	88,868	67,203	156,071	412	311	723	159	120
	Ruapehu	1,614,437	82,510	62,817	145,327	417	317	734	170	129	299
	East Coast	Gisborne / Wairoa	2,058,278	101,871	78,697	180,568	425	329	754	156	120
Hawkes Bay	Napier / Hastings	2,170,157	107,776	83,312	191,088	493	381	874	188	146	334
	Central Hawkes Bay	3,005,662	146,691	116,678	263,369	607	482	1,089	202	160	362
Taranaki	New Plymouth	987,147	50,943	38,437	89,381	503	379	882	191	144	335
	Stratford	974,591	49,320	37,862	87,182	522	401	923	196	151	347
	South Taranaki	1,224,175	63,258	48,158	111,416	577	440	1,017	199	152	351
Manawatu	Wanganui	1,616,586	75,677	60,396	136,073	487	389	876	183	146	330
	Rangitikei	1,943,040	96,949	74,382	171,331	527	404	931	198	152	350
	Manawatu	1,598,651	78,839	60,986	139,825	553	428	981	202	156	359
	Palmerston North City	1,843,211	92,944	70,622	163,566	578	439	1,017	209	159	368
	Horowhenua	1,651,897	79,871	62,328	142,199	570	445	1,016	204	159	363
	Kapiti Coast / Upper Hutt	1,179,595	55,630	44,226	99,856	463	368	831	187	149	335
Wairarapa	Tararua	1,261,792	64,537	48,841	113,378	512	387	899	191	145	336
	Masterton	2,273,344	111,274	86,769	198,044	648	505	1,153	228	178	405
	Carterton	1,595,665	79,252	61,498	140,750	527	409	936	197	153	351
	South Wairarapa	1,718,656	87,713	67,455	155,168	554	426	980	190	146	336
<b>North Island</b>		<b>1,390,182</b>	<b>69,599</b>	<b>53,337</b>	<b>122,935</b>	<b>547</b>	<b>419</b>	<b>966</b>	<b>197</b>	<b>151</b>	<b>349</b>

(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	1,397,425	70,624	53,634	124,258	641	487	1,128	215	163	379
	Kaikoura	1,918,499	98,340	75,329	173,669	703	538	1,241	224	171	395
	Tasman/Nelson City	1,427,328	73,724	55,921	129,646	538	408	946	191	145	335
West Coast	Buller	1,377,163	71,581	53,874	125,455	417	314	731	180	135	315
	Grey	1,726,652	90,088	68,157	158,245	429	324	753	188	142	331
	Westland	1,330,064	71,046	53,308	124,354	384	288	673	186	139	325
North Canterbury	Hurunui	4,024,292	201,228	156,499	357,727	809	629	1,438	242	188	430
	Waimakariri	3,148,468	151,708	121,575	273,284	770	617	1,387	223	179	402
	Christchurch City	3,451,363	172,228	136,594	308,823	765	606	1,371	221	175	397
	Banks Peninsula	1,295,224	65,199	49,892	115,091	481	368	849	208	159	366
	Selwyn	3,365,598	165,197	131,252	296,449	745	592	1,336	224	178	401
	Ashburton	4,124,179	203,017	162,295	365,312	818	654	1,472	233	186	419
South Canterbury	Timaru	3,312,780	163,399	129,980	293,379	769	612	1,381	216	172	388
	MacKenzie	4,034,313	201,989	161,644	363,632	639	511	1,150	234	187	421
	Waimate	3,666,066	183,439	145,611	329,050	750	595	1,346	220	175	395
Otago	Waitaki	3,152,116	158,083	125,072	283,154	743	588	1,330	219	173	393
	Dunedin City	1,898,127	92,656	73,900	166,557	614	490	1,103	214	171	385
	Clutha	2,412,654	118,049	93,997	212,046	587	467	1,054	218	173	391
	Central Otago / Lakes	3,364,426	172,780	134,977	307,757	552	431	983	219	171	390
Southland	Gore	2,475,271	124,511	98,043	222,554	558	440	998	217	171	387
	Invercargill	2,515,124	124,613	99,665	224,278	591	473	1,064	220	176	397
	Southland	2,777,491	138,752	110,418	249,169	608	484	1,093	230	183	414
<b>South Island</b>		<b>2,825,382</b>	<b>140,739</b>	<b>111,326</b>	<b>252,065</b>	<b>657</b>	<b>519</b>	<b>1,176</b>	<b>222</b>	<b>175</b>	<b>397</b>
<b>New Zealand</b>		<b>1,788,051</b>	<b>89,320</b>	<b>69,413</b>	<b>158,733</b>	<b>590</b>	<b>458</b>	<b>1,048</b>	<b>207</b>	<b>161</b>	<b>368</b>

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 60% of all herds.

Contract milkers (12% 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 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.

- 60% of all herds are operated as owner-operators
- 59% 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-seven per cent (3,159) of New Zealand dairy herds operated under a sharemilking agreement in 2017/18, this was a decline in numbers by 44 herds from the previous season. Owner-operator now number 6,940 reflecting a movement away from sharemilking, particularly variable order, to contract milking with greater certainty of milk income. Fifty-nine per cent (1,848) of all sharemilkers have 50/50 agreements. The majority of the variable order sharemilkers are between 20-29%. Contract milkers account for 12% of herds.

**Table 3.5: Herd analysis by operating structure in 2017/18**

Operating structure	Number of herds	Percentage of herds	Average herd size	Average effective hectares	Average cows per effective hectare
Owner-operators	6,940	59.9	428	153	2.80
Contract milkers	1,440	12.4	469	158	2.96
<b>Sharemilkers:</b>					
less than 20%	122	1.1	725	236	3.08
20-29%	595	5.1	444	155	2.87
30-49%	161	1.4	397	141	2.82
50/50	1,848	15.9	389	135	2.89
over 50%	433	3.7	437	153	2.86
All sharemilkers	3,159	27.3	420	145	2.89
Unknown	51	0.4			
<b>All farms</b>	<b>11,590</b>	<b>100</b>	<b>431</b>	<b>151</b>	<b>2.85</b>

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 and are probably more common in Canterbury than other regions.

**Table 3.6: Herd production analysis by operating structure in 2017/18**

Operating structure	Average litres per herd	Average kg milkfat per herd	Average kg milk solids per herd	Average kg milkfat per effective hectare	Average kg milk solids per effective hectare	Average kg milkfat per cow	Average kg milk solids per cow
Owner-operators	1,762,115	87,777	156,100	575	1,022	205	365
Contract Milkers	1,995,465	100,044	177,541	632	1,121	213	378
<b>Sharemilkers:</b>							
less than 20%	3,421,579	170,681	305,821	725	1,298	236	422
20-29%	1,853,355	93,057	165,386	601	1,068	209	372
30-49%	1,648,227	82,250	145,915	584	1,037	207	367
50/50	1,590,170	80,121	141,934	595	1,054	206	365
over 50%	1,857,269	92,239	164,523	604	1,077	211	376
All Sharemilkers	1,750,039	87,824	155,980	605	1,075	209	372
<b>All farms</b>	<b>1,787,930</b>	<b>89,321</b>	<b>158,743</b>	<b>590</b>	<b>1,049</b>	<b>207</b>	<b>368</b>

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 36.0% in 2008/09 to 27.3% of herds in 2017/18. In 2017/18 contract milkers were 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	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Owner-operators	63.6	65.1	65.4	65.8	64.6	65.5	67.3	69.8	72.4	59.9
Contract Milkers										12.4
<b>Sharemilkers:</b>										
less than 20%	1.5	1.3	2.0	2.0	1.9	1.7	1.5	1.3	1.1	1.1
20-29%	10.4	10.5	10.9	9.9	9.6	9.7	8.8	6.9	5.0	5.1
30-49%	1.8	1.7	2.3	1.6	1.4	1.5	1.4	1.5	1.3	1.4
50/50	20.5	19.7	19.2	18.8	18.7	18.5	17.1	16.8	16.4	15.9
over 50%	1.8	1.4	0.2	1.8	3.5	2.9	3.6	3.5	3.5	3.7
All sharemilkers	36.0	34.6	34.6	34.2	35.2	34.2	32.4	30.0	27.3	27.3
Other/Unknown	0.5	0.3	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.4

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

Operating structure	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Owner-operators	7,384	7,616	7,677	7,764	7,679	7,812	8,059	8,315	8,503	6,940
Contract Milkers										1,440
<b>Sharemilkers:</b>										
less than 20%	177	147	233	234	224	206	179	153	134	122
20-29%	1,206	1,222	1,274	1,173	1,140	1,151	1,050	821	586	595
30-49%	207	200	273	193	170	177	171	174	157	161
50/50	2,381	2,303	2,249	2,218	2,229	2,201	2,050	2,001	1,925	1,848
over 50%	207	169	29	216	417	346	429	421	406	433
All sharemilkers	4,178	4,041	4,058	4,034	4,180	4,081	3,879	3,570	3,208	3,159
Other/Unknown	56	34	0	0	32	34	32	33	37	51
<b>Total</b>	<b>11,618</b>	<b>11,691</b>	<b>11,735</b>	<b>11,798</b>	<b>11,891</b>	<b>11,927</b>	<b>11,970</b>	<b>11,918</b>	<b>11,748</b>	<b>11,590</b>

Table 3.9 compares the number (and percentage) of owner-operators with sharemilkers by region in 2017/18. 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 2017/18**

<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	572	8.2	81	5.6	189	6.0	120	6.5	69	5.3	842
Auckland	229	3.3	28	1.9	125	4.0	83	4.5	42	3.2	382
Waikato	1,808	26.1	498	34.6	1,009	31.9	691	37.4	318	24.3	3,315
Bay of Plenty	342	4.9	92	6.4	122	3.9	84	4.5	38	2.9	556
Central Plateau	296	4.3	80	5.6	115	3.6	78	4.2	37	2.8	491
Western Uplands	59	0.9	3	0.2	28	0.9	16	0.9	12	0.9	90
East Coast	6	0.1	3	0.2	0	0.0	0	0.0	0	0.0	9
Hawkes Bay	58	0.8	5	0.3	9	0.3	7	0.4	2	0.2	72
Taranaki	916	13.2	193	13.4	511	16.2	276	14.9	235	17.9	1,620
Manawatu	374	5.4	51	3.5	111	3.5	66	3.6	45	3.4	536
Wairarapa	281	4.0	60	4.2	91	2.9	53	2.9	38	2.9	432
<b>North Island</b>	<b>4,941</b>	<b>71.2</b>	<b>1,094</b>	<b>76.0</b>	<b>2,310</b>	<b>73.1</b>	<b>1,474</b>	<b>79.8</b>	<b>836</b>	<b>63.8</b>	<b>8,345</b>
Nelson/Marlborough	166	2.4	13	0.9	39	1.2	26	1.4	13	1.0	218
West Coast	275	4.0	23	1.6	77	2.4	36	1.9	41	3.1	375
North Canterbury	564	8.1	117	8.1	193	6.1	93	5.0	100	7.6	874
South Canterbury	200	2.9	23	1.6	94	3.0	25	1.4	69	5.3	317
Otago	253	3.6	35	2.4	141	4.5	54	2.9	87	6.6	429
Southland	541	7.8	135	9.4	305	9.7	140	7.6	165	12.6	981
<b>South Island</b>	<b>1,999</b>	<b>28.8</b>	<b>346</b>	<b>24.0</b>	<b>849</b>	<b>26.9</b>	<b>374</b>	<b>20.2</b>	<b>475</b>	<b>36.2</b>	<b>3,194</b>
<b>New Zealand</b>	<b>6,940</b>	<b>100.0</b>	<b>1,440</b>	<b>100.0</b>	<b>3,159</b>	<b>100.0</b>	<b>1,848</b>	<b>100.0</b>	<b>1,311</b>	<b>100.0</b>	<b>11,539</b>



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 2017/18**

<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	2	0.0		0.0	0	0.0		0.0		0.0	2	0.0
50-99	149	2.1	3	0.2	18	0.6	10	0.5	8	0.6	170	1.5
100-149	481	6.9	23	1.6	120	3.8	62	3.4	58	4.4	624	5.4
150-199	774	11.2	82	5.7	312	9.9	214	11.6	98	7.5	1,168	10.1
200-249	931	13.4	169	11.7	444	14.1	288	15.6	156	11.9	1,544	13.4
250-299	676	9.7	157	10.9	326	10.3	221	12.0	105	8.0	1,159	10.0
300-349	625	9.0	146	10.1	365	11.6	235	12.7	130	9.9	1,136	9.8
350-399	419	6.0	119	8.3	240	7.6	133	7.2	107	8.2	778	6.7
400-449	455	6.6	128	8.9	237	7.5	146	7.9	91	6.9	820	7.1
450-499	345	5.0	93	6.5	178	5.6	93	5.0	85	6.5	616	5.3
500-549	323	4.7	89	6.2	177	5.6	85	4.6	92	7.0	589	5.1
550-599	241	3.5	76	5.3	122	3.9	70	3.8	52	4.0	439	3.8
600-649	259	3.7	87	6.0	123	3.9	58	3.1	65	5.0	469	4.1
650-699	178	2.6	45	3.1	87	2.8	49	2.7	38	2.9	310	2.7
700-749	131	1.9	43	3.0	67	2.1	30	1.6	37	2.8	241	2.1
750-799	132	1.9	26	1.8	55	1.7	30	1.6	25	1.9	213	1.8
800-849	144	2.1	17	1.2	68	2.2	22	1.2	46	3.5	229	2.0
850-899	81	1.2	16	1.1	39	1.2	23	1.2	16	1.2	136	1.2
900-949	121	1.7	31	2.2	35	1.1	17	0.9	18	1.4	187	1.6
950-999	62	0.9	11	0.8	25	0.8	12	0.6	13	1.0	98	0.8
1000-1099	111	1.6	27	1.9	42	1.3	20	1.1	22	1.7	180	1.6
1100-1199	82	1.2	12	0.8	25	0.8	11	0.6	14	1.1	119	1.0
1200-1499	127	1.8	24	1.7	30	0.9	11	0.6	19	1.4	181	1.6
1500+	91	1.3	16	1.1	24	0.8	8	0.4	16	1.2	131	1.1
<b>Total/Avg</b>	<b>6,940</b>	<b>100.0</b>	<b>1,440</b>	<b>100.0</b>	<b>3,159</b>	<b>100.0</b>	<b>1,848</b>	<b>100.0</b>	<b>1,311</b>	<b>100.0</b>	<b>11,539</b>	<b>100.0</b>

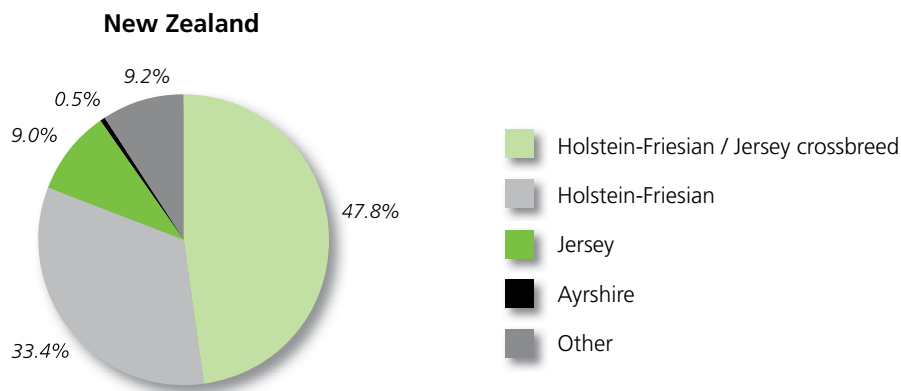
## D. Breed breakdown

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 crossbred.

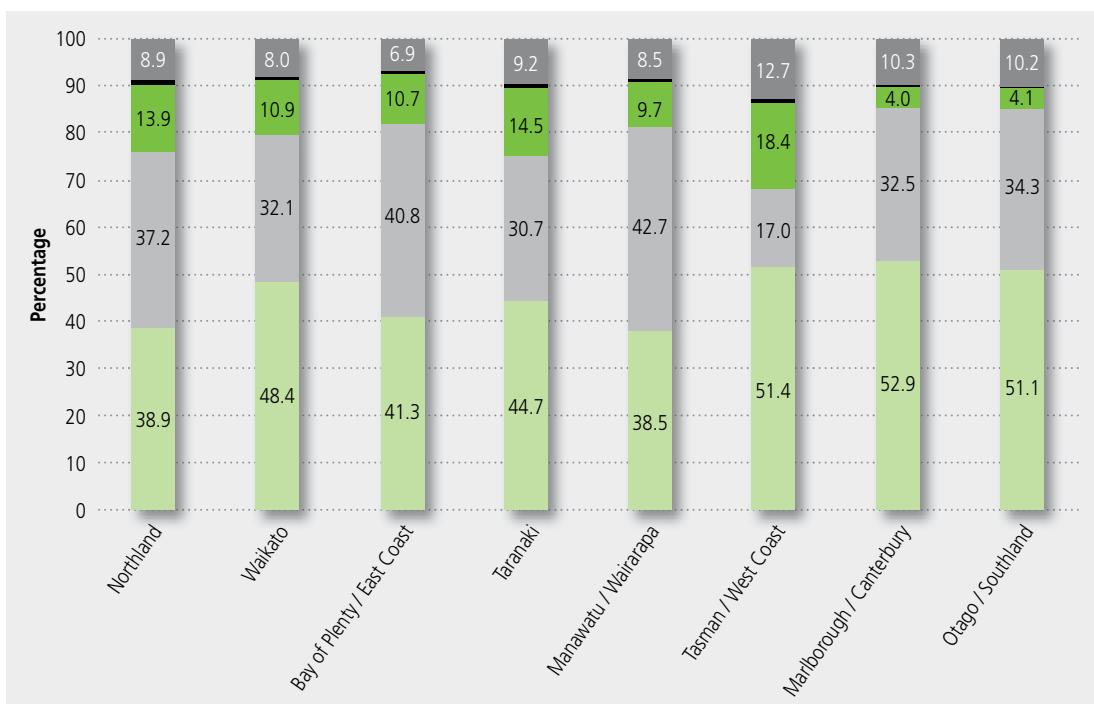
The Jersey breed dominated the national dairy herd until the late 1960s. By 1970, Holstein-Friesian was the dominant dairy breed in New Zealand, because of changes in farm management practices and farmers raising larger numbers of dairy calves for beef. Of the other breeds of cattle used to inseminate dairy cows, the main beef breed currently in use is Polled Hereford. Other beef breeds used to a lesser degree include Angus, Belgian Blue, and Simmental. Other breeds of dairy cattle present in smaller numbers in New Zealand include Milking Shorthorn, Guernsey and Brown Swiss. Holstein-Friesian/Jersey Crossbred 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 crossbred and Ayrshire cows with the remaining breeds and crossbreeds grouped into "Other". Holstein-Friesian is no longer the prevalent breed in Northland or Bay of Plenty/East Coast, but is still the prevalent breed in Manawatu/Wairarapa. Holstein-Friesian/Jersey crossbred is the prevalent breed category in all regions except the Manawatu/Wairarapa. The Manawatu/Wairarapa region continues to have the highest percentage of Holstein-Friesian cows (43%) followed by Bay of Plenty/East Coast (41%). Tasman/West Coast has the highest proportion of Jerseys (18%) followed by Taranaki (15%). Marlborough/Canterbury has the highest proportion of Holstein-Friesian/Jersey crossbreeds (53%), followed by Tasman/West Coast (51%) and Otago/Southland (also at 51%).

Graph 3.2: Breed category percentages of cows for New Zealand in 2017/18



Graph 3.3: Breed category percentages of cows by region in 2017/18



## 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).

- **72% of cows were herd-tested in 2017/18**

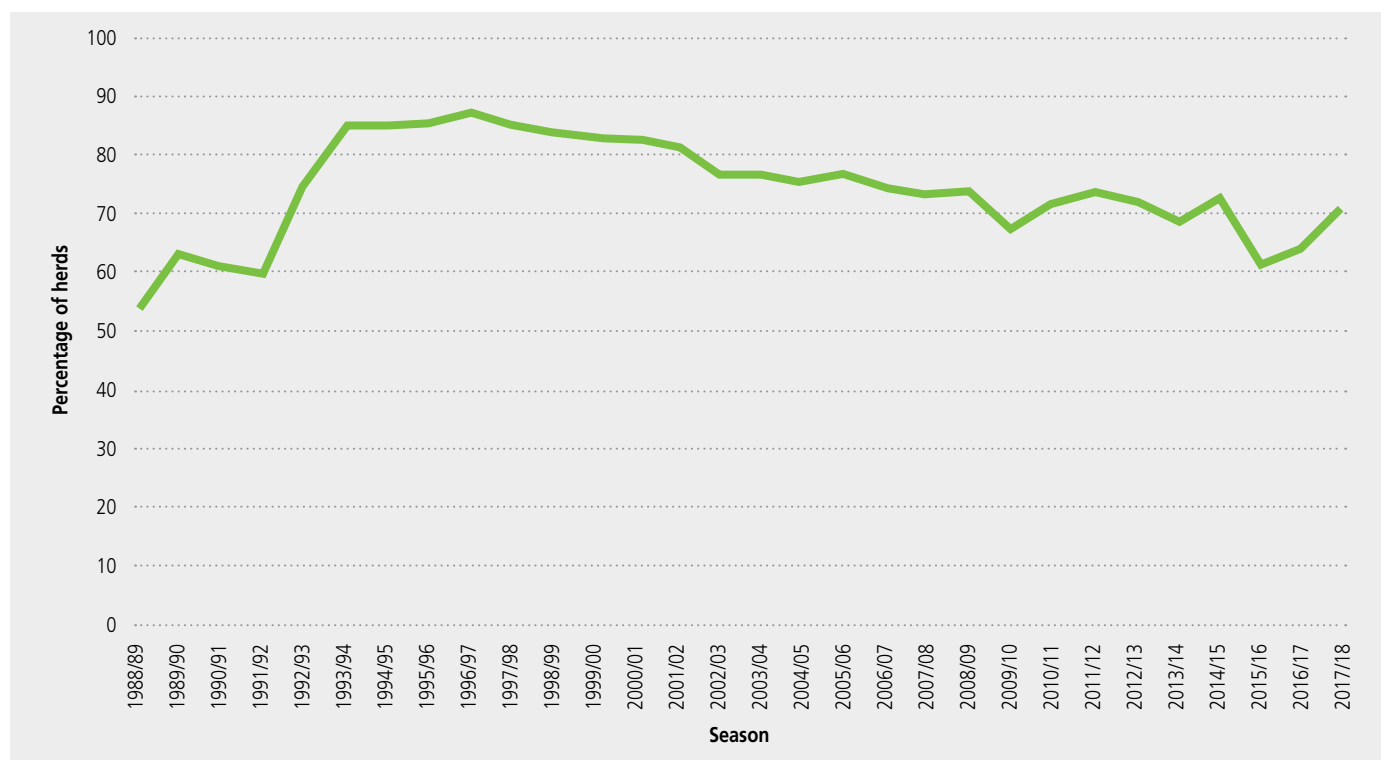
The percentage of total herds and the percentage of total cows using herd testing both increased in 2017/18. The percentage of herds, testing at 71.1% in 2017/18, was about 13% higher than in 2015/16 (Table 4.1). A total of 3.62 million cows were herd-tested in 2017/18, up from 3.21 million in 2016/17 and close to the record level in 2014/15.

**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
1998/99	12,059	14,362	84.0	2,819	3,289	85.7
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

The trend in the percentage of total herds using herd testing shows a continued increase over the past two seasons, back to the levels between 2008-09 and 2013-14 (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 2017/18 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 76 per cent of herds testing. Taranaki and North Canterbury had the highest percentage of herds using herd testing (76%). Taranaki had the highest percentage of cows herd tested (78%).

**Table 4.2: Use of herd testing by region in 2017/18**

Farming Region	Herds tested	Total herds	Percentage of total herds	Cows tested	Total cows	Percentage of total cows	Average herd size tested	Average herd size
Northland	570	853	66.8	197,347	271,945	72.6	346	319
Auckland	255	387	65.9	74,358	105,514	70.5	292	273
Waikato	2,354	3,322	70.9	825,032	1,135,822	72.6	350	342
Bay of Plenty	380	558	68.1	135,069	195,887	69.0	355	351
Central Plateau	328	492	66.7	183,363	280,707	65.3	559	571
Western Uplands	62	90	68.9	31,630	48,120	65.7	510	535
East Coast	6	9	66.7	2,747	5,887	46.7	458	654
Hawkes Bay	51	73	69.9	29,187	48,444	60.2	572	664
Taranaki	1,232	1,620	76.0	372,364	477,311	78.0	302	295
Manawatu	380	539	70.5	162,200	220,434	73.6	427	409
Wairarapa	325	434	74.9	117,433	162,151	72.4	361	374
Nelson/Marlborough	160	220	72.7	57,352	83,157	69.0	358	378
West Coast	243	375	64.8	99,445	154,058	64.6	409	411
North Canterbury	660	874	75.5	533,676	701,464	76.1	809	803
South Canterbury	215	317	67.8	169,537	250,899	67.6	789	791
Otago	331	445	74.4	205,300	267,874	76.6	620	602
Southland	690	982	70.3	418,467	583,240	71.7	606	594
<b>New Zealand</b>	<b>8,242</b>	<b>11,590</b>	<b>71.1</b>	<b>3,614,507</b>	<b>4,992,914</b>	<b>72.4</b>	<b>439</b>	<b>431</b>

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

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

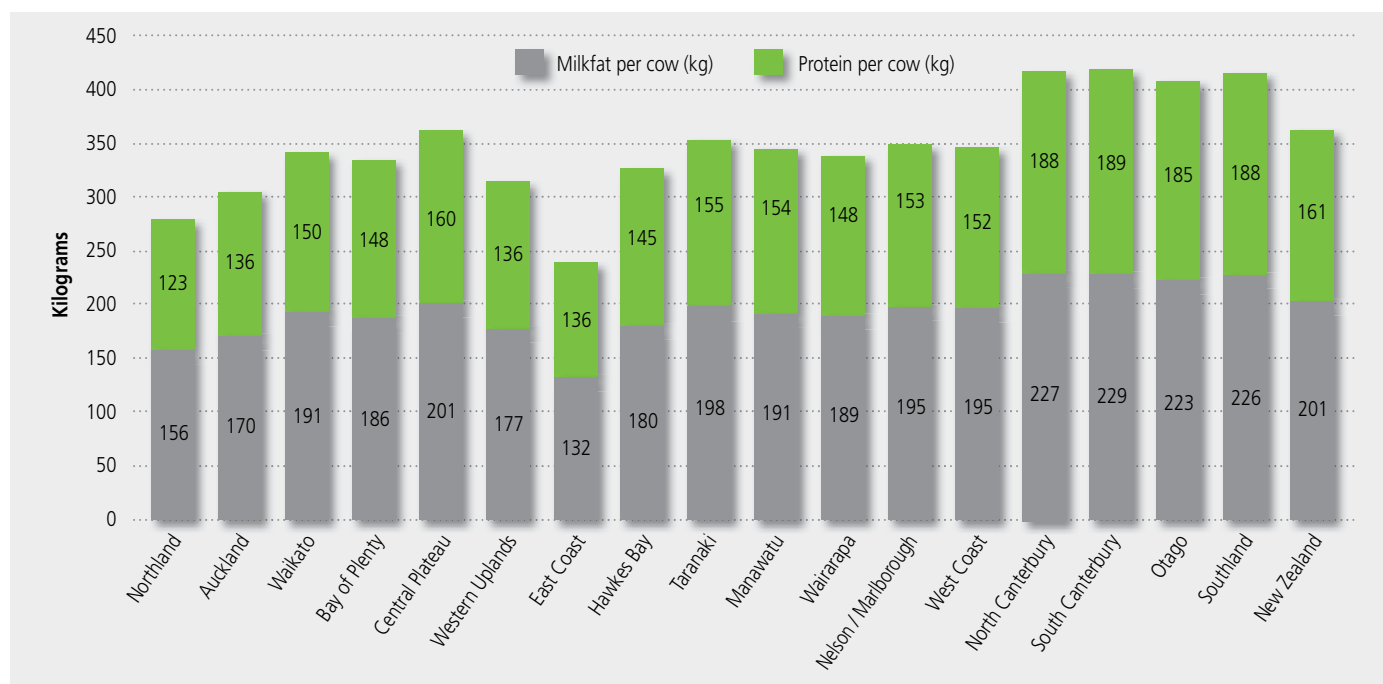
The average per-cow statistics for each region are summarised in Table 4.3. North Canterbury recorded the highest per cow milk volume (4,933 litres), while South Canterbury recorded the highest milkfat (229 kg), protein (189 kg) and milksolids (418 kg), of cows herd tested. West Coast recorded the highest percentage for milkfat (5.09%), protein (3.96%) and milksolids (9.05%). Herds in South Canterbury recorded the lowest average somatic cells (164,000 cells/ml).

**Table 4.3: Season herd test averages per cow by region in 2017/18**

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	3,269	156	4.78	123	3.77	280	8.55	199	276	235
Auckland	3,664	170	4.63	136	3.70	306	8.34	194	274	217
Waikato	3,969	191	4.80	150	3.77	341	8.58	221	278	179
Bay of Plenty	3,977	186	4.68	148	3.72	334	8.40	220	270	197
Central Plateau	4,241	201	4.73	160	3.78	361	8.51	218	274	180
Western Uplands	3,508	177	5.05	136	3.87	313	8.92	225	270	194
East Coast	3,066	132	4.29	107	3.50	239	7.79	221	270	278
Hawkes Bay	3,840	180	4.68	145	3.78	325	8.47	218	279	215
Taranaki	3,993	198	4.95	155	3.87	352	8.82	219	269	194
Manawatu	4,115	191	4.64	154	3.74	345	8.37	211	278	229
Wairarapa	3,878	189	4.86	148	3.83	337	8.69	220	274	210
Nelson/Marlborough	4,006	195	4.88	153	3.82	349	8.70	221	270	183
West Coast	3,826	195	5.09	152	3.96	346	9.05	223	263	191
North Canterbury	4,933	227	4.60	188	3.82	415	8.42	224	281	167
South Canterbury	4,907	229	4.67	189	3.86	418	8.53	224	277	164
Otago	4,727	223	4.72	185	3.91	408	8.62	228	275	171
Southland	4,802	226	4.71	188	3.91	414	8.62	225	274	168
<b>New Zealand</b>	<b>4,217</b>	<b>201</b>	<b>4.75</b>	<b>161</b>	<b>3.82</b>	<b>362</b>	<b>8.57</b>	<b>219</b>	<b>274</b>	<b>185</b>

The 2017/18 milkfat and protein lactation regional averages for herd-tested cows (Graph 4.2) show some variability in figures among regions, with milkfat production ranging from 132 (East Coast) to 229 kg per cow (South Canterbury) and protein production from 107 (East Coast) to 189 kg per cow (South Canterbury).

Graph 4.2: Average milkfat and protein production per cow by region in 2017/18



• Herd test averages decrease in 2017/18

Milk production (litres) per cow for 2017/18 decreased on the previous season (Table 4.4). Milksolids decreased from 374 kilograms in 2016/17 to 362 in 2017/18. The percentage of milksolids also decreased from 8.64% (2016/17) to 8.57% (2017/18).

The average herd somatic cell count increased slightly to 185,000 cells/millilitre for 2017/18 – the fifth consecutive season that it has been below 190,000 cells/millilitre. Average days in milk (production) at 274 in 2017/18 was slightly lower than the previous two seasons.

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)
1998/99	3,189	147	4.51	113	3.44	260	8.15	208	266	200
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 <sup>a</sup>	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

- Not available

<sup>a</sup> 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 2017/18**

#### Average litres of milk per cow per day

Farming region	2017							2018					Season average
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	
Northland	17.87	17.43	19.77	19.42	18.36	17.63	15.03	13.35	12.75	11.02	9.76	14.06	15.30
Auckland	17.13	19.37	19.20	21.32	19.75	19.87	16.74	14.40	14.69	12.20	11.74	16.35	17.00
Waikato	18.06	18.32	21.19	21.70	21.24	19.62	17.32	14.64	14.46	12.70	11.06	13.86	16.95
Bay of Plenty	12.91	17.85	23.98	21.81	21.08	19.58	17.83	15.02	13.86	11.03	9.27	14.86	16.51
Central Plateau	18.24	17.81	17.45	23.14	23.93	20.98	20.24	16.83	15.75	13.96	11.96	12.95	18.42
Western Uplands	.	.	24.72	19.56	18.72	17.38	16.80	13.14	12.30	11.05	9.66	8.38	14.56
East Coast	.	.	.	19.31	20.40	14.51	14.15	14.28	9.09	10.36	9.26	.	13.73
Hawkes Bay	.	17.13	18.64	22.79	22.23	19.55	18.35	16.06	13.00	11.62	10.85	11.35	16.96
Taranaki	19.22	17.35	21.17	21.82	21.35	20.06	17.74	15.12	14.14	12.58	11.27	14.14	17.09
Manawatu	16.92	17.31	20.45	23.12	22.52	21.79	19.30	16.49	15.60	14.31	12.10	14.01	18.26
Wairarapa	15.55	15.07	19.03	20.90	21.22	19.44	17.99	15.28	14.15	12.47	10.58	11.60	16.33
Nelson/Marlborough	.	15.73	22.89	21.94	22.68	20.58	18.28	16.13	15.19	13.26	11.33	10.67	17.23
West Coast	16.17	9.41	.	22.44	21.33	20.11	17.17	15.12	13.76	11.70	9.61	8.12	15.86
North Canterbury	19.18	21.30	20.71	25.21	25.42	24.18	22.48	19.90	18.41	16.32	14.28	12.92	20.29
South Canterbury	20.47	18.62	22.35	24.47	25.78	23.33	22.08	19.82	18.07	15.66	14.49	13.21	19.87
Otago	9.62	16.08	23.52	25.06	25.19	24.02	21.09	18.02	17.01	15.70	12.80	11.90	19.24
Southland	13.99	19.47	20.45	25.37	26.06	24.42	21.88	19.07	17.27	16.79	13.81	12.86	19.94
<b>New Zealand<sup>1</sup></b>	<b>17.80</b>	<b>18.11</b>	<b>20.65</b>	<b>22.27</b>	<b>23.27</b>	<b>21.06</b>	<b>19.41</b>	<b>16.49</b>	<b>15.63</b>	<b>13.90</b>	<b>12.20</b>	<b>12.97</b>	<b>18.01</b>

#### Average kg of milkfat per cow per day

Farming region	2017							2018					Season average
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	
Northland	0.84	0.86	0.94	0.93	0.88	0.85	0.72	0.68	0.65	0.61	0.57	0.73	0.77
Auckland	0.81	0.87	0.88	0.98	0.91	0.91	0.78	0.71	0.74	0.65	0.66	0.85	0.83
Waikato	0.86	0.88	1.01	1.03	1.00	0.93	0.82	0.75	0.76	0.70	0.65	0.78	0.86
Bay of Plenty	0.69	0.81	1.19	1.00	0.95	0.91	0.83	0.73	0.70	0.61	0.54	0.80	0.81
Central Plateau	0.94	0.82	0.92	1.08	1.08	0.97	0.92	0.82	0.79	0.74	0.68	0.72	0.91
Western Uplands	.	.	1.18	0.99	0.88	0.84	0.78	0.71	0.66	0.62	0.55	0.51	0.76
East Coast	.	.	.	0.81	0.86	0.62	0.60	0.73	0.42	0.52	0.52	.	0.66
Hawkes Bay	.	0.82	0.86	1.03	1.03	0.92	0.87	0.77	0.66	0.61	0.64	0.59	0.84
Taranaki	0.91	0.85	1.00	1.06	1.01	0.98	0.88	0.80	0.77	0.72	0.68	0.79	0.89
Manawatu	0.86	0.85	0.97	1.06	1.03	0.99	0.90	0.81	0.78	0.75	0.68	0.74	0.89
Wairarapa	0.83	0.78	0.91	0.98	1.00	0.93	0.87	0.78	0.73	0.69	0.63	0.66	0.84
Nelson/Marlborough	.	0.73	1.04	1.05	1.06	0.97	0.87	0.82	0.79	0.73	0.69	0.64	0.88
West Coast	0.99	0.57	.	1.10	0.99	0.96	0.85	0.77	0.76	0.69	0.63	0.54	0.85
North Canterbury	0.96	1.00	0.98	1.13	1.13	1.07	1.01	0.93	0.91	0.87	0.82	0.76	0.99
South Canterbury	0.97	0.90	1.02	1.10	1.13	1.06	1.02	0.92	0.92	0.81	0.85	0.78	0.98
Otago	0.68	0.82	1.09	1.14	1.12	1.07	0.97	0.85	0.87	0.83	0.75	0.74	0.96
Southland	0.77	1.00	1.05	1.16	1.16	1.11	1.02	0.90	0.91	0.88	0.81	0.77	0.99
<b>New Zealand<sup>1</sup></b>	<b>0.87</b>	<b>0.87</b>	<b>0.98</b>	<b>1.05</b>	<b>1.06</b>	<b>0.98</b>	<b>0.91</b>	<b>0.82</b>	<b>0.81</b>	<b>0.76</b>	<b>0.72</b>	<b>0.75</b>	<b>0.91</b>

## Average kg of protein per cow per day

Farming region	2017							2018					Season average
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	
Northland	0.68	0.68	0.74	0.73	0.69	0.67	0.57	0.51	0.51	0.47	0.45	0.59	0.60
Auckland	0.64	0.72	0.70	0.78	0.73	0.74	0.62	0.54	0.58	0.51	0.52	0.69	0.66
Waikato	0.70	0.73	0.80	0.81	0.79	0.75	0.65	0.56	0.57	0.54	0.51	0.62	0.67
Bay of Plenty	0.59	0.71	0.90	0.81	0.77	0.74	0.66	0.56	0.54	0.47	0.43	0.65	0.64
Central Plateau	0.71	0.68	0.67	0.86	0.88	0.79	0.74	0.63	0.62	0.59	0.54	0.59	0.72
Western Uplands	.	.	0.96	0.73	0.70	0.66	0.63	0.51	0.49	0.47	0.44	0.40	0.58
East Coast	.	.	.	0.66	0.76	0.50	0.48	0.55	0.33	0.44	0.42	.	0.53
Hawkes Bay	.	0.68	0.71	0.87	0.85	0.74	0.69	0.61	0.51	0.50	0.50	0.50	0.67
Taranaki	0.77	0.69	0.81	0.82	0.81	0.79	0.68	0.59	0.57	0.55	0.53	0.63	0.69
Manawatu	0.67	0.68	0.77	0.85	0.83	0.81	0.72	0.62	0.61	0.60	0.55	0.62	0.71
Wairarapa	0.66	0.59	0.78	0.78	0.79	0.74	0.68	0.59	0.56	0.53	0.49	0.52	0.65
Nelson/Marlborough	.	0.62	0.88	0.82	0.85	0.78	0.68	0.62	0.60	0.57	0.54	0.51	0.69
West Coast	0.75	0.43	.	0.86	0.81	0.77	0.65	0.59	0.57	0.52	0.49	0.42	0.66
North Canterbury	0.79	0.80	0.78	0.94	0.96	0.91	0.85	0.76	0.73	0.70	0.67	0.62	0.82
South Canterbury	0.76	0.70	0.83	0.91	0.97	0.89	0.84	0.76	0.73	0.67	0.69	0.63	0.81
Otago	0.46	0.67	0.88	0.95	0.96	0.91	0.80	0.68	0.69	0.68	0.61	0.59	0.79
Southland	0.64	0.78	0.79	0.95	1.00	0.93	0.83	0.72	0.72	0.74	0.66	0.63	0.82
<b>New Zealand<sup>1</sup></b>	<b>0.70</b>	<b>0.71</b>	<b>0.78</b>	<b>0.83</b>	<b>0.87</b>	<b>0.80</b>	<b>0.73</b>	<b>0.63</b>	<b>0.63</b>	<b>0.60</b>	<b>0.57</b>	<b>0.61</b>	<b>0.72</b>

## Average somatic cell count (000 cells per millilitre)

Farming region	2017							2018					Season average
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	
Northland	212	258	207	213	203	188	215	249	258	277	310	261	235
Auckland	235	199	187	214	194	175	211	223	252	248	252	231	217
Waikato	216	232	178	162	158	138	154	186	198	201	226	239	179
Bay of Plenty	337	272	211	170	181	157	168	196	224	228	262	252	197
Central Plateau	208	196	158	168	151	150	164	188	198	202	207	254	180
Western Uplands	.	.	238	176	170	156	181	199	205	225	208	253	194
East Coast	.	.	.	211	166	239	236	267	297	361	383	.	278
Hawkes Bay	.	357	278	178	191	183	153	196	262	231	273	346	215
Taranaki	279	259	206	166	179	155	167	197	223	219	241	243	194
Manawatu	287	255	215	195	214	192	217	243	252	250	256	269	229
Wairarapa	245	301	256	200	185	186	186	203	218	243	245	253	210
Nelson/Marlborough	.	130	438	146	159	156	166	183	218	205	218	219	183
West Coast	263	663	.	173	151	161	158	197	192	198	242	319	191
North Canterbury	229	190	216	164	159	148	149	170	177	167	178	205	167
South Canterbury	252	169	304	164	153	164	152	175	169	162	170	182	164
Otago	240	317	158	167	162	156	154	168	174	168	184	224	171
Southland	216	207	244	183	163	148	160	167	183	163	174	186	168
<b>New Zealand<sup>1</sup></b>	<b>230</b>	<b>237</b>	<b>195</b>	<b>173</b>	<b>167</b>	<b>155</b>	<b>165</b>	<b>190</b>	<b>202</b>	<b>200</b>	<b>213</b>	<b>228</b>	<b>185</b>

<sup>1</sup> Volume weighted averages



### iii) Breed category averages

- *Holstein-Friesian cows produce 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 Jerseys, six-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 2017/18**

#### Holstein-Friesian

Age	Cows tested	Days in milk	Milk (litres)	Milkfat (kg)	Protein (kg)	Milksolids (kg)	Milkfat (%)	Protein (%)	Milksolids (%)
2	213,770	227	3,663	163.6	138.1	301.8	4.52	3.78	8.30
3	176,167	221	4,361	192.3	164.1	356.4	4.46	3.78	8.24
4	133,887	220	4,813	212.1	179.5	391.7	4.45	3.74	8.19
5	116,097	219	4,980	220.4	184.4	404.8	4.47	3.72	8.19
6	87,628	219	5,001	221.2	184.8	406.0	4.47	3.71	8.18
7	60,264	216	4,929	218.5	181.0	399.5	4.47	3.69	8.16
8	45,482	214	4,806	211.7	174.6	386.4	4.45	3.65	8.10
9	35,772	211	4,599	205.8	167.1	372.9	4.51	3.65	8.16
10+	36,483	206	4,263	189.5	152.9	342.3	4.48	3.60	8.08
<b>Total</b>	<b>905,550</b>	<b>220</b>	<b>4,470</b>	<b>198.0</b>	<b>166.2</b>	<b>364.2</b>	<b>4.48</b>	<b>3.73</b>	<b>8.21</b>

#### Jersey

Age	Cows tested	Days in milk	Milk (litres)	Milkfat (kg)	Protein (kg)	Milksolids (kg)	Milkfat (%)	Protein (%)	Milksolids (%)
2	46,156	227	2,599	146.7	106.8	253.5	5.67	4.12	9.79
3	45,274	223	3,093	173.9	128.6	302.5	5.66	4.17	9.83
4	39,152	222	3,393	192.5	141.6	334.1	5.71	4.18	9.89
5	35,917	222	3,505	197.2	145.6	342.8	5.67	4.17	9.84
6	28,549	220	3,518	195.9	145.2	341.2	5.61	4.14	9.75
7	20,890	217	3,488	191.8	142.7	334.5	5.53	4.11	9.64
8	16,912	216	3,358	188.0	137.9	325.9	5.63	4.12	9.75
9	11,991	214	3,274	183.4	134.1	317.5	5.65	4.11	9.76
10+	14,011	209	3,019	169.3	122.9	292.2	5.64	4.08	9.72
<b>Total</b>	<b>258,852</b>	<b>221</b>	<b>3,208</b>	<b>180.1</b>	<b>132.6</b>	<b>312.7</b>	<b>5.65</b>	<b>4.14</b>	<b>9.79</b>

#### Holstein-Friesian/Jersey crossbreed

Age	Cows tested	Days in milk	Milk (litres)	Milkfat (kg)	Protein (kg)	Milksolids (kg)	Milkfat (%)	Protein (%)	Milksolids (%)
2	314,601	227	3,344	165.1	131.9	297.0	4.99	3.96	8.95
3	288,251	222	3,965	196.0	157.9	353.8	5.00	3.99	8.99
4	237,352	221	4,400	216.6	173.7	390.4	4.97	3.96	8.93
5	196,170	220	4,525	222.3	177.5	399.7	4.96	3.94	8.90
6	152,501	219	4,558	222.8	177.6	400.5	4.94	3.91	8.85
7	106,373	218	4,487	219.4	173.9	393.4	4.94	3.89	8.83
8	79,430	216	4,356	213.4	167.7	381.1	4.94	3.86	8.80
9	52,520	213	4,200	206.8	161.3	368.1	4.97	3.86	8.83
10+	50,803	207	3,879	191.6	147.4	338.9	4.98	3.81	8.79
<b>Total</b>	<b>1,478,001</b>	<b>221</b>	<b>4,102</b>	<b>201.8</b>	<b>161.0</b>	<b>362.8</b>	<b>4.97</b>	<b>3.94</b>	<b>8.91</b>

## Ayrshire

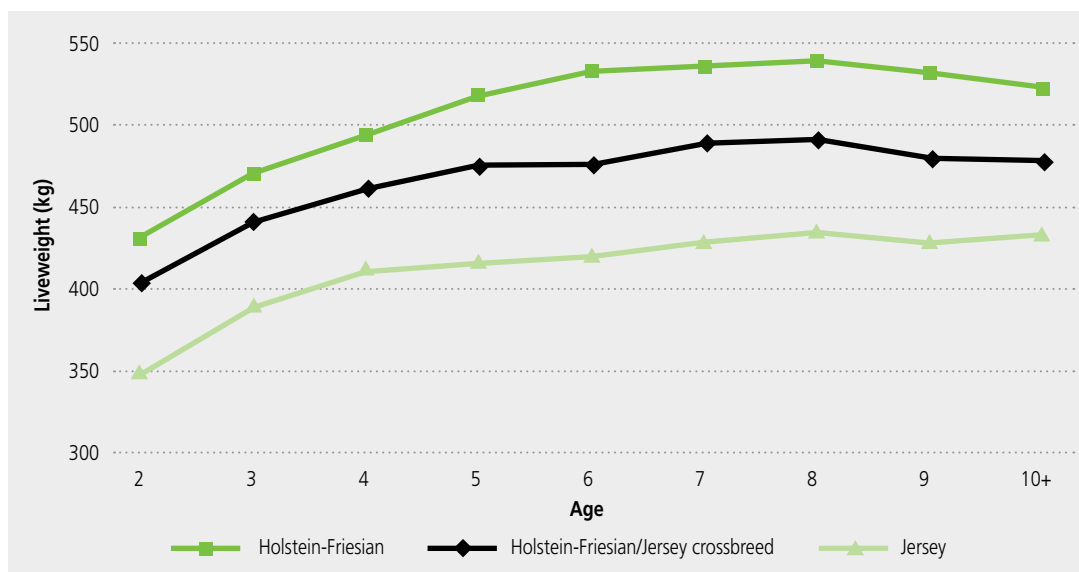
Age	Cows tested	Days in milk	Milk (litres)	Milkfat (kg)	Protein (kg)	Milksolids (kg)	Milkfat (%)	Protein (%)	Milksolids (%)
2	2,564	232	3,117	139.1	111.5	250.5	4.48	3.59	8.07
3	2,374	228	3,900	170.2	139.4	309.6	4.39	3.58	7.97
4	2,106	228	4,273	186.9	152.8	339.8	4.40	3.58	7.98
5	1,825	227	4,306	188.1	154.4	342.5	4.39	3.59	7.98
6	1,525	227	4,412	192.2	157.7	349.9	4.38	3.58	7.96
7	1,254	226	4,337	188.9	154.8	343.6	4.38	3.58	7.96
8	878	221	4,182	182.8	148.9	331.7	4.39	3.57	7.96
9	673	217	4,089	179.9	145.9	325.8	4.41	3.58	7.99
10+	909	210	3,649	157.2	129.5	286.7	4.34	3.55	7.89
<b>Total</b>	<b>14,108</b>	<b>226</b>	<b>3,970</b>	<b>173.8</b>	<b>141.9</b>	<b>315.7</b>	<b>4.40</b>	<b>3.58</b>	<b>7.98</b>

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 2017/18

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	431	12,570	346	4,733	404	21,964
3	471	1,980	389	864	441	3,592
4	495	1,410	412	584	460	2,862
5	519	1,121	417	495	476	2,351
6	534	785	420	378	476	1,789
7	537	506	429	267	489	1,227
8	540	317	435	188	491	935
9	533	259	429	139	481	631
10+	524	291	434	139	478	596
<b>Weighted Avg</b>	<b>490</b>		<b>403</b>		<b>453</b>	

Graph 4.3: Liveweight by age and by breed category of cow in 2017/18



## C. Artificial Breeding (AB) statistics

- 3.57 million cows to AB in 2017/18

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 71.5% in 2017/18 was lower than the previous season (72.7%) even though more cows were mated to AB (Graph 4.4). Overall, the number of cows to AB increased on the previous season to 3.57 million, although the numbers in several regions decreased slightly. The number of yearlings to AB increased (17%) to 207,394 from 177,170 in the previous season (Table 4.8).

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

### Cows to AB

Region	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Northland	168,427	171,390	180,615	192,066	190,785	188,887	178,521	175,397	174,589
Auckland	70,604	70,730	73,516	76,013	74,961	75,070	68,754	69,918	66,330
Waikato	803,113	817,660	837,380	867,180	843,758	835,426	792,672	782,259	783,030
Bay of Plenty	135,087	138,554	136,183	137,806	139,262	141,394	134,733	127,063	126,445
Central Plateau	128,561	132,040	143,101	160,005	157,294	164,093	168,407	177,653	181,982
Western Uplands	20,508	25,415	25,136	28,427	28,256	28,163	25,143	25,764	26,257
East Coast	1,343	714	1,474	2,240	2,025	2,450	2,703	2,283	2,588
Hawkes Bay	28,480	32,338	34,433	36,878	38,851	40,145	34,375	32,076	35,780
Taranaki	379,318	389,668	392,236	396,646	395,722	396,760	371,247	358,147	356,631
Manawatu	131,907	141,879	151,327	160,485	155,417	159,631	155,641	150,140	148,158
Wairarapa	124,670	128,243	133,934	133,086	135,131	130,870	120,007	114,472	115,694
Nelson/Marlborough	64,028	67,256	68,986	68,423	65,670	65,629	63,613	61,112	61,409
West Coast	98,785	96,423	96,049	98,182	103,085	107,056	105,142	98,711	97,689
North Canterbury	374,378	411,344	455,981	502,449	524,567	539,260	549,647	566,958	579,275
South Canterbury	130,043	141,565	154,917	171,235	183,195	184,241	187,341	187,901	189,284
Otago	158,855	170,412	175,922	180,320	178,088	192,118	189,911	189,665	196,805
Southland	334,520	366,399	381,678	367,641	379,911	404,233	405,102	414,283	427,837
<b>New Zealand</b>	<b>3,152,627</b>	<b>3,302,030</b>	<b>3,442,868</b>	<b>3,579,082</b>	<b>3,595,978</b>	<b>3,655,426</b>	<b>3,552,959</b>	<b>3,533,802</b>	<b>3,569,783</b>

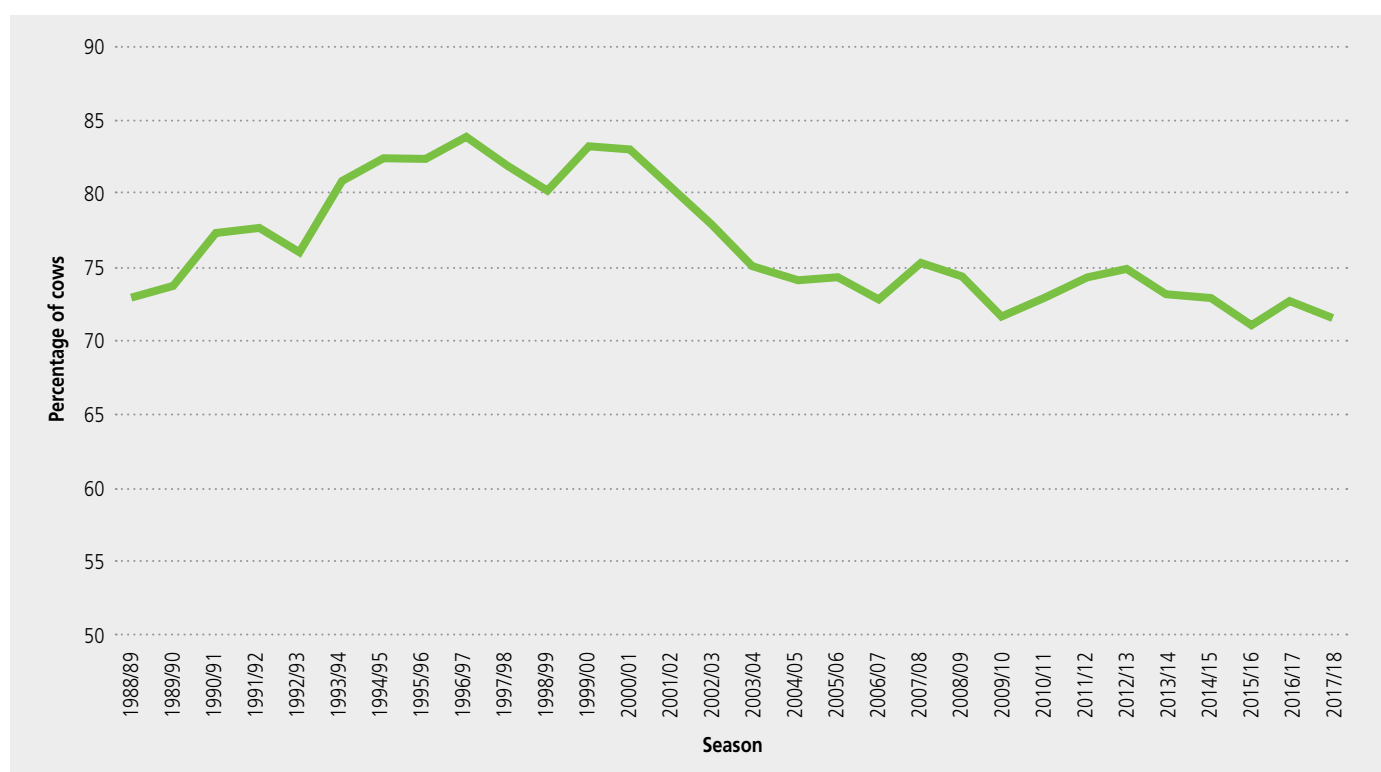
### % Cows to AB

Region	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Northland	62.0	62.3	64.6	67.2	67.0	66.2	63.7	65.2	64.2
Auckland	64.5	63.9	67.1	67.9	67.6	65.8	61.8	67.0	62.9
Waikato	71.7	72.0	73.5	75.5	72.4	71.2	68.8	70.0	68.9
Bay of Plenty	70.0	72.1	71.1	71.4	70.5	70.4	67.8	66.4	64.5
Central Plateau	55.3	55.8	59.8	64.8	62.4	62.6	62.9	65.5	64.8
Western Uplands	55.5	63.9	64.2	67.5	63.2	60.9	53.8	58.4	54.6
East Coast	24.1	15.1	30.7	45.7	43.6	52.2	45.9	38.2	44.0
Hawkes Bay	62.0	69.3	73.7	77.2	80.2	82.1	70.5	70.2	73.9
Taranaki	79.3	80.0	81.0	80.9	80.2	79.9	76.2	75.7	74.7
Manawatu	65.0	66.6	71.3	74.7	70.7	72.6	70.4	70.5	67.2
Wairarapa	75.6	77.9	80.3	78.9	79.8	77.4	72.2	71.2	71.3
Nelson/Marlborough	77.0	79.3	81.7	79.4	74.1	74.8	74.0	71.8	73.8
West Coast	68.8	66.4	65.4	66.5	68.6	68.8	66.5	63.4	63.4
North Canterbury	78.8	80.4	81.5	82.7	79.7	79.9	79.7	84.3	82.6
South Canterbury	73.9	76.8	80.2	78.4	78.4	76.1	78.0	80.8	75.4
Otago	79.9	80.1	76.2	76.1	70.8	72.8	72.4	73.9	73.5
Southland	73.0	75.7	75.5	69.1	69.0	70.5	70.4	73.6	73.4
<b>New Zealand</b>	<b>71.7</b>	<b>72.9</b>	<b>74.3</b>	<b>74.8</b>	<b>73.0</b>	<b>72.8</b>	<b>71.1</b>	<b>72.7</b>	<b>71.5</b>

## Yearlings to AB

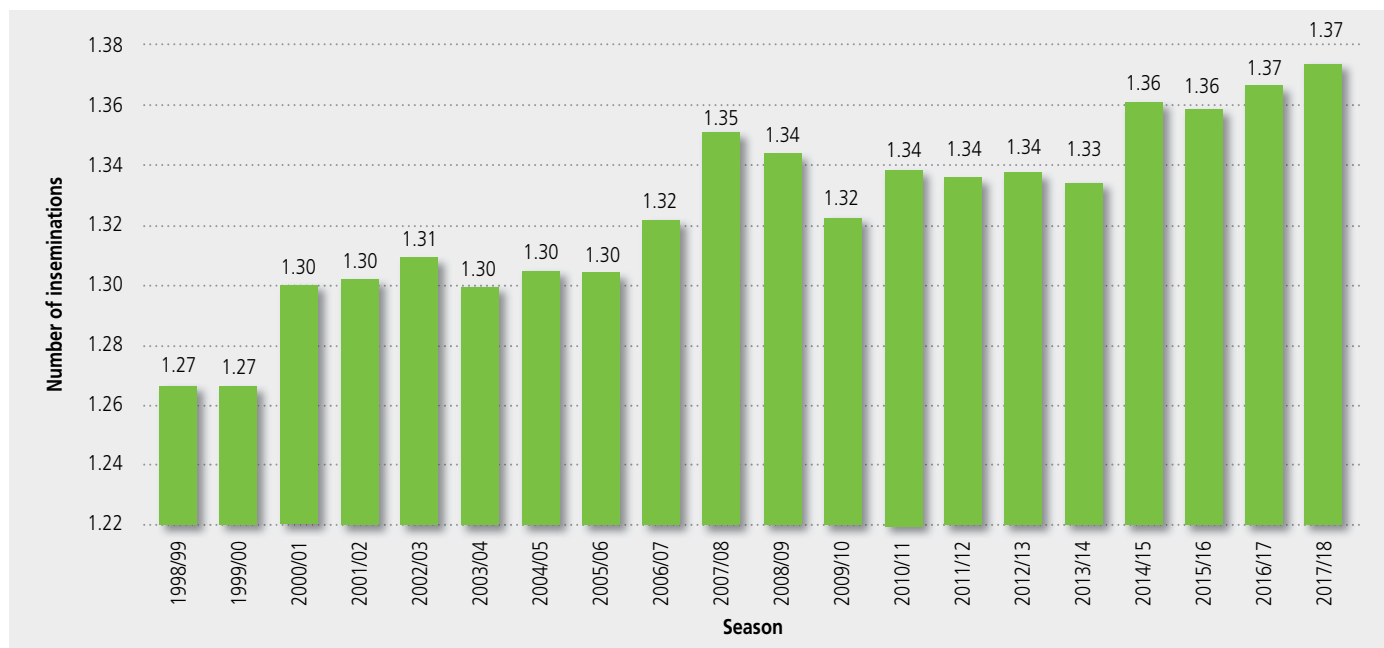
Region	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Northland	8,816	8,744	9,637	10,377	11,876	11,160	8,912	9,665	9,858
Auckland	2,588	3,073	3,170	2,994	3,622	3,754	2,593	2,706	2,943
Waikato	15,505	18,676	23,609	26,144	28,667	25,827	18,358	18,685	19,506
Bay of Plenty	7,116	7,871	7,461	8,373	9,375	9,411	8,032	7,205	7,750
Central Plateau	2,917	2,704	4,118	4,533	5,343	6,798	3,833	4,439	4,685
Western Uplands	782	1,048	1,577	2,066	2,344	1,697	2,106	1,779	1,786
East Coast	7	2	0	0	60	69	60	126	152
Hawkes Bay	1,010	1,986	2,025	3,725	2,955	2,532	1,441	1,609	2,794
Taranaki	4,822	5,191	6,458	7,651	7,920	6,652	4,292	3,800	3,848
Manawatu	4,137	4,717	6,341	7,119	8,575	8,850	5,482	6,352	6,013
Wairarapa	4,150	4,055	4,537	4,721	5,792	5,172	4,630	4,649	4,497
Nelson/Marlborough	2,499	4,006	4,826	4,874	5,012	4,082	3,210	3,597	4,246
West Coast	3,580	3,706	4,481	3,760	5,201	4,269	3,573	4,569	4,889
North Canterbury	18,911	29,168	36,916	43,063	48,312	47,250	36,328	42,882	56,143
South Canterbury	11,395	14,808	18,151	23,201	25,707	25,731	17,724	19,428	21,429
Otago	13,043	15,754	16,392	16,974	20,490	20,306	16,918	17,326	21,754
Southland	18,209	22,947	27,266	29,161	35,522	37,415	26,372	28,353	35,101
<b>New Zealand</b>	<b>119,487</b>	<b>148,456</b>	<b>176,965</b>	<b>198,736</b>	<b>226,773</b>	<b>220,975</b>	<b>163,864</b>	<b>177,170</b>	<b>207,394</b>

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



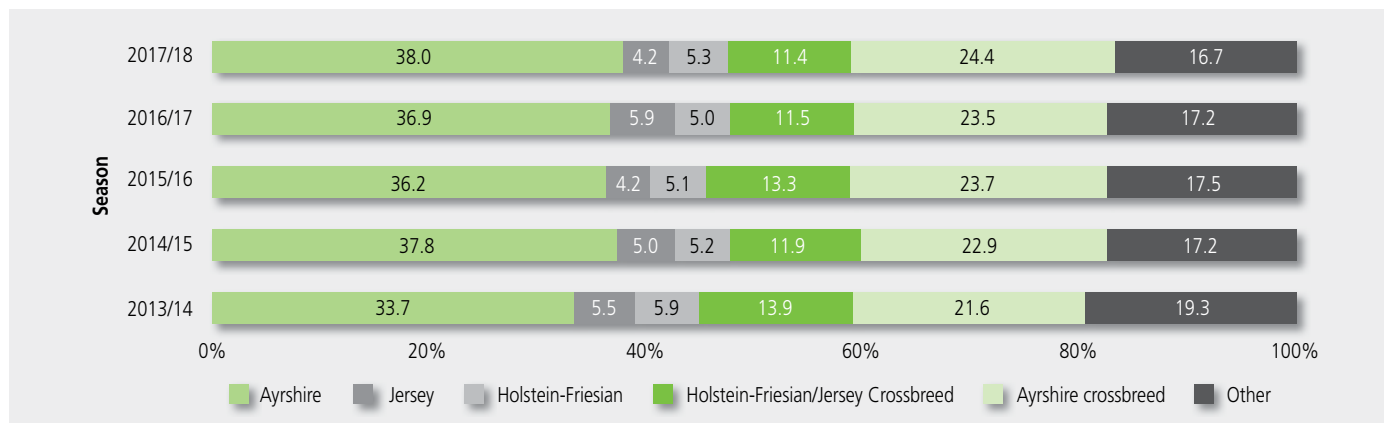
In 2017/18 the average number of inseminations per cow (1.37) (recorded on the LIC Herd Improvement Database) was slightly higher than the previous two seasons (Graph 4.5).

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

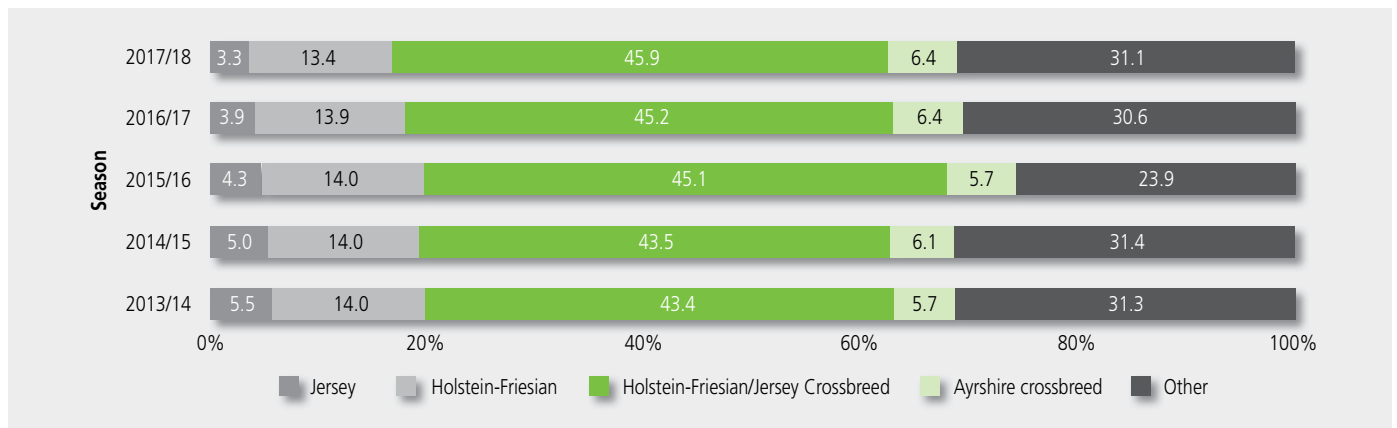


The use of Ayrshire, Holstein-Friesian and Jersey semen over different cow breeds for the past five seasons is shown in the graphs below. Ayrshire semen use over Ayrshire cows is 38% (Graph 4.6). Holstein-Friesian/Jersey Crossbreed semen is used predominantly over Holstein-Friesian/Jersey crosses (Graph 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 the previous two seasons (Graph 4.9).

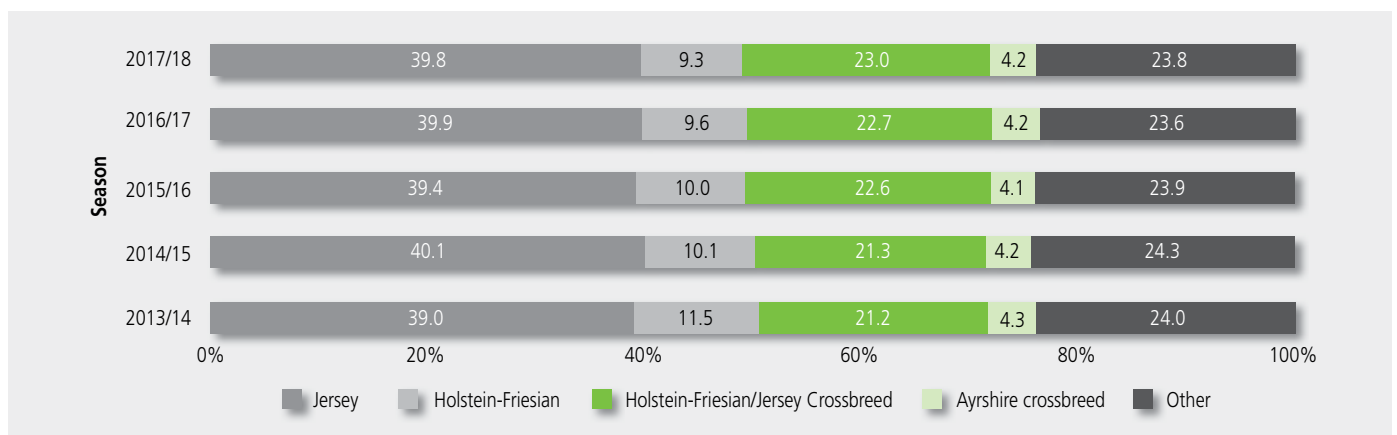
**Graph 4.6: Ayrshire semen usage (%) over breed category for the last five seasons**



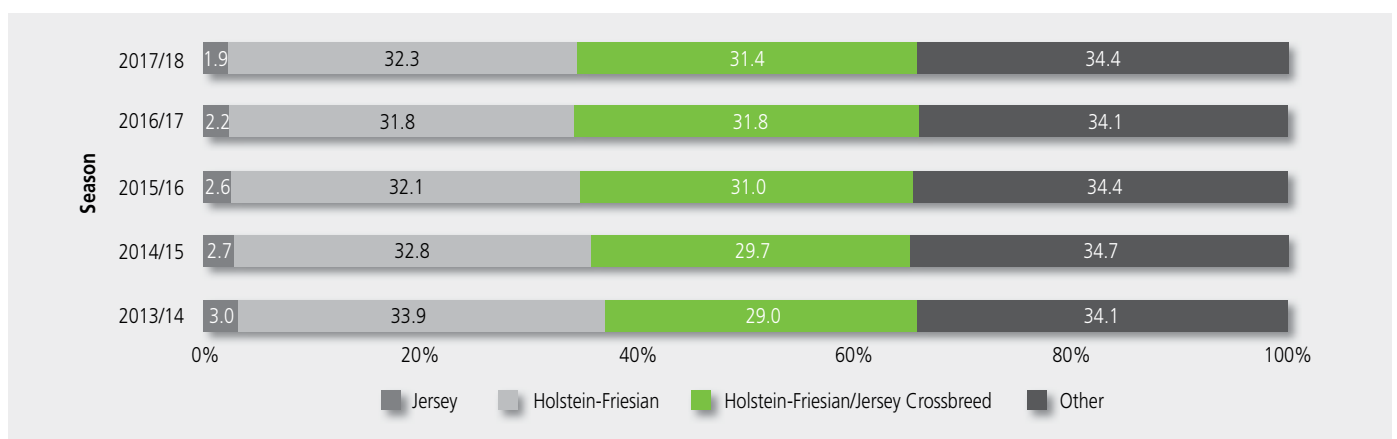
Graph 4.7: Holstein-Friesian / Jersey Crossbreed semen usage (%) over breed category for the last five seasons



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

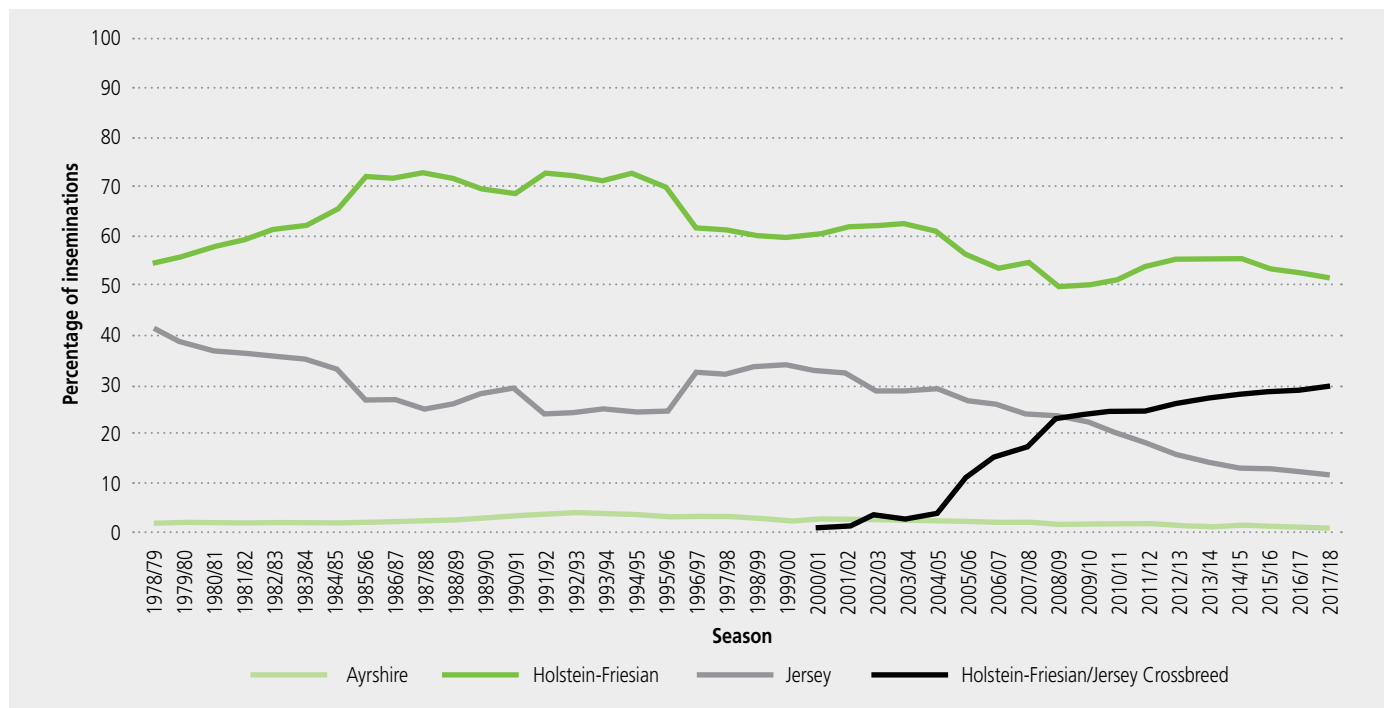


Graph 4.9: Holstein-Friesian semen usage (%) over breed category for the last five seasons



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

**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 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 4,264 in 2017/18 (Table 4.9).

The mean actual 6-week in-calf rate at 66.1% 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 2017/18 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	Number of herds	Actual			Estimated		
		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

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**





Mean actual 6-week in-calf rate by region ranged between 63.3% (Hawkes Bay / Manawatu / Wairarapa) and 68.9% (West Coast / Nelson / Marlborough) in 2017/18 (Table 4.10). Taranaki was the only region to record a decrease 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					
	2015/16		2016/17		2017/18		2015/16		2016/17		2017/18	
	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	179	63.4	193	64.6	257	64.6	522	61.1	485	60.5	521	60.9
Waikato / Western Uplands	983	67.7	1,065	66.1	1,198	66.6	1,529	63.9	1,370	62.3	1,302	62.4
BoP / Central Plateau / East Coast	325	65.1	335	64.6	343	64.8	422	64.0	398	62.5	402	61.9
Hawkes Bay / Manawatu / Wairarapa	323	64.0	341	62.8	406	63.3	380	62.3	352	61.6	371	60.7
Taranaki	308	67.7	308	67.1	383	66.9	1,020	64.7	973	63.8	886	63.0
West Coast / Nelson / Marlborough	137	69.2	139	68.5	128	68.9	306	65.1	297	64.5	296	63.4
North & South Canterbury	691	66.3	735	65.5	783	65.5	242	64.3	218	63.4	200	62.1
Otago / Southland	700	66.8	740	65.8	766	67.6	357	63.2	323	63.8	336	63.6

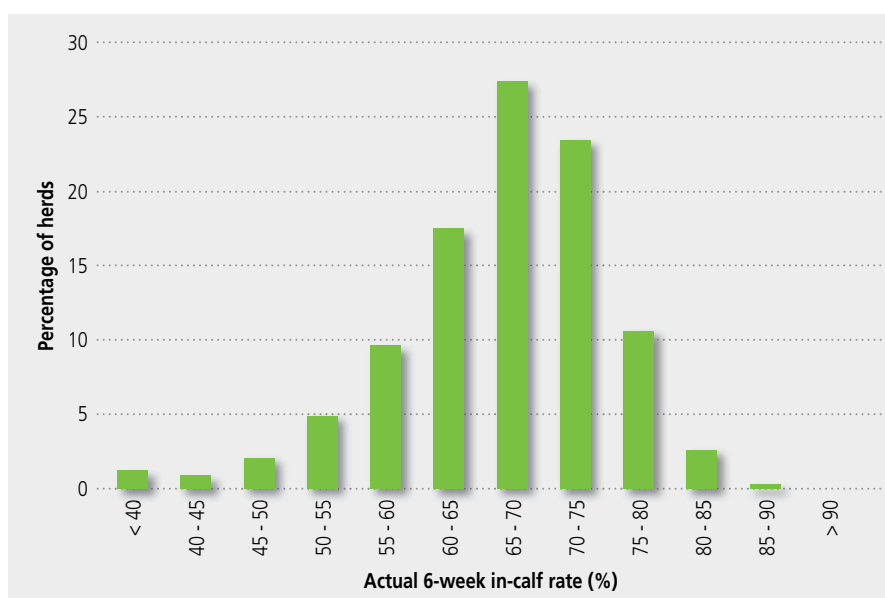
Note: Results reported in this table are from an improved version of the Fertility Focus Report software and will differ from earlier publications.

In 2017/18, 50% of herds had an actual 6-week in-calf rate of 67% or higher and 10% had an in-calf rate of 76% or higher (Table 4.11). Ten per cent of herds had 6-week-in-calf rate of 56% or lower.

**Table 4.11: Actual 6-week in-calf rate in 2017/18**

	Number of herds	Median	Top 10%	Top 25%	Bottom 25%	Bottom 10%
6-week in-calf rate	4,264	67	> 76	> 72	< 62	< 56

**Graph 4.12: Distribution of actual 6-week in-calf rate in 2017/18**

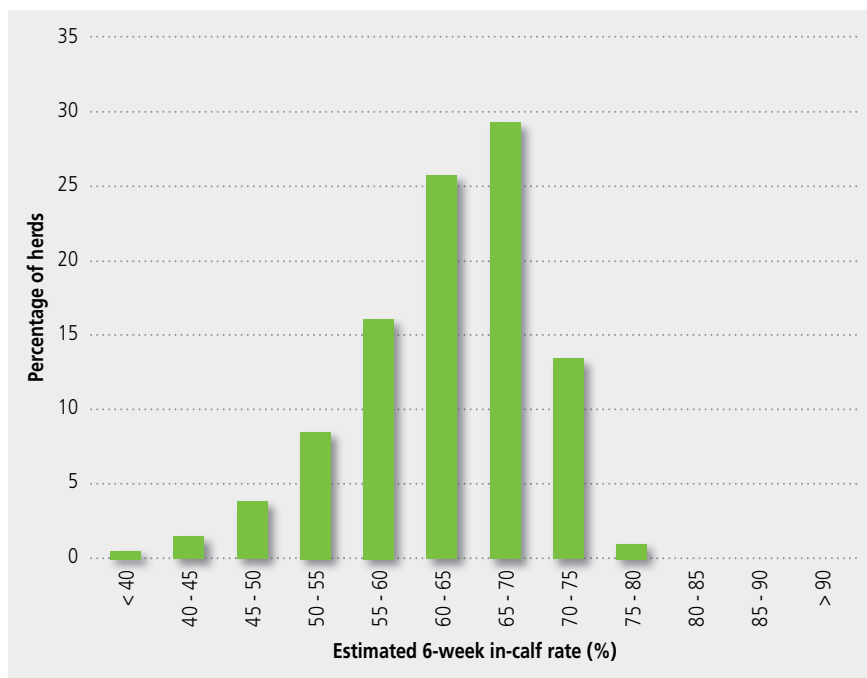


The distribution of estimated 6-week in-calf rates is tighter than the actual results reflecting that estimates tend towards the mean. This is because estimates for low performing herds tend to be overestimated, while estimates for high performing herds tend to be underestimated. In 2017/18, 50% of herds had an estimated 6-week in-calf rate of 63% or higher and 10% of herds had an estimated 6-week in-calf rate of 71% or higher (Table 4.12). Ten per cent of herds had an in-calf rate of 52% or lower.

**Table 4.12: Estimated 6-week in-calf rate in 2017/18**

	<b>Number of herds</b>	<b>Median</b>	<b>Top 10%</b>	<b>Top 25%</b>	<b>Bottom 25%</b>	<b>Bottom 10%</b>
6-week in-calf rate	4,314	63	> 71	> 67	< 58	< 52

**Graph 4.13: Distribution of estimated 6-week in-calf rate in 2017/18**



## E. Calving

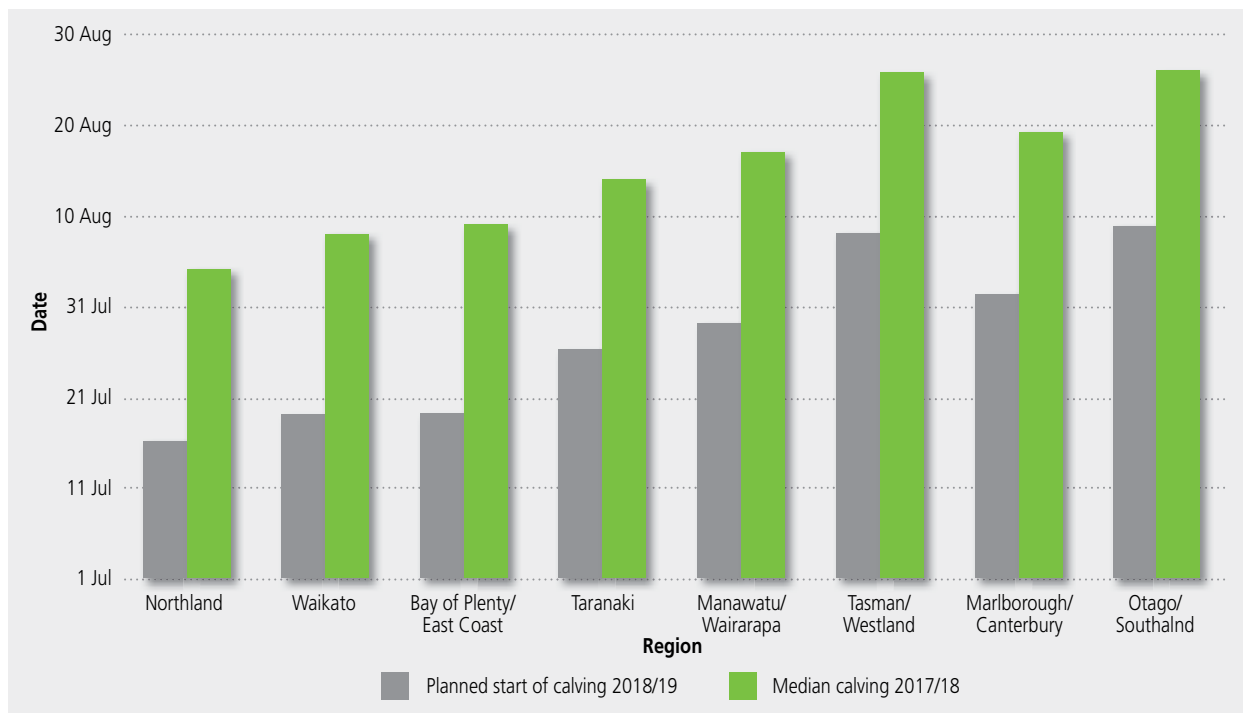
### i) Planned start of calving and median calving dates

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.

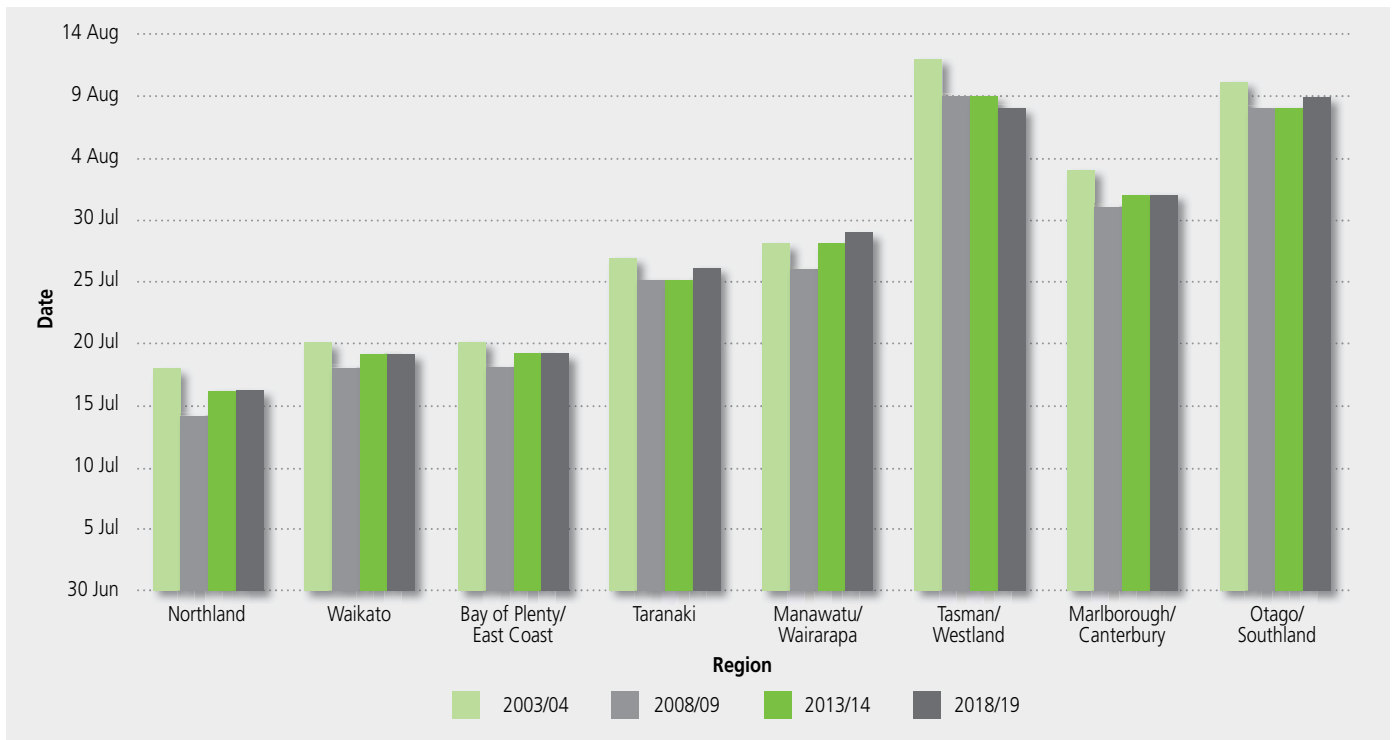
The median calving date (the date that occupies the middle position after the dates are arranged in ascending order) is used as an indicator of actual calving spread. The forecast planned start of calving and actual median calving dates for cows (excluding first calvers) for the 2017/18 season are shown 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 a later planned start of calving for Manawatu / Wairarapa. 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

## 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:

1. 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.
2. 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 of average quality pasture.

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

$$\begin{aligned}
 \text{Breeding Worth} &= \text{Milkfat BV} && \times && \text{\$EV (Milkfat)} && + \\
 &\text{Protein BV} && \times && \text{\$EV (Protein)} && + \\
 &\text{Milk BV} && \times && \text{\$EV (Milk)} && + \\
 &\text{Liveweight BV} && \times && \text{\$EV (Liveweight)} && + \\
 &\text{Somatic Cell BV} && \times && \text{\$EV (Somatic cell)} && + \\
 &\text{Fertility BV} && \times && \text{\$EV (Fertility)} && + \\
 &\text{Residual Survival BV} && \times && \text{\$EV (Residual Survival)} && +
 \end{aligned}$$

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 2018 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 17 February 2018**

	Milkfat (\$/kg)	Protein (\$/kg)	Milk (\$/kg)	Liveweight (\$/kg)	Somatic Cell (\$/score)	Fertility (\$/%)	Body Cond. Score (\$/score)	Residual Survival (\$/day)
Breeding Worth	2.85	6.06	-0.088	-1.30	-38.33	6.55	100.60	0.124
Production Worth	2.85	6.06	-0.086	-1.30	-38.33	-	-	-

The information for all Animal Evaluation statistics was sourced from cows and sires recorded on the LIC Database as at 19 May 2018 as calculated by New Zealand Animal Evaluation Limited (NZAEL), a wholly owned subsidiary of DairyNZ. The evaluations were conducted with reference to a genetic base of cows born in 2005.

### i) Sire Evaluations

Table 4.15 shows the Breeding Values (BV) and Breeding Worth (BW) by breed, of all bulls born in 2013, first proven in the 2017/18 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.

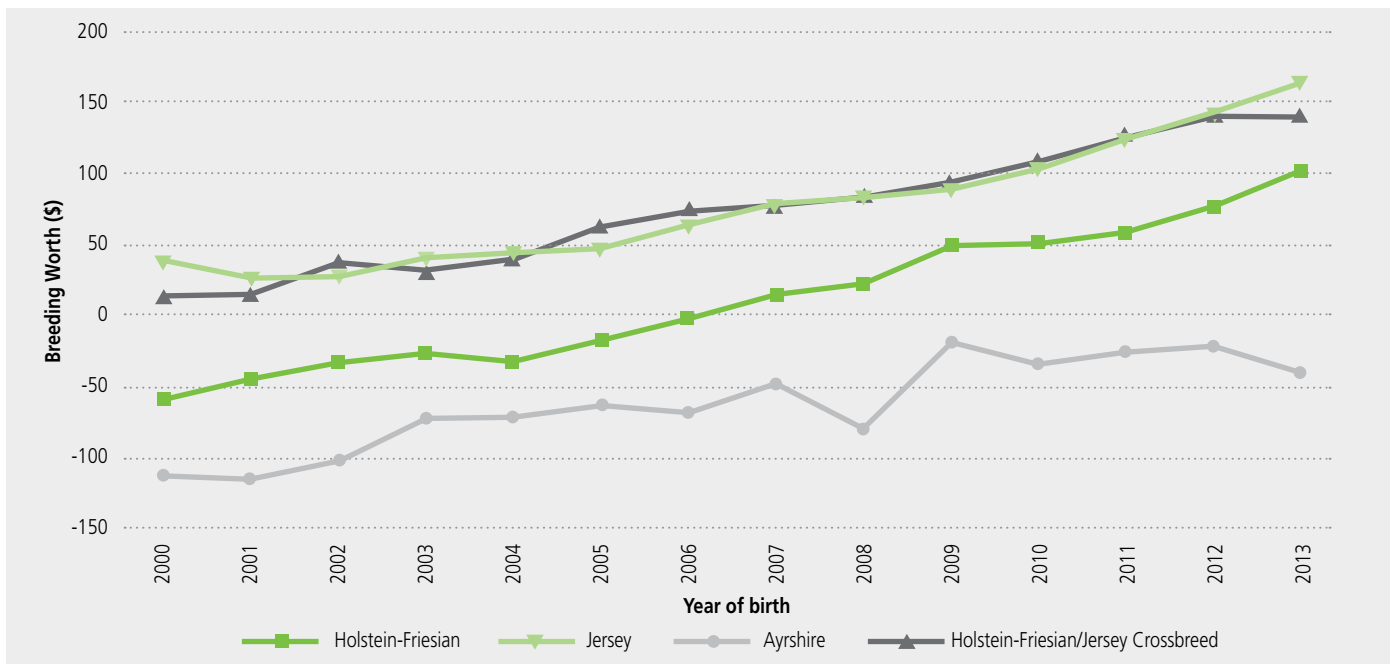
**Table 4.15: Average Breeding Values and Breeding Worth of 2013 born bulls (BW reliability of 75% or greater)**

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	14.8	13.8	550	75.3	-0.34	-2.1	-0.09	-93.0	-40.9	1
Friesian	19.1	28.4	767	46.2	0.07	0.1	0.04	10.1	102.7	159
Jersey	14.1	0.0	-475	-53.2	-0.11	0.8	0.05	-9.8	164.2	72
Cross	18.5	16.3	233	-4.2	0.02	0.3	0.01	17.1	140.5	94

(Evaluation date: 19 May 2018)

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: 19 May 2018)

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	Holstein-Friesian/Jersey Crossbreed	Other breeds
2000	530	288	136	32	67	7
2001	539	262	162	33	74	8
2002	538	273	164	24	73	4
2003	523	262	151	37	69	4
2004	541	266	156	27	91	1
2005	516	239	161	18	94	4
2006	515	244	159	28	82	2
2007	329	161	97	24	44	3
2008	352	155	107	20	68	2
2009	343	154	109	18	61	1
2010	318	156	83	17	60	2
2011	365	178	101	16	70	0
2012	348	162	89	7	90	0
2013	326	159	72	1	94	0
<b>Grand Total</b>	<b>6,083</b>	<b>2,959</b>	<b>1,747</b>	<b>302</b>	<b>1,037</b>	<b>38</b>

(Evaluation date: 19 May 2018)

## ii) Cow Evaluations

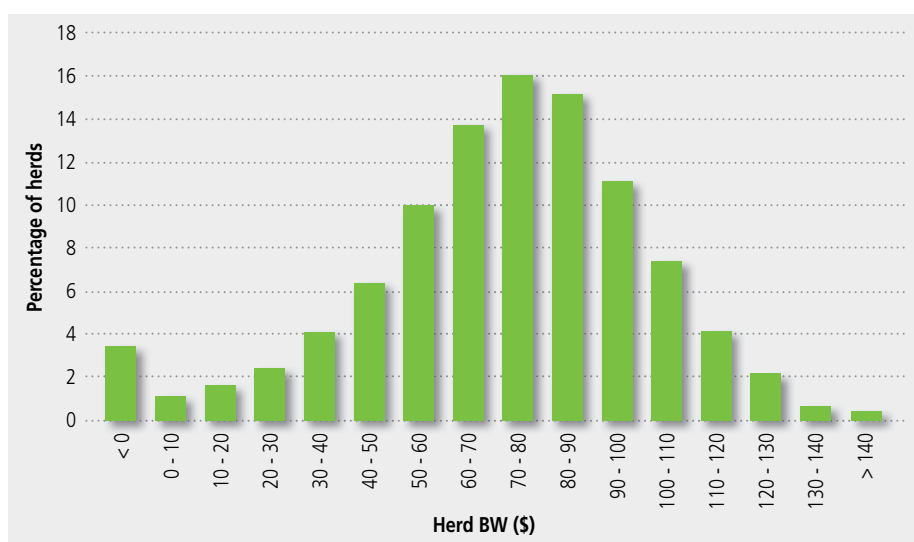
The Breeding Worth for herds presented below (Table 4.17 and Graph 4.17) is based on cows of the users of herd testing services, in herds with at least 80 cows, in the 2017/18 season. Table 4.17 shows that 50% of these herds had a BW of 72 or higher and 25% of these herds had a BW of 89 or higher.

**Table 4.17: Herd Breeding Worth in 2017/18**

	<b>Median</b>	<b>Top 5%</b>	<b>Top 10%</b>	<b>Top 25%</b>	<b>Bottom 25%</b>	<b>Bottom 10%</b>	<b>Bottom 5%</b>
Herd BW	72	> 114	> 105	> 89	< 51	< 25	< 4

(Evaluation date: 19 May 2018)

**Graph 4.17: Distribution of Herd Breeding Worth in 2017/18**



(Evaluation date: 19 May 2018)

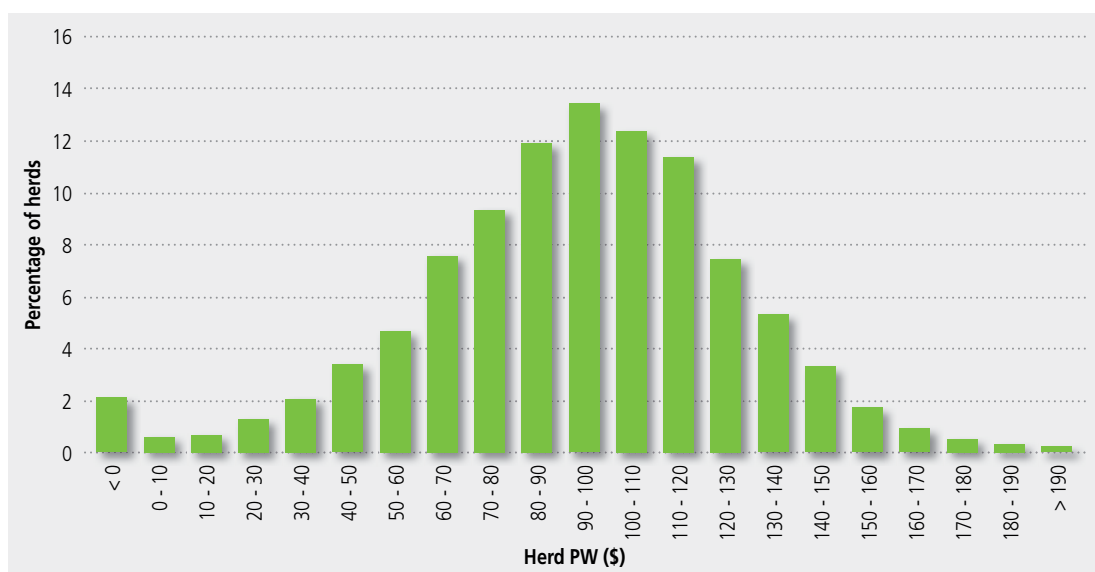
The Production Worth (PW) for herds presented below (Table 4.18 and Graph 4.18) is based on cows of the users of herd testing services, in herds with at least 80 cows, in the 2017-18 season. Table 4.18 shows that 50% of these herds had a PW of 92 or higher and 25% of these herds had a PW of 113 or higher.

**Table 4.18: Herd Production Worth in 2017/18**

	<b>Median</b>	<b>Top 5%</b>	<b>Top 10%</b>	<b>Top 25%</b>	<b>Bottom 25%</b>	<b>Bottom 10%</b>	<b>Bottom 5%</b>
Herd PW	92	> 144	> 132	> 113	< 68	< 43	< 24

(Evaluation date: 19 May 2018)

**Graph 4.18: Distribution of Herd Production Worth in 2017/18**



(Evaluation date: 19 May 2018)

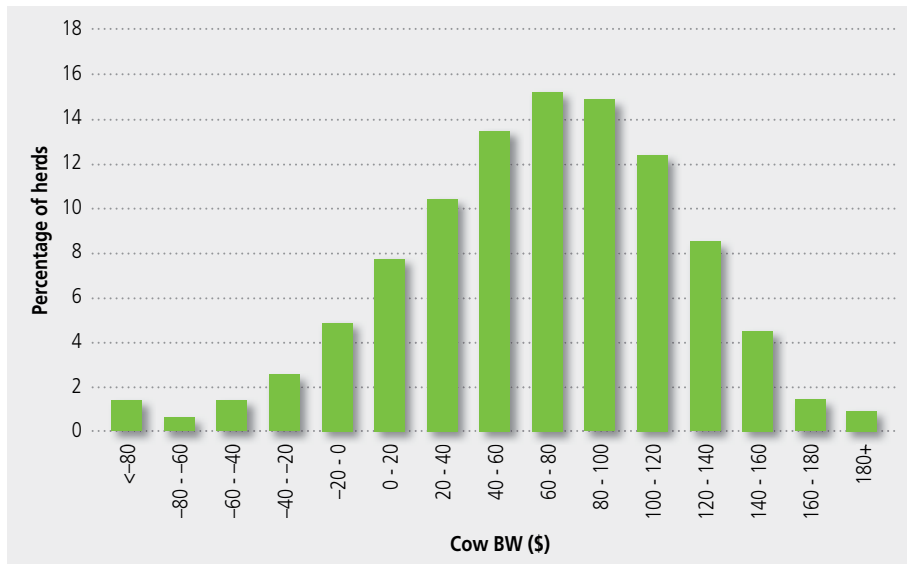
The Breeding Worth (BW) for cows presented below (Table 4.19 and Graph 4.19) is based on all cows of the users of herd testing services, in herds with at least 80 cows, and signed up for herd testing in the 2017/18 season. Table 4.19 shows that 50% of these cows had a BW of 70 or higher and that 25% of these cows had a BW of 104 or higher.

**Table 4.19: Cow Breeding Worth in 2017/18**

	<b>Median</b>	<b>Top 5%</b>	<b>Top 10%</b>	<b>Top 25%</b>	<b>Bottom 25%</b>	<b>Bottom 10%</b>	<b>Bottom 5%</b>
Cow BW	70	> 146	> 131	> 104	< 33	< -2.6	< -26.4

(Evaluation date: 19 May 2018)

**Graph 4.19: Distribution of Cow Breeding Worth in 2017/18**



(Evaluation date: 19 May 2018)

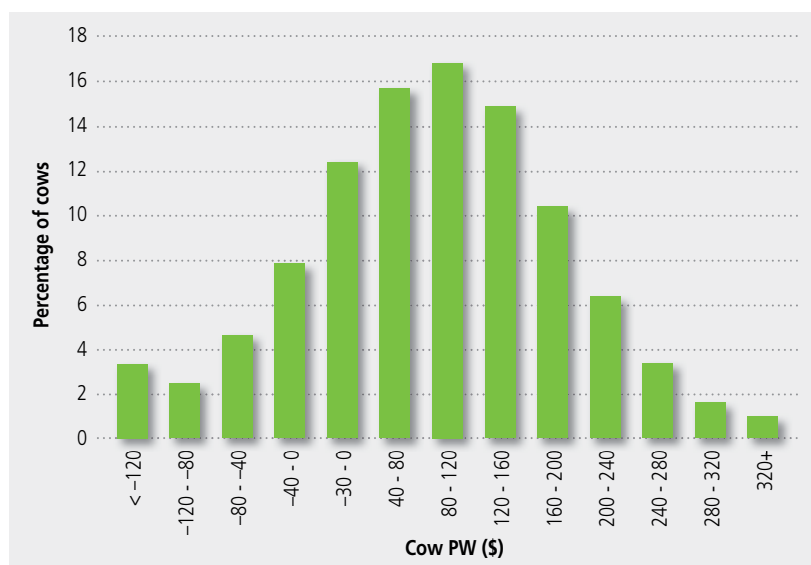
The Production Worth (PW) for cows presented below (Table 4.20 and Graph 4.20) is based on cows of the users of herd testing services, in herds with at least 80 cows, in the 2017/18 season. Table 4.20 shows that 50% of these cows had a PW of 91 or higher and that 25% of these cows had a PW of 153 or higher.

**Table 4.20: Cow Production Worth in 2017/18**

	<b>Median</b>	<b>Top 5%</b>	<b>Top 10%</b>	<b>Top 25%</b>	<b>Bottom 25%</b>	<b>Bottom 10%</b>	<b>Bottom 5%</b>
Cow PW	91	> 248	> 212	> 153	< 26	< -36	< -76

(Evaluation date: 19 May 2018)

**Graph 4.20: Distribution of Cow Production Worth in 2017/18**

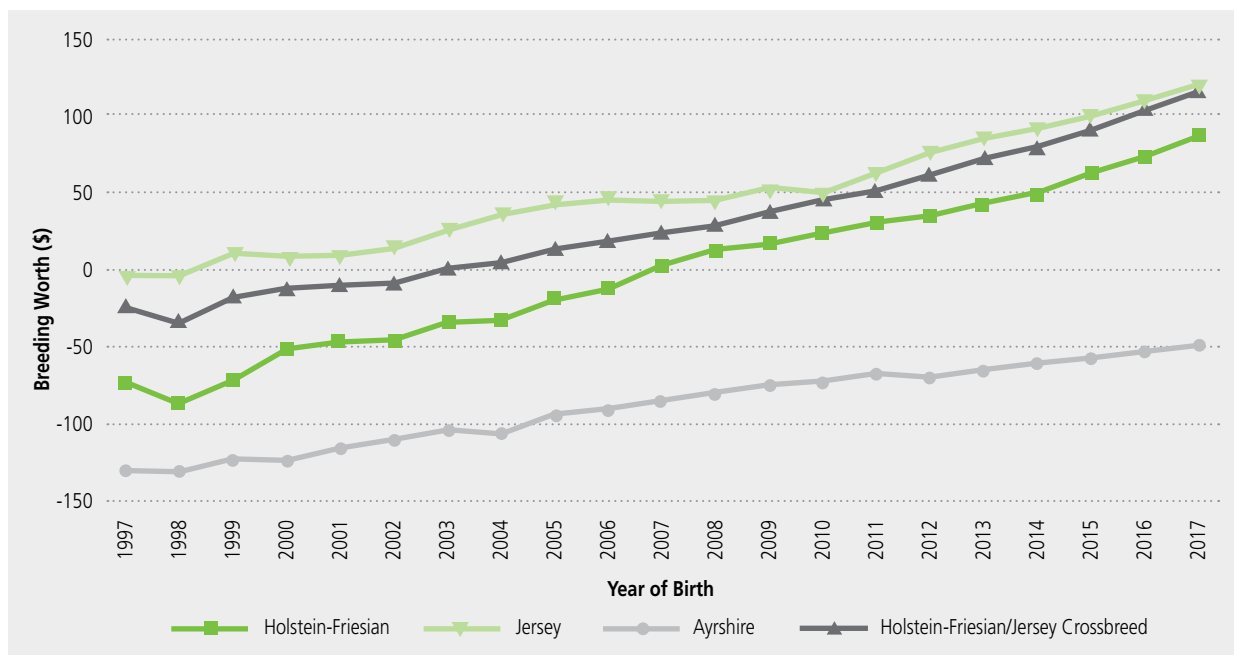


(Evaluation date: 19 May 2018)



The genetic trend for cows is based on all cows (alive or dead) recorded on the LIC Database in the 2017/18 season. Also included are the estimated BW and PW for replacement stock (2016 and 2017 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.

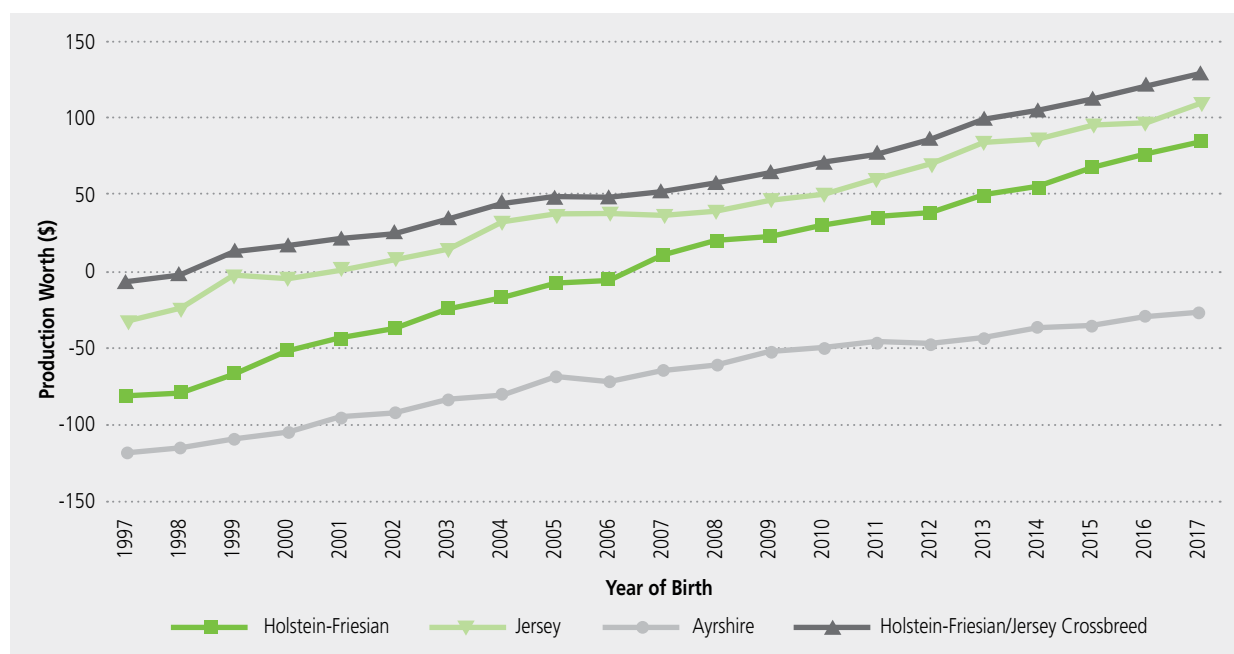
**Graph 4.21: Trend in Breeding Worth for all cows**



(Evaluation date: 19 May 2018)

The trend for PW by breed is presented in Graph 4.22. Holstein-Friesian/Jersey crossbreds have maintained a higher PW over other breeds, caused by the effects of heterosis (hybrid vigour) in the crossbreds.

**Graph 4.22: Trend in Production Worth for all cows**



(Evaluation date: 19 May 2018)

Table 4.21 shows the average BVs and BW by breed category, of all 2015 born cows. The Jersey cows had the highest average BW at 101.4. 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 cows born in 2015 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	65	13.2	18.9	549	31.8	0	0.1	0.01	-7	381,775
Jersey	101.4	4.2	-5.5	-523	-47.9	-0.12	0.7	0.05	-13	80,333
Ayrshire	-54.3	-7.4	-1.3	68	6.1	-0.21	-3.3	-0.09	94	4,983
HF/J Crossbred	90.6	11	9.7	108	-1.2	-0.04	0.5	0.04	-14	474,533
Guernsey	-236.3	-25.9	-19.9	-528	25.3	-0.08	-6.9	-0.17	42	92
Milking Shorthorn	-173.3	-30.7	-16.3	-348	12.2	-0.15	-3.7	0.02	128	228
Brown Swiss	-176	-20.1	-7.6	-197	50	-0.42	-8.6	-0.02	149	71
Other	59.2	6.1	7.2	67	2.2	-0.11	-0.4	0.03	11	56,195
<b>Weighted Average</b>	<b>79.1</b>	<b>10.9</b>	<b>11.8</b>	<b>223.2</b>	<b>7.9</b>	<b>-0.04</b>	<b>0.3</b>	<b>0.03</b>	<b>-9.2</b>	<b>998,210</b>

(Evaluation date: 19 May 2018)

Survivability is measured by the percentage of cows that have a lactation recorded for consecutive years. In the 2017/18 season, survivability was higher than the previous year for most age groups. The value in the "2-3 years" column is the percentage of cows that were milking as two-year-olds in the 2016/17 season and are now milking as three-year-olds in the 2017/18 season. Table 4.22 shows that for the 2017/18 season the highest percentage of survival is in animals aged 2-3 years (85.2%), followed by animals aged 3-4 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

## 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 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.

- **\$6.68 average dairy company payout**

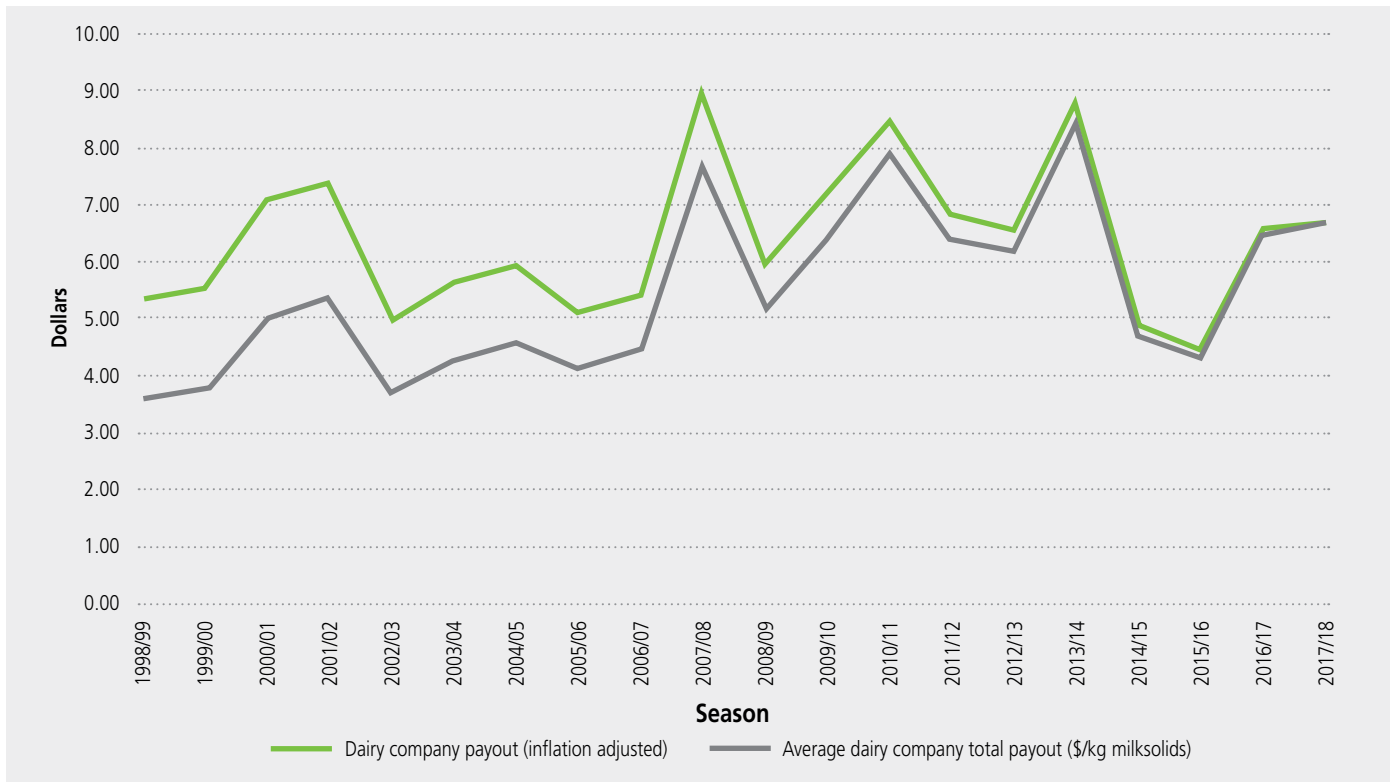
The weighted average dairy company total payout (per kilogram of milksolids) received by dairy farmers from seasonal supply milk is shown in Table 5.1 (weightings are based on the number of herds supplying each dairy company). The average payout is given in both nominal and inflation-adjusted dollars using the Consumers Price Index. The average dairy company payout of \$6.68 per kg milksolids in 2017/18 was slightly higher than the previous season (\$6.47) and higher than the decade average milk payout of \$6.26.

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

Season	Average Dairy Company total payout (\$/kg milksolids)	Dairy Company payout (inflation-adjusted) <sup>a</sup>
1998/99	3.58	5.35
1999/00	3.78	5.54
2000/01	5.01	7.12
2001/02	5.35	7.40
2002/03	3.66	4.99
2003/04	4.25	5.66
2004/05	4.58	5.93
2005/06	4.10	5.11
2006/07	4.46	5.44
2007/08	7.67	9.01
2008/09	5.14	5.92
2009/10	6.37	7.22
2010/11	7.89	8.48
2011/12	6.40	6.82
2012/13	6.18	6.54
2013/14	8.47	8.82
2014/15	4.69	4.86
2015/16	4.30	4.44
2016/17	6.47	6.57
2017/18	6.68	6.68

<sup>a</sup> 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 company 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 steady

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 decreased to \$4.94 million in 2017/18 from the previous season's high of \$5.36 million (Table 5.2). Farms sold were 12 hectares smaller on average than sales in 2016/17. The weighted average sale price per hectare of \$38,015 increased 0.5% 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	4,657,420	130	31,653	35,840	39	1,099
2010/11	143	4,119,017	4,430,133	126	32,735	35,208	38	1,157
2011/12	157	4,514,365	4,809,615	139	32,376	34,493	41	1,168
2012/13	197	4,375,251	4,629,693	130	33,557	35,508	36	1,176
2013/14	312	5,174,010	5,387,855	142	36,369	37,872	42	1,195
2014/15	244	5,228,018	5,421,411	132	39,577	41,041	44	1,200
2015/16	192	6,190,928	6,393,302	169	36,557	37,752	39	1,205
2016/17	217	5,358,571	5,438,950	142	37,835	38,403	40	1,226
2017/18	226	4,935,487	4,935,487	130	38,015	38,015	40	1,244

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 2017/18 was 20 (Table 6.1). The number of Tuberculous dairy cattle decreased to from 112 in 2016/17 to 28 in 2017/18.

The West Coast had the greatest number of infected herds (16) and 75% of the Tb dairy cattle in 2017/18.

**Table 6.1: Tuberculosis (Tb) testing and results in 2017/18**

Region	Vector Status	Number of infected Dairy herds at 30 June 2018	Number of Dairy Cattle Primary Tested in 2017/18	Number of tuberculous <sup>a</sup> dairy cattle
Northland	Free	0	104,212	0
Auckland	Free	0	17,954	0
Waikato	Free	2	511,357	3
	Risk	0	18,153	0
Bay of Plenty	Free	0	79,679	0
	Risk	0	8,471	0
Gisborne	Free	0	147	0
Hawke's Bay	Free	0	10,862	0
	Risk	0	26,351	0
Taranaki	Free	0	161,898	0
Manawatu/Wanganui	Free	0	116,111	0
	Risk	0	16,951	0
Wellington	Free	0	7,819	0
	Risk	0	56,542	0
North Island	Free	2	1,010,039	3
	Risk	0	126,468	0
<b>North Island</b>	<b>Total</b>	<b>2</b>	<b>1,136,507</b>	<b>3</b>
Marlborough	Free	0	4,676	0
	Risk	0	2,809	0
Tasman/Nelson	Free	0	21,354	0
	Risk	0	15,483	0
West Coast	Free	0	4,837	0
	Risk	16	227,843	21
Canterbury	Free	2	308,774	3
	Risk	0	121,460	0
Otago	Free	0	82,133	0
	Risk	0	136,419	1
Southland	Free	0	170,831	0
	Risk	0	36,187	0
South Island	Free	2	592,605	3
	Risk	16	540,201	22
<b>South Island</b>	<b>Total</b>	<b>18</b>	<b>1,132,806</b>	<b>25</b>
New Zealand	Free	4	1,602,644	6
	Risk	16	666,669	22
<b>New Zealand</b>	<b>Total</b>	<b>20</b>	<b>2,269,313</b>	<b>28</b>

Sourced from TBfree New Zealand

<sup>a</sup> 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, 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

