

Chapter 14

Primary Industries

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Mt. Elephant

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OVERVIEW

This chapter contains information on Victoria's primary industries. Topics covered include agriculture, fishing, forestry and mining.

The majority of agricultural data in the chapter are derived from the annual Agricultural Census. Readers should be aware that the 1995–96, 1994–95 and 1993–94 Agricultural Censuses included those establishments with an Estimated Value of Agricultural Operations (EVAO) of \$5,000 or more. In both 1991–92 and 1992–93 the scope of the census was those establishments undertaking agricultural activity having an EVAO of \$22,500 or more. Consequently this change in the scope of the census means that care should be taken when comparing 1993–94 to 1995–96 census results with the results of previous censuses.

AGRICULTURE

The 1995–96 Agricultural Census included just under 37,000 establishments with agricultural activity. The 1995–96 season was not affected by drought in contrast to 1994–95, causing an increase in the production of cereals and legumes grown for grain and fodder crops. The dairy industry continued to make gains in production, and meat cattle numbers increased marginally. Sheep numbers were up. Overall, fruit and vegetable production was generally up on the previous season.

The gross value of all crops increased by 56% to \$2.76 billion. This was mainly as a result of the increase in the gross value of cereals for grain, which rose by almost 145% to \$903 million as a result of the more favourable weather conditions.

The total gross value of agricultural commodities produced was \$6.39 billion, a 24% increase compared with the previous season.

Victoria compared with Australia

In terms of farm income, as measured in the Australian National Accounts, Victoria's share for the latest 6 year period (1990–91 to 1995–96) fluctuated markedly. The 1995–96 Victorian figure was \$1,816 million, which represented 33.4% of the total Australian farm income of \$5,441 million.

The Gross Value of Agricultural Commodities Produced (GVACP) provides a measure of the output from farming. In 1995–96, the GVACP for Victoria was \$6,389 million, or 23% of the Australian total of \$27,370 million. In terms of value, Victoria produced 18% of Australia's crops, 22% of livestock slaughtered and 39% of livestock products (wool, milk, eggs, and honey).

14.1 AUSTRALIAN NATIONAL ACCOUNTS: FARM INCOME

Year	Victoria \$m	Australia \$m	Victoria as a percentage
			of Australia %
1991–92r	1 011	1 935	52.2
1992–93r	1 220	3 134	38.9
1993–94r	1 429	3 710	38.5
1994–95r	806	2 025	39.8
1995–96	1 816	5 441	33.4

Source: Australian National Accounts: State Accounts (5220.0).

14.2 GROSS VALUE OF AGRICULTURAL COMMODITIES PRODUCED, VICTORIA

Particulars	Year ended 30 June						Victoria as a percentage of Australia 1996 %
	1991 \$'000	1992 \$'000	1993 \$'000	1994 \$'000	1995 \$'000	1996 \$'000	
Crops							
Cereals for grain	343 967	413 010	600 975	593 056	368 928	902 807	14
Hay	287 937	285 127	263 850	228 734	261 689	371 305	43
Industrial crops(a)	42 031	41 292	47 598	62 530	44 689	77 393	26
Vegetables	320 528	314 933	316 239	413 213	385 090	405 398	25
Grapes	158 598	178 620	155 721	175 568	144 516	227 880	32
Fruit	244 160	334 263	342 669	344 563	324 959	344 391	23
Other	211 270	265 893	384 009	355 231	240 720	435 717	11
Total	1 608 591	1 834 131	2 111 061	2 172 895	1 770 592	2 764 891	18
Livestock slaughtering and other disposals							
Cattle and calves	794 469	743 455	678 886	830 553	775 794	693 957	19
Sheep and lambs	112 914	146 071	203 312	243 602	263 402	324 521	31
Other	363 327	392 961	389 325	411 682	336 233	352 082	23
Total	1 270 711	1 282 487	1 271 523	1 485 837	1 375 429	1 370 560	22
Livestock products							
Wool	707 796	552 141	413 178	439 771	633 714	482 699	19
Dairy products	1 000 565	1 080 903	1 332 455	1 381 149	1 313 269	1 712 393	57
Other	95 507	72 468	79 267	56 868	54 383	58 405	19
Total	1 803 870	1 705 510	1 824 900	1 877 788	2 001 366	2 253 492	39
Grand total	4 683 172	4 822 131	5 207 484	5 536 522	5 147 387	6 388 943	23

(a) Industrial crops for the period 1990–1994 refers to tobacco, hops, linseed, canola, safflower and sunflower. Linseed production data was not collected by the ABS in 1995 and 1996.

Source: *Value of Agricultural Commodities Produced, Australia (7503.0)*.

14.3 NUMBER OF ESTABLISHMENTS, WITH AGRICULTURAL ACTIVITY, AREA, AND LAND UTILISATION BY STATISTICAL DIVISION 1995–96

Statistical division	Number of establishments(a) ha	Area used for crops(b) ha	Area of horticulture ha	Sown pasture and lucerne ha	Native pasture ha	Total area of establishments '000 ha
Melbourne	2 743	5 912	17 422	119 763	34 795	224
Barwon	2 027	31 298	2 465	292 585	79 859	507
Western District	5 148	50 952	1 142	1 140 261	210 069	1 749
Central Highlands	1 957	67 253	4 637	373 514	82 887	739
Wimmera	3 171	887 764	1 372	679 894	143 225	2 292
Mallee	4 499	958 958	29 098	456 585	138 759	2 576
Loddon-Campaspe	2 315	169 232	1 754	422 357	112 212	966
Goulburn	6 559	150 031	14 701	782 210	209 125	1 568
Ovens-Murray	2 330	17 965	2 932	272 510	85 999	663
East Gippsland	2 534	6 462	3 841	372 477	121 666	1 023
Gippsland	3 622	4 596	5 673	325 284	82 962	462
Total Victoria	36 905	2 350 422	85 035	5 237 439	1 301 558	12 768

(a) Includes non land-based beekeeping establishments (i.e. beekeeping activity not permanently located at one site). (b) Duplicated area included if double-cropping occurred.

Source: *AgStats on Floppy Disk (7117.0)*.

Wheat

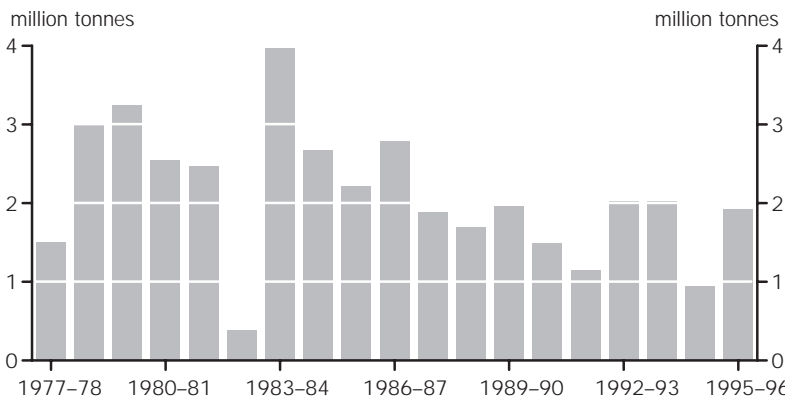
Wheat is still Victoria's largest crop in terms of area and production. In 1995–96 the area sown increased almost 4% to 853,000 hectares; however as a result of favourable conditions production recovered to 1,921,000 tonnes. Of the major cereals for grain, wheat accounted for 56% of the total production, with a gross value of \$504 million.

14.4 WHEAT FOR GRAIN, VICTORIA

Season	Area '000 ha	Production '000 tonnes	Average yield per hectare tonnes	A.S.W. (a) wheat standard kg/hl
1991-92	664	1 150	1.7	83.0
1992-93	821	2 015	2.5	79.5
1993-94	780	2 022	2.6	80.0
1994-95	822	944	1.1	84.5
1995-96	853	1 921	2.3	85.5

(a) Australian Standard White, quoted in kilograms per hectolitre, which is a measure of density.
Source: AgStats on Floppy Disk (7117.0); Australian Wheat Board.

WHEAT PRODUCTION, VICTORIA, YEAR ENDED 31 MARCH



Source: AgStats on floppy disk (Cat. no. 7117.0); Australian Wheat Board.

Oats

Oats are sown for grain production, winter grazing, and hay production. Of the total area sown, about 74% was harvested for grain, some of it having been grazed during the winter.

A significant portion of the total production of oats is held on farms for future use, with the balance being used for compound/urban feed markets, for milling, and for export.

14.5 OATS FOR GRAIN, VICTORIA

Season	Area '000 ha	Production '000 tonnes	Average yield per hectare tonnes
1991-92	183	300	1.64
1992-93	223	404	1.81
1993-94	186	362	1.95
1994-95	148	201	1.36
1995-96	187	392	2.10

Source: AgStats on Floppy Disk (7117.0).

Barley

As a result of more favourable conditions, the area sown to barley recovered in 1995-96. While barley is grown throughout the State, production has been traditionally centred in two distinct areas where high quality grain is produced. The highest production is in the south-west of the Mallee Statistical Division and the adjacent north-western Wimmera Statistical Division. The second source of high quality barley grain is in an area between Melbourne, Geelong, and Bacchus Marsh in southern Victoria.

14.6 BARLEY FOR GRAIN, VICTORIA

Season	Area '000 ha	Production '000 tonnes	Average yield per hectare tonnes
1991–92	534	898	1.68
1992–93	551	1 116	2.03
1993–94	639	1 386	2.17
1994–95	492	448	0.91
1995–96	628	1 342	2.14

Source: AgStats on Floppy Disk (7117.0).

Other Cereal Crops

Other cereal crops are rye, maize, millet and triticale (a wheat/rye hybrid). Production and area planted for them all is small compared to major cereal crops of wheat, oats and barley. Maize and triticale have shown a steady growth in the area given over to these grains. Triticale is a recent introduction to agriculture.

14.7 OTHER CEREAL CROPS FOR GRAIN

Season	Rye		Maize		Millet		Triticale	
	Area '000 ha	Production '000 tonnes	Area '000 ha	Production '000 tonnes	Area '000 ha	Production '000 tonnes	Area '000 ha	Production '000 tonnes
1991–92	19.0	17.1	0.3	3.0	0.9	1.7	18.9	34.6
1992–93	18.7	16.3	0.4	2.8	0.8	1.6	22.6	50.0
1993–94	12.5	14.2	0.2	1.7	1.4	2.1	32.4	70.7
1994–95	n.a.	n.a.	0.7	5.1	1.7	2.6	47.0	66.2
1995–96	n.a.	n.a.	1.1	6.8	1.0	1.8	54.8	120.5

Source: AgStats on Floppy Disk (7117.0).

Hay

Hay is an important farm resource. It can be stored for later use as fodder when normal feed is deficient or needs supplementing. It can therefore be used to overcome seasonal fluctuations in fodder availability or periods of drought. It can also be easily transported to drought affected areas from areas unaffected. The majority of hay is produced from pasture.

Photo:

Blampied near Daylesford (two men in front of haystack)

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14.8 HAY PRODUCTION, VICTORIA, SEASON 1995-96

Variety	Area ha	Production '000 tonnes	Average yield per hectare tonnes
Pastures (excluding lucerne)	511.9	1 970.9	3.9
Oaten	65.8	273.0	4.2
Lucerne	48.9	237.9	4.9
Cereals (excluding oats)	9.0	27.9	3.1
Total	649.6	2 562.9	3.9

Source: AgStats on Floppy Disk (7117.0).

Oilseeds

The more favourable conditions experienced during 1995-96 also had a beneficial effect upon oilseed production. The area sown to canola (rapeseed), increased by only 2% (as compared with a 155% between 1993-94 and 1994-95). However, production increased from 57,000 tonnes to 120,000 tonnes, the average yield per hectare increasing from 0.76 tonnes to 1.57 tonnes, reflecting the improved weather conditions. The area sown and the production of both safflower and sunflower showed significant increases.

14.9 SELECTED OILSEEDS PRODUCTION, VICTORIA

Season	Linseed		Canola(a)		Safflower		Sunflower	
	Area ha	Production tonnes	Area ha	Production tonnes	Area ha	Production tonnes	Area ha	Production tonnes
1991-92	1 287	1 251	22 957	26 481	19 707	12 116	1 396	2 222
1992-93	1 073	1 045	18 459	23 543	15 376	12 347	1 157	1 828
1993-94	3 004	3 258	29 151	46 835	29 358	24 404	2 425	3 720
1994-95	n.a.	n.a.	74 467	56 728	17 708	8 223	880	1 523
1995-96	n.a.	n.a.	76 227	119 556	25 123	17 145	1 600	2 159

(a) Rapeseed.

Source: AgStats on Floppy Disk (7117.0).

Grain legumes

The area of lupins sown fell by almost 22% to 50,500 hectares in 1995-96. However the production of lupins increased by 170% to 62,000 tonnes. The production of field peas experienced an even greater increase of 277% to 260,000 tonnes despite a 23% fall in the area sown.

14.10 LEGUMES FOR GRAIN, VICTORIA

Season	Lupins		Field peas	
	Area '000 ha	Production '000 tonnes	Area '000 ha	Production '000 tonnes
1991-92	36.7	40.5	193.6	211.7
1992-93	52.6	82.5	174.2	246.2
1993-94	55.1	59.5	199.9	292.5
1994-95	64.4	23.0	223.2	68.9
1995-96	50.5	62.0	171.9	260.0

Source: AgStats on Floppy Disk (7117.0).

Orchard fruit and nuts

In Victoria the area planted with fruit, nuts and berries in 1995-96 was 24,601 hectares, and the area of vineyards was 23,103 hectares. Although the total represented less than 2% of the total area under crops, fruit and grapes contributed almost 21% of the gross value of crops produced.

The main fruit growing areas are in the Goulburn, Mallee, and Melbourne Statistical Divisions. There are other important, but smaller areas throughout the State, including areas in the Ovens-Murray, Wimmera and Loddon Statistical Divisions.

Apple production is still the most significant fruit grown in Victoria, despite a 20% decrease on the previous season with a gross value of production of \$98.0 million. Peaches, oranges and pears are the next most important orchard fruit grown. The total gross value of production of orchard fruit, including nuts, was \$328.0 million.

A wide range of nuts can be grown in Victoria. Examples are almonds, walnuts, chestnuts, hazelnuts, and pistachios. In the past only a few of these trees have been grown in commercial plantings and nut growing is still not a major activity. Almonds are the most significant of nuts grown in Victoria, production in 1995–96 increased by almost 4% to 2,907 tonnes. Almonds were mainly planted in the northern area; walnuts and chestnuts in situations with deep soil in the north-east, the Dandenongs and Gippsland; and hazelnuts on shallower soils in the north-east and the Dandenongs.

14.11 ORCHARD FRUIT AND NUT PRODUCTION, VICTORIA

Type of fruit	Year ended 31 March				
	1992 tonnes	1993 tonnes	1994 tonnes	1995 tonnes	1996 tonnes
Pears	158 394	146 145	138 967	138 696	141 275
Apples	105 725	109 488	94 657	98 971	78 988
Peaches	35 758	36 787	33 875	34 354	36 354
Apricots	10 421	10 203	5 976	10 649	7 026
Cherries	1 736	1 525	1 943	2 391	2 353
Plums and prunes	4 414	4 235	4 500	4 312	3 756
Olives	352	356	410	n.a.	n.a.
Nectarines	4 537	5 618	6 126	6 175	6 919
Oranges	68 507	97 747	92 369	84 253	72 358
Lemons and limes	5 846	6 206	5 913	6 088	4 849
Grapefruit	6 647	5 932	5 570	n.a.	n.a.
Mandarins	3 781	4 211	4 643	3 830	4 963
Almonds	2 454	2 411	2 898	2 805	2 907

(a) The production of oranges in 1994–95 totalled 84,253 tonnes. Varieties were not collected.

Source: AgStats on Floppy Disk (7117.0).

Small fruit

Climatic requirements have restricted the commercial production of strawberries, and cane and bramble fruits in particular, to the cooler southern regions of Victoria; consequently most of this fruit is grown in the Dandenong Ranges and the Mornington Peninsula areas, which are relatively close to the Melbourne markets. In recent years, fruit growers in other parts of the State have diversified into strawberries, raspberries and kiwi fruit, particularly for the fresh fruit market.

14.12 SMALL FRUIT PRODUCTION, VICTORIA

Type of fruit	Year ended 31 March				
	1992 tonnes	1993 tonnes	1994 tonnes	1995 tonnes	1996 tonnes
Strawberries	1 976	2 333	3 145	2 921	3 279
Raspberries	279	341	266	224	220
Kiwi Fruit	2 380	2 317	2 593	2 731	2 063
Blueberries	107	131	131	n.a.	n.a.

Source: AgStats on Floppy Disk (7117.0).

Grapes

Grape growing, particularly for wine making, is extensive throughout Victoria. The Mallee Statistical Division is the principle grape growing region, with most vines being grown under irrigation. Ovens-Murray and Goulburn Statistical Divisions are also major grape growing regions—irrigation is used extensively in both areas. The increasing interest in wine grapes over recent years has resulted in the establishment of many vineyards of varying sizes throughout the State.

Grape production increased by 54% to 427,002 tonnes with a gross value of production of \$228 million, or 32% of the Australian gross value of \$714 million.

14.13 VITICULTURE, AREA AND PRODUCTION, VICTORIA

Season	Bearing ha	Non-bearing ha	Wine making tonnes	Drying and table(a) tonnes
1991-92	18 490	981	104 398	294 514
1992-93	19 049	1 014	118 452	192 448
1993-94	19 535	1 511	167 083	192 150
1994-95	18 989	2 603	137 613	139 822
1995-96	19 834	3 270	199 325	227 677

(a) Production for drying is estimated as fresh weight equivalent of dried weight.

Source: AgStats on Floppy Disk (7117.0).

14.14 AREA OF GRAPEVINES AND PRODUCTION BY VARIETY, VICTORIA, 1995-96

Variety	Area planted		Production tonnes	Average yield(a) tonnes/ha
	Not yet bearing ha	Bearing ha		
Red grapes				
Cabernet Franc	3	91	888	9.8
Cabernet Sauvignon	251	891	9 061	10.2
Currant (including Carina)	51	514	10 985	21.4
Frontignanc Red	1	100	512	5.1
Grenache	7	78	1 131	14.5
Merlot	70	159	1 707	10.7
Muscat Hamburgh	26	81	627	7.7
Pinot Noir	128	377	2 897	7.7
Shiraz	466	775	7 437	9.6
Ruby Cabernet	38	91	2 008	22.1
Other red grapes	113	1 044	12 896	12.4
Total red grapes	1 153	4 200	50 149	11.9
White grapes				
Chardonnay	1 268	1 765	22 216	12.6
Chenin Blanc	9	120	3 003	25.0
Colombard	31	257	7 787	30.3
Doradillo	0	45	1 816	40.4
Muscat Gordo Blanco	77	937	23 322	24.9
Riesling	11	357	5 029	14.1
Sauvignon Blanc	74	218	3 409	15.6
Semillon	232	79	924	11.7
Sultana	327	10 680	293 185	27.5
Traminer	0	38	546	14.4
Waltham Cross	9	394	6 486	16.5
Other white grapes	80	743	9 131	12.3
Total white grapes	2 117	15 633	376 854	24.1
Total	3 270	19 834	427 002	21.5

(a) Yield is production per hectare of bearing vines.

Source: Agstats on Floppy Disk (7117.0).

Wine exports

Exports of Victorian sparkling and table wines amounted to over \$85 million in 1996-97. The major importer of Victorian wine in 1995-96 was the United States of America which took \$12.1 million of white table wine and \$16.5 million of red table wine. The corresponding figures for the United Kingdom were \$8.8 million and \$9.7 million respectively.

14.15 EXPORTS OF SPARKLING AND TABLE WINES, VICTORIA

	Quantity		Value (FOB)	
	1995-96 '000 litres	1996-97 '000 litres	1995-96 \$'000	1996-97 \$'000
White table wine	4 361	5 737	23 353	31 620
Red table wine	5 449	7 032	36 248	49 229
Table rose	8	11	26	19
Sparkling wine	461	287	4 220	2 575
Fortified wine	139	106	840	828
Other wine	82	150	792	1 319
Vermouth and other flavoured wine	59	963	3	20
Total	10 599	13 325	66 443	85 610

Source: ABS unpublished data.

Vegetables

Most of the fresh vegetable production in Victoria is located in the Melbourne, Central Highlands, Gippsland, East Gippsland and Goulburn Statistical Divisions.

Potatoes, the most significant vegetable produced, are grown mainly in the Melbourne (at Toolangi and Koo-wee-rup), Central Highlands (around Ballarat), and Gippsland (Thorpdale) Statistical Divisions, with additional areas around Warrnambool, the Bellarine Peninsula, Colac, and the Otway Ranges. The gross value of production of potatoes in 1995-96 was \$114 million. The total gross value of production of vegetables was \$405 million, which was up 5% on the previous year.

The tomato industry in Victoria is predominantly processing-oriented with most of the crop produced in the irrigated areas between Shepparton and Rochester in northern Victoria. Total production of tomatoes in 1995-96 was 171,805 tonnes, and was valued at \$22 million.

14.16 VEGETABLES FOR HUMAN CONSUMPTION, VICTORIA

Type of vegetable	Area sown			Production		
	1993-94 ha	1994-95 ha	1995-96 ha	1993-94 tonnes	1994-95 tonnes	1995-96 tonnes
Potatoes	12 005	10 135	11 457	322 147	279 876	355 649
Onions	545	512	545	16 200	15 427	17 604
Carrots	1 938	2 253	2 736	66 460	74 637	91 123
Parsnips	197	238	284	3 388	3 843	6 708
Beetroot	72	75	66	803	879	824
Tomatoes	2 740	2 812	2 991	120 396	139 541	171 805
French beans	504	655	672	2 188	2 575	2 220
Green peas	281	293	181	613	699	407
Cabbages	726	750	864	26 548	27 875	30 603
Cauliflowers	1 280	1 264	1 249	28 573	19 638	20 780
Lettuce	1 632	1 639	2 071	35 041	34 155	45 785
Pumpkins	379	394	375	5 975	6 271	5 774

Source: AgStats on Floppy Disk (7117.0).

Tobacco

The tobacco industry in Victoria is centred at Myrtleford in the Ovens-Murray Statistical Division, with production areas in the adjacent valleys of the Buffalo, Ovens, King, and Kiewa Rivers. In 1995-96, the total number of tobacco growers in Victoria decreased from 121 to 113. The total production was 3,214 tonnes (dried weight), with a gross value of production of \$19 million.

14.17 TOBACCO PRODUCTION, VICTORIA

Season	Area ha	Production tonnes (dry)	Average yield per hectare tonnes (dry)
1991-92	1 845	4 219	2.29
1992-93	1 983	4 738	2.39
1993-94	1 357	4 128	3.04
1994-95	1 357	2 893	2.13
1995-96	1 421	3 214	2.26

Source: AgStats on Floppy Disk (7117.0).

Hops

In Victoria production of hops is confined to the alluvial soils in the valleys of the Ovens and King Rivers where good quality irrigation water is available to supplement the natural summer rainfall. In 1995-96 the 12 hop gardens in Victoria produced 688 tonnes (dried weight) of hops for both domestic brewers and the export market. The gross value of production was \$3.3 million.

14.18 HOP PRODUCTION, VICTORIA

Season	Area ha	Production (dried weight) tonnes	Average yield per hectare tonnes
1991-92	352	764	2.17
1992-93	335	566	1.69
1993-94	356	643	1.81
1994-95	319	644	2.02
1995-96	307	688	2.24

Source: AgStats on Floppy Disk (7117.0).

Livestock

Sheep numbers, including lambs, increased by almost 3% to 22.0 million head in 1995-96. The number of sheep slaughtered decreased by almost 23%, whilst the number of lambs slaughtered was down by over 6%. The number of live sheep exported from Victorian ports was 634,211 with a value free on board (FOB) of \$23.7 million. Numbers of cattle and pigs have remained relatively steady as have the numbers slaughtered.

14.19 SELECTED LIVESTOCK NUMBERS, VICTORIA

Season	Cattle			Sheep '000	Pigs '000
	Dairy '000	Beef '000	Total '000		
1991-92	1 422	2 152	3 574	24 782	431
1992-93	1 463	2 226	3 689	23 552	423
1993-94	1 585	2 604	4 189	23 439	460
1994-95	1 622	2 663	4 285	21 361	439
1995-96	1 682	2 714	4 396	21 974	458

Source: AgStats on Floppy Disk (7117.0).

14.20 LIVESTOCK SLAUGHTERED, VICTORIA

Types of livestock	1991-92 '000	1992-93 '000	1993-94 '000	1994-95 '000	1995-96 '000
Sheep	4 154	3 723	3 976	3 230	2 488
Lambs	6 321	6 288	5 601	6 303	5 898
Cattle and calves	2 226	1 974	1 977	2 103	2 113
Pigs	1 211	1 071	1 189	1 197	1 142

Source: Livestock Products, Australia (7215.0).

Sheep and wool

At 31 March 1996 the Victorian sheep population was 22 million head, well below the 1971 peak of 34 million head. Sheep numbers are widely distributed throughout the State. The Western District Statistical Division holds 30% of the States sheep flock. The other significant Statistical Divisions are Wimmera (16%) and Central Highlands (15%). Total wool production in 1995–96 decreased by 7.0% to 129,000 tonnes, with a gross value of \$483 million.

Photo:

Summit Park near Hamilton (with sheep)

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14.21 SHEEP AND LAMBS BY STATISTICAL DIVISION, AT 31 MARCH 1996

Statistical division	Sheep(a) '000	Lambs and hoggets '000	Total '000
Melbourne	121	25	146
Barwon	1 173	343	1 515
Western District	5 049	1 490	6 539
Central Highlands	2 517	699	3 216
Wimmera	2 694	772	3 467
Mallee	941	312	1 253
Loddon-Campaspe	1 514	441	1 955
Goulburn	1 831	419	2 250
Ovens-Murray	304	67	371
East Gippsland	799	211	1 009
Gippsland	196	56	253
Total Victoria	17 138	4 836	21 974

(a) Includes rams, ewes and wethers.

Source: *AgStats on Floppy Disk (7117.0)*.

14.22 TOTAL WOOL PRODUCTION, VICTORIA

Season	Clip tonnes	Stripped from or exported on skins (greasy) tonnes	Total quantity (greasy) tonnes
1991–92	116 574	28 791	145 365
1992–93	117 520	27 554	145 082
1993–94	110 035	14 500	124 535
1994–95	123 303	14 827	138 130
1995–96p	115 672	12 857	128 529

Source: *Value of Agricultural Commodities Produced, Australia (7503.0)*.

Lambing

Victoria's largest lambing season occurred in 1970–71, when 12.7 million lambs were marked from 14.8 million ewes mated (86%). The peak in more recent years was in 1984–85 when 10.4 million lambs were marked from 11.7 million ewes mated (89%). In 1995–96, 8.5 million ewes were mated resulting in 7.0 million lambs marked; and a success rate of 83%, which is consistent with recent years.

14.23 LAMBING, VICTORIA

Season	Ewes mated '000	Lambs marked '000	Percentage of lambs marked to ewes mated %
1991–92	9 466	7 412	78
1992–93	9 352	7 592	81
1993–94	9 325	7 549	81
1994–95	9 029	7 318	81
1995–96	8 491	7 027	83

Source: AgStats on Floppy Disk (7117.0).

Mutton and lamb production

Mutton, the meat from adult sheep, is mainly produced from sheep which are surplus to the wool industry; consequently production patterns correspond closely to expansions and contractions in that industry. In 1995–96, mutton production was 50,910 tonnes, down on the previous year's figure of 64,440 tonnes.

Prime lamb producers are found throughout the State. However, early to mid-season producers are distributed in a broad band across northern Victoria, including some irrigated areas. In addition, a considerable number of early lambs are brought from southern New South Wales for slaughter in Victoria. Mid to late-season producers are located mainly in the Western District, Central Highlands, Gippsland, and parts of the Ovens-Murray Statistical Divisions of the State. In 1995–96 there were 110,172 tonnes of lamb meat produced.

Meat cattle

The Victorian environment is very favourable for beef production with cattle able to graze on pasture throughout the year. The herd is spread throughout the State with the Western District, Goulburn, Ovens-Murray, East Gippsland and Gippsland Statistical Districts being the major regions. In 1995–96 there were 348,649 tonnes of beef and 12,009 tonnes of veal was produced.

14.24 DISTRIBUTION OF CATTLE AND PIGS BY STATISTICAL DIVISION AT 31 MARCH 1996

Statistical division	Meat cattle '000	Milk cattle(a) '000	Pigs '000
Melbourne	161	42	16
Barwon	136	117	19
Western District	590	372	17
Central Highlands	118	9	26
Wimmera	57	3	47
Mallee	101	93	72
Loddon-Campaspe	109	31	150
Goulburn	424	444	89
Ovens-Murray	317	62	2
East Gippsland	325	172	3
Gippsland	377	337	15
Total Victoria	2 714	1 682	458

(a) Excludes house cows.

Source: AgStats on Floppy Disk (7117.0).

THE VICTORIAN DAIRY INDUSTRY

INTRODUCTION

Victoria is the largest producer of dairy products in Australia. In 1996–97, 62% of milk and about 85% of dairy exports came from Victoria and were valued at \$1.55 billion. The majority of exports are in the form of bulk commodities of skim milk powder, butter and cheese. Victoria's export success is due in large part to the low cost of milk production resulting in the industry being internationally competitive. Dairy products are the biggest component of the Victorian food industry.

Victoria has some comparative advantages in dairy farming over many other parts of the world. The temperate climate in this area enables the production of milk using pasture grown under natural rainfall in the south west, most of Gippsland and the river valleys of the North East or with relatively low priced irrigation water in the Murray, Goulburn and Macalister irrigation systems. This pasture based production system is further enhanced and complimented by the availability of cheap grain.

The typical Victorian dairy farm is a family operated and managed enterprise, milking about 150 cows on 80 to 100 hectares producing about 750,000 litres of milk per annum. The farm has a seasonally calving herd, calving down during June to September and each year raising about 30 replacement heifers on the farm. The majority of hay and silage is produced on the farm and each cow is fed about 0.8 tonnes of grain or pellets in the bail. Farm labour is primarily provided by the family who assist with the milking, calving down, calf raising, hay and silage making.

DEVELOPMENT

The development of the Victorian dairy industry began in 1834 when Edward Henty arrived at Portland with the first dairy cows. The south west had high rainfall and good soil and was suitable for successful farming. In the years until 1860, exploration was the key feature of agricultural development. Gippsland was explored and found to be a rich agricultural area and its unlocking began with the construction of stock routes after 1861. Gold mining had attracted immigrants to Victoria after 1851. Ten years later when the diggings had become less lucrative for many, interest in agriculture and the settlement of farms began in earnest. Between 1860 and 1880, land under cultivation in Victoria increased from 387,282 acres to 1,548,282 acres. While this included settlement in the north of the State, a less reliable water supply saw the most significant development in that area occur after the provision of irrigation, much of which appeared during the Depression of the 1930s.

The dairy industry of the 1800s had twenty years of exploration and twenty years of settlement, and the next twenty years was characterised by the development of technology, export markets and administrative and regulatory arrangements. Significant technological advances were the introduction of the centrifugal cream separator and refrigeration in the ten years between 1880 and 1890. During the 1890s State Governments appointed experts to advise farmers and encourage the export of butter to the United Kingdom. In 1888-9, 31 butter factories were registered and by 1895 there were 174 factories and 284 creameries. In the same five years, butter production increased by 253%. By 1900 a sound dairy industry had been established and the perishability of the product had been overcome by technology. Exports of butter to the United Kingdom began and remained our major export market until the early 1970s.

The amount of time taken to milk cows by hand and the availability of labour limited the size of dairy farms. Milking machines had been patented as early as 1836 but it was not until the late 1930s that there was broader adoption in Victoria due to the recovery from the Depression and distribution electricity to farms. Developments in milking technology, including capacity of machinery, refrigerated storage tanks and improved shed design have enabled huge changes in the size of farms. Table 14.25 shows the change in average herd size. Today there are farms milking as many as 1,200 cows through one rotary shed.

14.25 AVERAGE DAIRY HERD SIZE, VICTORIA

Year	No. cows per herd
1950	18
1960	24
1970	50
1980	91
1986	96
1990	110
1995	136
1996	142

Source: Australian Dairy Corporation.

The Second World War marked a change in the dairy industry. Government assistance promoted land development and irrigation schemes in Victoria's dairy regions and soldier settlement schemes were instituted for returned soldiers. By the 1950s Victoria was the dominant dairy manufacturing State and the industry had become a significant sector of the Victorian economy.

A critical period for the dairy industry was in 1973 when the United Kingdom joined the European Economic Community and access to European markets was cut. The industry had to find new markets and improve its international competitiveness. There was a significant rationalisation in the industry (note the large drop in numbers of farms between 1970 and 1975 shown in table 14.26). There was also a major change in the product mix over this period. Butter production was reduced by over 60% while cheese production more than doubled. Australia had to find new markets for its dairy products. Asia offered great opportunities and Japan became our most important market for dairy products. Currently over 70% of dairy exports go to Asia and South East Asia.

14.26 NUMBER OF DAIRY FARMS, AS AT 30 JUNE

Year	NSW	Vic.	Qld	SA	WA	Tas.	Aust.
1950	16 685	27 975	21 475	7 751	4 432	4 161	82 479
1960	15 430	26 004	17 960	6 600	4 502	4 352	74 848
1966	12 230	23 430	12 560	5 450	2 283	2 979	58 932
1970	8 733	19 803	8 931	4 111	1 650	3 232	46 460
1975	4 805	14 920	4 622	3 064	961	2 229	30 601
1980	3 601	11 467	3 052	1 730	622	1 522	21 994
1985	2 838	10 850	2 544	1 300	626	1 184	19 342
1990	2 220	8 840	1 970	969	496	901	15 396
1995	1 911	8 379	1 746	819	479	832	14 166
1996	1 853	8 275	1 693	791	457	819	13 888

Source: ABS-Note: Farms with less than 10 dairy cows omitted; State Departments of Agriculture and State Milk Authorities.

**RELIABLE
FRESH MILK
SUPPLIES**

Milk has two primary uses, firstly for the fresh liquid milk market and secondly for the production of manufactured products (such as cheese and butter) for domestic and export markets.

In 1933 the Victorian Milk Board was formed under State legislation with the objectives of ensuring quality control and a regular supply of fresh milk to the community. The price farmers received for their milk and the price consumers paid was also controlled.

There have been numerous changes since the establishment of the original Victorian Milk Board. Currently the Victorian Dairy Industry Authority is responsible for the regulation of the liquid milk market including promotion, pricing, distribution and quality. The regulation of retail pricing, distribution and sourcing of liquid milk has been progressively removed. Full deregulation of the liquid milk market is expected to proceed under national competition policy requirements, and is likely to be completed by the turn of the century. The expected increase in competition from deregulation should result in generally lower prices to consumers, increased diversity of products and better utilisation of industry infrastructure and plant, making for an even more efficient industry.

**MAINTAINING
THE
COMPETITIVE
EDGE**

Research, extension and quality assurance services have played an important part in the development of the dairy industry. Increases in productivity, responsible use of the natural resource base and ensuring that milk produced is safe and free of contaminants, are the focus of government services to the Victorian dairy industry.

The increases in production and the international competitiveness of the industry are an indication of the level of uptake of improved farming practices by dairyfarmers and improved genetic stock of dairy cows.

14.27 WHOLE MILK PRODUCTION

Year ended 30 June	NSW	Vic.	Qld	SA	WA	Tas.	Aust.
1950	1 420	2 133	1 278	406	225	168	5 630
1960	1 589	2 720	1 148	357	262	319	6 395
1970	1 418	4 057	870	483	254	469	7 551
1980	907	3 151	508	329	222	315	5 432
1990	879	3 787	629	356	267	343	6 263
1995	1 087	5 114	740	485	343	437	8 206
1996	1 114	5 482	751	513	342	514	8 716

Source: Australian Dairy Corporation.

The introduction of artificial insemination in the 1950s allowed dairy farmers to progressively improve the production potential of their herds. The Australian Dairy Herd Improvement Scheme which began in 1982 has enabled more accurate evaluation of the breeding potential of dairy cattle and has been able to select cattle with traits that better match the needs of industry such as increased protein levels in milk. Combined with improved pasture species, increased use of fertiliser, improved pasture management and strategic grain feeding, the Victorian dairy industry has significantly improved on-farm productivity. Table 14.28 shows that the average annual per cow production has more than doubled since 1960.

14.28 AVERAGE ANNUAL MILK PRODUCTION PER COW, AUSTRALIA

Year ended 30 June	Litres
1950	1 746
1960	1 959
1970	2 650
1980	2 848
1985	3 337
1990	3 781
1995	4 481

Source: Australian Dairy Corporation.

'Target 10', which is the extension component of the Victorian dairy industry development program, has played an important role over the last five years in demonstrating to farmers the benefits of changing farming practices to improve profitability. Target 10 is an informal partnership between industry, government and agribusiness. The Victorian dairy industry is reliant upon a relatively low cost of milk production as a major source of competitive advantage with the rest of the world. This being the case, the Target 10 project initially set out to increase the utilisation of pasture by 10% on half of Victoria's 8,000 dairy farms within five years. Over the first four years of the program, approximately 35% of farmers have participated in the grazing management program. The project has since been broadened to cover other priority farming issues including animal nutrition, farm development as well as soils and fertiliser management.

MANUFACTURED
DAIRY
PRODUCTS

The manufacturing segment of the dairy industry has undergone substantial structural change over the past twenty-five years, particularly so in the last ten years enabling the industry to be internationally competitive. Changes have occurred in both the number and size of firms and in the product mix. Mergers and takeovers have featured in structural adjustment, and have resulted in greater concentration of ownership in the industry. The effect has been factory closures and increased investment in new plant and equipment at the remaining factories. Milk processing has made major technological progress in this time with advances such as large scale continuous cheesemaking plants, large capacity spray driers, ultrafiltration/reverse osmosis plants and ultra heat treatment of liquid milk. New technology has enabled the production of milk tailored to consumer requirements such as modified lactose, fat and calcium contents. The proportions of milk used for manufacturing are cheese 36%, skim milk powder and butter 40%, whole milk powder 14%, casein/butter 3% and other products 6%.

FUTURE
PROSPECTS

Industry forecasts for the dairy industry are confident due to anticipated gains from international trade reforms and continued demand from Asian markets. Strong competition in these markets will be maintained which will force farmers and processors to continue to achieve productivity gains. Victorian exports have concentrated on producing bulk commodities (cheese, butter, milk powder). In the medium term, processors are likely to shift production to products tailored to meet the specific needs of end-users.

On current trends, Victorian milk production is expected to increase from 5,482 ML to 10,800 ML in 2010 (70% of Australia's production). The number of farms is expected to decline from 8,275 to about 7,000 and the average herd size will increase from 145 cows to 250 cows. Annual production per cow will increase from about 4,745 litres to 5,800 litres. Eighty per cent of the Victorian herd will be artificially bred and 50% of herds will have automatic milk recording. Dairy farm numbers will generally contract with most contraction in West Gippsland due to residential and other land use pressures.

The image of Victorian dairy products and other food will play an important role in securing overseas and local markets. Community concerns over 'clean and green' production will reinforce the commitment of the dairy industry to produce milk in an environmentally responsible way. The dairy industry will continue to be a major contributor to the Victorian economy through increased export income and employment and profits to the rural sector.

Photo:

Dairy cows

Delete keylines

Source: Primary Industries Division, Department of Natural Resources and Environment, Victoria.

Pigs

Pig farming has been undergoing rapid change over the last few years with many smaller producers leaving the industry. The number of commercial establishments with pigs declined by 18% from 714 to 613. At the same time the number of pigs has risen by over 4% to 458,000 pigs, the average number of pigs per establishment has risen by nearly 28% from 586 to 748.

Poultry

In 1995–96 Victorian egg production for human consumption was 40.1 million dozen, 23% of the total Australian production. The gross value of production was \$51.3 million.

At 31 March 1996 there were 3.0 million hens for egg production held on farms, including replacement and breeding stock. The average size of farms was 17,000 hens, although there are many larger farms with up to 40,000 plus layers. The main areas for commercial egg production are centred on the outskirts of the Melbourne Statistical Division; other significant regions are the Goulburn, Barwon, Gippsland and Loddon Statistical Divisions.

14.29 POULTRY SLAUGHTERED FOR HUMAN CONSUMPTION, VICTORIA

Year ended 30 June	Chickens (i.e. broilers, fryers, or roasters) '000	Other fowl and turkeys '000	Ducks and drakes '000
1992	73 921	1 938	735
1993	78 615	1 391	830
1994	85 798	1 782	821
1995r	77 193	1 374	935
1996	85 411	1 789	1 246

Source: *Livestock Products Australia (7215.0)*; ABS unpublished data.

In 1995–96, 85 million chickens were slaughtered for human consumption. The total dressed weight was 128,000 tonnes. The gross value was \$209.7 million or 22% of the Australian total of \$961.3 million.

The main broiler production centres are located on the Mornington Peninsula, in areas east and south-east of Melbourne, the Geelong area, and the Goulburn Statistical District—near the processing works and the main centres of consumption. Most of Victoria's production is consumed locally.

14.30 DRESSED WEIGHT(a) OF POULTRY SLAUGHTERED, FRESH AND FROZEN(b), VICTORIA

Year ended 30 June	Chickens (i.e. broilers, fryers, or roasters) '000 kg	Other fowl and turkey '000 kg	Ducks and drakes '000 kg
1992	107 049	3 565	1 399
1993	114 587	2 474	1 567
1994	123 529	3 170	1 547
1995r	109 515	3 661	1 751
1996	127 736	4 164	2 326

(a) Dressed weight of whole birds, pieces, and giblets intended for sale as reported by producers.

(b) Fresh: sold immediately after slaughter or chilled for sale soon after. Frozen: frozen hard for storage of indefinite duration.

Source: *Livestock Products, Australia (7215.0)*; ABS unpublished data.

Apiculture

Honey production in Victoria was 4,415 tonnes in 1995–96. The bulk of the honey produced is sold to large processors who clarify and pack it.

14.31 BEEHIVES, HONEY, AND BEESWAX, VICTORIA

Year ended 30 June	Apiarists no.	Production		
		Beehives no.	Honey tonnes	Beeswax tonnes
1992	118	56 540	3 579	56
1993	129	57 562	3 160	65
1994	322	88 742	4 905	194
1995	294	82 704	3 302	58
1996	254	81 506	4 415	80

Source: *AgStats on Floppy Disk (7117.0)*.

FISHING

Australia's fisheries stocks are extremely diverse but, by world standards, its marine ecosystem is relatively unproductive. The Australian Fishing Zone covers an area 16% larger than the Australian land mass and is the third largest fishing zone in the world. However, Australia's fish production is small by world standards. This reflects low productivity of the oceans rather than under-exploitation of the resource.

Over 3,000 species of marine and freshwater fish and at least an equal number of crustacean and mollusc species occur in and around Australia. Fewer than 100 of these are commercially exploited, the major species being prawns, rock lobster, abalone, tuna, other fin fish, scallops, oysters and pearls. Australian fishing operators concentrate their efforts on estuarine, coastal, pelagic (surface) species and demersal (bottom living) species that occur on the continental shelf.

In 1993–94, Australians consumed 3.5kg of edible weight fresh and frozen fish per person sourced from Australian waters, and 2.1kg of imported fish. The consumption per person of crustaceans and molluscs (such as prawns, lobsters, crabs and oysters) was 1.5kg. A further 3.1kg per person was consumed in the form of prepared seafood products.

Aquaculture, or 'fish farming', is an alternative to harvesting the naturally occurring fish stocks and has considerable potential as a means of ensuring sustainability of harvesting yields. Aquaculture industries are established in all States, with species involved ranging from pearl oysters to freshwater trout. The industry has experienced rapid growth during the past six years, with the value of production rising from \$188 million in 1989–90 to \$419 million in 1994–95.

Victorian fisheries

Statistics relating to the Victorian fisheries catch are produced by the Victorian Fisheries Research Institute on behalf of Victorian Fisheries. Data is supplied by licensed commercial fishers, the Melbourne Fish Market and selected fish processors.

As at August 1996, there were 922 personal fishing licences and 1,034 boat licences valid in Victoria.

14.32 ANNUAL FISHERIES CATCH, LANDED COMMERCIALY IN VICTORIA(a)

Fish	Production, live weight			Value		
	1994–95 tonnes	1995–96 tonnes	1996–97 tonnes	1994–95 \$'000	1995–96 \$'000	1996–97 \$'000
Freshwater	655	693	789	1 372	1 510	1 493
Abalone	1 447	1 532	1 453	42 546	37 630	41 997
King Crab	54	41	61	768	535	1 720
Rock Lobster	510	483	455	15 862	14 262	14 152
Scale Fish	5 381	5 268	3 627	9 747	11 222	8 818
Scallops	418	2 657	575	846	5 313	1 150
Squid(c)	1 317	94	75	1 899	405	327
Shark	1 416	1 514	1 154	8 172	9 777	7 807
Other	1 037	331	249	1 250	905	554
Total	12 235	12 613	8 438	82 462	81 559	78 018

(a) This information is based on mandatory fishing returns submitted by commercial fishers. The figures do not take into account returns not received or processed.

Source: Victorian Fisheries Research Institute, Department of Natural Resources and Environment.

The drop in production between 1995–96 and 1996–97 was mainly due to scallops, which decreased from 2,657 tonnes to 575 tonnes. The population of scallops can be quite unstable and may vary markedly from year to year.

FORESTRY

Forests are an important sustainable natural resource providing a wide range of essential products and benefits to the community.

Forest vegetation cover protects the soil from water and wind erosion, reduces the potential for flooding and siltation of water bodies and sustains water quality. Forests also act as an agent in the absorption of greenhouse gases and provide habitats for a wide variety of native animals and plants.

The forest and wood products industries, based on native and plantation forests, contribute substantially to Australia's economy and provide substantial employment in regional areas. Forests are also valuable ecosystems providing a gene pool of great diversity for scientific investigation; a source of honey, oils, gums, resins and medicines; and a resource base for education, tourism and recreation.

Forests cannot necessarily provide for all uses at the same time, but careful management can ensure that forests provide multiple benefits in the long term for the Australian community.

Farm forestry is becoming increasingly important as a potential commercial source of timber. A broad range of programs have been implemented by government and private agencies to promote landcare and reafforestation on Australian farms.

The Forest Estate

Australia's forest estate is made up of 155.8 million hectares of native forest and 1.043 million hectares of plantations (about 20% of Australia's land area), according to the most recent inventories available (National Forest Inventory, 1997, and National Plantation Inventory 1997).

Native forest

The native forest inventory was conducted based on the 1992 National Forest Policy Statement (NFPS) definition of forest.

Native forest is defined as: *'an area, incorporating all living and non-living components, that is dominated by trees having usually a single stem and a mature or potentially mature stand height exceeding 2 metres, and with existing or potential projected canopy cover of overstorey strata about equal to or greater than 20 percent'*. This definition includes Australia's diverse native forests, regardless of age. It is also sufficiently broad to encompass areas of trees that are sometimes described as woodlands.

Using this definition, the total area of native forest was estimated at 155.835 million hectares at 30 June 1997.

To date, the term 'forest' has referred to ecosystems dominated by tall, relatively densely spaced trees, and 'woodlands' has been used where the trees are smaller or more widely spaced or open. However, at times 'forest' has been broadened to include woodlands and as in earlier Quarterly Forest Product Statistics, also narrowed to equate to only 'commercially exploitable trees' or trees generally more than 20 meters high. The difficulty in using the apparently simple terms of forest and woodland is that there has always been debate about where the boundary between them should lie. The native forest areas reported here include regrowth forest on agricultural land where they could be identified in the mapping process.

The NFPS definition was modified to reduce uncertainty in relation to projected canopy cover and height. The definition refers to 'usually' single stemmed trees, which recognises that the mallees multi-stemmed eucalypt trees must be included. To make this possible the lower tree height limit has been set at two metres, a reduction from five metres. The full definition, which requires the vegetation to be of tree formation, excludes shrublands, even if they are higher than two metres. This reduction in the minimum height makes no significant difference to the total area of forest, adding only about 4–5 per cent of the total.

There is currently no national standard used for mapping. Nationally tree height information has either been collected or reclassified by the National Forest Inventory into three categories:

- low — 2–10 meters
- medium — 11–30 metres
- tall — greater than 30 metres

14.33 NATIVE FOREST AREAS BY FOREST TYPE AND OWNERSHIP

	Victoria '000 ha	Australia '000 ha	Victoria as a percentage of Australia %
DOMINANT CANOPY SPECIES			
Eucalypt			
Tall	2 825	6 543	43.2
Medium	2 986	91 450	3.3
Low	76	14 700	0.5
Mallee	958	11 764	8.1
Unknown	—	6	0.0
Total Eucalypt	6 845	124 463	5.5
Acacia	17	12 299	0.1
Meleleuca	18	4 093	0.4
Rainforest	3	3 583	0.1
Casuarina	—	1 052	0.0
Mangrove	5	1 045	0.5
Callitiris	37	867	4.3
Other	360	8 435	4.3
Total	7 285	155 835	4.7
TENURE			
Public ownership			
Multiple use forests	3 346	13 351	25.1
Nature conservation reserve	2 710	17 580	15.4
Other crown land	165	15 597	1.1
Leasehold	—	66 103	0.0
Total public ownership	6 220	112 631	5.5
Private ownership	1 038	42 018	2.5
Unresolved tenure	26	1 186	2.2
Total	7 285	155 835	4.7

Source: Bureau of Resource Sciences.

Of Victoria's 7.3 million hectares of native forest at June 1997, 6.2 million hectares (85%) were publicly owned and 1.0 million hectares (14%) were on private land. Of the publicly owned forests, 2.7 million hectares (44%) were in nature conservation reserves, 3.3 million hectares (54%) were managed by State forest authorities for multiple uses, including wood production, 0.2 million hectares were in other Crown land and none were under lease. This distribution is very different from Australia as a whole. A greater proportion of Victoria's forests are in public ownership than in the rest of Australia. Of the Victorian forests in public ownership, a greater proportion are either in nature conservation reserves or are in multiple use forests managed by State forest authorities. No Victorian publically owned forest is leased.

Plantations

Under the National Forest Policy Statement ratified by the Commonwealth, State and Territory Governments in 1992, Australia is committed to expanding its plantation estate. Previously, the National Afforestation Program was established to stimulate an expansion in the commercial hardwood timber resource and to assist in land rehabilitation through broadacre commercial plantations (including farm forestry).

In July 1996, the Ministerial Council on Forestry, Fisheries and Aquaculture agreed to a national goal of trebling Australia's forest plantations estate by the year 2020.

The National Plantation Inventory (NPI) project was established to collect up to date quantitative data about Australia's plantation resources (both hardwood and softwood) based on growers' information, focussing on growers with plantation estates exceeding 1,000 hectares. Information includes location, area, species and 5 year planting periods of standing plantations.

The first report of the NPI of Australia (National Forest Inventory 1997) aggregates comprehensive information on Australia's standing plantation forest resources at regional and national scales.

The NPI was not provided with complete figures for annual establishment rates.

14.34 PLANTATION AREAS CLASSIFIED BY SPECIES AT 31 MARCH 1995

Species	Victoria r ha	Australia r ha	Victoria as a percentage of Australia %
Coniferous			
<i>Pinus radiata</i>	195 195	642 940	30.4
<i>Pinus elliotii</i>	—	72 880	0.0
<i>Pinus pinaster</i>	761	28 880	2.6
<i>Pinus caribaea</i>	—	54 160	0.0
<i>Araucaria</i> species	—	45 300	0.0
Other	73	39 680	0.2
Total	196 029	883 840	22.2
Broadleaved			
<i>Eucalyptus</i> species	19 307	158 370	12.2
<i>Populus</i> species	40	40	100.0
Other	—	230	0.0
Total	19 347	158 640	12.2
Grand Total	215 380	1 042 500	20.6

Source: Australian Bureau of Agricultural and Resource Economics-Quarterly Forest Products Statistics.

The NPI reports there are approximately 1.043 million hectares of standing plantations in Australia at the end of 1994, representing a very small proportion (less than 0.2%) of Australia's landmass. 883,840 hectares are softwood (mostly *Pinus Radiata*) and 158,640 hectares are hardwood species. Although more recent information was provided to the NPI, the inventory is only nationally complete to March 1995. The predominant species in Victoria is *Pinus radiata*. There are however increasing areas of Eucalypt species being established in Victoria.

The increasingly commercial focus of State/Territory plantation operations, and their separation from forestry services in a number of States, has created difficulties in the collection of annual forest area statistics at the State level for the past five years and some private growers have also expressed concerns about providing data to agencies in direct competition with them. To maintain grower confidentiality, the inventory has not distinguished between different ownership classes.

Source: Philip Tickle, Debbie Lamb, Roger Hnatiuk and Claire Howell, Bureau of Resource Sciences.

MINING

Mining has played a significant part in Victoria's economic development since the discovery of gold in central Victoria in 1851.

Much of Victoria's industry, transport and infrastructure, including the growth of towns such as Bendigo, Ballarat and Melbourne itself, can be traced back to the impetus of the discovery and mining of gold and other minerals.

Today, mineral exploration and extraction remains a significant component of Victoria's economic activity, in particular, the extraction of oil and natural gas from the rich Bass Strait off-shore fields.

In 1995–96, the Victorian mining industry contributed 16.0% of the Australian mining component of Gross Domestic Product (GDP) at factor cost. In the same period, the mining industry accounted for 2.9% of Victoria's Gross State Product (GSP) at factor cost.

The mining component of GDP includes the extraction of minerals occurring naturally as solids, such as coals and ores, liquids, such as crude petroleum, and gases such as natural gas.

In 1995–96, Victoria's main mining outputs were oil and gas from Bass Strait, gold from mining ventures in central Victoria and brown coal for use in the power stations of the LaTrobe Valley. Additionally, small quantities of zinc, copper and bauxite were also mined.

14.35 MINING, SUMMARY OF OPERATIONS, VICTORIA

Year	Establishments at June 30 no.	Employment(a) no.	Wages and salaries(b) \$m	Turnover \$m	Stocks		Purchases, transfers in, selected expenses \$m	Value added(c) \$m
					Opening \$m	Closing \$m		
1990-91(d)	9	1 517	100.4	4 037.9	35.2	33.2	130.6	3 905.3
1991-92(d)	11	1 031	124.5	3 630.6	46.1	61.5	170.9	3 475.1
1992-93	116	2 108	90.1	4 310.5	82.7	65.5	332.6	3 960.7
1993-94(d)(e)	29	2 225	139.6	4 082.6	46.9	43.8	328.5	3 750.9
1994-95(d)(e)	25	2 036	139.5	3 434.6	41.4	52.3	253.1	3 178.8
1995-96(d)(e)	22	1 900	115.3	3 275.6	51.6	51.6	236.5	3 039.1

(a) At 30 June, including working proprietors. (b) Excludes drawings of working proprietors. (c) Value added is calculated by adding to turnover the increase (or deducting the decrease) in value of stock and deducting the value of purchases and selected items of expense. All components needed to calculate value added are only collected triennially. (d) The 1990-91, 1991-92, 1993-94 and 1994-95 (truncated) censuses differ from previous mining censuses in that the construction materials and other non-metallic minerals industries have been excluded. (e) Includes brown coal mining operations of the former State Electricity Commission of Victoria.

Source: *The Australian Mining Industry (8414.0)*.

At 30 June 1996, 1,900 people were employed in the mining industry in Victoria, 1,360 in coal and metal ore mining (72%) and 540 in oil and gas mining (28%).

This represents a fall in employment of 7% over 1994-95. This fall was mainly accounted for by a fall in employment of 7% in the coal and metal ore mining sector, while the oil and gas extraction also decreased by 5%.

The oil and gas mining sector showed a far higher level of concentration of employment than coal and metal ore mining. The three establishments in this sector employed an average 180 workers each, whilst the 19 coal and metal ore mining establishments employed an average of 76 workers each.

14.36 MINING INDUSTRY EMPLOYMENT, VICTORIA

Items	Unit	Coal mining and metal ore mining		Oil and gas extraction		Total coal mining, oil and gas extraction and metal ore mining	
		1994-95	1995-96	1994-95	1995-96	1994-95	1995-96
Number of establishments at 30 June	no.	22	22	3	3	25	22
Employment at 30 June							
Males	no.	1 400	1 302	526	510	1 926	1 812
Females	no.	70	58	40	30	110	88
Total	no.	1 470	1 360	566	540	2 036	1 900
Persons employed per establishment	no.	66.8	75.8	188.7	180.0	81.4	86.8
Employment type							
Administrative office and sales	no.	164	190	188	180	352	370
Production and all other	no.	1 306	1 170	378	360	1 684	1 530
Employees working below ground	no.	90	116	0	0	90	116
Wages and salaries	\$m	100.7	78.1	38.8	37.2	139.5	115.3

Source: *The Australian Mining Industry (8414.0)*.

Brown coal

Most of Australia's measured resources of brown coal are located in Victoria's Latrobe Valley. Brown coal is by far Victoria's most valuable solid mineral commodity, with the 1995-96 production (54.3 million tonnes) valued at an estimated \$465 million. Production in 1994-95 was 50.6 million tonnes.

Metallic minerals

Victorian gold production increased dramatically from a low base of 41kg in 1979–80, largely as a result of the Wonga open cut mine at Stawell coming on stream. In 1990–91, Victorian production peaked at 4,863 kilograms of gold bullion (doré) and 1 tonne of gold concentrate, valued at \$70.9 million. Gold production then fell by over 30% in 1991–92 before steadily rising to around 4,000 kilograms in 1992–93. Production increased by nearly 10% between 1993–94 and 1994–95, from 3,984 kilograms to 4,370 kilograms. It has increased a further 11% during 1995–96 to 4,838 kilograms, nearly equal to the 1990–91 peak.

Copper concentrate production dropped off in 1995–96 to 8,000 tonnes from the 1994–95 figure of 58,000 tonnes. Zinc concentrate production rose slightly to 14,000 tonnes. The only other metallic mineral produced in any quantity in Victoria has been bauxite. However production has generally been sporadic—in 1995–96 only 1,000 tonnes were mined.

14.37 MINERALS PRODUCED, VICTORIA AND AUSTRALIA

Mineral	Unit	Victoria		Australia
		1994–95	1995–96	1995–96
Oil and gas				
Crude oil-stabilised (incl. condensate)	megalitres	14 598	12 732	30 763
Natural gas(a)	gigalitres	5 480	6 299	19 169
Ethane	gigalitres	189	180	199
Liquefied petroleum gases(b)				
Propane	megalitres	1 395	1 275	2 092
Butane	megalitres	1 139	1 037	1 544
Liquefied natural gases	'000 tonnes	0	0	7 346
Metallic minerals				
Bauxite	'000 tonnes	2	1	50 724
Copper concentrate	'000 tonnes	58	8	1 297
Gold bullion (dore)(c)	kg	4 370	4 838	287 524
Zinc concentrate	'000 tonnes	13	14	1 088
Coal (lignite)				
For briquettes	'000 tonnes	750	n.a.	n.a.
Other	'000 tonnes	49 929	54 281	54 281

(a) Includes field and plant usage. (b) Excludes refinery production. (c) Includes alluvial gold.

Source: *The Australian Mining Industry (8414.0)*.

Oil and gas production

In 1995–96, Victoria's Bass Strait produced 12,262 megalitres of crude oil, and 6,656 gigalitres of natural gas. This highlights the importance of the Bass Strait field to Australia's economy, as one of only three off-shore oil and gas fields (the other two being in the Timor Sea and the North-West Cape, both in Western Australia). Victoria has a very much smaller on shore oil and gas field in the Otway region, but its production is negligible compared with Bass Strait.

14.38 REFINING CAPACITY, VICTORIA, AT 31 DECEMBER 1996

Refining Company	Location	Capacity b/sd(a)
Mobil Refining Australia Pty Ltd	Altona, Vic (1949)	110 000 (or 5 343 000 tonnes/year)
Shell Refining (Australia) Pty Ltd	Geelong, Vic (1954)	110 000 (or 5 343 000 tonnes/year)

(a) b/sd: barrels per stream day. Barrels per day are multiplied by 46.42 to convert to tonnes per year.

Source: *Australian Institute of Petroleum Ltd: Oil and Australia Statistical Review, 1997*.

The total Australian refining capacity as at 31 December 1994 was 813,000 barrels per stream day (b/sd) or 38,194,000 tonnes per year. The Australian lubricating oil refinery capacity at the same date was 16,510 b/sd or 766,000 tonnes per year. Refineries do not operate at 100% capacity for 365 days per year, with maximum operating capacity generally around 85–88% of designed capacity. Actual capacity at any given time depends on the type of crude oil being processed.

14.39 ESTIMATED HYDROCARBON RESERVES, BASS STRAIT, VICTORIA

Item	Unit	At 30 June	
		1995	1996
Crude oil and condensate	gigalitres	110.0	110.2
Natural gas	giga cubic metres	135.3	130.8
LPG	gigalitres	34.9	33.5

Source: Department of Energy & Minerals, Victoria: *Minerals and Petroleum Victoria, Statistical Review*.

REFERENCES

Data sources

The majority of agricultural statistics in this chapter are derived from the Agricultural Census conducted at 31 March each year.

Estimated Value of Agricultural Operations (EVAO) is an aggregation of derived values for all crop and livestock activity for each unit. It should be noted that EVAO is applicable only for industry coding and size valuation purposes. It is not an indicator of receipts obtained by units, nor of the actual value of agricultural commodities produced by these units.

Gross Value of production is the value placed on production at the wholesale prices realised in the market place.

ABS Sources

Australian National State Accounts (Cat. no. 5220.0)

Agriculture, Victoria (Cat. no. 7113.2)

Agstats on floppy disk (Cat. no. 7117.0)

Livestock Products Australia (Cat. no. 7215.0)

The Australian Mining Industry (Cat. no. 8414.0)

Value of Agricultural Commodities Produced Australia (Cat. no. 7530.0)

Non-ABS sources

Australian Dairy Corporation

Australian Institute of Petroleum Ltd: Oil and Australia Statistical Review, 1996

Australian Wheat Board

Department of Energy & Minerals, Victoria: Annual Report 1993-94

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