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AGRICULTURAL INDUSTRIES

FARMING IN VICTORIA

Land settlement

Beginnings

The first permanent settlement of the then Port Phillip District of the Colony of New South Wales occurred in 1834 when the Henty brothers "squatted" on Crown land at Portland. They were followed by Batman and Fawkner who in 1835 similarly squatted on the present site of Melbourne. Although squatting was illegal, settlement had extended some 130 kilometres inland by 1836.

Efforts were made to legalise the position of the squatters and in 1836 regulations were drafted to enable them to acquire for \$20 as much land as they wished. This resulted in some very large holdings. At one time four pastoralists held approximately 3 million hectares of the District. By 1840, most of the southern and western parts had been occupied. Also, because of the favourable reports of Major Mitchell, who led an expedition through the area, pastoralists were bringing their flocks south of the Murray River, resulting in extensive settlement in northern areas from New South Wales.

Various Acts of Parliament were proclaimed to give the squatters security of tenure and to break up the large holdings and make land available to more people. However, by the use of "dummy settlers", vast areas of land still remained in the hands of a few.

The early settlers were all pastoralists. Such crops as were grown were for their own consumption and for food for livestock. With the large increase in population that came with the gold rushes and in the aftermath of the Irish potato famines, land-use had to be diverted from grazing to agriculture and large holdings had to be broken up to make land available to the small farmer.

In all, some ninety Acts of Parliament were proclaimed dealing with land settlement. To enable closer settlement to take place, the Government re-purchased land from the original holders and then offered it for sale to small farmers to use for cropping instead of grazing. Full details of these Acts of Parliament can be found in the *Victorian Year Book* 1973.

Land occupation

The following tables show alienation and utilisation of Crown land in Victoria:

VICTORIA—ALIENATION OF LAND AT 30 JUNE 1979

Particulars	Area
	hectares
Lands alienated in fee simple	13,830,000
Lands in process of alienation	127,000
Crown lands	8,803,000
Total	22,760,000

VICTORIA—CROWN LANDS AT 30 JUNE 1979

Particulars	Area
	hectares
Land in occupation under—	
Perpetual leases	12,383
Grazing leases and licences	2,311,968
Other leases and licences	13,845
Reservations—	
Reserved forest	2,259,670
Timber reserves (under Land Act)	59,640
Water catchment and drainage purposes	85,411
National parks (under National Parks Act)	602,620
Wildlife reserves	59,582
Water frontages, beds of streams and lakes (not included above)	333,207
Other reserves	125,366
Unoccupied and unreserved but including areas set aside for roads	2,939,102
Total	8,802,794

Physical characteristics of statistical divisions

Introduction

In earlier editions of the *Victorian Year Book*, the description of land utilisation in Victoria was based on the division of the State into eight Agricultural Districts which were combinations of counties, i.e., land areas with immutable boundaries.

From the 1978 edition, land utilisation has been described in terms of twelve statistical divisions, the standard Australian Bureau of Statistics regions which are combinations of local government areas forming coherent socio-economic zones. These regions were adopted by the Victorian Government for planning purposes. Statistical divisions are subject to change as local government areas change and as socio-economic conditions change. (See also pages 167 to 171). A map of statistical divisions in Victoria can be found on page 325 of the 1979 *Victorian Year Book*.

Melbourne Statistical Division

As the Melbourne Statistical Division is largely occupied by the metropolitan area, it is of comparatively small agricultural significance. Nevertheless there is quite a range of soils, climates, and agricultural activities.

The basalt plains stretch eastwards from the western plains to the mountains and hills. The topography in the west is quite flat, and hilly to mountainous in the north and east. The Mornington Peninsula comprises the southern boundary.

The predominant soils are Podsollic derived from basalt, sedimentary rocks, and unconsolidated sediments, and Red-Brown Earths. Other soils are the Kranozems and the peaty soils (very acidic, black, and consisting mainly of organic matter over clay subsoils). Rainfall varies from 475 mm in the west to 1,250 mm in the east.

The western area has been well regarded for its hay and barley production. The peripheral shires in most of the remainder of the Division support mainly small farms with dairying, orchards, poultry raising, flower growing, and stud farming. Some of these areas are under wooded hills and mountains, although the land is much clearer to the south.

A recent development has been the proliferation of subdivisions into small farms, many of which are owned by city residents. Many of these properties are kept for recreation; others for small commercial ventures. Recreation is in fact a substantial industry in this Division, as there are a number of golf courses and country clubs. Another trend has been the industrialisation of areas away from Melbourne, e.g., Dandenong and Hastings, which has resulted in additional inroads into the rural areas.

VICTORIA—MELBOURNE STATISTICAL DIVISION: NUMBER OF
AGRICULTURAL ESTABLISHMENTS (a), 1978-79 (b)

Main activity of establishment (a)	Estimated value of agricultural operations (\$'000)					Total establishments
	2-9	10-19	20-39	40-99	100+	
Meat cattle	739	178	88	19	8	1,032
Orchard and other fruit	108	65	84	82	27	366
Vegetables	64	70	113	131	98	476
Nurseries	84	50	53	57	27	271
Poultry	20	21	46	44	61	192
Potatoes	6	5	12	19	4	46
Other	500	229	203	65	18	1,015
Total	1,521	618	599	417	243	3,398

(a) Establishment is a term used in economic statistics and refers to the full range of activities at the smallest operating level of a business, which in general corresponds to a location. Establishments are classified according to their predominant activity based on the estimated value of commodities produced; the sum of these comprises the "estimated value of operations" of the establishment as a whole. This table excludes those establishments with an estimated value of agricultural operations of less than \$1,500.

(b) The period covered in this and most subsequent tables in this Chapter is the 1978-79 season which in general refers to the year ended 31 March 1979, but also includes activities which may have been finalised after 31 March (e.g., grape picking). In most of these the growing period occurred before 31 March.

Barwon Statistical Division

Barwon is one of Victoria's smallest statistical divisions and lies west of the south-west corner of Port Phillip Bay. It comprises nine shires. In the south, the main topographical feature is the Otway Ranges, a steep mountainous region with high rainfall, ideally suited to forestry. To the north is the flat volcanic plain which is used mainly for grazing as well as a little cropping. Intermediate between these extremes are the coastal plains which have a mixture of soil types and topography.

Most of the soils are Podsollic, being derived from basalt, unconsolidated sediments, and sedimentary rocks. Others are Red-Brown Earths. The average annual rainfall varies between 450 mm and 1,200 mm in various parts of the Division.

About 75 per cent of the Division is under primary production. The main agricultural industries are dairying, and beef and sheep raising, but there are also quite significant areas of cereal and oilseed crops as well as grass seed production, beekeeping, and pigs. Forestry is also important in and around the Otway Ranges.

There has been a tendency during recent years for farmers to go out of dairying. Beef and wool production are the main activities on the volcanic plains, and prime lambs are raised in the southern areas of the Division.

VICTORIA—BARWON STATISTICAL DIVISION: NUMBER OF
AGRICULTURAL ESTABLISHMENTS (a), 1978-79 (b)

Main activity of establishment (a)	Estimated value of agricultural operations (\$'000)				Total establishments
	2-9	10-19	20-39	40+	
Milk cattle	121	259	369	78	827
Meat cattle	383	108	38	23	552
Sheep	171	108	126	87	492
Other	247	165	194	195	801
Total	922	640	727	383	2,672

(a) See footnote to table above.

(b) See footnote to table above.

South Western Statistical Division

The South Western Statistical Division covers a large portion of the south-west of Victoria, being bounded on the south by the sea and the west by the State boundary with South Australia. It is mainly located on volcanic and coastal plains, with some rising country in the south-east of the Division. Rainfall varies from about 500 mm in the extreme north to 1,200 mm in the Otway Ranges in the south-east corner. Temperatures

are generally cooler away from the coast where the sea has an ameliorating influence during the winter.

Few rivers flow through the area, and those that do show a considerable variation in the content of dissolved salts. Lakes in the basalt areas vary from fresh water to brine. Underground water is widely available at fairly shallow levels with salt content varying from 1,000 to 7,000 parts per million.

Many of the soils have developed from lava flows with acid grey loams and sandy loams coming from the older flows. Some of the more recent lava has not weathered greatly and the soils from it are skeletal with stony rises. The dominant soil type is the one which is derived from basalt and unconsolidated sediments. Sub-dominants are derived from sedimentary rocks and the miscellaneous soil group. Soils in the red gum areas have a sandy topsoil with clay below.

A large portion of the Division is farmed; the remainder is covered by natural forest or planted commercial forests. Substantial areas of the farmed land are under improved pasture.

The Western District, within this Division, is a traditional woolgrowing area. Sheep numbers fell during the early 1970s but are now recovering. Dairying is popular along the southern section and beef cattle are also raised. Numbers of the latter have begun to decline and the numbers of dairy farms and dairy cattle are also falling.

The main crops are oats, wheat, and barley. Oilseeds such as sunflowers, linseed, and rape, have gained popularity during recent years.

VICTORIA—SOUTH WESTERN STATISTICAL DIVISION: NUMBER OF AGRICULTURAL ESTABLISHMENTS (a), 1978-79 (b)

Main activity of establishment (a)	Estimated value of agricultural operations (\$'000)					Total establishments
	2-9	10-19	20-39	40-99	100+	
Milk cattle	203	644	1,093	258	8	2,206
Sheep	267	306	645	390	64	1,672
Sheep and meat cattle	164	237	378	367	141	1,287
Meat cattle	629	263	145	64	11	1,112
Other	100	65	129	121	64	479
Total	1,363	1,515	2,390	1,200	288	6,756

(a) See footnote to table on page 335.

(b) See footnote to table on page 335.

Central Highlands Statistical Division

The Central Highlands are a very important statistical division, with Ballarat near its eastern boundary and Ararat near the west. The district is a mixture of extinct volcanic cores, basaltic plains, and uplifted sedimentary strata of Ordovician age. Elevation ranges from about 200 metres to 500 metres above sea level. The Great Dividing Range passes a few kilometres north of Ballarat, and the Pyrenees Range enters the north-west corner of the Division. The western section stretches into plains, and finishes near the Grampians.

The main soils are Podsollic, derived from basalt and sedimentary rocks; Kranozems are sub-dominant. Annual rainfall varies from 425 mm to 1,050 mm. The main streams which rise in the area are the Wimmera, Avoca, Loddon, and Campaspe Rivers, flowing north, and the Mt Emu, Fiery, Hopkins, Leigh, Woody Yallock, Moorabool, and Werribee flowing south.

About 75 per cent of the Division is farmed, the remainder being Crown land and forest. Most of the Crown land and forest is in the Daylesford-Trentham, Smythesdale, Enfield, and Mt Cole areas.

The main agricultural produce comprises wool, prime lambs, potatoes, beef, cereals, and oilseeds, with some dairying and small seeds production. The plains produce very heavy crops of oats and good crops of wheat.

Improved pastures have increased the carrying capacity of the plains greatly and have improved soil fertility, enabling productive clover ley farming to be undertaken.

VICTORIA—CENTRAL HIGHLANDS STATISTICAL DIVISION: NUMBER OF AGRICULTURAL ESTABLISHMENTS (a), 1978-79 (b)

Main activity of establishment (a)	Estimated value of agricultural operations (\$'000)					Total establishments
	2-9	10-19	20-39	40-99	100+	
Sheep	366	279	311	226	46	1,228
Meat cattle	303	57	36	15	3	414
Sheep and meat cattle	108	86	87	60	26	367
Potatoes	22	23	36	58	27	166
Other	227	138	206	223	59	853
Total	1,026	583	676	582	161	3,028

(a) See footnote to table on page 335.

(b) See footnote to table on page 335.

Wimmera Statistical Division

The Wimmera is one of Victoria's largest and most productive statistical divisions. It stretches broadly from the South Australian border in the west to Stawell in the south-east and Hopetoun in the north-east. It is primarily a large plain, sloping gently to the north, but has the distinctive Grampians Range of mountains on its south-east border.

The dominant soils groups are Grey and Brown soils of heavy texture (alkaline clay loams and clays over clay subsoils—friable calcareous self-mulching grey soils) and Podsolc soils derived from unconsolidated sediments. The sub-dominant groups are Red-Brown Earths, Mallee soils, Podsolc soils derived from sedimentary rocks, and the Miscellaneous Soil Group. Rainfall ranges from 350 mm to 880 mm a year.

Most of the area, except the uncleared desert country in the north-west and south-west of the Division, is farmed.

Cereal growing is the dominant agricultural industry, with heavy crops of wheat being produced in good seasons. Barley is grown primarily on the Rosebery Ridge between Beulah and Hopetoun, while oats and rye, which are grown in the lighter soils, are also produced. Some sunflowers have also been grown in recent years.

Grazing, which encompasses both the running of some excellent medium to strong Merino sheep flocks in the south and of fat lambs in the north, is also important. A number of beekeepers also use the flowering eucalyptus to advantage.

VICTORIA—WIMMERA STATISTICAL DIVISION: NUMBER OF AGRICULTURAL ESTABLISHMENTS (a), 1978-79 (b)

Main activity of establishment (a)	Estimated value of agricultural operations (\$'000)					Total establishments
	2-9	10-19	20-39	40-99	100+	
Sheep and cereal	61	202	486	556	112	1,417
Cereal grains	119	184	558	835	202	1,898
Sheep	187	141	191	81	14	614
Other	167	76	80	47	29	399
Total	534	603	1,315	1,519	357	4,328

(a) See footnote to table on page 335.

(b) See footnote to table on page 335.

Northern Mallee Statistical Division

This large Division extends along the Murray Valley from the Kerang area to Mildura and on to the South Australian border. It is essentially a vast plain, sloping to the north-west from about 100 metres above sea level in the south to 35 metres at Lake Cullulleraine. Low superficial land forms of ridges and dunes are also present.

The dominant soil group is the Solonised Brown soils (Mallee soils)—alkaline brown sandy soils over more clayey, highly calcareous soils. Several sub-dominant groups occur. These are Grey and Brown soils of heavy texture, Red-Brown Earths, and Alluvial Soils. This Division is relatively dry, with rainfall ranging from 240 mm to 370 mm a year.

Most of the Division has been cleared for agriculture except for two major tracts of country along the South Australian border—the Sunset Country, south-west of Mildura, and the Big Desert which extends south into the Wimmera Division.

The main broadacre farming is cereal growing, associated with wool, prime lambs, and beef cattle. Wheat is the principal crop, followed in order by barley and oats. Dairying is conducted primarily in the irrigated country around Swan Hill and Kerang.

Horticulture is concentrated around Mildura, Robinvale, and Swan Hill. A high proportion of Victoria's grapes (for drying, table use, and wine), olives, and citrus fruits are grown in this Division. Vegetables are also grown.

VICTORIA—NORTHERN MALLEE STATISTICAL DIVISION: NUMBER OF AGRICULTURAL ESTABLISHMENTS (a), 1978-79 (b)

Main activity of establishment (a)	Estimated value of agricultural operations (\$'000)					Total establishments
	2-9	10-19	20-39	40-99	100+	
Grapes	515	997	265	50	4	1,831
Cereal grains	41	90	235	663	345	1,374
Sheep and cereal	10	33	66	137	45	291
Orchard and other fruit	64	56	71	53	16	260
Other	272	211	236	87	35	841
Total	902	1,387	873	990	445	4,597

(a) See footnote to table on page 335.

(b) See footnote to table on page 335.

Loddon-Campaspe Statistical Division

The Loddon-Campaspe Division stretches from the Central Highlands in the south to the Murray River. The hilly and woody country of the south gives way to flat treeless plains. Red-Brown Earths are the dominant soils. Sub-dominant groups are Grey and Brown soils of heavy texture (both friable and dense Grey soils), Podsolc soils derived from sedimentary rocks, and Alluvial soils. Rainfall ranges from about 350 mm to 650 mm a year.

Grazing in the south of the Division gives way to heavy cropping in the west and dairying on irrigated land in the north and east. Sheep are run in conjunction with cereal growing, and there are intensive poultry and pig raising industries in the Bendigo area.

VICTORIA—LODDON-CAMPASPE STATISTICAL DIVISION: NUMBER OF AGRICULTURAL ESTABLISHMENTS (a), 1978-79 (b)

Main activity of establishment (a)	Estimated value of agricultural operations (\$'000)				Total establishments
	2-9	10-19	20-39	40+	
Meat cattle	483	116	51	19	669
Sheep	371	189	169	116	845
Milk cattle	95	229	461	142	927
Sheep and cereal	78	158	321	436	993
Sheep and meat cattle	115	82	80	65	342
Pigs	32	21	25	54	132
Other	347	195	262	431	1,235
Total	1,521	990	1,369	1,263	5,143

(a) See footnote to table on page 335.

(b) See footnote to table on page 335.

Goulburn Statistical Division

The Goulburn Statistical Division, which occupies an area on the east side of central Victoria, encompasses a wide range of topography and agricultural activities. From the mountainous part of the Great Dividing Range in the south, it stretches to the Murray River as a wide plain, much of which is known as the Goulburn Valley. In the north-west corner, the principal landscape features are treeless plains, old watercourses, riverside woodland, and swamps. The Goulburn, Loddon, and Campaspe Rivers drain the area to the north.

The main soils are Red-Brown Earths (slightly acid brown loams over alkaline clay subsoils containing calcium carbonate) and Podsolc soils derived from sedimentary rocks

(grey loams, silty loams, and fine sandy loams with a more or less bleached sub-surface over clay subsoils). A sub-dominant group of alluvial soils occurs. Rainfall varies from 430 mm to 1,400 mm a year.

Most of the area, apart from the wooded hills, is farmed. Farming activities range from dairying (in the river valleys and highly productive irrigated country) to cereal growing; orchards, especially in the Shepparton and Cobram districts; and grazing. Irrigated cash crops of wheat or oilseeds (principally sunflowers) are becoming important. Vegetables are also grown.

During recent years there has been a decline in dairying, especially in the dry country, and, in the early 1970s, an increase in cattle raising. However, cattle numbers have, until recently, declined with the fall in prices for beef.

VICTORIA—GOULBURN STATISTICAL DIVISION: NUMBER OF AGRICULTURAL ESTABLISHMENTS (a), 1978-79 (b)

Main activity of establishment (a)	Estimated value of agricultural operations (\$'000)					Total establishments
	2-9	10-19	20-39	40-99	100+	
Milk cattle	218	612	1,176	230	11	2,247
Meat cattle	714	285	142	65	10	1,216
Sheep and meat cattle	130	220	247	97	17	711
Orchard and other fruit	53	46	119	152	82	452
Cereal grains	121	104	133	114	18	490
Meat cattle and cereal	53	70	82	49	2	256
Other	456	355	503	371	71	1,756
Total	1,745	1,692	2,402	1,078	211	7,128

(a) See footnote to table on page 335.

(b) See footnote to table on page 335.

North Eastern Statistical Division

The North Eastern Statistical Division is characterised by mountainous country and some highly productive river valleys. There is also some cultivable country in the north-west corner of the Division.

Two dominant soil groups occur—Podsollic soils derived from sedimentary rocks and a miscellaneous group comprised of Podsollic, Peaty, and Skeletal soils, and red loams of the mountainous regions. Rainfall varies from 500 mm to 1,900 mm.

Traditional agricultural industries have included cropping, particularly around Rutherglen and Yarrowonga; winegrowing in the Rutherglen-Wahgunyah district; dairying along the valleys; beef cattle, particularly in the upper reaches of the Murray River; and hop growing, stonefruits, walnuts, and a high proportion of Victoria's tobacco growing, in the Ovens Valley, centred around Myrtleford.

A recent innovation has been the attempt to grow oilseed crops, particularly lupins, in the higher rainfall area to the south and as an addition to the cereal rotation in the north. There have been increases in the area of vines, lucerne production, and the area irrigated; and a decline in hop gardens, due to higher yields from the currently recommended variety of hops.

VICTORIA—NORTH EASTERN STATISTICAL DIVISION: NUMBER OF AGRICULTURAL ESTABLISHMENTS (a), 1978-79 (b)

Main activity of establishment (a)	Estimated value of agricultural operations (\$'000)					Total establishments
	2-9	10-19	20-39	40-99	100+	
Meat cattle	654	359	229	72	14	1,328
Milk cattle	60	139	232	76	3	510
Tobacco	3	2	82	178	48	313
Sheep and meat cattle	61	87	81	36	2	267
Other	211	122	154	150	62	699
Total	989	709	778	512	129	3,117

(a) See footnote to table on page 335.

(b) See footnote to table on page 335.

East Gippsland Statistical Division

East Gippsland covers a large area of south-east Victoria with the Great Dividing Range in the north, the New South Wales border on the north-east, and Bass Strait on the south. The Division can be divided into five main areas: (1) The coastal plain from south of Sale to Lakes Entrance, including the Gippsland Lakes. (Here there are mainly sandy to sandy loam soils over clay or gravel and sheep and cattle are the main industries in this area.) (2) the foothills, undulating country which carries mainly sheep and cattle; (3) the highlands, carrying sheep and cattle on undulating to steep country; (4) the river valleys beginning in the west at the sources of the La Trobe and McAlister Rivers, and running east along the Tambo, Snowy, Cann, and other rivers; and (5) the productive irrigation district around Sale and Maffra.

Soils are mainly Podsollic, derived from sedimentary rocks, and the Miscellaneous Soil Group. The sub-dominant group comprises Podsols derived from unconsolidated sediments. This Division has quite a wide range of annual rainfall varying from 520 mm west of Bairnsdale to 1,150 mm in the mountains.

Apart from major areas of development in the plains in the western part of the Division which includes the irrigated area around Sale and Maffra, and the Omeo and Gelantipy districts, most agriculture is confined to the river valleys.

Beef cattle, sheep, and dairying are the most important livestock industries in the area. There is little broadacre cultivation. Vegetables are grown on the river flats at Lindenow and Orbost. The main crop, beans, is harvested green and sent to Melbourne to be frozen. Other crops include edible beans, sweetcorn, capsicums, and gherkins.

**VICTORIA—EAST GIPPSLAND STATISTICAL DIVISION: NUMBER OF
AGRICULTURAL ESTABLISHMENTS (a), 1978-79 (b)**

Main activity of establishment (a)	Estimated value of agricultural operations (\$'000)				Total establishments
	2-9	10-19	20-39	40+	
Meat cattle	458	198	109	52	817
Milk cattle	55	138	249	87	529
Sheep and meat cattle	83	100	130	90	403
Other	135	72	78	69	354
Total	731	508	566	298	2,103

(a) See footnote to table on page 335.

(b) See footnote to table on page 335.

Central Gippsland Statistical Division

Central Gippsland is bounded on the south by Bass Strait, on the north by the mountains, on the west by an irregular line running north from near Wonthaggi, and on the east by a diagonal line passing just east of Sale. The main part of the area consists essentially of two mountain systems—the foothills of the Great Dividing Range and the Strzeleckis—separated by an east-west trough known as the Great Valley of Victoria. The remainder consists of low-lying hills and coastal plains.

The average rainfall ranges from 900 mm to 1,150 mm over most of the area, falling to about 700 mm at Yarram and 760 mm in the vicinity of Western Port Bay. The Division has a large number of soil-types ranging from sands to clays and loams, with some Acid Swamp soils and Calcareous sand dunes. The dominant group is the Podsols, derived from sedimentary rocks and unconsolidated sediments. Kranozems also occur.

There are about 6,000 rural establishments, a substantial portion of which are under pasture. The main improved pasture species are perennial ryegrass, cocksfoot, white clover, and subterranean clover.

The main agricultural and pastoral industries are potato growing, vegetables, dairying, beef raising, and fat lamb production. Other industries include forestry, coal mining, and sand mining. There are several milk processing factories and an important paper mill in the Division.

VICTORIA—CENTRAL GIPPSLAND STATISTICAL DIVISION: NUMBER OF AGRICULTURAL ESTABLISHMENTS (a), 1978-79 (b)

Main activity of establishment (a)	Estimated value of agricultural operations (\$'000)					Total establishments
	2-9	10-19	20-39	40-99	100+	
Milk cattle	253	914	1,400	324	11	2,902
Meat cattle	837	404	208	78	16	1,543
Other	247	133	195	181	70	826
Total	1,337	1,451	1,803	583	97	5,271

(a) See footnote to table on page 335.

(b) See footnote to table on page 335.

East Central Statistical Division

The East Central Statistical Division forms a very narrow corridor between what is virtually Melbourne's metropolitan area and Central Gippsland which has Moe as its approximate geographic centre. The East Central Division stretches from Bass Strait to the Upper Yarra area of the Great Dividing Range.

The soils are mainly Podsollic, derived from sedimentary rocks and unconsolidated sediments (sandy loams over clay subsoils and deep sands). Other groups include peaty soils and Kranozems (red loams). Rainfall is fairly uniform at about 900 mm to 1,000 mm a year. Some of the Division is still under forest, scrub, and Crown land. There is a relatively small orchard industry around Pakenham, some berry growing in the hills, and dairying in some of the valleys. There are a number of small farms engaged in potato growing and flower production, and some stud properties.

VICTORIA—EAST CENTRAL STATISTICAL DIVISION: NUMBER OF AGRICULTURAL ESTABLISHMENTS (a), 1978-79 (b)

Main activity of establishment (a)	Estimated value of agricultural operations (\$'000)				Total establishments
	2-9	10-19	20-39	40+	
Meat cattle	382	94	51	22	549
Milk cattle	92	184	179	44	499
Other	134	62	91	127	414
Total	608	340	321	193	1,462

(a) See footnote to table on page 335.

(b) See footnote to table on page 335.

Financial statistics

Agricultural Finance Survey

To complement the commodity statistics produced from the Agricultural Census, the Agricultural Finance Survey (AFS) has been conducted by the Australian Bureau of Statistics to obtain statistics describing the financial performance of enterprises mainly engaged in agricultural activities. The AFS was conducted annually from 1968-69 to 1977-78. Following the 1977-1978 survey, a decision was taken in the light of resource restrictions and apparent user demand to conduct it triennially in future. The next survey was planned for 1980-81. The AFS provides estimates of agricultural expenditure, proceeds, indebtedness, value added, and net worth of the various agricultural industries. A number of cross-classifications of important economic aggregates by size of farm business are also produced. The statistics from this survey provide a basis for the assessment of the economic viability of agricultural industries compared with other industries or sectors of the economy. This is possible because, like the collections concerned with other sectors of the economy, the AFS is conducted on the basis of a standard industry classification with standard data items and units definitions.

Caution should be exercised when making comparisons between estimates derived from the AFS and those compiled annually in the *Value of Agricultural Commodities Produced, Australia* (7503.0). Some of the major reasons for differences between the estimates are:

(1) AFS data relate only to enterprises whose predominant activity is agriculture whereas "value of agricultural commodities produced" data relate to total recorded production regardless of the predominant activity of the enterprise;

(2) the AFS operates on a cash basis for selected enterprises during specific financial years whereas the "value of agricultural commodities produced" measures the income accruing from production for a particular year irrespective of whether the total production has been marketed or not; and

(3) the AFS includes only the value for crops sold, whereas the "value of agricultural commodities produced" estimates include the value of crops and seed produced and consumed on the farm.

The following table contains estimates of selected financial aggregates of Victorian agricultural enterprises for the years 1973-74 to 1977-78; the associated standard error for each estimate is also given, being a measure of the sampling error resulting from the use of sampling techniques as opposed to undertaking a complete census. More detailed information both on the statistics shown and the terms used are contained in the publication *Agricultural Sector Financial Statistics, 1977-78 (7507.0)*.

VICTORIA—ESTIMATES OF MAIN FINANCIAL AGGREGATES OF
AGRICULTURAL ENTERPRISES, 1973-74 TO 1977-78

Item	1973-74		1974-75		1975-76		1976-77		1977-78	
	Amount	Standard error	Amount	Standard error	Amount	Standard error	Amount	Standard error	Amount	Standard error
	\$m	per cent	\$m	per cent	\$m	per cent	\$m	per cent	\$m	per cent
Sales from crops	267.4	10	332.4	3	376.8	4	426.7	5	341.8	5
Sales from livestock	527.3	7	246.9	8	217.3	4	284.3	4	346.9	3
Sales from livestock products	451.0	4	406.5	4	384.8	3	392.1	3	455.5	3
Turnover	1,267.7	4	1,023.5	3	1,017.2	2	1,146.3	2	1,190.6	2
Purchases and selected expenses	616.4	5	512.4	4	498.4	5	526.0	3	591.5	2
Value added	742.8	n.a.	552.5	6	518.0	6	562.8	3	572.6	3
Adjusted value added	667.1	n.a.	475.6	7	443.2	5	479.1	4	491.3	3
Gross operating surplus	575.8	n.a.	383.4	8	347.2	6	359.6	5	397.4	4
Total net capital expenditure	145.7	8	111.1	7	122.0	6	123.0	7	151.2	6
Gross indebtedness	745.0	7	764.1	9	758.1	5	759.5	7	668.6	6

Agricultural improvements

Pasture improvement

A substantial proportion of Victoria's beef, sheep, and dairy farming is conducted on improved pastures, which can support much higher rates of stocking than native pastures. During the past 40 years, the area of improved pasture in Victoria has increased from about 2 million to 7 million hectares. Much of this increase has resulted from widespread use of superphosphate and subterranean clover. At present, improved pastures are based on introduced clovers, medics, and perennial grasses, such as ryegrass, cocksfoot, and phalaris.

There are still about 3 million hectares of unimproved (or "native") pasture in Victoria. These pastures consist mainly of unproductive indigenous grasses such as wallaby grasses, kangaroo grass, weeping grass, and spear grasses, with no leguminous species of any value. They do not respond to fertiliser, as do pastures sown with improved species, and have a low carrying capacity.

Where annual rainfall is 750 mm or more, mainly south of the Divide, improved pastures of perennial grasses, white clover, and subterranean clover are used for intensive dairying and beef production. In the medium rainfall areas (500 mm to 750 mm) of north-east through to south-west Victoria, beef and sheep are run on pastures of perennial grasses and annual clovers, particularly subterranean clover. The remaining pastoral areas (250 mm to 500 mm rainfall) grow pastures of annual medics or clovers, with volunteer annual grasses such as barley grass, Wimmera ryegrass, and bromes, which are suitable mainly for sheep.

Irrigated pastures, based on highly productive perennial grasses and clovers, are grown on about 400,000 hectares of the northern plains, and about 40,500 hectares in southern Victoria, mainly Gippsland. They are primarily used for dairying.

In the past 20 years the widespread use of superphosphate and, to a lesser extent potash, nitrogen, and the trace elements molybdenum and copper, has contributed greatly

to increased pasture productivity. A rise in the price of superphosphate in 1974-75 resulted in an initial large decline in its use on pastures (to about one-third of previous use). There has been a subsequent slow recovery in the amount used. Other developments have included a more informed approach to pasture management and the introduction of improved cultivars of cocksfoot and phalaris grasses, and white and subterranean clovers.

The advent in 1977 of new and potentially devastating aphid pests of lucerne and other pasture legumes has stimulated the importation and local development of resistant legume cultivars which are resistant to these and other problems.

Fertilisation

James Cuming, who arrived in Victoria in 1862, established the superphosphate industry in Australia, using bones and guano as a source of phosphate. Later, rock phosphate was imported from the United States of America. Since the First World War, supplies of rock phosphate from Nauru, Ocean Island, and Christmas Island have provided almost all of the requirements for superphosphate manufacture in Australia. Recently, Christmas Island has become the major supplier, with Nauru remaining important, but Ocean Island providing little. Most of the sulphur used in the industry comes from Canada.

Since the 1920s, the need to topdress pastures with superphosphate for high productivity has become generally accepted, and soil fertility has been much improved by the practice. Although superphosphate is designed to supply mainly phosphorus, its contents of sulphur and calcium are also essential for plants in certain areas of Victoria. In 1978-79, 632,155 tonnes of superphosphate were used in Victoria of which 399,072 tonnes were applied to pastures. This represents an extraordinary fall in use since 1974 and is associated with unfavourable conditions in the pastoral industries and, to some extent, with the rapid increase in the cost of superphosphate. Re-introduction of the Government bounty early in 1976 partly offset the increases in the cost of superphosphate.

While phosphorus and, to a lesser extent, nitrogen are the most important nutrients in Victorian agriculture generally, in certain areas potassium and sulphur are no less important. The use of nitrogenous fertiliser has become almost static in recent years and, despite the wide range of forms available, requirements are met mainly by ammonium nitrate, calcium ammonium nitrate, urea, and sulphate of ammonia. However, since the 1950s, there has been a rapid and continuing expansion in the use of potassic fertilisers in southern Victoria. Usually, potassium is applied to pastures as mixtures of muriate of potash and superphosphate. In Victoria, the trace elements molybdenum, copper, zinc, and cobalt are also supplied in a variety of mixtures with superphosphate.

Since the Artificial Manures Act was introduced in 1897, the law has required fertilisers to be sold according to a guaranteed analysis. Under the *Fertilizers Act 1974* manufacturers must register the brands and analyses of their products with the Department of Agriculture. A list of registrations is published in the *Victorian Government Gazette*.

In 1978-79, 754,031 tonnes of artificial fertilisers were used on 1,223,373 hectares of wheat; 612,980 hectares of other cereal crops; 19,530 hectares of vegetables; 24,165 hectares of vineyards and orchards; 33,451 hectares of other crops; and 3,093,761 hectares of pastures. Superphosphate is the main fertiliser used on both crops and pastures and in 1978-79 amounted to 632,155 tonnes, or 84 per cent of the total artificial fertiliser used.

VICTORIA—ARTIFICIAL FERTILISERS

Year (a)	Crops		Pastures	
	Area fertilised	Quantity used	Area fertilised	Quantity used
	'000 hectares	'000 tonnes	'000 hectares	'000 tonnes
1974-75	1,383	223	3,487	654
1975-76	1,473	223	1,953	323
1976-77	1,655	241	2,295	353
1977-78	1,851	277	2,670	408
1978-79	1,913	277	3,093	476

(a) See footnote (b) to table on page 335.

Further references: *Superphosphate, Victorian Year Book 1971*, p. 302-3; *Forest clearing, 1978*, pp. 358-60

Private storage dams

Early Victorian pastoralists commenced constructing small private dams and weirs in the 1850s. By the turn of the century small dams were being built throughout the State, particularly in areas near highly populated cities. Doncaster orchardists, for example, had built a vast network of dams by this time.

Due to the concentration on large-scale public irrigation schemes by successive Victorian Governments, the later development of private dams did not progress as rapidly as it did in other States. However, a start was made in 1944, when the Victorian Government passed the Farm Water Supplies Act, which established a scheme under which advances were made to farmers to finance farm water supply projects. The Act was administered by the Department of Lands. The State Rivers and Water Supply Commission formed a Farm Water Supplies Branch for the special purpose of providing advice to all farmers interested in taking advantage of its provisions.

In 1965, the Soil Conservation (Water Resources) Act was passed, which permitted the Soil Conservation Authority of Victoria to "... provide for landholders an advisory service with respect to the development and use of the water resources available to them". Under this Act, the Authority provides advisory, survey, and design services. A loan scheme to finance private soil and water conservation projects (the latter not to be located within declared irrigation districts), including the construction of private farm dams, was initiated in 1971. The Soil Conservation Authority assesses the technical feasibility of the projects and the Rural Finance and Settlement Commission of Victoria administers the financial aspects of the scheme.

Originally, in the 1850s, private dams were erected with a centre core of puddle clay. These dams were built up gradually from thin layers of materials set in place by using horse-drawn carts or barrows. Compaction of these thin layers was effected by the combined traffic of feet, both human and animal and vehicle wheels. Later contractors, using horse teams and scoops, developed successful techniques of placing layers of soil, which were trodden down and compacted by the horses.

Horse power was gradually replaced by mechanised earth-moving plant during the Second World War. With the adoption of this equipment in private dam construction, it was reasonably assumed that improved compaction would result, but unfortunately this progress did not automatically follow. A major problem was that, when a bulldozer alone was used, many small dams suffered from inadequate compaction, because the tracks of bulldozers are designed to spread and not concentrate their load. In the absence at the time of suitable rollers, such as the modern sheepsfoot roller, many private dams failed because of insufficient compaction.

In 1979, Victorians spent about \$1.5m on private dam construction, and government engineers and agricultural officers ensure that contractors are aware of the need for correct compaction and moisture content when building dams. However, the costs of this work have risen steeply over recent years, and private dams for irrigation are now costing farmers about \$200 per megalitre.

One current problem in Victoria, particularly in the semi-arid regions, is the poor run-off from small catchments into private dams. The Soil Conservation Authority, in conjunction with the Agricultural Engineering Section of the University of Melbourne, is at present conducting a joint investigation into methods of developing low cost treatment of small catchments to provide an improved yield or run-off.

Livestock disease eradication

Victoria is free of many of the most serious livestock diseases as a result of successful Government quarantine and other disease control measures and its favourable climate. The nature of many livestock diseases makes their eradication difficult or practically impossible, but control measures can minimise their impact.

The Department of Agriculture conducts several major programmes to control and eradicate animal disease. Meat inspection is used to ensure a high quality of meat for human consumption and to detect disease in slaughtered animals. Traceback procedures are used to identify the properties of origin of diseased cattle and pigs. Animal Health field staff, supported by Regional Veterinary Laboratories, investigate disease in livestock and conduct control and eradication procedures.

As part of the National Brucellosis and Tuberculosis Eradication Programme, all Victorian breeding cattle are being tested for brucellosis by Department of Agriculture staff and by private veterinarians under contract. Infected animals are slaughtered, and the owners are compensated. Herds free of disease can become accredited, allowing them to be advertised and to profit by their disease-free status. Victoria is already provisionally free of bovine tuberculosis and brucellosis.

An ovine brucellosis ram-flock accreditation scheme is also conducted to encourage stud breeders to have rams examined and tested annually. A Footrot Control Area has been declared in western Victoria in which sheep footrot is subject to rigorous control. The impact of the disease has been greatly reduced and it is hoped that it can be eliminated. Various other diseases are also subject to control under the Stock Diseases Act.

Through its research and extension activities the Department of Agriculture assists the livestock industries overcome disease problems and keep abreast of new developments in control and eradication.

Vermin and noxious weeds control

The control of pest animals and plants affects the whole range of agricultural industries of Victoria, as well as the forests and natural bushlands environments, such as wildlife and game reserves. The Vermin and Noxious Weeds Destruction Board, which was established in 1959 to work with the Department of Crown Lands and Survey, is responsible for intensifying the control of vermin and noxious weeds and implementing a philosophy of pest control.

The targets of the Board's operation are the 95 plants which are proclaimed noxious weeds, under the *Vermin and Noxious Weeds Act 1958*, throughout Victoria except in the Melbourne metropolitan area, and the eight proclaimed vermin animals, such as rabbits and foxes. Two birds, the sparrow and the starling, are also considered vermin. Blackberries, ragwort, and rabbits are the most serious pests in Victoria.

Noxious weeds and vermin control policy decided on by the Board is implemented throughout Victoria by 142 Departmental Land Inspectors under the supervision of eighteen regional Senior Land Inspectors. Each Land Inspector has a team of workmen together with appropriate equipment to carry out weed and vermin control, and is backed up by workshop and research facilities. The annual cost of maintaining this service to the rural community in Victoria is more than \$9.9m.

As well as being responsible for maintaining a good working relationship with landholders, the Land Inspector is also responsible for the control of vermin and noxious weeds on Crown land, and as the Board has agreements with many other government departments concerned with agriculture, forestry, national parks, roads, railways, municipalities, and so on, he may also be called upon to carry out control work in these areas.

Land cultivation

The following table shows details of the broad utilisation of land under occupation in Victoria for agricultural purposes for the season 1978-79:

VICTORIA—LAND IN OCCUPATION FOR AGRICULTURAL PURPOSES, 1978-79 (a)

Statistical division	Number of establishments (b)	Area of	Area of	Native	Total area
		crops	sown pasture and lucerne	pasture	of establishments
		hectares	hectares	hectares	hectares
Melbourne	3,391	24,780	131,474	54,707	267,053
Barwon	2,676	46,598	314,297	79,096	500,337
South Western	6,776	76,282	1,357,947	240,284	1,821,895
Central Highlands	3,011	93,898	579,788	134,487	876,543
Wimmera	4,336	718,070	977,206	217,737	2,432,644
Northern Mallee	4,637	654,267	600,649	334,001	2,594,407
Loddon-Campaspe	5,062	309,963	721,806	340,215	1,606,594
Goulburn	7,055	206,585	782,664	280,453	1,492,655

VICTORIA—LAND IN OCCUPATION FOR AGRICULTURAL
PURPOSES, 1978-79 (a)—*continued*

Statistical division	Number of establishments (b)	Area of crops	Area of sown pasture and lucerne	Native pasture	Total area of establishments
North Eastern	3,085	60,645	330,076	206,390	837,768
East Gippsland	2,103	7,301	272,280	377,043	1,217,235
Central Gippsland	5,278	13,160	467,876	74,992	677,082
East Central	1,445	3,386	80,477	13,737	116,316
Total	48,855	2,214,935	6,616,540	2,353,142	14,440,529

(a) See footnote (b) to table on page 335.

(b) This table excludes data for establishments where the legal entities operating those establishments have an estimated value of agricultural operations of less than \$1,500.

Economic contribution

Gross value of agricultural production

The gross value of agricultural commodities produced provides a measure of the output from farming. The gross value of commodities produced is the value placed on recorded production at the wholesale prices realised in the principal markets. In general, the "principal markets" are the metropolitan markets in each State. In cases where commodities are consumed locally or where they become raw materials for a secondary industry, these points are presumed to be the principal markets.

Quantity data is, in the main, obtained from the Agricultural Census held at 31 March each year, and from supplementary collections which cover crops that have not been harvested at the time of the Census. Information covering such commodities as livestock slaughterings, dairy produce, and bee farming is obtained from separate collections and from organisations such as the Department of Primary Industry. Price data for commodities is obtained from a variety of sources including statutory authorities responsible for marketing products, e.g., the Australian Wheat Board, marketing reports, wholesalers and brokers, and auctioneers. For all commodities, values are in respect of production during the year, irrespective of whether or when payments are made.

The gross value of agricultural commodities produced in Victoria during 1978-79 (\$2,148m) contributed 21.0 per cent of the Australian total of \$10,233m.

VICTORIA—VALUE OF AGRICULTURAL COMMODITIES PRODUCED (EXCLUDING MINING) (\$'000)

Particulars	Year ended 30 June—				
	1975	1976	1977	1978	1979
Crops—					
Cereals for grain	276,873	224,404	219,742	r196,950	464,376
Hay	67,025	61,378	78,263	r47,418	64,797
Industrial crops	22,491	23,168	28,156	r29,177	27,708
Vegetables	62,371	73,270	70,067	r92,033	127,681
Grapes	37,453	37,477	55,386	60,363	63,747
Fruit	54,961	47,382	48,899	r54,801	91,756
Other	19,245	17,120	21,895	r28,539	51,545
Livestock slaughterings and other disposals—					
Cattle and calves	114,309	184,873	222,730	318,997	419,554
Sheep and lambs	58,410	75,225	89,533	95,691	116,879
Other	71,334	71,440	81,803	104,484	122,885
Livestock products—					
Wool	193,623	174,055	176,732	228,813	271,243
Dairy products	266,659	220,867	230,020	246,977	281,155
Other	45,869	45,353	39,853	43,804	45,240
Total	1,290,623	1,256,012	1,363,079	r1,548,047	2,148,567

AGRICULTURAL COMMODITIES PRODUCED

Introduction

In the following pages some detailed descriptions and statistical information about all the main crops, livestock, and livestock products produced in Victoria are given. The section deals, first, with the field crops including wheat, barley, and oats; and then with the intensive crops including fruit and vegetables. The section then discusses livestock including sheep, cattle, pigs, poultry, bees, goats, and deer, together with the various livestock products.

Field crops

The cereals wheat, barley, and oats, are the principal field crops in Victoria. These, together with hay production, represent about 90 per cent of the total area sown, although there is some variation from year to year.

Wheat

Wheat is Victoria's largest crop. The average area sown in the six-year period 1973-74 to 1978-79 was 1.20 million hectares, about 55 per cent of the State's total cropping area. The area under wheat is normally subject to fairly minor fluctuations. The 1978-79 season produced a Victorian record harvest of 3.0 million tonnes of wheat from 1.3 million hectares.

More than 85 per cent of Victorian wheat is grown in the Northern Mallee, Wimmera, and Loddon-Campaspe Divisions. The average annual rainfall in the main wheat belt varies from about 300 mm in the north-west to about 500 mm to 750 mm in the eastern and southern areas. With the exception of a small area of intensive cropping in the Wimmera, wheat is grown in rotation with fallow, pastures, and other crops, principally oats and barley but with increasing areas of grain legume crops — lupins and peas. Surveys of the Wimmera have shown that many paddocks are under-cropped and that the potential exists to increase cropping intensity without risk to the stability of the farm system. Levels of soil nitrogen in the region are highly correlated with the ability to support cereal crops, and a soil nitrogen testing service introduced by the Department of Agriculture in 1974 now adds precision to the complex decision on cropping rotations within the ley farming system of the Wimmera.

Since the adoption of legume based pastures (subterranean clover or medic) and the addition of grain legumes into Victorian cropping rotations, nitrogenous fertilisers have found only limited application. Nitrogen is applied only in specific circumstances, namely, on light sandy soils and land infested with skeleton weed in the Northern Mallee, and on intensively cropped land in the Wimmera and southern areas. Superphosphate is applied at seeding to virtually all crops to correct a phosphorus deficiency inherent in nearly all Australian soils.

Diseases of wheat are not normally a major problem but in 1973-74 heavy losses were incurred through attack by stem rust, Septoria leaf spot, and root diseases. The root disease known as "takeall" took a heavy toll in parts of the Northern Mallee in 1978 where crop yields were reduced by more than 25 per cent. The cereal cyst, nematode, which exists in most wheat soils in the Wimmera and Northern Mallee is a chronic source of loss and can cause severe damage in some seasons, particularly on more intensively cropped land.

During the 67 years from 1911 to 1978, stem rust occurred in some part of Victoria in varying degrees of severity, in sixteen seasons. In only four of these years, 1934, 1947, 1955, and 1973, did the disease cause heavy losses of production; 1973 being the heaviest on record. The only effective control is to breed disease-resistant varieties, a continuing project in Victoria since 1950. The variety, Kalkee, which was released in 1976, is currently resistant to all known rust strains. Another disease problem, the ball smut fungus, is effectively controlled by fungicide, applied to the seed.

A most serious problem facing the cereal industries, wheat in particular, is the control of insect pests in grain storage, as the loading of wheat and other cereals for export is prohibited if insects are present. The prevention of insect infestation of farm stored grain and of grain residues in machinery is a prerequisite for ensuring the delivery of insect-free grains to the export terminals.

Wheat marketing in Australia during 1978-79 was controlled by the Australian Wheat Board under the provisions of the *Wheat Industry Stabilization Act 1974*. This legislation provided for a guaranteed "stabilisation" price, adjusted annually on the basis of movements in export markets. When average export prices were higher than the stabilisation price, growers were required to contribute to a fund (subject to a minimum and maximum level). The fund could be used to maintain returns to growers should export prices fall below the stabilisation price. In the event of the fund being exhausted, the Commonwealth Treasury would provide an interest-free loan, up to a maximum of \$80m, to operate the plan.

Most wheat varieties grown in Victoria are of the soft white class. The environment generally does not favour the production of wheat of the harder types, although large areas of the harder variety Condor are now sown in north-west Victoria where wheat with protein content above the Victorian average is usually produced.

VICTORIA—PRINCIPAL VARIETIES OF WHEAT SOWN

Variety in order of popularity in season 1978-79	Season 1976-77		Season 1977-78		Season 1978-79	
	Hectares sown	Percentage of total area sown	Hectares sown	Percentage of total area sown	Hectares sown	Percentage of total area sown
Halberd	429,846	38.5	340,837	26.5	349,690	26.0
Olympic	331,587	29.7	372,546	29.0	347,526	25.8
Condor	139,263	12.5	298,629	23.2	309,070	23.0
Summit	75,185	6.7	43,896	3.4	27,867	2.0
Zenith	30,468	2.7	63,864	5.0	94,726	7.0
Insignia	27,073	2.4	8,887	0.7	4,035	0.3
Pinnacle	23,685	2.1	19,699	1.5	16,294	1.2
Egret	22,985	2.1	98,563	7.7	150,240	11.2
Emblem	14,337	1.3	5,804	0.5	2,611	0.2
Heron	8,009	0.7	4,998	0.4	3,853	0.3
Oxley	(a)	(a)	3,607	0.3	8,748	0.7
All other including mixed and unspecified	113,745	10.3	23,626	1.8	30,333	2.3
Total	1,116,183	100.0	1,284,956	100.0	1,344,993	100.0

(a) Included with "All other".

VICTORIA—WHEAT FOR GRAIN

Season	Area	Production	Average yield per hectare	A.S.W. (a) wheat standard
	'000 hectares	'000 tonnes	tonnes	kg/h.l.
1974-75	1,141	2,091	1.83	81.2
1975-76	1,073	1,579	1.47	76.9
1976-77	1,103	1,780	1.61	81.2
1977-78	1,270	1,497	1.18	81.8
1978-79	1,337	2,998	2.24	80.9

(a) Australian Standard White.

Further references: Australian Wheat Board, *Victorian Year Book 1977*, pp. 439-40; Grain Elevators Board of Victoria, 1977, pp. 440-1

Oats

Oats are sown for grain production, winter grazing, and hay production. The average annual area sown for grain and hay between 1973-74 and 1978-79 was 300,318 hectares of which about 82 per cent was harvested for grain, some of it after being grazed during the winter. During the last decade, oats have been displaced by barley as Victoria's second most widely grown cereal crop. This change has been most evident on the lighter soils where winter waterlogging is not a problem.

The predominance of oats in the higher rainfall areas has been maintained by the greater tolerance shown by oats to wet conditions and by the demand for oats for stock feed. About half of the oats produced in Victoria is held on farms or used as stock feed, especially during periods of seasonal shortage or in drought conditions. About a quarter

of the crop goes to mills, but only a small fraction of this is processed for human consumption. The bulk of the "milled" oats is destined for incorporation in proprietary stock feeds or as unkilned oats for export. The remaining 25 per cent of the crop is exported as grain. The dominant export market for oats is Japan which accounts for almost 80 per cent of Australian exports. Italy is another significant importer of feed oats. Oats are also supplied to a speciality market in West Germany for baby food production.

Unlike wheat and barley which are marketed through the Australian Wheat Board and the Australian Barley Board, respectively, oats are sold on the free market. Domestic prices are markedly affected by the size of the crops and pasture conditions during winter and spring, and trends in the world markets for feed grains.

VICTORIA—OATS FOR GRAIN

Season	Area	Production	Average yield per hectare
	'000 hectares	'000 tonnes	tonnes
1974-75	198	186	0.94
1975-76	243	282	1.16
1976-77	241	309	1.28
1977-78	228	269	1.18
1978-79	291	446	1.53

Barley

Barley is now the second largest crop grown in Victoria. Barley production in Victoria (99 per cent of which is of the two-row type) increased significantly between 1965-66 and 1978-79. In 1978-79, a record 519,000 tonnes of barley was produced. By comparison, production in 1965-66 was only 73,000 tonnes. So far, the Australian Barley Board in Victoria has been successful in selling this large increase in production.

During this period, impetus was added to an already established trend of increased production by the introduction of the Wheat Delivery Quota Scheme in 1969-70, which had the effect of reducing the area of wheat sown in the cereal belt. Barley proved to be the most popular alternative crop to wheat, particularly in the Northern Mallee. In other areas, oilseeds, such as rapeseed and safflower, were also prominent.

Removal of wheat delivery quotas in 1973-74 resulted in a slight fall in the area sown to barley as land was diverted back into wheat. However, the general trend for increased production of barley in Victoria is well established and seems unlikely to suffer further significant reduction in the absence of a marked shift in the price ratios between the cereal crops. The provision of bulk handling facilities for barley by the Grain Elevators Board of Victoria since 1963 has contributed to the increased production of this grain.

While some barley is grown in all statistical divisions, production has been traditionally centred in two distinct areas where high quality grain is produced. The largest production is in the south-west of the Northern Mallee and the adjacent north-western Wimmera where the best quality barley is grown on the sandier soil types. The crop is sown either on cultivated ley ground without fallow or on wheat stubble land.

A new variety Weeah, was introduced in 1968 and soon became the dominant type. However, another variety, Clipper, is now recommended to replace Weeah for malting barley production in the Northern Mallee and Wimmera. The barley industry aimed for a changeover to Clipper in the malting grades by 1979. Clipper has a 5 per cent greater yield on average than Weeah and is less susceptible to wind damage. However, growers prefer Weeah where conditions are less favourable. The Victorian malting industry processes most of Victoria's barley production for both the local brewing industry and export to overseas breweries. Clipper is better for malting than Weeah, and is being sought by overseas markets.

The second source of high quality barley grain is in an area between Melbourne, Geelong, and Bacchus Marsh in southern Victoria. In this area, barley is the principal crop. Yields of barley in this region average about 1.7 tonnes per hectare compared with about 1.0 tonnes per hectare in the Northern Mallee-Wimmera. The area has the further advantage of proximity to the main barley shipping terminals. Consequently, freight costs are much lower than for northern areas.

The variety Lara, which was introduced in 1971, displaced Research types as the main variety grown in this area. Lara suffered some initial resistance to its acceptance by growers, in spite of its inherent higher yielding potential than the Research type varieties. Its small grain led to a number of samples being refused classification as suitable for malting, and being declared unsuitable for handling in mixed bulk samples with Research types. Lara has since gained acceptance with both growers and maltsters, and has been declared compatible with Research for the purposes of bulk handling. The new variety Parwan, with slightly larger grain and improved yield, was released early in 1979 as a replacement for Lara.

The substantial increase in barley production has meant that, in normal seasons, Victoria is self-sufficient in barley for malting, food, and manufacturing in the distilling, pearling, and prepared stock feed industries. It also contributes to Australian export markets. Barley is received and marketed in Victoria through the Australian Barley Board on a pool basis. The Board is responsible for setting prices for sales to domestic users. The price received for exports is determined by the world supply and demand situation, and can vary greatly from year to year. Japan provides the main export market; smaller quantities go to the United Kingdom, Europe, Taiwan, and the Middle East. In 1973-74, the Australian Barley Board negotiated its first direct sale to the U.S.S.R. and is hopeful of developing this market in the future. Australia is now a major exporter of barley.

VICTORIA—BARLEY PRODUCTION

Season	Area		Production		Average yield per hectare	
	2-row	6-row	2-row	6-row	2-row	6-row
	'000 hectares	'000 hectares	'000 tonnes	'000 tonnes	tonnes	tonnes
1974-75	238	5	314	5	1.32	1.00
1975-76	337	7	436	9	1.29	1.29
1976-77	362	4	397	5	1.10	1.25
1977-78	413	5	354	5	0.86	1.00
1978-79	361	4	513	6	1.42	1.46

Further reference: Australian Barley Board, *Victorian Year Book 1976*, pp. 404-5

Maize

Maize is grown on a small scale in Victoria, both for grain and for green fodder, and is cultivated mainly in Gippsland. Lower values in the late 1960s and other more profitable alternatives in vegetables and livestock, led to a substantial decline in the production of maize grain. The area and yield of maize for each of the five seasons 1974-75 to 1978-79 were:

VICTORIA—MAIZE PRODUCTION

Season	For green fodder	For grain						
		Area			Production			Average yield per hectare
		Hybrid	Other	Total	Hybrid	Other	Total	
hectares	hectares	hectares	hectares	tonnes	tonnes	tonnes	tonnes	
1974-75	485	536	10	546	1,891	36	1,927	3.53
1975-76	359	521	5	526	2,510	3	2,513	4.78
1976-77	389	411	22	433	1,685	25	1,710	3.95
1977-78	347	477	28	505	1,729	119	1,848	3.66
1978-79	242	421	92	513	1,930	64	1,994	3.89

Rye

Cereal rye is of minor importance in Victoria and is not usually grown as a cash crop. European migrants to Australia have created a small demand for this cereal for human consumption, thus helping to stabilise the market for rye grain. The chief purpose for which rye is grown is the stabilisation of loose sand or sandhills in the Northern Mallee Statistical Division. There is also some interest in it for winter grazing in cold areas during the winter months.

VICTORIA—RYE FOR GRAIN

Season	Area	Production	Average yield per hectare
	hectares	tonnes	tonnes
1974-75	1,750	671	0.38
1975-76	1,471	648	0.44
1976-77	1,401	936	0.67
1977-78	1,828	903	0.49
1978-79	2,449	1,750	0.71

Fodder

The stability of livestock production on Victorian farms depends largely on fodder conservation. Natural irregularities in the diet of grazing animals are met by conserved fodders, fed as supplement, when the paddock ration of crop or pasture is deficient in quantity or quality. Such deficiencies occur regularly with seasonal changes, e.g., spring lush growth contrasts with winter-short or summer-dry pastures. Deficiencies also occur when the unexpected turns up, such as extended dry, or excessively cold or wet periods; ravishment of pasture by pests or disease; failed crops; floods; or fire. All or any of these events may result in feed shortages for grazing animals. Fodder conservation provides a means of overcoming such shortages.

VICTORIA—HAY PRODUCTION, SEASON 1978-79

Variety	Area	Production	Average yield per hectare
	hectares	tonnes	tonnes
Meadow grass and clover	424,553	1,668,503	3.93
Oaten	50,865	204,788	4.03
Lucerne	26,019	115,043	4.42
Wheaten	4,895	15,558	3.18
Barley and other	3,293	8,518	2.59
Total	509,625	2,012,410	3.95

VICTORIA—SILAGE MADE AND FARM STOCKS OF SILAGE AND HAY (tonnes)

Statistical division	Silage made, season 1978-79	Stocks at 31 March 1979	
		Silage	Hay
Melbourne	11,871	9,180	87,168
Barwon	11,156	7,942	157,909
South Western	23,795	17,635	548,549
Central Highlands	3,615	4,181	209,921
Wimmera	3,404	5,744	215,973
Northern Mallee	1,332	4,731	87,380
Loddon-Campaspe	4,001	6,520	267,477
Goulburn	3,793	9,347	423,701
North Eastern	7,983	8,706	144,785
East Gippsland	3,036	3,068	85,016
Central Gippsland	35,691	20,282	327,137
East Central	8,965	5,789	59,408
Total	118,642	103,125	2,614,424

Oilseeds

Demand for high-protein meals for livestock feed, together with a general world-wide trend to increased consumption of vegetable oils, has been reflected in Australia, where

domestic oilseed prices rose in sympathy with prices on world markets and reached record levels during 1973-74. Aggregate oilseed production expanded rapidly between 1968-69 and 1971-72 in response to both increased oilseed prices and the introduction of wheat quotas. However, better markets for wheat and coarse grains, together with agronomic problems, resulted in an immediate decline in the production of rapeseed and safflower. The area sown to sunflower increased rapidly between 1974-75 and 1976-77 due to abnormal sowing conditions for the more traditional cereal crops and attractive prices for these oilseeds. Sunflower production continued to increase in 1978-79 in both dry land and irrigation districts with an area sown of 14,220 hectares.

VICTORIA—SELECTED OILSEED PRODUCTION

Season	Area	Production	Average yield per hectare
	hectares	tonnes	tonnes
	LINSEED		
1974-75	4,924	3,812	0.77
1975-76	4,513	3,056	0.68
1976-77	4,694	5,393	1.15
1977-78	7,048	8,089	1.15
1978-79	4,474	4,747	1.06
	RAPESEED		
1974-75	3,707	2,288	0.62
1975-76	4,681	2,907	0.62
1976-77	2,495	1,915	0.77
1977-78	3,798	2,406	0.63
1978-79	2,992	2,825	0.94
	SAFFLOWER		
1974-75	2,813	1,269	0.45
1975-76	3,952	1,701	0.43
1976-77	3,698	1,405	0.38
1977-78	3,592	1,258	0.35
1978-79	3,227	2,180	0.68
	SUNFLOWER		
1974-75	7,973	4,766	0.60
1975-76	7,815	5,725	0.73
1976-77	13,271	8,405	0.63
1977-78	14,013	11,288	0.81
1978-79	14,220	10,997	0.77

Further reference: *Victorian Year Book 1977*, pp. 444-5

Grain legumes

Interest in the production of cheap sources of protein for both human and livestock consumption is world-wide. The legumes, including soybeans, field peas, and lupins comprise a major group of high protein grains. Of these, field peas have been grown on a limited scale over much of the wheat belt since early settlement, and recent research by the Department of Agriculture and experience by growers has shown that lupins have much potential.

The average area sown to field peas in the decade 1968-69 to 1978-79 was about 4,000 hectares, with more than 60 per cent of this area and 55 per cent of the total production being in western and central Victoria. There was, however, renewed interest in field pea production in the Loddon-Campaspe Division in 1976. This was brought about by the increased awareness by farmers of the necessity of maintaining soil fertility and also the attractive prices being offered for field peas for processing locally into split peas for culinary use.

Lupins with 25 to 30 per cent protein are readily acceptable as a substitute for other protein meals in rations for poultry and pigs. A potential market also exists in the

production of a meat substitute for human consumption. The lupin industry has expanded considerably in Victoria. Since 1973, the area sown to lupins has risen from about 100 hectares to about 9,000 hectares in 1979. Average yields are about 1.25 tonnes per hectare.

Intensive crops

Fruit

Introduction

When the members of the Henty family established the first settlement in Victoria at Portland in 1834, they were probably the first to plant apple trees in this State. The first vineyard, which was planted around 1837, was at Yering, near Lilydale, and the first orchard was started at Hawthorn on the banks of the Yarra River in about 1848. A variety of tree fruits, berries, and grapes carted to the Melbourne market provided the main source of income of many early settlers in the hills to the north, north-east, and east of Melbourne.

In the second half of the last century, fruit and vine growing gradually extended into the western, central, north-eastern, and Gippsland areas of the State. The foundation of Mildura in 1887, and the establishment of irrigation facilities there, marked the beginning of the development of one of the major horticultural districts in Victoria. With the extension of irrigation facilities in the Goulburn Valley and Murray Valley areas, a flourishing canning-fruit industry was developed after the First World War. Similarly to tree fruits, vine area increased steadily until the 1870s when Phylloxera devastated vineyards at Geelong, Bendigo, and Rutherglen. However, within a few years, new vineyards had been established in the Sunraysia district. After the First World War, the planting of dried vine fruit varieties extended along the Murray River to Robinvale and Swan Hill.

In Victoria in 1978-79, the area planted with fruit, nuts, and berries was almost 20,000 hectares, and the area of vineyards was just under 21,000 hectares. This total of approximately 41,000 hectares is hardly more than 2 per cent of the total area under crops in Victoria, yet fruit and vine growing make an important contribution to the economy of the State.

Tree fruit

(1) *Distribution.* In Victoria, the main fruit growing areas are in the Goulburn Valley-Murray Valley irrigation area, the Mallee, the eastern Melbourne metropolitan area, the Mornington Peninsula, West Gippsland, Bacchus Marsh, and the North Eastern area.

Almost all the canning fruit is grown in the Goulburn Valley-Murray Valley irrigation area which also produces large quantities of dessert pears and Granny Smith apples. Dessert apples and stone fruit are the main crops in the southern areas, while early stone fruit is grown in the Northern Mallee around Swan Hill. The main concentration of citrus fruit production is in the Northern Mallee Division with additional groves in the north-east. Lemons are also produced in the eastern Melbourne metropolitan area.

VICTORIA—NUMBER OF ORCHARD FRUIT TREES
(EXCLUDING CITRUS) BY STATISTICAL DIVISION AT 31 MARCH 1979

Statistical division	Pears	Apples	Peaches	Apricots	Cherries	Plums	Olives	Nectarines	Other
Melbourne	32,953	414,123	46,925	3,873	72,931	21,197	n.p.	9,137	3,250
Barwon	415	3,056	1,600	775	n.p.	484	—	54	n.p.
South Western	n.p.	15,270	85	n.p.	n.p.	n.p.	—	n.p.	n.p.
Central Highlands	1,803	37,524	2,067	1,134	908	270	—	2,750	n.p.
Wimmera	1,903	2,088	2,764	1,067	—	297	n.p.	n.p.	n.p.
Northern Mallee	1,314	7,103	7,852	48,803	425	41,642	41,369	14,677	2,127
Loddon-Campaspe	22,971	59,927	805	116	1,735	1,210	—	n.p.	610
Goulburn	886,654	218,693	453,102	110,451	4,210	20,378	1,190	4,780	9,683
North Eastern	274	53,358	550	195	4,162	n.p.	740	n.p.	n.p.
East Gippsland	n.p.	22,802	n.p.	n.p.	—	n.p.	—	—	—
Central Gippsland	n.p.	16,200	n.p.	n.p.	—	n.p.	—	—	n.p.
East Central	8,237	108,110	5,072	n.p.	1,583	2,682	—	2,525	n.p.
Total	956,904	958,254	521,917	167,509	86,066	88,415	83,799	34,021	16,026

**VICTORIA—NUMBER OF CITRUS TREES BY STATISTICAL
DIVISION AT 31 MARCH 1979**

Statistical division	Oranges	Lemons and limes	Grapefruit	Mandarins
Melbourne	n.p.	20,051	n.p.	—
Barwon	—	n.p.	—	—
South Western	—	—	—	—
Central Highlands	—	n.p.	—	—
Wimmera	n.p.	n.p.	n.p.	n.p.
Northern Mallee	624,663	47,404	43,244	43,739
Loddon-Campaspe	—	n.p.	—	—
Goulburn	58,289	14,968	5,193	916
North Eastern	14,430	5,404	157	n.p.
East Gippsland	—	683	—	—
Central Gippsland	—	—	—	—
East Central	n.p.	4,804	n.p.	—
Total	699,426	94,017	48,912	44,931

(2) *Size of production.* Since the early 1950s, many of the old lower producing or marginal orchards have been pulled out, and new orchards with a small number of higher yielding and more popular varieties of fruit trees have been planted on more suitable soils. These factors, as well as greatly improved technology, have increased production potential. During the 1950s and 1960s, there were only slight changes in the area planted to most types of fruit trees, yet production showed an increasing trend, particularly with canning fruits and dessert pears; here the Victorian production greatly exceeded local demand and increasing amounts were exported. This situation changed during the early 1970s. Following the wet winter in 1973, about 300,000 canning peach trees died, causing a significant drop in production. At about the same time, residential and industrial developments in the eastern Melbourne metropolitan and Mornington Peninsula areas greatly reduced the area planted to apples. These changes coincided with the deterioration of overseas market prospects for Victorian fresh and processed fruit and many growers have been forced to limit production or leave the industry. In the citrus industry, the same economic pressures have not operated as keenly as in other fruit industries because of an eight-fold increase in the demand for orange juice on the local market over the last twenty years, and protective measures limiting the importation of low-cost citrus juice from overseas.

**VICTORIA—TREE FRUIT PRODUCTION
(tonnes)**

Type of fruit	Year ended 31 March—				
	1975	1976	1977	1978	1979
Pears	125,496	103,429	103,675	80,055	100,896
Apples	81,357	51,830	61,139	62,880	89,343
Peaches	38,441	32,017	24,329	24,670	28,337
Apricots	8,949	7,598	6,712	6,268	8,135
Cherries	3,503	3,139	2,562	2,436	2,295
Plums	3,009	3,575	2,946	2,494	6,966
Olives	1,120	814	1,889	712	1,492
Nectarines	820	1,218	1,119	1,009	4,607
Prunes	266	169	306	56	103
Quinces	143	118	148	127	179
Figs	25	16	10	17	65
Oranges—					
Valencias	25,550	24,647	21,472	24,100	24,911
Navels	14,592	14,570	13,056	14,023	15,367
Other	579	371	764	519	673
Lemons and limes	5,666	5,365	6,000	5,361	13,883
Grapefruit	3,561	3,728	3,000	2,845	3,740
Mandarins	2,762	2,407	2,842	1,980	2,874

(3) *Marketing.* Most of the fruit grown in Victoria for the fresh fruit market is sold locally in Melbourne, as well as in Sydney and Brisbane. While in Melbourne up to half of the total crop sold as fresh fruit may be sold direct to supermarkets or at the orchard gate, the price established at the Melbourne Wholesale Fruit and Vegetable Market still provides the basis for all Victorian sales.

The Fruit and Vegetable Act and Regulations outline standards of produce and the size and marking of containers. Produce presented in accordance with this Act and within the provisions of the Health Act may be sold in Victoria. There are also restrictions on the introduction of fruit and certain vegetables from interstate to prevent the spread of pests and diseases and, in particular, fruit fly, into the main fruit growing areas of the State.

The development of cool storage techniques towards the end of the last century made possible the exporting of dessert apples and pears from Australia to Britain, during the off-season in the northern hemisphere. Since then, cool storage methods have improved constantly and with the general acceptance of controlled atmosphere storage by Victorian apple growers during the late 1960s, apples and pears can now be sold right through the year in Victoria.

While efficient cool storage techniques have extended the local market, they have also had an adverse effect on the northern hemisphere export market where the availability of locally grown fruit from cool stores has eroded the seasonal advantage of fruit from the southern hemisphere. This has been one of several factors causing the decline in the prospects of Victorian fruit on traditional markets. Other important factors have been the phasing out of preferential treatment for Australian produce following Britain's entry into the E.E.C., disadvantages because of changes in the currency exchange rate, and greatly increased labour and freight charges in Australia. Alternative market outlets for Victorian pome fruit are being developed in the U.S.A., South East Asia, and the Middle East.

In order to help the apple and pear industry to overcome marketing problems, the Commonwealth Government established the Apple and Pear Corporation in 1974. The Corporation has taken over the export control role of the former Apple and Pear Board and also has powers to trade in its own right and to promote the use of both fresh and processed apples and pears.

The establishment of the Citrus Marketing Board in Victoria in 1973 has enabled all citrus fruits to be marketed in an orderly manner. Sales of citrus fruit on export markets (mainly to New Zealand) have not been very significant and most of the crop is sold on the domestic market, either as fresh fruit or juice.

(4) *Financial assistance.* In 1971, the Commonwealth Government set up an Apple and Pear Stabilization Scheme to help pome fruit growers by lessening the effect of price fluctuations for different varieties on overseas markets. This scheme will be phased out by 1984 and an underwriting scheme will be implemented to cover all apple exports to all markets for the 1981 to 1985 period.

In recent years, citrus processors have been importing quantities of juice concentrate to overcome periods when the demand exceeds local availability of fresh fruit. The price of the imported juice was significantly lower than the local product, and in order to prevent excessive imports the Commonwealth Government has imposed a duty on citrus juice imported in excess of a certain maximum volume.

Small fruit

(1) *Distribution.* Climatic requirements have restricted the commercial production of strawberries, and cane and bramble fruits in particular, to the cooler southern regions of Victoria, and most of the fruit is grown in the hills of the eastern Melbourne metropolitan and Mornington Peninsula areas which are relatively close to the Melbourne market. During the last few years, fruit growers in other parts of the State interested in diversification have considered strawberry production for local demand. With cane and bramble berries, the development of mechanised harvesting requires production on flat sites, and several plantations have now been established in Central Victoria and north of the Great Dividing Range.

(2) *Size of production.* In the 1950s, practically all strawberry planting material available in Victoria was heavily infected with virus diseases and, as a result, the industry almost ceased to exist. The successful Runner Certification Scheme conducted by the Department

of Agriculture revitalised the industry between 1960 and 1970 and total production increased tenfold. More recently there has been increasing demand for cane and bramble berries from the processors. As the use of mechanical harvesters replaces expensive hand picking, there will be a potential for the development of a viable cane and bramble berry industry in the State.

VICTORIA—SMALL FRUIT PRODUCTION (kilograms)

Type of fruit	Year ended 31 March—				
	1975	1976	1977	1978	1979
Strawberries	1,138,339	910,069	1,004,395	945,646	1,115,344
Youngberries	202,072	125,762	129,756	80,445	53,860
Raspberries	114,385	91,167	88,995	80,949	86,741
Gooseberries	14,494	13,669	11,096	9,103	8,371
Loganberries	5,417	2,189	5,511	5,635	6,955
Other berries	13,494	17,696	15,779	16,783	63,739
Passionfruit	25,169	11,968	5,377	653	910

(3) *Marketing.* Berry fruits are mainly sold on the fresh fruit market or sent to processors. Recently, many growers have introduced the "pick your own" system of sales where the general public is invited to pick the fruit for themselves. This method greatly reduces harvesting and marketing costs, and growers with land on routes near holiday resorts, in particular, achieve a good public response and increased net returns.

Increased use of berry fruits in health foods (yoghurt), and cakes and tarts, is likely to produce a larger outlet for these fruits in the future.

Nuts

(1) *Distribution.* In Victoria a wide range of nuts can be grown such as almonds, walnuts, chestnuts, hazelnuts, macadamia nuts, pecans, and others. In the past, only a few of these trees have been grown in commercial plantings. In most cases they have been planted as windbreaks around orchards and vineyards (almonds) or in groups in the farm orchard.

Almonds were mainly planted in the northern areas; 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.

Since the early 1970s, many orchardists and farmers, who wanted to diversify, or others, who wanted to take up farming on a part-time basis, have shown interest in planting nuts. Along the Murray Valley, several almond groves have been established, including two large plantations of over 150 hectares each. Although there has been difficulty in obtaining young chestnut, hazelnut, and walnut trees with proven capacity, several small plantations have been established in suitable localities.

(2) *Size of production.* The production of almonds decreased from 50,000 kilograms in 1960-61 to 10,400 kilograms in 1976-77, but is now increasing due to recently established groves commencing production. In 1978-79, production reached 277,212 kilograms. There has not been much change in the quantity of other nuts produced. Because of the long establishment period for most of them, recent plantings have had little effect on production at this stage.

VICTORIA—NUT PRODUCTION (kilograms)

Type of fruit	Year ended 31 March—				
	1975	1976	1977	1978	1979
Walnuts	70,800	66,345	67,403	77,176	68,016
Chestnuts	13,234	20,028	18,172	19,851	24,884
Almonds	15,475	13,548	10,401	98,975	277,212
Filberts	73	586	100	4,342	1,337

(3) *Marketing.* Almonds and other nuts are keenly sought after by wholesalers who pre-pack the shelled or salted product for retail sale, and by confectioners who use nuts as ingredients for their products. To satisfy local demand, almonds and other nuts are being imported regularly. Thus there is an opportunity to increase local production as long as the price of local nuts can be kept at or below the level of the imported product (locally produced almonds are protected by tariff).

Grapes

(1) *Distribution.* In Victoria, most vine grapes are grown under irrigation in the Northern Mallee Division, and in the Goulburn Valley and Murray Valley areas. Wine grape varieties are also being grown in the traditional non-irrigated areas in the north-east (Rutherglen) and in the west (Great Western) of the State. With the increasing interest in wine grapes over recent years, many vineyards of varying sizes have been established in other suitable areas throughout the State.

(2) *Wine.* During the 1960s and 1970s, the demand for grapes for winemaking increased quite significantly, and as a result, many new areas were planted both by established vine growers and by many others without previous experience. Further, to satisfy winery demand, large quantities of sultanas and grapes of other varieties suitable for drying and winemaking have been diverted to wineries. Between 1960 and 1979, the intake of grapes by wineries had increased from 11,000 tonnes to 65,000 tonnes. Many of these grapes are now mechanically harvested.

Until recently, wineries were able to absorb the greatly increased volume of grapes produced in Victoria, New South Wales, and South Australia. During the 1977 harvest, there were signs of over-production in red varieties. This became a serious problem in 1978. For persons who wish to make their own wine at home on a small scale, a direct sales market has developed in recent years, based largely on sultanas, Waltham Cross, and Black Muscats. It is estimated that this market may take about 15,000 tonnes to 20,000 tonnes of fresh grapes annually. Due to a world wine surplus there seems little potential for developing the very small export trade in wine. Nevertheless imports are increasing.

(3) *Dried fruits.* The production of sultanas and other drying varieties has remained fairly steady at around 42,000 tonnes to 60,000 tonnes (dry weight). Only about one-third of the Victorian crop is marketed locally and the rest has to be exported. Thus growers' returns depend largely on prices established at world markets according to supply and demand. Recent shortfalls in the production of dried vine fruits in the U.S.A. and Europe have ensured favourable market conditions for the Australian produce. However, there are indications that the current high prices will not be maintained in the long-term. The diversion of sultanas to wineries provides a useful alternative outlet, but, in the long run, without improved efficiency, restriction of the production of drying varieties may be necessary.

(4) *Table grapes.* Table grape production in recent years, has increased to an estimated 35,000 tonnes. The table grape season is lengthening due to the introduction of new table grape cultivars, a number of which are earlier than traditional varieties, and also by improved handling and storage techniques. The above factors, combined with developing air and sea freighting facilities, are leading to the development of a table grape export trade.

VICTORIA—VITICULTURE: AREA AND PRODUCTION

Season	Area		Production for —		
	Bearing	Non-bearing	Wine making	Drying and table (a)	Grapes left on the vine
	hectares	hectares	tonnes	tonnes	tonnes
1974-75	20,541	1,807	r54,109	233,401	n.a.
1975-76	r19,308	r1,450	r59,189	226,424	n.a.
1976-77	19,598	1,197	63,252	208,541	n.a.
1977-78	r19,149	r1,233	r56,224	173,857	n.a.
1978-79	19,597	961	65,201	177,623	5,367

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

Further reference: *Victorian Year Book 1977*, pp. 461-6

Vegetables

Victoria is the leading State for vegetable production in Australia, closely followed by Queensland and New South Wales. The principal crops grown in Victoria are potatoes, tomatoes, carrots, cauliflowers, cabbages, peas, and onions.

VICTORIA—VEGETABLES FOR HUMAN CONSUMPTION

Main type	Area sown		Production	
	1977-78 (a)	1978-79 (a)	1977-78 (a)	1978-79 (a)
	hectares		tonnes	
Potatoes	12,147	11,256	303,433	279,613
Onions	825	703	17,161	17,009
Carrots	864	967	26,739	35,553
Parsnips	183	161	5,664	5,182
Beetroot	38	36	901	709
Tomatoes	2,826	2,503	74,146	70,051
French beans	1,008	1,026	3,821	5,382
Green peas— market	270	156	555	550
factory	1,569	1,964	3,073	(b) 4,355
Cabbage and Brussels sprouts	1,065	1,061	39,236	83,422
Cauliflowers	900	1,089	44,222	68,805
Lettuce	867	954	17,496	22,776
Pumpkins	784	679	10,805	10,037

(a) See footnote to table on page 335

(b) Shelled weight

Tobacco

Tobacco growing in Australia has traditionally been regarded as a rather speculative proposition, because of wide fluctuations in production and in market conditions. Technical advances in the use of fertiliser, disease control, and other cultural factors influencing crop production, have in recent years led to marked improvements in the level and consistency of average yields.

The introduction of a Tobacco Stabilisation Plan in 1965 promoted further stability in the industry. This scheme, now in its fifth term, provides for the annual sale, at a guaranteed minimum price, of up to 15,000,000 kilograms of leaf which meets defined quality standards. This plan is operated by the Australian Tobacco Board together with a Tobacco Leaf Marketing Board in each producing State.

Australian tobacco is mainly used in the manufacture of cigarettes. The use of domestic leaf is encouraged by a statutory mixing percentage applied in conjunction with concessional rates of import duty. The statutory percentage is currently 50 per cent and, at this level, it is important that only leaf of high smoking quality is produced. This requires friable and well drained soils, appreciable summer rainfall, and freedom from high winds and extremes of temperature.

The Victorian tobacco crop is usually rather more than one-third of the total Australian production. The crop is predominantly of the flue-cured or Virginia type. A significant area of burley, a light air-cured tobacco, has been grown in Victoria in recent years, but is decreasing. Suitable growing conditions are found in north-east Victorian river valleys, the industry being concentrated along the Ovens, Kiewa, and King Rivers and their tributaries, with small outlying areas in the northern part of Victoria.

Most Victorian tobacco is produced under sharefarming agreements on the general basis that the landowner provides land, facilities, and equipment, the sharefarmer provides labour and operating costs, and the proceeds of sale of produce are shared equally.

The major proportion of tobacco production costs is accounted for by manual labour requirements, and in recent years, considerable attention has been given to the reduction of labour by mechanisation. As a result, equipment such as semi-automatic transplanters, topping machines, harvesting aids, stringing machines, and bulk curing units, is now replacing tedious manual operations on most Victorian tobacco farms.

The Department of Agriculture helps tobacco growers to increase yield and improve leaf quality by research in agronomy, plant pathology, and plant breeding at the Tobacco

Research Station, Myrtleford, and by an intensive farm-to-farm tobacco advisory service in all producing districts.

The Department of Agriculture has released flue-cured varieties resistant to common strains of blue mould, the blue mould-resistant burley breeding lines also show promise. Other advances in tobacco production include improved practices to give more effective and economical control of blue mould, identification of the effects of soil and climatic variables on tobacco crop production, the testing and development of mechanical harvesting and associated curing methods, and the testing of cheap solid fuels to replace gas and oil for curing.

VICTORIA—TOBACCO PRODUCTION

Season	Area	Production	Average yield per hectare
	hectares	tonnes (dry)	tonnes (dry)
1974-75	3,926	6,086	1.55
1975-76	3,755	5,683	1.51
1976-77	3,821	5,999	1.57
1977-78	3,621	5,788	1.60
1978-79	3,505	5,563	1.59

Hops

The hop is a summer-growing perennial plant. The rootstock produces vines which may grow up to 10 metres high each season before being cut back during the autumn.

Victorian hops are of high quality when measured against world standards and the area given over to hops in this State increased during the first half of the 1970s. However, because of uncertain markets, production has tended to decline slightly since then.

Hops need a good rainfall, evenly distributed throughout the growing season, deep, well-drained soils, and protection from wind. In Victoria, the industry is confined to alluvial soils in the valleys of the Ovens and King Rivers where the availability of liberal supplies of good quality irrigation water is essential to supplement the natural summer rainfall.

Hops are planted from root cuttings, or sets, on a square spacing to give some 2,200 plants per hectare, supported on a system of trellising about 6 metres above the planted area. The size of hop gardens in Victoria varies considerably from 2 hectares to over 100 hectares.

In all cases, production is by family and hired labour. The labour needs vary from month to month, being heaviest at pruning, training, and harvest time, and the average is about one man for each 3 hectares. Before the advent of mechanical harvesting, much more labour than this was needed.

Machine harvesting is universal in Victorian hops, the whole vine being cut down and brought to a stationary picker which separates the cones from the rest of the plant. Conveyor belts and mechanical loaders ensure that the passage of the hops through the drying kiln generally requires little manual effort.

In small gardens, harvesting is commonly done under contract or by neighbours sharing fully mechanised equipment. Other processes, such as pruning, are also becoming increasingly mechanised.

Hops are normally grown under annual contract to merchants, known as hop factors. Annual hop production in Australia currently exceeds the total quantity demanded by domestic brewers, leaving a substantial proportion of the crop for export.

The high quality Victorian bred variety *Pride of Ringwood*, which is now virtually the only variety grown in Victoria, has been well received on world markets but profitable export sales have nevertheless been difficult to negotiate in seasons of overall world surplus.

The Department of Agriculture conducts research and extension services in the Victorian hop industry, current emphasis being on improvement of hop quality. This work has been intensified, and additional investigations on long-term fertiliser requirements and control of weeds and insect pests have recently been introduced.

VICTORIA—HOPS PRODUCTION

Season	Area		Average yield
	hectares	tonnes	per hectare
1974-75	478	831	1.74
1975-76	469	746	1.59
1976-77	424	809	1.91
1977-78	429	959	2.24
1978-79	427	745	1.74

Plant nurseries

In 1977-78, the total area of nurseries in Victoria was about 933 hectares, including about 45 hectares of glass, plastic film, and bush houses; the total value of sales of nursery products exceeded \$30.5m.

VICTORIA—NURSERIES (a)

Item	Amount	
	1974-75	1977-78
Number of nurseries	373	321
Sales of nursery products (\$'000)—		
Seeds and bulbs	1,458	2,751
Seedlings	2,849	3,578
Cut flowers (including orchids)	3,758	7,167
Cultivated turf and ferns	167	4,110
Fruit trees and vines	642	2,254
Rose bushes	937	684
Other shrubs and trees	6,792	10,052
Total nursery sales	16,603	30,596

(a) For the purpose of the census, a nursery was defined as a location commercially engaged in growing or raising nursery products from seeds, bulbs, cuttings, etc., or significantly "growing-on" any of these items.

Further reference: *Victorian Year Book 1977*, pp. 471-2

Livestock and livestock products

Introduction

The first significant development in Victoria, or as it was then known, the Port Phillip District, was the pastoral industry. Millions of hectares of lightly timbered land lay before the newcomers, and the quickest way to wealth was evidently by the division of the land into runs and the depasturing of sheep and cattle. Settlers and stock came at first from Tasmania and eventually from New South Wales.

According to early statistical records there were 41,332 sheep, 155 cattle, and 75 horses in the District on 25 May 1836. On 1 January 1841, as a result of five years of livestock importation and breeding, there were 782,283 sheep, 50,837 cattle, and 2,372 horses. By 1 January 1851, the livestock population had increased to 6,032,783 sheep, 378,806 cattle, 21,219 horses, and 9,260 pigs.

The following table shows the numbers of livestock in Victoria at decennial intervals from 1871 to 1971, and the numbers of livestock on rural holdings for each of the eight years 1972 to 1979. From 1957, no allowance has been made for the small number of livestock not on rural holdings.

VICTORIA—SELECTED LIVESTOCK: NUMBERS (a)
('000)

Year	Cattle (b)			Sheep	Pigs
	Dairy	Beef	Total		
1871 at 31 March	n.a.	n.a.	721	10,762	131
1881 at 31 March	n.a.	n.a.	1,286	10,360	242
1891 at 31 March	n.a.	n.a.	1,783	12,693	282
1901 at 31 March	n.a.	n.a.	1,602	10,842	350

VICTORIA—SELECTED LIVESTOCK: NUMBERS (a)—continued
(’000)

Year	Cattle (b)			Sheep	Pigs
	Dairy	Beef	Total		
1911 at 1 March	n.a.	n.a.	1,584	12,883	333
1921 at 1 March	n.a.	n.a.	1,575	12,171	175
1931 at 1 March	n.a.	n.a.	1,430	16,478	281
1941 at 1 March	n.a.	n.a.	1,922	20,412	398
1951 at 31 March	1,489	727	2,216	20,012	237
1961 at 31 March	1,717	1,147	2,864	26,620	319
1971 at 31 March	1,974	3,086	5,060	33,761	520
1972 at 31 March	1,927	3,508	5,435	29,496	590
1973 at 31 March	1,957	3,488	5,445	24,105	585
1974 at 31 March	1,933	3,906	5,839	25,787	424
1975 at 31 March	1,939	4,235	6,174	26,411	383
1976 at 31 March	1,871	3,996	5,867	25,395	393
1977 at 31 March	1,681	3,423	5,104	21,925	397
1978 at 31 March	1,609	2,963	4,572	22,021	401
1979 at 31 March	1,516	2,619	4,134	22,750	390

(a) A table showing livestock numbers for each year from 1837 to 1971 is published in the *Victorian Year Book* 1973, pages 1090-1.

(b) Separate figures for beef and dairy cattle are not available for the years before 1943.

The following table shows details of the stock slaughtered in Victoria during each of the five years 1974-75 to 1978-79:

VICTORIA—LIVESTOCK SLAUGHTERED
(’000)

Particulars	1974-75	1975-76	1976-77	1977-78	1978-79
Sheep	4,147	5,677	4,922	r4,247	3,879
Lambs	5,685	5,696	5,550	r5,731	5,399
Cattle and calves	2,498	3,298	3,594	3,856	2,929
Pigs	969	882	935	r1,017	961

Sheep

Distribution

During 1978-79, the Victorian sheep population increased 3.3 per cent to 22.8 million head—32.5 per cent below the 1971 peak of 33.8 million head. Sheep are widely distributed throughout Victoria and the numbers of sheep in each statistical division are shown in the following table:

VICTORIA—SHEEP AND LAMBS IN EACH STATISTICAL DIVISION
AT 31 MARCH 1979
(’000)

Statistical division	Rams	Ewes	Wethers	Lambs	Total
Melbourne	3	117	88	46	255
Barwon	20	701	253	284	1,257
South Western	83	3,397	1,505	1,530	6,515
Central Highlands	36	1,617	1,131	729	3,513
Wimmera	41	1,762	980	712	3,496
Northern Mallee	14	664	127	236	1,041
Loddon-Campaspe	30	1,334	762	521	2,647
Goulburn	30	1,251	487	375	2,144
North Eastern	8	297	85	94	484
East Gippsland	7	358	178	156	699
Central Gippsland	9	361	105	168	643
East Central	1	40	3	13	57
Total	284	11,897	5,705	4,864	22,750

Main sheep breeds

Victorian sheep can be divided broadly into "wool" and "meat" breeds. The distinction is necessarily an arbitrary one, since wool is an important source of income from ewes kept for prime lamb production, while mutton is produced mainly from surplus or aged sheep from "woolgrowing" flocks.

The Merino is the most numerous breed in Victoria, although not as dominant as in the other mainland States. At 31 March 1977, the 12 million Merinos comprised 55 per cent of the Victorian flock, compared with 48 per cent in 1974.

The traditional Victorian Merino is a comparatively small framed Saxon type, producing fine to superfine wool. This type is now giving way to larger, heavier cutting, broader woolled strains, in response to reduced price margins for fineness, greater stress on carcase values, and sharp increases in production costs.

Other breeds derived from Merino crossbreds and kept mainly for wool production include the Corriedale (half Merino, half Lincoln), 11 per cent, and Polwarth (one-quarter Lincoln), 3 per cent. Comebacks (predominantly Merino, fine-woolled crossbreds) make up another 5 per cent. Other stronger woolled crossbreds are used mainly for prime lamb production. These contributed 19 per cent (4 million) to the total in 1977, compared with 25 per cent in 1974.

British meat breeds and Australasian breeds developed from them, such as the Poll Dorset, are widely used as sires in crossbreeding programmes, so that their influence is much greater than their contribution to total numbers (8.3 per cent in 1977) would suggest. British longwool breeds, such as the Border Leicester and the Romney Marsh, are commonly mated to Merino ewes to produce crossbred breeding ewes and prime lambs. Shortwool breeds, such as the Dorset Horn, Poll Dorset, and Southdown are used mainly as terminal sires, mated with crossbred, Corriedale, or Merino ewes to produce prime lambs.

VICTORIA—BREEDS OF SHEEP (INCLUDING RAMS) AT 31 MARCH (a)

Breed	1971		1974		1977	
	Number	Percentage of total	Number	Percentage of total	Number	Percentage of total
Merino	16,739,818	49.58	12,256,133	47.53	11,973,587	54.61
Corriedale	3,717,225	11.01	2,492,255	9.66	2,419,208	11.03
Polwarth	1,008,052	2.99	688,378	2.67	626,895	2.86
Border Leicester	615,620	1.82	431,096	1.67	782,107	3.57
Cheviot	9,574	0.03	9,797	0.04	4,687	0.02
Dorset Horn	464,249	1.38	491,367	1.90	389,699	1.78
Poll Dorset	161,445	0.48	215,328	0.84	209,465	0.96
Perendale	5,794	0.02	7,200	0.03	7,871	0.04
Romney Marsh	445,171	1.32	262,800	1.02	280,854	1.28
Ryeland	22,445	0.07	19,173	0.07	12,870	0.06
Southdown	133,302	0.39	115,559	0.45	89,612	0.41
Suffolk (including South Suffolk)	11,173	0.03	9,588	0.04	18,625	0.08
Zenith	70,722	0.21	50,670	0.20	40,912	0.19
Comeback	2,199,043	6.51	1,887,569	7.32	1,031,150	4.70
Crossbred (including half breed Merino and coarser)	8,143,820	24.12	6,533,446	25.33	4,017,269	18.32
Other (including unspecified)	14,034	0.04	317,192	1.23	20,639	0.09
Total	33,761,487	100.00	25,787,551	100.00	21,925,450	100.00

(a) Not collected in 1972, 1973, 1975, 1976, 1978, or 1979.

Lambing

The lambing performance of the Victorian flock fluctuates according to seasonal conditions around a fairly static twenty year average of 83 lambs marked for each 100 ewes mated.

Lambing performance in the year ended 31 March 1979 conformed to this average following two years when lambings from early matings in particular had been reduced as a

result of poor seasonal conditions. Ewe matings also stabilised at 9.6 million after a five year decline.

Victoria's largest lambing occurred in 1970-71, when 12.7 million lambs were marked from 14.8 million ewes mated (86 per cent).

VICTORIA—LAMBING

Season	Ewes mated	Lambs marked	Percentage of lambs marked to ewes mated
	'000	'000	per cent
1974-75	10,622	8,823	83
1975-76	10,365	8,359	81
1976-77	9,551	6,566	69
1977-78	9,462	7,482	79
1978-79	9,562	7,923	83

Wool production

In 1978-79, Victoria produced 138.6 million kilograms of wool (greasy basis), 5 per cent higher than in 1977-78, and this represented 20 per cent of Australian production.

Victorian production peaked at 201 million kilograms in 1970-71, although the most valuable clip (\$254m) was produced in 1972-73 during a brief period of boom prices. From 1970-71 until 1977-78, the size of the clip declined in line with the decline in sheep numbers but now appears to have stabilised. The Victorian clip spans a very wide range of wool types, ranging from superfine Merino, through the stronger grades of Merino and Comeback, to coarse crossbred and Lincoln and a small quantity of speciality (hairy) carpet wool.

VICTORIA—SHEEP SHORN AND WOOL CLIPPED

Season	Shorn		Wool clipped (including crutchings)		Average	
	Sheep	Lambs	Sheep	Lambs	Per sheep	Per lamb
	'000	'000	'000 kg	'000 kg	kg	kg
1974-75	26,385	6,591	128,614	9,887	4.87	1.50
1975-76	23,271	5,839	102,798	8,020	4.42	1.37
1976-77	21,734	4,404	91,378	5,769	4.20	1.31
1977-78	21,449	5,194	96,421	6,867	4.50	1.32
1978-79	22,569	5,896	105,848	8,582	4.69	1.46

VICTORIA—SHEEP AND LAMBS SHORN, SEASON 1978-79

Statistical division	Shorn		Wool clipped (including crutchings)		Average	
	Sheep	Lambs	Sheep	Lambs	Per sheep	Per lamb
	number	number	kg	kg	kg	kg
Melbourne	251,405	50,083	1,250,503	77,808	4.97	1.55
Barwon	1,258,119	349,437	5,541,312	474,571	4.40	1.36
South Western	6,549,809	1,980,290	30,070,164	2,901,160	4.59	1.47
Central Highlands	3,534,798	779,372	15,598,034	1,147,455	4.41	1.47
Wimmera	3,478,973	818,236	17,420,757	1,212,535	5.01	1.48
Northern Mallee	909,799	235,933	4,539,073	351,072	4.99	1.49
Loddon-Campaspe	2,678,041	632,331	13,197,281	936,450	4.93	1.48
Goulburn	2,149,908	499,344	10,102,285	706,497	4.70	1.41
North Eastern	465,272	109,805	2,083,103	148,613	4.48	1.35
East Gippsland	688,013	166,079	3,228,181	216,643	4.69	1.30
Central Gippsland	555,460	251,766	2,595,686	375,944	4.67	1.49
East Central	49,368	23,721	222,070	33,559	4.50	1.41
Total	22,568,965	5,896,397	105,848,449	8,582,307	4.69	1.46

VICTORIA—TOTAL WOOL PRODUCTION

Season	Clip	Stripped from and exported on skins, etc. (greasy)	Total quantity (greasy)
	'000 kg	'000 kg	'000 kg
1974-75	r138,500	27,043	r165,543
1975-76	110,818	r27,080	r137,898
1976-77	97,147	28,996	126,143
1977-78	103,288	28,346	131,634
1978-79	114,431	24,198	138,629

Further reference: Australian Wool Corporation, *Victorian Year Book 1977*, p. 452

Mutton and lamb production

Victoria is the leading State in the production of mutton and lamb. However, part of this production is derived from sheep and lambs originating in other States, especially from southern New South Wales.

Mutton, the meat from adult sheep, is mainly produced from surplus sheep from the wool industry so that production patterns correspond closely to expansions and contractions in that industry. In 1978-79, Victoria produced 81,304 tonnes of mutton, well down on the 1971-72 peak of 247,000 tonnes.

Prime lamb production decreased by 4.9 per cent to 94,939 tonnes in 1978-79. 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 the Murray and Goulburn Valleys. 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 South Western, Central Highlands, Central Gippsland, and parts of the North Eastern Statistical Divisions of the State.

During 1978-79, domestic consumption of lamb in Australia declined by 6 per cent to 14 kilograms per head per annum. Mutton consumption rose 1 kilogram to 4 kilograms per head per annum during 1978-79, still well below the 20-25 kilogram level that prevailed during the early 1970s.

Export of live sheep

Exports of Australian live sheep for slaughter in the country of destination have grown from 1.5 million head in 1975 to 5.7 million head during the year ended 30 June 1980. A total of 98 per cent of the 1979-80 exports were consigned to the Middle East and to North African markets, notably Iran (33 per cent), Kuwait (25 per cent), and Saudi Arabia (22 per cent).

Western Australia, the nearest source, has been the main supplier during this period of expansion, but shippers have recently had to look increasingly to the eastern States to fill their contracts. Western Australia now supplies approximately 2.5 million head while Victorian flocks contributed approximately 700,000 head to shipments from Victorian and South Australian ports during 1979.

Middle East demand for sheep meat has been enhanced by rapidly growing populations and increasing wealth from oil revenues. Traditional taste, religious beliefs, the lack of refrigeration favour meat from freshly killed sheep. However, the growing demand for lamb and young mutton is the major factor in a parallel expansion in carcase meat imports. Carcase meat imports have been built up as rapidly as suitable refrigerated storage and distribution facilities have been installed, and traditional habits modified.

Australia's long-established export trade in breeding sheep continued at a high level during the year ended 30 June 1979. Sheep were consigned to Rumania, the U.S.S.R., Peru, and India.

Meat cattle

Cattle were introduced into southern Australia by the early settlers. These first cattle were poor stock from Africa intended to meet the needs of draught, milk, and meat, and were quickly replaced by herds of meat cattle imported from Britain.

In its early years, the meat cattle industry faced many natural hazards including drought, disease, and pests. More recently, changing economic conditions and patterns of

land-use have been most important in determining the size and distribution of the meat cattle population. Refrigeration, pasture improvement, the relative prices received for other primary products, and the export markets for beef, have all been important factors.

In the early 1970s, high prices for beef, and marketing difficulties in the sheep, dairy, and wheat industries, encouraged farmers to build up breeding herds. As a result, beef cattle numbers in Victoria rose from 1.5 million in 1968, to reach a peak of 4.2 million in 1975. This included a large number of heavy bullocks retained by producers anticipating some recovery in market prices, which had dropped dramatically when export demand, especially from Japan, was suddenly curtailed. After 1975, however, several factors combined to force a sharp downturn in meat cattle numbers. They included continued low beef prices, several dry autumn periods, buoyant grain prices, and a gradually improving wool market. Numbers fell to 2.5 million before stabilising in 1979 in response to a marked recovery in beef prices.

The Victorian environment is very favourable for beef production with cattle able to graze pasture throughout the year. The following table shows the numbers and types of meat cattle in each statistical division at 31 March 1979:

VICTORIA—DISTRIBUTION OF MEAT CATTLE AT 31 MARCH 1979
(‘000)

Statistical division	Bulls for service		Cows and heifers	Calves under 1 year	Other	Total
	1 year and over	Under 1 year				
Melbourne	4	1	75	42	28	150
Barwon	3	1	67	34	20	125
South Western	14	4	297	129	99	543
Central Highlands	3	1	77	38	25	144
Wimmera	2	1	37	22	8	70
Northern Mallee	1	1	34	23	9	68
Loddon-Campaspe	4	2	92	54	30	182
Goulburn	8	3	184	101	67	363
North Eastern	5	1	158	83	72	319
East Gippsland	5	1	118	61	30	215
Central Gippsland	7	2	157	89	105	360
East Central	2	—	36	20	22	80
Total	58	18	1,332	696	515	2,619

Most of the Victorian breeding herd (bulls and cows) are in the South Western, Goulburn, North Eastern, and Gippsland Statistical Divisions. There were large decreases from 1976 in the total meat cattle populations of the Wimmera, Loddon-Campaspe, and Goulburn Statistical Divisions.

In the early 1970s, beef production increased rapidly and reached a peak of 530,199 tonnes in 1978 as producers started to reduce their herds. Exports constituted about 37 per cent of Victorian beef and veal production in 1977-78 and the main markets were the U.S.A., Japan, Korea, Canada, the U.S.S.R., Eastern European countries, and the Middle East. During 1978-79, exports to the U.S.A., Korea, and Japan increased, while exports to the Soviet block, Iran, and Egypt declined.

Domestic consumption of beef and veal is very responsive to price. During the low price period of the early 1970s, consumption rose from about 40 kilograms per head per annum to a peak of 70 kilograms in 1975-76. Consumption fell again to 57 kilograms in 1978-79 in the wake of higher prices which accounted for a large part of the decline in total meat consumption in that year. Attention is drawn to the historical table of livestock numbers on pages 360-1, and the table on livestock slaughterings on page 361.

Further reference: Australian Meat Board, *Victorian Year Book 1977*, pp. 453-4

Milk cattle

Distribution

Dairy farming in Victoria is largely confined to the higher rainfall areas of Gippsland, the Western District, and the northern irrigation areas.

Although cow numbers are decreasing, production per cow is increasing.

VICTORIA—DISTRIBUTION OF MILK CATTLE AT 31 MARCH 1979
(’000)

Statistical division	Bulls for service		Cows and heifers for milk and cream			House cows and heifers	Total
	1 year and over	Under 1 year	Cows in milk and dry	Heifers			
				1 year and over	Under 1 year		
Melbourne	1	—	30	8	5	—	44
Barwon	1	1	69	14	14	1	99
South Western	5	1	207	45	39	2	297
Central Highlands	1	—	11	4	2	1	18
Wimmera	—	—	3	1	1	2	5
Northern Mallee	1	—	24	5	5	1	35
Loddon-Campaspe	2	1	88	18	19	1	128
Goulburn	5	2	208	42	42	1	299
North Eastern	1	—	45	10	10	1	66
East Gippsland	1	1	57	12	11	1	82
Central Gippsland	6	2	265	53	50	1	376
East Central	1	—	40	7	7	—	55
Total	25	8	1,047	219	205	12	1,504

Recent developments

The high capital investment in dairying is largely a reflection of advances in dairy farming technology. These have been marked by progress in the mechanisation of milking, the introduction of farm refrigeration and tanker collection of milk from properties, and the improvement in systems of cleaning dairy shed equipment and of disposing of milking shed wastes. These advances have contributed towards expansion of dairy farm enterprises which one, two, or three persons can operate. Improvements in pasture production and grazing management, and increased mechanisation in growing and harvesting fodder, have made it possible to carry more stock on farms.

Contract labour is used by dairy farmers mainly to meet peak labour demands such as hay making. Usually the contractor owns most of the equipment.

VICTORIA—MILK PRODUCTION AND UTILISATION
(’000 litres)

Purpose for which used	Year ended 30 June—				
	1975	1976	1977	1978	1979
Butter	2,435,763	2,186,791	1,804,081	1,505,882	1,414,097
Cheese	420,693	489,095	471,247	518,989	646,344
Processed milk products	415,585	410,504	496,463	533,833	736,432
Other purposes	472,591	431,373	440,456	452,373	450,681
Total milk produced	3,744,632	3,517,763	3,212,247	3,011,077	3,247,554

Further references: Australian Dairy Corporation. *Victorian Year Book* 1977, p. 456; Marketing of milk, 1980, pp. 370-1

Pigs

Approximately two-thirds of the pig meat consumed in Victoria is produced in this State. The remaining one-third is acquired from other States.

Australians are relatively large meat eaters, but they eat much less pig meat than most other nations. Pig meat provides about only 7 per cent of the total meat consumed by Australians. This is due partly to traditional eating habits and partly to the relative costs of sheep and cattle meat, produced on low cost pasture, and pig meat, produced from concentrated foods such as grain.

The pig industry was developed largely in conjunction with the dairy industry. Pigs were used to salvage separated milk, buttermilk, and whey — by-products of butter, cheese, and casein manufacture—and those foods provided the greater part of their diet. In the 1950s and 1960s, more milk was used for human food, and less was available for pigs. Pig production then became less dependent on milk but more on grain feeding, protein foods,

animal by-products such as meat and bone-meal, fish-meal, and whale solubles. With this change in the major source of food for pigs, the structure of the pig industry changed to fewer but larger pig herds.

Pigs mature early, are prolific, and grow fast. A sow can produce a litter when she is twelve months old; her pigs can be ready for pork when three and a half to four months old, or for bacon when five to six months old, at which time the sow can be producing her second litter.

The large variations in the annual production of pigs caused fluctuations in the prices farmers received for their pigs. The variations in supply are caused more by the rapid production potential of pigs, and the absence of adequate forward information on trends, than by changes in seasonal conditions.

In recent years, the increased demand for pig meat has resulted in a consistent upward trend in production, with prices remaining fairly stable. For example, between 1966 and 1972, production of pig meat increased by some 60 per cent, which was all consumed by the domestic market. However, during 1973, the situation altered. An oversupply of pigs led to a sharp decline in prices at a time when food costs were rising. Many persons left the industry and by March 1974 the Victorian pig population had fallen by 27 per cent. The resultant shortage of pigs caused pig prices to rise to record levels. During 1975, the pig population fell a further 10 per cent and stabilised with a slight increase of 2.5 per cent in 1976. Pig prices during this time stabilised just above the previous record levels. Despite this, high capital costs and escalating feed prices are tending to deter persons from entering the industry. There is no scheme to support pig prices in Australia.

In the 1930s and early 1940s, Australia exported pig carcasses, mainly to the United Kingdom, where it had a protected market. In 1941, more than one-third of Australia's pig production was exported. Since then, production and local demand have come closer together and only an insignificant part of the country's production is exported. In 1972-73, as a result mainly of orders from Japan, exports amounted to only 6 to 7 per cent of production.

Pigs now provide the major part of the income from many of the farms on which they are kept. More capital and skilled management are involved in the individual units.

The number of pigs in Victoria at 31 March 1979 was 389,976. The following table shows classification (in statistical divisions) of pigs, together with the numbers of pig keepers. The historical table on pages 360-1 and the table on slaughtering on page 361 contain further information about the pig industry.

VICTORIA—PIGS AND PIG KEEPERS AT 31 MARCH 1979

Statistical division	Boars	Breeding sows	All other	Total pigs	Pig keepers
Melbourne	377	4,289	27,642	32,308	109
Barwon	113	1,419	8,026	9,558	77
South Western	261	2,487	13,503	16,251	242
Central Highlands	196	2,604	20,984	23,784	135
Wimmera	664	5,368	33,441	39,473	583
Northern Mallee	393	3,912	22,311	26,616	364
Loddon-Campaspe	1,148	15,474	102,492	119,114	531
Goulburn	876	10,696	60,982	72,554	414
North Eastern	441	3,464	21,495	25,400	200
East Gippsland	71	652	3,181	3,904	95
Central Gippsland	231	2,824	14,994	18,049	157
East Central	40	487	2,438	2,965	30
Total	4,811	53,676	331,489	389,976	2,937

Poultry

The trend in the Victorian egg industry has been towards large specialised farms, for example, egg producers, hatcheries, and pullet growers, all of which use modern poultry housing, equipment, and labour saving machinery.

The greater proportion of Victoria's estimated 3.0 million adult female fowls are now contained within the commercial egg industry. There are, however, small household flocks in suburban and country areas. The main areas of commercial production are centred on

the outskirts of the Melbourne metropolitan area and in the Bendigo district, with large centres around Ballarat and Geelong, and substantial populations in the Wimmera, Goulburn Valley, and north-east.

Farms consisting of one man or one family usually manage 5,000 to 10,000 layers. There are, however, many larger farms employing labour with up to 50,000 layers, and a few much bigger establishments.

Housing is planned on the intensive principle, with deep litter pens or multiple bird cage units. Most of the new housing is based on the laying cage system. A proportion of layers are kept in fully enclosed, windowless houses in a fully controlled environment. Artificial lighting is used on almost all commercial egg farms to stimulate egg production.

Feeding is based on grains (wheat, oats, and barley) and their by-products (bran and pollard), with meatmeal used as the major protein supplement. A wide range of commercial, ready-mixed poultry rations is available.

Laying stock consists mainly of a specially produced cross between the White Leghorn and Australorp breeds. The average State egg production is estimated at approximately 240 eggs per bird per year. Commercial stock of the local breeding farms and hatcheries is tested for profitability using the Department of Agriculture's Random Sample Laying Test at Burnley Gardens.

Chicks are hatched continuously throughout the year, with an emphasis on the June to November period. Hatcheries are large and use modern incubators of about 65,000 egg capacity. Most commercial egg-type chicks are sexed at one day old by machine or hand methods. The main power source used in the brooding of chicks is electricity, but gas brooders and hot water brooders fired by oil burners are also used.

The marketing of eggs is controlled by the Victorian Egg Marketing Board. Flocks with over twenty adult female fowls come within the Board's jurisdiction. Victoria produces a surplus of eggs which is exported through the Australian Egg Board.

Advisory and research services to the egg industry are provided by the Department of Agriculture and by commercial firms concerned with the sale of feed, chickens, drugs, and equipment.

VICTORIA—HEN EGGS SET AND CHICKENS HATCHED ('000)

Period (a)	Hen eggs set (b)	Chicks hatched (c) intended to be raised for—				Total hatched
		Meat production	Egg production	Breeding		
				Pullets	Cockerels	
MEAT STRAINS						
1974-75	34,772	27,306	..	n.a.	n.a.	(d) 27,306
1975-76	40,738	33,219	..	n.a.	n.a.	(d) 33,219
1976-77	42,615	34,694	..	n.a.	n.a.	(d) 34,694
1977-78	r47,881	r38,439	..	n.a.	n.a.	(d) r38,439
1978-79	53,934	42,798	..	n.a.	n.a.	(d) 42,798
EGG STRAINS (e)						
1974-75	14,924	316	5,005	196	39	5,556
1975-76	11,480	196	4,012	145	36	4,389
1976-77	11,842	173	3,804	141	28	4,146
1977-78	r8,568	157	r2,976	90	27	r3,250
1978-79	8,395	123	2,772	103	21	3,019

(a) Year ended 30 June.

(b) Includes eggs which failed to hatch.

(c) Excludes chicks destroyed.

(d) Incomplete.

(e) Egg strain chicks reported as "unsexed" have been allocated half to chicks for meat production and half to chicks for egg production.

Broilers

The raising of chicks for meat on a large scale has emerged in Victoria since the mid-1950s. Chickens are most efficient in converting poultry feeds, grain, and protein supplements to meat, and are also multiplied cheaply and rapidly through scientific breeding and modern artificial incubation methods.

It now takes approximately 2.1 kilograms of poultry feed to produce 1 kilogram of poultry meat, and a 2 kilogram chicken is grown in eight weeks. This efficient conversion and rapid growth has been achieved by extensive breeding programmes, by the use of "high energy" poultry feeds, highly supplemented with vitamins, minerals, growth promoters, and disease control drugs, and by the development of enclosed, factory-like broiler houses with controlled temperature, humidity, ventilation, and light all of which are conducive to fast growth. Broiler houses are fully enclosed; each house grows a "crop" of about 30,000 to 60,000 broilers about five times a year. A one man or one family farm raises approximately 150,000 to 300,000 birds a year. Growers are usually contracted to supply large broiler organisations which hatch and supply the specially bred meat chickens and receive broilers back for processing and distribution.

The organisation of the broiling industry as a continuous, production-line, factory-type operation has been a major factor in the significant reduction in the price of poultry meat to consumers. Breeders, hatcheries, contract growers, poultry processors, and distributors have all been co-ordinated to ensure efficient and continuous production. Seasonal effects are no longer a consideration and prices do not fluctuate. As a result, poultry meat, once a luxury, is now inexpensive and a normal part of the diet.

The main broiler production centres are located on the Mornington Peninsula, in areas south-east and east of Melbourne, and in the Geelong area — near the processing works and the main centres of consumption. Most of Victoria's production is consumed locally; very little is exported, but considerable numbers of interstate broilers are imported.

The Broiler Chicken Industry Act requires all commercial broiler growing to be under an agreement or contract approved by the Negotiation Committee of grower and processor representatives set up under the Act. The Committee negotiates and sets growing fees and conditions for the industry.

The following statistics have been compiled from statistical returns submitted by commercial chicken hatcheries (i.e. those making sales of day-old chicks) and by commercial poultry slaughtering establishments.

VICTORIA—POULTRY SLAUGHTERED
FOR HUMAN CONSUMPTION
(‘000)

Period (a)	Chickens (i.e., broilers, fryers, or roasters)	Hens and stags	Ducks and drakes
1974-75	26,324	2,044	104
1975-76	29,233	1,646	84
1976-77	31,435	1,831	55
1977-78	35,053	2,029	261
1978-79	38,294	2,276	256
DRESSED WEIGHT OF POULTRY SLAUGHTERED (b) (c) ('000kg)			
Period (a)	Fresh and frozen	Fresh and frozen	Fresh and frozen
1974-75	33,140	3,196	166
1975-76	36,332	2,610	131
1976-77	39,785	2,881	249
1977-78	44,230	3,149	441
1978-79	48,359	3,423	469

(a) Year ended 30 June.

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

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

Miscellaneous livestock

Goats

The main breeds of goats in Victoria are the Angora (mohair producer) and the various milking breeds consisting of the Saanen, Toggenburg, British Alpine, and Anglo-Nubian. Angora goat numbers, although still small, have increased rapidly in recent years. In 1977, there were about 4,000 registered purebred and part Angora breeding animals in Victoria.

By 1980, the number had risen to 45,000. This is attributed to the improved world market price for mohair — a luxury fibre that has lustre, is light in weight, has softness of

handle, and is hard wearing. Prices of Angora breeding animals have broken world records, the highest price paid for a buck bred in Victoria was \$42,000 on 8 February 1980, and for a doe, \$7,800. Angora goats are shorn twice a year and the mohair produced is sorted into grades, after which the fibre is sold by the auction system. Estimated mohair production in 1979-80 was 25,500 kilograms.

Recent interest in cashmere has stimulated the upgrading of cashmere-type feral goats for fibre production. Cashmere is the fine undercoat of goats and is harvested by combing the animals in spring. Cashmere-type goats in Victoria numbered approximately 2,000 in 1980.

Goat milk production declined in recent years because of a Commonwealth Government ruling on pharmaceutical benefits. In 1976, the upper age limit for subsidised goat milk for children allergic to cows milk was reduced from 6 years to 18 months. As a result, the main processor and outlet ceased production of canned goat milk in 1976-77. Since 1978, fresh goat milk has been sold in increasing quantities and in 1979 there were 10,000 milch type goats in Victoria.

Although Victoria has few feral goats, this State exports significant quantities of meat from goats caught in New South Wales. In 1977-78, Victoria exported 235 tonnes of goat meat valued at \$1.9m. A total of 60,000 goats were slaughtered in Victoria in 1979.

Deer

Deer produce two valuable products, namely, venison and antler velvet. Farming of deer has begun on a small scale, and in 1979 there were about 1,790 domesticated deer in Victoria. The main breeds of deer are the fallow and red deer. The small number of animals available for breeding is hindering the development of this industry. Regulatory powers for deer farming are exercised by the Division of Fisheries and Wildlife of the Ministry for Conservation.

Apiculture

Honey production in Victoria fell from 3,106 tonnes in 1977-78 to 2,715 tonnes in 1978-79. The bulk of the honey produced from the 477 beekeepers each with 40 or more beehives in Victoria, is sold to large processors who clarify and pack the honey. About one-third of the annual production is exported, chiefly to the United Kingdom. In recent years, there has been a decline in imports of Australian honey by the United States of America.

VICTORIA—BEEHIVES, HONEY, AND BEESWAX

Season ended 31 May —	Beekeepers	Hives	Production	
			Honey	Beeswax
	number	number	tonnes	tonnes
1975	468	87,972	2,788	35
1976	492	91,203	3,476	61
1977	529	92,734	1,713	30
1978	455	81,569	3,106	46
1979	477	85,817	2,715	47

Further reference: *Victorian Year Book 1977*, pp. 460-1

SERVICES TO AGRICULTURE

Introduction

There are many organisations, both government, e.g., the Department of Agriculture, and private, e.g., pesticide contractors, engaged in providing services to agricultural industries. One possible categorisation of these services is by function, and this section sets out the various regulatory, research, educational, marketing, and financial services to agriculture together with the bodies responsible for providing these services. An article on farmers' organisations in Victoria, is also included.

Further reference: *Transport in agriculture*, *Victorian Year Book 1979*, pp. 370-1

Regulatory services

As farming is essentially based on the land, it is subject to the various regulations on land-use which apply in Victoria, as well as to regulations on farming activities. A number

of government authorities exercise regulatory powers in such fields as planning, water supply, forestry, and environmental protection, while the Department of Agriculture is the major body regulating farming activities.

Department of Agriculture

The Department of Agriculture, Victoria, conducts extension, diagnostic, regulatory, teaching, and research activities to assist Victorian farmers and other producers of agricultural products. The Department's programmes are directed towards:

- (1) Conservation and management of natural resources;
- (2) protection of crops and livestock from pests and diseases;
- (3) improved productivity, processing, and marketing of agricultural products;
- (4) consumer services; and
- (5) improved standards of rural life.

This role is achieved through about 200 specific programme objectives which are collected into nine broad groups which relate to the above areas. Individual extension, diagnostic, regulatory, teaching, research, and administrative projects are developed to meet the objectives of programmes.

The Minister of Agriculture has responsibility for a wide range of Acts and Regulations. Most of these are administered by the Department of Agriculture but in addition there are a number of marketing and licensing boards and other statutory authorities that are directly responsible to the Minister.

In addition, the Department undertakes on behalf of the Commonwealth Government the inspection of fruit and grain for export, and the inspection and quarantining of imported animals and plants to prevent the introduction of diseases.

Further references: *Vermin and Noxious Weeds Destruction Board, Victorian Year Book 1978*, pp. 392-3; *1980*, p. 376; *Department of Crown Lands and Survey, 1980*, pp. 375-6

Research

Research is undertaken into all phases of farm production ranging from research into the various farm processes, which aims to improve productivity, to research into agricultural products in either their raw or processed form.

A number of organisations, such as government departments, universities, and marketing boards, are involved in agricultural research. For example, the CSIRO undertakes a wide range of process and product research projects in the agricultural field, while the Bureau of Agricultural Economics conducts various economic research studies, and the Australian Bureau of Statistics is prominent in the field of statistical information.

Research work is a very important function of the Department of Agriculture. Fundamental and applied research activities, mainly in conjunction with Victoria's primary industries, are conducted at a number of research institutes and laboratories and on many private properties throughout the State.

Agricultural research is also undertaken by other departments such as the State Rivers and Water Supply Commission, Crown Lands and Survey, Fisheries and Wildlife, Soil Conservation, and the Forests Commission.

The University of Melbourne School of Agriculture and Forestry also conducts research as do several private companies which manufacture and sell agricultural chemicals and other products. These companies also engage in research into such aspects as hops and other foodstuffs.

A list of the Department of Agriculture's research institutes and stations can be found on pages 364-6 of the *Victorian Year Book 1979*.

Bureau of Agricultural Economics

General

The Bureau of Agricultural Economics is a research body established by the Commonwealth Government to carry out research and analysis to help farmers, farm representatives, and economic policy makers to make decisions. The Bureau's area of responsibility includes the agricultural, pastoral, and forest industries.

Within this framework of responsibility the Bureau pursues the following inter-related operational objectives:

- (1) To monitor economic trends in the rural sector and in each of the major industries;
- (2) to assess and publish regularly the results of detailed research in the economic outlook for each of the rural industries;
- (3) to contribute to the Department of Primary Industry's activities by providing research results, economic analysis, and interpretation;
- (4) to undertake applied research and policy analysis in economic issues in the rural sector;
- (5) to provide economic advice and economic information to the Minister for Primary Industries, inter-departmental committees and other departments, as appropriate, the Australian Agricultural Council and Standing Committees, individual farmers, agribusiness and rural organisations, e.g., National Farmers' Federation and Commodity Councils, and other groups or organisations as appropriate, e.g., media, trade unions, overseas missions, and agencies; and
- (6) to disseminate the results of data collection, research, and policy analysis among target audiences.

In recent years, the role of agriculture in the economy has changed significantly and accordingly the Bureau's role has been adjusted to these changes. Thus there has been a relative shift in emphasis away from descriptive research and monitoring activities toward in-depth economic research and policy analysis based on a rigorous quantitative approach employing econometric and programming techniques.

Activities in Victoria

As a Commonwealth body, the Bureau is concerned with agricultural problems and policies primarily on a Commonwealth-wide basis. Its activities in the States are largely parts of wider Commonwealth studies and investigations.

A major part of the Bureau's activities in Victoria comprises the conduct of annual economic surveys of industries such as wheat, sheep, beef cattle, dairying, apples and pears, deciduous canning fruit, citrus, multi-purpose grapes and wine grapes, and occasional surveys of other industries such as prime lamb.

Although the surveys are conducted at the national level, results are generally produced for Victoria and for regions within Victoria. Data obtained in these surveys have formed a major input into many of the Bureau's farm studies and into submissions to Industries Assistance Commission Inquiries, including those into the wheat industry.

Projects which have been examined since 1969-70 include the following:

- (1) The National Water Resources Development Programme to 1972. This included evaluations of the Nangiloc-Colignan irrigation scheme, the Annuello-Kooloonong pipeline, and the Millewa stock water supply scheme.
- (2) The National Approach to Water Resource Management. This involved a detailed evaluation of the Mitchell River Irrigation Project.
- (3) The Australian Softwood Products Industry. This study concentrated on plantation requirements to 1980 based on analysis of the supply and demand for forest products to 2020. This covered the Victorian sawn timber market and pulp and paper market in the Australian context.

Educational services

Agricultural information is disseminated to farmers through both formal education courses and a variety of information services such as the extension services of the Department of Agriculture and the media, particularly the Australian Broadcasting Commission and the rural press. A number of these sources of information are discussed below.

Courses

Department of Agriculture: Agricultural Colleges

The Department of Agriculture administers five colleges through its Division of Agricultural Education: Dookie Agricultural College (established 1886) in the north-east of the State; Longerenong Agricultural College (1889) in the Wimmera; Burnley Horticultural

College (1891) on a bend of the Yarra River in the Melbourne metropolitan area, and the newer colleges—Glenormiston Agricultural College (1971) and the McMillan Rural Studies Centre (1977) which are situated in the Western District and Gippsland, respectively. The colleges are financed chiefly from Victorian Government funds.

The objectives of the colleges are to improve the skills, competence, and knowledge of persons involved or interested in any aspect of agriculture and horticulture, by the provision of a flexible range of educational opportunities which are primarily concerned with post-secondary and recurrent education matched to State and regional needs.

While the colleges provide a total system of agricultural education in conjunction with the extension services of the Department of Agriculture, each has its own characteristics which reflect the needs of the community in its region. For example, Dookie and Longerenong Agricultural Colleges both offer three-year courses leading to a Diploma of Applied Science (Agriculture). In addition, Dookie now offers a Diploma of Applied Science (Food Production Horticulture). The Diploma courses share common ground in that each emphasises farm management, but they are different and orientated towards the agricultural activities in their regions. Glenormiston Agricultural College offers two-year Associate Diploma courses leading to the Associate Diploma of Farm Management and Associate Diploma of Horse Management. In 1981, the Associate Diploma of Farm Management will also be available for external study. Burnley Horticultural College provides a three-year Diploma course of Applied Science in Amenity Horticulture and Nursery Production and Management. In 1980, Dookie Agricultural College offered for the first time, a full-time middle level certificate course in farming to train farm owner-operators. These four colleges are also heavily involved in providing short courses, seminars, field days, and part-time certificate courses for farmers and persons involved in the horticultural and agricultural industries.

The McMillan Rural Studies Centre, which opened in 1977, is unique in that it has no campus at this stage. Regional Education Officers at four centres—Bairnsdale, Leongatha, Maffra, and Warragul—provide educational programmes in response to district needs, using existing facilities. A principal, with support staff, is located at Warragul providing the co-ordinating centre for such on-going courses as are seen to be required by the region.

All of these activities are supported by the resources of the Department of Agriculture and take advantage of the personal contacts made by its extension officers with farmers, as well as the continuing contact maintained with agricultural industries.

University of Melbourne—Faculty of Agriculture and Forestry

The Faculty of Agriculture was established in 1905 by statute of the Council of the University, and the first Professor of Agriculture, Dr Thomas Cherry, was appointed in 1911. However, it was not until 1921, following the passing of the *Agricultural Education Act 1920*, that provision was made for a building to house the school and for the appointment of permanent staff. In 1973, the Department of Forestry, then a Department of the Faculty of Science, was amalgamated with the Faculty of Agriculture, and the Faculty of Agriculture and Forestry was established.

The purpose of the four-year Bachelor of Agricultural Science course is to give students a sound basic training in scientific principles as applied to agriculture. The first year is devoted to science subjects, and is followed by a year in residence at the University Field Station at Mt Derrimut, Deer Park, where students are introduced to the variety of farm operations involved in a mixed farming enterprise, while taking lectures and practical classes in various sciences applied to agriculture. They return to the University campus for more advanced training in economics and the soil, plant, and animal sciences in the third and fourth years of the course. In the final year, the students have a restricted choice of subjects, which ensures that all students receive a general training in all aspects of agricultural science, while allowing a measure of specialisation.

University of Melbourne—Department of Civil Engineering—Agricultural Engineering Section

The University of Melbourne also offers training in the more physical aspects of agriculture, leading to a degree in Agricultural Engineering. This course is the only one of its type at an Australian university, and is closely linked with complementary postgraduate

and research programmes. Some of the specific field tasks handled are the interactions between soil, crops, and machinery in regard to function, safety, and economics; the control of natural and irrigation waters to achieve maximum production; the estimation of water resources and disposal of wastes; work study and organisation of farming systems; processing of farm products, such as refrigeration and drying; and mechanical handling and transport of a wide range of materials such as fruit, grain, and wool. The course is of four years duration and leads to a B.E.(Agr.).

La Trobe University—School of Agriculture

La Trobe University, which admitted its first students in March 1967, opened its School of Agriculture a year later. The emphasis of the course is on the sciences relevant to an understanding of the rural environment, covering the relation between the soil, the plant, the animal, and the environment. Substantial emphasis is also given to the study of the economic and social aspects of agriculture and farm management. The four-year course leads to a B.Agr.Sc. (pass or honours degree).

Some six hectares of the University campus are presently used by the School of Agriculture for field work involving crops, pastures, and livestock, enabling students to have day to day contact with agricultural experimentation as well as with the more applied aspects of crop and animal husbandry. At least twelve weeks practical experience on approved farms supplements these facilities on the campus.

Marcus Oldham Farm Management College

Founded privately near Geelong in 1961, the Marcus Oldham Farm Management College specialises in farm management education for the sheep, cattle, and cropping industries. Students with previous practical experience attend the College for three years, during which time they complete a "sandwich" course of an eight month academic period, a twelve month practical period on an approved property, and then a final eight month academic period. Thus while there are only 70 students in residence at one time, the College is dealing with about 105 students each year. About 35 students complete the course every year.

The College farm is used as a teaching laboratory rather than a training area for manual work. It covers 190 hectares in a 533 mm annual rainfall area, and is commercially self-supporting from the income received from Merino sheep and Hereford cattle. Course work consists of lectures, demonstrations, and field trips, which provide the subject of extensive written reports on the farm, its management, financing, and budgeting. There are four broad subject groups in the lecture programme: plant and environmental sciences, animal science, farm management and economics, and agricultural engineering.

The entry requirements are a minimum age of 19 years, at least one year of practical experience since leaving school, and the completion of a full secondary course; a Higher School Certificate pass is not necessary. Preference is usually given to older students with more practical experience.

Apprenticeships

(1) *General farming and fruit growing.* Apprenticeships in general farming and fruit growing were offered for the first time in Australia in 1975. Courses were established in six technical schools by the Technical Schools Division of the Education Department, with active co-operation from farm industry organisations and the Department of Agriculture. The general farming courses incorporate instruction to cater for individual needs in such areas as grazing, dairying, and cropping. Also, advanced basic vocational and technician programmes have been developed for post-apprenticeship training together with middle level programmes designed to meet the needs of owner-operators of small farms.

(2) *Horticultural trade training.* Historically, Australia relied on Britain for a steady stream of skilled gardeners to supply its gardening needs. From the 1930s however, these tradesmen ceased to be attracted to the country so that by the 1950s there was a critical shortage of skilled gardeners. Following representations from the parks industry in the early 1960s, the Apprenticeship in Gardening was proclaimed in 1966 for municipal councils in the Melbourne metropolitan area. Schooling commenced in 1968, and an evening course was established to train persons already in the trade. In 1971, the proclamation was broadened to include all municipal councils, golf courses, racing clubs, and cemetery trusts in Victoria. Then in 1975, the horticultural trades were proclaimed as

four separate trades: gardening, turf management, landscape gardening, and nurseryman, and training programmes were developed by the Education Department.

Information services

Agricultural extension services

Advancing technology and increasing competition on world markets have intensified the need for farmers to be advised quickly about new developments so that they have the requisite knowledge on which to base the many decisions they have to take as a consequence of rapid change. Extension services to provide advice and training in these matters are conducted by several government departments and by commercial firms such as the manufacturers of agricultural chemicals, farm machinery, and stock foods and medicines. Some farmers employ professional consultants on a personal basis.

In Victoria, the major extension service is provided by the Department of Agriculture, which, in addition to its research and regulatory staffs, has a large group of extension workers throughout the State.

The Department's extension services are district-based and are administered locally through eighteen district centres; each of which is under the leadership of an Extension Director who co-ordinates the activities of a group of extension specialists according to the needs of his district, e.g., agronomy, dairy husbandry, sheep and wool, beef, horticulture, or agricultural economics. Close relationships are maintained with the Department's research stations and other experimental centres, agricultural colleges, regulatory staff, the rural community, commercial firms that serve agriculture, and associated government departments.

The extension service occasionally has to divert its immediate activity to special campaigns such as the alleviation of drought or the consequences of other crises such as floods and bushfires. Sometimes it is necessary for extension specialists to visit individual farms and to use other person-to-person methods such as office consultations, telephone discussions, and correspondence. However, to make the most efficient use of available resources and to serve as many farmers as possible, extension officers do much of their work with groups of primary producers and use media outlets such as publications, radio, television, and films.

More than 200 discussion groups (mainly of dairy farmers) meet regularly in farm homes to exchange ideas on developments in their industry. Department of Agriculture specialists often visit these groups to provide information about the subject under discussion.

More formal group activities occur at regular field days on research stations, experimental plot sites, and other places of interest such as the winning farm in a soil conservation competition. Whereas field days on major research stations attract up to 800 visitors, smaller farm talks involving up to 20 farmers provide effective informal discussions about current methods and problems.

Occasionally groups within an area combine to hold schools for farmers or to tour together to other similar areas in Victoria, other States, and sometimes New Zealand. Subsequent discussions are helpful in assessing the potential local application of ideas which have been seen elsewhere. More formal schools for farmers are held in local halls, woolsheds, and Education Department classrooms. Emphasis is being given to management in courses which continue, one night a week, for several weeks. Between classes, farmers apply what they have learned to their individual circumstances and raise points for discussion at the next session. Meetings and conferences also provide opportunities for farmers to receive new information and discuss problems. Exhibits at agricultural shows are often focal points of discussion.

Both person-to-person activities and group work are complemented by articles in newspapers and magazines, specialised notes called *Agnotes*, farm radio and television programmes, and films. Farmers often become aware of new developments through the media before seeking further advice to help them to decide on the adoption of new ideas. The Department of Agriculture's Media Services Branch in Melbourne has the printing facilities, studios, and other resources for providing this complementary information to, and through, extension workers in the field. In addition to its direct services, the Department of Agriculture provides much information which reaches farmers through other departments and commercial organisations, including consultants.

Media services

Victorian primary producers, and other persons who are interested in agriculture, have access to information from both government and commercial sources. In fact much information from government advisers reaches farmers through commercial newspapers and radio and television stations. In addition, many commercial organisations supply information direct to farmers, including market news and details of chemicals, such as insecticides and fungicides.

The main government agencies are the Commonwealth Scientific and Industrial Research Organization (CSIRO), Department of Agriculture, and the Australian Broadcasting Commission. Other agencies such as the State Rivers and Water Supply Commission, Soil Conservation Authority, and the Department of Crown Lands and Survey also provide considerable information. The CSIRO's main publications are *Rural Research* and *Ecos* which provide up-to-date interpretations of the Organization's findings and background information on matters such as those affecting the environment.

The Department of Agriculture has a wide range of publications, as has been described in the previous section. The Department also has a wide-reaching radio service, and provides films and other information for television stations. Its weekly television session *On the Land* has been transmitted from STV-8 Mildura for more than ten years.

The Australian Broadcasting Commission's radio and television programmes are a major source of information for primary producers. They also provide a very important link between the rural and urban communities. Commercial stations also provide rural news and information programmes.

The ABC's regional radio stations at Horsham (3WV) and Sale (3GI) provide special sources of rural information and its State-wide *Country Hour* has a large audience. In recent years, the ABC has produced a daily public affairs rural television programme, and has screened many educational documentaries. The advent of colour television has added to the value of television for farmers in such matters as the identification of pests and symptoms of diseases.

All the media noted above are especially valuable as disseminators of information during campaigns on such subjects as droughts and locust plagues; they also help to draw the community's attention to the achievements and problems of the State's primary industries.

Marketing*Introduction*

The marketing of agricultural produce poses a number of problems peculiar to the rural sector. The wide fluctuations in seasonal conditions and in supply, demand, and prices which occur on world markets have significant repercussions for Australian farmers. Also, marketing of products overseas requires resources and expertise beyond the capacity of individual farmers. To overcome these marketing problems, organisations have been established with the aim of co-ordinating marketing arrangements for specific products. The following is a brief review of the principal marketing systems in Victoria.

Public auction

Public auction, where the product is sold to the highest bidder, is a common method of selling both to Australian and overseas buyers. Wool, cattle, sheep, and pigs are sold in this way.

Price bargaining

The sale of fresh fruit and vegetables, broiler chickens, and oilseed crops is effected either through direct bargaining or through contractual agreements between buyers and sellers.

Marketing controlled by legislation

The *Marketing of Primary Produce Act 1958* enables growers to seek the establishment of a statutory marketing board to control the marketing of a particular commodity. Commodities such as wool, wheat, honey, wine, meat, apples, pears, canned fruits, dried fruits, and eggs are covered by Commonwealth legislation in that boards have been constituted to regulate exports.

Further reference: *Victorian Year Book 1978*, pp. 401-2

Financial services

Introduction

Australia's national policy for permanent land settlement has been based on the family farm. Recognition of the vulnerability of the rural industry to the changing economic conditions both at home and abroad has led the appropriate authorities to establish various schemes to assist farmers carry out the necessary structural changes. To enable land acquisition and clearing, the conditions of purchase were made easy and after each world war generous terms of settlement were offered to ex-servicemen.

Rural Finance Settlement Commission

The Rural Finance Settlement Commission was established by legislation in late 1961 to merge the former Soldier Settlement Commission and the Rural Finance Corporation. In the first instance, the new Commission carried out the functions of the former organisations in two separate branches until further legislation was passed in 1963 which completed the merger and co-ordinated the functions of the two branches in providing finance for country industry and land settlement development.

A number of amendments to several of the Acts administered by the Commission were provided for in the *Rural Finance and Settlement Commission (Amendment) Act 1977*. The Act came into effect on 1 January 1978 when the name of the Commission was changed to the Rural Finance Commission; and changes were also made in the operation of the Rural Finance Fund.

Rural Finance Act

The Rural Finance Act, which is administered by the Commission, embraces two distinct functions. First, under Part III of the Act, the Commission may grant loans "to any person or body establishing or carrying on any country industry", primary or secondary. These loans are, subject to the Act, made on such terms as are determined by the Commission. However, interest on the loans is required to be at a rate as low as practicable having regard to the rate at which the Commission borrows money and the costs of administration. Loans are made to primary industry for farm purchase, farm development, re-finance, soil and water conservation projects, and seasonal advances. Loans to secondary industry have resulted in the establishment of a number of successful country industries over the years.

The other function administered by the Commission under the Rural Finance Act is to act as agent for the Treasurer of Victoria in administering money provided from the Public Account for any special purpose, subject to such directions as the Treasurer may give or impose. Under these agency provisions, the Commission administers relief lending to the rural community in times of adversity, such as bushfire, drought, flood, etc. The agency provisions are also the means whereby special loans outside the scope of the Commission's ordinary lending are made available to particular industries. Major Commonwealth-State Government Schemes such as the Rural Reconstruction Scheme, Dairy Adjustment Programme Rural Adjustment Scheme, Beef Industry Assistance Scheme, and the Fruit Growing Reconstruction Scheme, were administered in Victoria by the Commission.

VICTORIA—LOANS BY RURAL FINANCE COMMISSION (\$'000)

Particulars	Year ended 30 June—				
	1975	1976	1977	1978	1979
Lending—					
Primary industry—					
Ordinary lending	2,806	3,139	5,137	5,349	11,449
Agency lending—					
General	1,220	1,057	1,548	3,984	3,867
Rural reconstruction	7,067	6,180	4,172	201	35
Rural adjustment (a)	2,978	11,699	9,032
Dairy adjustment	4,636	10,645	7,145	509	119
Fruit growing	131	146	751	239	..
Beef industry	24	2,177	1,169	433	294

VICTORIA—LOANS BY RURAL FINANCE COMMISSION—*continued*
(\$'000)

Particulars	Year ended 30 June—				
	1975	1976	1977	1978	1979
Lending—<i>continued</i>					
Secondary industry—					
Ordinary lending	2,484	426	2,217	134	331
Agency lending	679	3,401	100	384	1
Land settlement	59	692	2,893	108	7
Total lending (b)	19,106	27,863	28,110	23,040	25,135
Loans outstanding at 30 June—					
Ordinary lending	31,447	31,283	34,484	35,023	40,873
Agency lending—					
General	9,278	12,221	10,778	11,748	12,031
Rural reconstruction	33,891	37,137	37,774	34,636	30,784
Rural adjustments (a)			2,939	14,355	22,251
Dairy adjustment	4,808	14,757	19,998	18,379	14,915
Fruit growing	564	710	1,461	1,677	1,285
Beef industry	24	2,168	3,271	3,516	3,450
Land settlement	14,031	13,908	15,669	14,859	13,635
Soldier settlement	28,315	26,538	24,744	22,569	20,381
Total loans outstanding	122,358	138,722	151,118	156,762	159,603

(a) The Rural Adjustment Scheme superseded the Rural Reconstruction Scheme on 1 January 1977.

(b) Excludes grants and subsidies (\$145,981 in 1978-79) and loans to the fishing industry (\$338,000 in 1978-79).

Rural Reconstruction Scheme

Following the economic problems experienced by the farming community in 1969 and 1970, with greatly depressed prices and rising costs, a scheme for rural reconstruction was introduced in 1971, after conferences between the Commonwealth and the State Governments. The three main forms of assistance provided for by the Rural Reconstruction Scheme were Debt Reconstruction, Farm Build-up, and Retraining and Rehabilitation.

Rural Adjustment Scheme

The Rural Adjustment Scheme combined the various types of rural adjustment measures previously provided. In addition, two further forms of assistance were introduced:

- (1) *Household support assistance*. This covered all agricultural, horticultural, and pastoral industries with the aim of assisting farmers in conditions of personal and family hardship, while they considered whether to adjust out of farming.
- (2) *Purchase of uneconomic farms*. This form of assistance is provided to those owners having difficulties finding purchasers through normal commercial channels.

Other sources of finance

There are a number of other sources of finance available to the rural sector, ranging from various bank facilities to specialised sources such as pastoral finance companies. For example, the Rural Credits Department of the Reserve Bank advances payments to growers of produce, such as wheat and barley, pending its sale; the Commonwealth Development Bank provides rural loans for farm improvement purposes; and the Farm Development Loan Fund of the trading banks and the State Bank provide all-purpose loans to the rural sector. The pastoral finance companies provide a variety of credit facilities to farmers to cover all aspects of farm activity.

Further reference: *Victorian Year Book 1978*, pp. 403-7

Farmers organisations in Victoria

Victorian farmers formed organisations to represent their interests early in the history of settlement. The Graziers' Association of Victoria, for example, was formed in 1891. Other organisations have included the Australian Primary Producers Union (which had State divisions as well as the national council), the Victorian Wheat and Woolgrowers Association, and the Victorian Dairyfarmers Association.

These organisations had branches throughout Victoria, at which local farmer members presented their ideas about what the organisation should do to help them and what policies should be recommended to government and other authorities whose decisions affected farmers.

As the proportion of the population employed in agriculture decreased there was a tendency for farmers' organisations to amalgamate. In 1960, the Victorian Dairyfarmers Association, the Graziers' Association of Victoria, the Victorian Division of the Australian Primary Producers Union, and the Victorian Wheat and Woolgrowers Association began discussions about the advantages of amalgamating. These discussions broke off, however, in 1965.

The Victorian Division of the Australian Primary Producers Union merged with the Victorian Wheat and Woolgrowers Association in 1969 to form the Victorian Farmers Union, which represented the producers of many commodities.

During the 1970s, many farmers faced increasing difficulties caused by rising costs of the goods and services for their farms as against fluctuating prices for their products. Many of them felt difficulties in the economically viable management of their properties. The sharp fall of beef prices in 1974 and the fall of dairy prices in 1976 together with the drought in 1976 keenly affected the farming community.

In 1976, the Victorian Dairyfarmers Association amalgamated with the Dairying Division of the Victorian Farmers Union to form the United Dairyfarmers of Victoria.

The two major primary producer organisations in New South Wales amalgamated in 1978, forming the Livestock and Grain Producers Association. This encouraged the trend toward further amalgamation in Victoria.

The Victorian Farmers Union, including its affiliate, the United Dairyfarmers of Victoria, and the Graziers Association of Victoria had further discussions and on 1 July 1979, the three groups merged to form the Victorian Farmers and Graziers Association. The Association has no political affiliations. Its most important activity is to represent farmers' interests to governments, statutory authorities, and commodity marketing boards. The Association has more than 25,000 members. A member nominates the commodity group or groups in which he is interested: the groups are pastoral, grains, dairying, commercial fishing, fruit, vegetables, pigs, poultry, chicken meat, and flowers. Each commodity group is autonomous informing its policies.

Each member is registered with one of the Association's 294 branches. The branches nominate delegates to their District Commodity Councils. These councils nominate delegates to the State Commodity Councils.

The Association is governed by the General Council, the members of which are appointed by the Commodity Group. The General Council appoints specialist sub-committees dealing with matters of common concern to all farmers, such as economics and taxation, local government and planning, land-use, irrigation and water use, energy, transport and communication, education, and agricultural engineering.

Members of the Association who are employers may also join the Victorian Farmers and Graziers Employers Association, which provides a handbook covering all aspects of industrial awards affecting rural employment. Members are provided with an updating service whenever changes occur in award rates of pay or in conditions of employment.

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