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RURAL INDUSTRY

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 1978

Particulars	Area
	hectares
Lands alienated in fee simple	13,778,808
Lands in process of alienation	134,416
Crown lands	8,846,776
Total	22,760,000

VICTORIA—CROWN LANDS AT 30 JUNE 1978

Particulars	Area
	hectares
Land in occupation under—	
Perpetual leases	12,200
Grazing leases and licences	2,365,578
Other leases and licences	12,761
Reservations—	
Reserved forest	2,279,069
Timber reserves (under Land Act)	59,637
Water catchment and drainage purposes	85,388
National parks (under National Parks Act)	260,140
Wildlife reserves	54,897
Water frontages, beds of streams and lakes (not included above)	341,825
Other reserves	137,832
Unoccupied and unreserved but including areas set aside for roads	3,237,449
Total	8,846,776

NOTE. Crown lands alienated in fee simple during the years ended 30 June 1974, 1975, 1976, 1977, and 1978 were 33,019, 61,200, 57,589, 41,585, and 38,235 hectares, respectively.

Physical characteristics

Statistical divisions

Introduction

In previous editions of the *Victorian Year Book,* the description of land utilisation in Victoria has been 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 179 to 184). A map of statistical divisions in Victoria can be found on page 325 of the 1979 *Victorian Year Book.*

Melbourne

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 Podsolic 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)*, 1977–78 *(b)*

Main activity of establishment *(a)*	Estimated value of agricultural operations ($'000)					Total establish-ments
	<11	11–20	21–40	41–100	101+	
Meat cattle	1,295	112	34	11	4	1,456
Orchard and other fruit	167	74	95	65	16	417
Vegetables	88	64	101	83	97	433
Nurseries	152	50	53	52	23	330
Poultry	46	24	38	55	62	225
Potatoes	16	15	30	54	36	151
Other	874	272	205	65	16	1,432
Total	2,638	611	556	385	254	4,444

(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.

(b) The period covered in this and most subsequent tables in this Chapter is the 1977–78 season which in general refers to the year ended 31 March 1978, 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

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 mountanious 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 Podsolic, 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)*, 1977–78 *(b)*

Main activity of establishment *(a)*	Estimated value of agricultural operations ($'000)				Total establish-ments
	<11	11–20	21–40	41+	
Milk cattle	201	335	304	42	882
Meat cattle	632	68	27	18	745
Sheep	221	111	102	57	491
Other	466	183	188	197	1,034
Total	1,520	697	621	314	3,152

(a) See footnote to table above.
(b) See footnote to table above.

South Western

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)*, 1977-78 *(b)*

Main activity of establishment *(a)*	Estimated value of agricultural operations ($'000)					Total establish-ments
	<11	11-20	21-40	41-100	101 +	
Milk cattle	359	923	901	157	10	2,350
Sheep	392	400	561	280	38	1,671
Sheep and meat cattle	308	338	459	310	105	1,520
Meat cattle	976	196	100	41	8	1,321
Other	248	68	115	74	39	544
Total	2,283	1,925	2,136	862	200	7,406

(a) See footnote to table on page 339.
(b) See footnote to table on page 339.

Central Highlands

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 Podsolic, 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, Woady 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)*, 1977–78 *(b)*

Main activity of establishment *(a)*	Estimated value of agricultural operations ($'000)					Total establish-ments
	<11	11–20	21–40	41–100	101+	
Sheep	547	298	301	177	17	1,340
Meat cattle	611	43	24	5	5	688
Sheep and meat cattle	230	93	95	71	17	506
Potatoes	23	25	58	93	95	294
Other	456	137	175	117	34	919
Total	1,867	596	653	463	168	3,747

(a) See footnote to table on page 339.
(b) See footnote to table on page 339.

Wimmera

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 Podsolic soils derived from unconsolidated sediments. The sub-dominant groups are Red-Brown Earths, Mallee soils, Podsolic 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)*, 1977–78 *(b)*

Main activity of establishment *(a)*	Estimated value of agricultural operations ($'000)					Total establish-ments
	<11	11–20	21–40	41–100	101+	
Sheep and cereal	171	371	661	412	42	1,657
Cereal grains	215	387	615	354	28	1,599
Sheep	281	183	175	69	17	725
Other	385	90	131	76	29	711
Total	1,052	1,031	1,582	911	116	4,692

(a) See footnote to table on page 339.
(b) See footnote to table on page 339.

Northern Mallee

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)*, 1977–78 *(b)*

Main activity of establishment *(a)*	Estimated value of agricultural operations ($'000)					Total establishments
	<11	11–20	21–40	41–100	101+	
Grapes	1,000	698	146	24	1	1,869
Cereal grains	92	143	343	494	77	1,149
Sheep and cereal	40	76	168	186	29	499
Orchard and other fruit	97	60	60	43	8	268
Other	513	244	227	88	38	1,110
Total	1,742	1,221	944	835	153	4,895

(a) See footnote to table on page 339.
(b) See footnote to table on page 339.

Loddon-Campaspe

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). Podsolic 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)*, 1977–78 *(b)*

Main activity of establishment *(a)*	Estimated value of agricultural operations ($'000)				Total establishments
	<11	11–20	21–40	41+	
Meat cattle	1,036	91	37	21	1,185
Sheep	589	168	154	81	992
Milk cattle	173	365	376	81	995
Sheep and cereal	172	241	359	251	1,023
Sheep and meat cattle	226	111	78	44	459
Pigs	66	29	43	73	211
Other	670	198	261	237	1,366
Total	2,932	1,203	1,308	788	6,231

(a) See footnote to table on page 339.
(b) See footnote to table on page 339.

Goulburn

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 Podsolic 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)*, 1977–78 *(b)*

Main activity of establishment *(a)*	Estimated value of agricultural operations ($'000)					Total establishments
	<11	11–20	21–40	41–100	101 +	
Milk cattle	344	956	935	151	10	2,396
Meat cattle	1,149	243	81	48	1	1,522
Sheep and meat cattle	276	236	198	72	7	789
Orchard and other fruit	76	80	144	124	52	476
Meat cattle and cereal	77	90	79	23	1	270
Other	1,105	511	575	297	75	2,563
Total	3,027	2,116	2,012	715	146	8,016

(a) See footnote to table on page 339.
(b) See footnote to table on page 339.

North Eastern

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—Podsolic soils derived from sedimentary rocks and a miscellaneous group comprised of Podsolic, 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 Yarrawonga; 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)*, 1977–78 *(b)*

Main activity of establishment *(a)*	Estimated value of agricultural operations ($'000)					Total establishments
	<11	11–20	21–40	41–100	101 +	
Meat cattle	1,077	277	126	26	4	1,510
Milk cattle	110	206	211	44	—	571
Tobacco	23	11	95	162	44	335
Sheep and meat cattle	109	92	69	19	2	291
Other	337	145	194	117	21	814
Total	1,656	731	695	368	71	3,521

(a) See footnote to table on page 339.
(b) See footnote to table on page 339.

East Gippsland

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. 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 Podsolic, 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)*, 1977–78 *(b)*

Main activity of establishment *(a)*	Estimated value of agricultural operations ($'000)				Total establish-ments
	<11	11–20	21–40	41+	
Meat cattle	733	158	84	29	1,004
Milk cattle	110	197	228	65	600
Sheep and meat cattle	118	120	122	62	422
Other	240	77	80	60	457
Total	1,201	552	514	216	2,483

(a) See footnote to table on page 339.
(b) See footnote to table on page 339.

Central Gippsland

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)*, 1977–78 *(b)*

Main activity of establishment *(a)*	Estimated value of agricultural operations ($'000)					Total establishments
	<11	11–20	21–40	41–100	101+	
Milk cattle	496	1,316	1,162	194	4	3,172
Meat cattle	1,241	253	128	45	5	1,672
Other	488	149	168	173	97	1,075
Total	2,225	1,718	1,458	412	106	5,919

(a) See footnote to table on page 339.
(b) See footnote to table on page 339.

East Central

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 Podsolic, 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)*, 1977–78 *(b)*

Main activity of establishment *(a)*	Estimated value of agricultural operations ($'000)				Total establishments
	<11	11–20	21–40	41+	
Meat cattle	536	65	32	11	644
Milk cattle	148	236	140	22	546
Other	261	63	85	146	555
Total	945	364	257	179	1,745

(a) See footnote to table on page 339.
(b) See footnote to table on page 339.

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 1977–78, 575,032 tonnes of superphosphate were used in Victoria of which 341,762 tonnes were applied to pastures. This represented an extraordinary fall in use and was 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 1977–78, 685,716 tonnes of artificial fertilisers were used on 1,150,192 hectares of wheat; 623,083 hectares of other cereal crops; 19,147 hectares of vegetables; 22,937 hectares of vineyards and orchards; 35,251 hectares of other crops; and 2,670,311 hectares of pastures. Superphosphate is the main fertiliser used on both crops and pastures and in 1977–78 amounted to 575,032 tonnes, or 84 per cent of the total artificial fertiliser used on all crops, and 341,762 tonnes or 85 per cent of that used on pastures.

VICTORIA—ARTIFICIAL FERTILISERS

Year (a)	Crops			Pastures		
	Number of holdings	Area fertilised	Quantity used	Number of holdings	Area fertilised	Quantity used
		'000 hectares	'000 tonnes		'000 hectares	'000 tonnes
1973-74	n.a.	1,547	240	35,374	4,488	869
1974-75	n.a.	1,383	223	n.a.	3,487	654
1975-76	n.a.	1,473	223	n.a.	1,953	323
1976-77	n.a.	1,655	241	n.a.	2,295	353
1977-78	n.a.	1,851	277	n.a.	2,670	408

(a) See footnote *(b)* to table on page 339.

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

Irrigation

Information about water supply and land settlement can now be found in Chapter 13 (Water Resources and Sewerage) of this *Year Book,* but previous references to this material when it appeared in this Chapter under Rural Industry are as follows:

Further references: Irrigation, *Victorian Year Book* 1962, pp. 479–83; Wimmera-Mallee region water supply, 1963, pp. 499–501; Flood protection, river improvement, and drainage, 1963, pp. 501–2; Underground water, 1964, pp. 544–5; Water supply in Victoria, 1964, pp. 535–44; Goulburn-Murray Irrigation District, 1965, pp. 477–9; Spray irrigation in agriculture and dairying, 1965, p. 502; Private irrigation development, 1966, pp. 477–9; Water Research Foundation, 1966, pp. 479–80; River improvement, 1967, p. 298; Rivers and streams fund, 1967, p. 298; Dandenong Valley Authority, 1968, pp. 300–1; Water conservation, 1969, pp. 309–10; Water supply to Western Port, 1971, pp. 288–90; Lake William Hovell dam, 1972, pp. 294–5; River Murray Agreement and the River Murray Commission, 1972, pp. 296–301; Ten year plan, 1974, pp. 298–304; Millewa pipeline project, 1974, pp. 296–7; Snowy Mountains Hydro-Electric Scheme, 1974, pp. 298–304; Millewa Scheme, 1975, pp. 403–6; Tarago-Western Port pipeline, 1975, pp. 406–7

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. By the end of June 1976, over $1m had been advanced to Victorian landholders on a long-term, low interest basis.

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 was expected to be eligible to be declared provisionally free of bovine brucellosis by early 1980. The State is already provisionally free of bovine tuberculosis.

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 both the agricultural and pastoral 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 and pastoral purposes for the season 1977–78:

VICTORIA—LAND IN OCCUPATION FOR AGRICULTURAL AND PASTORAL PURPOSES, 1977–78 *(a)*

Statistical division	Number of holdings *(b)*	Area of crops	Area of sown pasture and lucerne	Balance of holding *(c)*	Total area of holdings
		hectares	hectares	hectares	hectares
Melbourne	3,228	29,640	146,051	96,880	272,571
Barwon	2,599	51,063	310,703	140,016	501,782
South Western	6,856	68,717	1,383,505	413,046	1,865,268
Central Highlands	2,921	84,953	553,656	239,679	878,288
Wimmera	4,375	699,101	910,013	838,795	2,447,909
Northern Mallee	4,647	640,847	576,852	1,393,139	2,610,838
Loddon-Campaspe	4,923	298,618	679,230	668,152	1,646,000
Goulburn	7,004	211,462	750,162	551,163	1,512,787
North Eastern	3,040	62,552	319,013	445,922	827,487
East Gippsland	2,078	9,777	237,013	952,166	1,198,956
Central Gippsland	5,269	13,248	555,139	207,499	775,886
East Central	1,370	3,898	79,156	33,167	116,221
Total	48,310	2,173,876	6,500,493	5,979,624	14,653,993

(a) See footnote *(b)* to table on page 339.

(b) A rural holding is an area of land of 10 hectares or more in extent, used for the production of crops or for the raising of livestock and the production of livestock products. Rural holdings of less than 10 hectares operated by a legal entity with $1,500 or more estimated gross value of agricultural operations are also included. In general, a holding corresponds to an establishment; however, an establishment can comprise more than one holding if their operational financial records are combined. (See also footnote *(a)* to table on page 339).

(c) Balance of holding includes fallow.

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 1977–78 ($1,548m) contributed 22.1 per cent of the Australian total of $6,999m.

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

Particulars	Year ended 30 June—				
	1974	1975	1976	1977	1978
Crops—					
Cereals for grain	199,053	276,873	224,404	219,742	196,200
Hay	79,598	67,025	61,378	78,263	47,310
Industrial crops	20,558	22,491	23,168	28,156	29,511
Vegetables	61,064	62,371	73,270	70,067	92,032
Grapevines	38,555	37,453	37,477	55,386	60,363
Fruit	53,993	54,961	47,382	48,899	52,556
Other	23,081	19,245	17,120	21,895	31,653
Livestock slaughterings and other disposals—					
Cattle and calves	245,661	114,309	184,873	222,730	318,997
Sheep and lambs	103,958	58,410	75,225	89,533	95,691
Other	64,943	71,334	71,440	81,803	104,484
Livestock products—					
Wool	248,232	193,623	174,055	176,732	228,813
Dairy products	239,767	266,659	220,867	230,020	246,977
Other	42,038	45,869	45,353	39,853	43,804
Total	1,420,501	1,290,623	1,256,012	1,363,079	1,548,391

RURAL PRODUCTION

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.

It should be noted that the statistical information is in terms of Statistical Divisions, *not* Agricultural Districts as in previous *Victorian Year Books* (see page 338 for further details).

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 ten-year period 1968–69 to 1977–78 was 1.20 million hectares, about 60 per cent of the State's total cropping area. The area under wheat is normally subject to fairly minor fluctuations. The 1968–69 season produced a Victorian record harvest of 2.47 million tonnes of wheat from 1.6 million hectares. However, this production coincided with a large Australian harvest and a saturated world wheat market. As only about 20 per cent of Victorian production is used for home consumption, the difficulties in marketing export wheat in 1969 led to considerable storage problems. To reduce production levels, the *Wheat Marketing Act* 1969 implemented the Wheat Delivery Quota Scheme which allocated deliveries in accordance with market demand and storage capacity. Quotas effectively reduced the area of wheat sown in 1970–71 to 760,000 hectares. Effective quota restrictions were removed by 1973–74 in response to a world demand for wheat, and the legislation ceased to operate from 30 September 1975. In 1977–78, 1.5 million tonnes of wheat were produced from 1.3 million hectares.

More than 90 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 under a ley system of farming in which it is produced in rotation with fallow, pastures, and other crops, principally oats and barley. 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) 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.

During the 63 years from 1911 to 1973, stem rust occurred in some part or parts 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 main 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 when the seed is graded. Crop failures following the use of seed which had been treated with fungicide in 1973 and carried over to be sown in 1974, and field experiments by the Department of Agriculture, emphasised the fact that treated seed should not be carried over from one season to the next as seed viability is greatly reduced and re-sowing costs are high.

The 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. Strains of insects have developed which are resistant to rates of insecticides approved for the international grains trade. The grain insect campaign initiated by the Department of Agriculture in 1973 has improved awareness of farmers to the problem of ensuring the delivery of insect-free grains to the export terminal. Processors and retail outlets have also been encouraged to improve their standards of grain hygiene.

Wheat marketing in Australia is controlled by the Australian Wheat Board under the provisions of the present *Wheat Industry Stabilization Act* 1974 operating until 1978. This legislation provides for a guaranteed "stabilisation" price, adjusted annually on the basis of movements in export markets. When average export prices are higher than the stabilisation price, growers are required to contribute to a fund (subject to a minimum and maximum level.) This money is 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 will 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 newer hard 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 1977–78	Season 1975–76		Season 1976–77		Season 1977–78	
	Hectares sown	Percentage of total area sown	Hectares sown	Percentage of total area sown	Hectares sown	Percentage of total area sown
Halberd	494,707	45.8	429,846	38.5	340,837	26.5
Olympic	323,061	29.9	331,587	29.7	372,546	29.0
Condor	15,023	1.4	139,263	12.5	298,629	23.2
Summit	109,521	10.1	75,185	6.7	43,896	3.4

VICTORIA—PRINCIPAL VARIETIES OF WHEAT SOWN—*continued*

Variety in order of popularity in season 1977-78	Season 1975-76		Season 1976-77		Season 1977-78	
	Hectares sown	Percentage of total area sown	Hectares sown	Percentage of total area sown	Hectares sown	Percentage of total area sown
Zenith	2,861	0.3	30,468	2.7	63,864	5.0
Insignia	36,266	3.4	27,073	2.4	8,887	0.7
Pinnacle	29,566	2.7	23,685	2.1	19,699	1.5
Egret	*(a)*	*(a)*	22,985	2.1	98,563	7.7
Emblem	24,589	2.3	14,337	1.3	5,804	0.5
Heron	22,975	2.1	8,009	0.7	4,998	0.4
Oxley	*(a)*	*(a)*	*(a)*	*(a)*	3,607	0.3
All other including mixed and unspecified	14,934	1.4	8,875	0.9	23,626	1.8
Total	1,080,419	100.0	1,116,183	100.0	1,284,956	100.0

(a) Included with "All other"

VICTORIA—WHEAT FOR GRAIN

Season	Holdings growing wheat	Area	Production	Average yield per hectare	A.S.W. *(a)* wheat standard
		'000 hectares	'000 tonnes	tonnes	kg/h.l.
1973-74	9,524	1,258	1,490	1.18	77.5
1974-75	9,156	1,141	2,091	1.83	81.2
1975-76	9,265	1,073	1,579	1.47	76.9
1976-77	9,310	1,103	1,780	1.61	81.2
1977-78	9,891	1,270	1,497	1.18	81.8

(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 between 1972-73 and 1977-78 was 331,367 hectares of which about 72 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.

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.

Since 1972, the world feed grains market production base has been eroded by land being redirected to wheat production. As the U.S.A. provides 50 to 60 per cent of the total world trade in feed grains, the U.S.A. crop decisively influences the market. Other factors which can influence export markets include the general level of economic activity and the demand for coarse grains for lot-fed livestock enterprises. 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.

VICTORIA—OATS FOR GRAIN

Season	Area	Production	Average yield per hectare
	'000 hectares	'000 tonnes	tonnes
1973–74	271	233	0.86
1974–75	198	186	0.94
1975–76	243	282	1.16
1976–77	241	309	1.28
1977–78	228	269	1.18

Barley

Barley is now the second largest crop grown in Victoria. Barley production in Victoria (95 per cent of which is of the two-row type) increased significantly between 1965–66 and 1975–76. In 1975–76, a record 344,000 hectares of barley produced a record 445,000 tonnes harvest. By comparison, production in 1965–66 was only 73,000 tonnes from 78,000 hectares. 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.

Increased wheat quota allocations in 1972–73 and 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 wheaten stubble land. Until 1970, the variety Prior was almost exclusively sown in this area.

A new variety Weeah, was introduced in 1968 and steadily displaced Prior to a significant extent. However, another barley variety, Clipper, is now recommended to replace Weeah for sowings in the Northern Mallee and Wimmera. The barley industry is moving toward a changeover to Clipper in the malting grades by 1979. Clipper has a 5 per cent greater yield than Weeah and is less susceptible to wind damage. 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 and it is normally sown with superphosphate on fallowed land. Yields of barley in this region average about 1.7 tonnes/hectare compared with about 1.0 tonnes/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, has 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 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 and Europe. 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. However, Australia is a minor contributor to the world barley market, which is determined by climatic and economic conditions in the principal exporting countries, namely, Canada and France.

VICTORIA—BARLEY PRODUCTION

Season	Area		Production		Average yield per hectare		
	2-row	6-row	2-row	6-row	2-row	6-row	Total
	'000 hectares	'000 hectares	'000 tonnes	'000 tonnes	tonnes	tonnes	tonnes
1973–74	217	4	281	5	1.29	1.25	1.29
1974–75	238	5	314	5	1.32	1.00	1.31
1975–76	337	7	436	9	1.29	1.29	1.29
1976–77	362	4	397	5	1.10	1.25	1.10
1977–78	413	5	354	5	0.86	1.00	0.86

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 1973–74 to 1977–78 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
1973–74	536	646	8	654	1,873	17	1,890	2.89
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

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
1973–74	2,956	882	0.30
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

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 1977–78

Variety	Area	Production	Average yield per hectare
	hectares	tonnes	tonnes
Pasture	268,319	910,075	3.39
Oaten	68,658	201,069	2.93
Lucerne	28,696	108,571	3.78
Wheaten	11,272	25,913	2.30
Barley and other	3,146	6,342	2.02
Total	380,091	1,251,970	3.29

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

Statistical division	Ensilage made, season 1977–78	Stocks at 31 March 1978	
		Ensilage	Hay
Melbourne	9,002	8,956	77,910
Barwon	9,222	4,751	140,495
South Western	14,509	14,542	415,737
Central Highlands	1,265	4,664	149,049
Wimmera	433	5,293	77,448
Northern Mallee	503	1,979	44,729
Loddon-Campaspe	1,237	5,657	182,250
Goulburn	2,980	9,882	350,277
North Eastern	3,617	5,803	111,838
East Gippsland	1,926	3,758	67,275
Central Gippsland	25,999	16,928	296,965
East Central	6,434	5,629	52,954
Total	77,127	87,842	1,966,927

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, larger wheat quotas and higher prices 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 and safflower had 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 1977–78 in both dry land and irrigation districts with an estimated area sown of 14,000 hectares.

VICTORIA—SELECTED OILSEED PRODUCTION

Season	Area	Production	Average yield per hectare
	hectares	tonnes	tonnes
	LINSEED		
1973–74	4,336	4,668	1.08
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
	RAPESEED		
1973–74	5,967	3,498	0.59
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
	SAFFLOWER		
1973–74	971	520	0.54
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
	SUNFLOWER		
1973–74	3,325	2,526	0.76
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

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 1967–68 to 1977–78 was about 5,000 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.

Lupins with 25 to 30 per cent protein are more readily acceptable than peas as a substitute for soybean meal 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 6,000 hectares in 1978. 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 acreage 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 1977–78, the area planted with fruit, nuts, and berries was almost 19,000 hectares, and the area of vineyards was just under 21,000 hectares. This total of approximately 40,000 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 1978

Statistical division	Pears	Apples	Peaches	Apricots	Cherries	Plums	Olives	Nectarines	Other
Melbourne	39,817	457,892	68,885	6,335	96,101	28,525	n.p.	14,992	3,770
Barwon	502	3,122	1,565	1,030	n.p.	280	—	77	n.p.
South Western	n.p.	17,380	n.p.	—	—	—	n.p.	—	—
Central Highlands	2,407	42,205	3,447	1,945	1,175	316	n.p.	2,824	—
Wimmera	2,183	2,591	3,178	1,465	—	371	40,710	63	—
Northern Mallee	2,172	9,431	9,803	61,685	486	76,099	43,248	19,012	8,286
Loddon-Campaspe	24,295	83,497	1,320	206	1,982	1,371	—	n.p.	570
Goulburn	948,765	247,140	583,289	120,228	5,784	29,830	6,072	6,937	8,242
North Eastern	81	61,939	2,819	660	8,044	n.p.	1,070	420	n.p.
East Gippsland	n.p.	5,876	n.p.	100	—	n.p.	n.p.	n.p.	—
Central Gippsland	n.p.	13,875	n.p.	—	n.p.	n.p.	—	90	n.p.
East Central	8,074	136,656	6,261	n.p.	2,747	3,738	—	2,387	253
Total	1,028,509	1,081,604	681,737	193,914	117,219	141,227	91,304	46,822	21,164

VICTORIA—NUMBER OF CITRUS TREES BY STATISTICAL DIVISION AT 31 MARCH 1978

Statistical division	Oranges	Lemons and limes	Grapefruit	Mandarins
Melbourne	—	27,541	n.p.	n.p.
Barwon	—	262	—	—
South Western	—	—	—	—
Central Highlands	—	n.p.	n.p.	—
Wimmera	n.p.	n.p.	n.p.	n.p.
Northern Mallee	591,269	66,267	49,616	48,061
Loddon–Campaspe	n.p.	n.p.	n.p.	—
Goulburn	70,180	18,247	7,344	1,150
North Eastern	15,873	7,330	198	212
East Gippsland	—	n.p.	—	—
Central Gippsland	—	n.p.	—	—
East Central	n.p.	4,723	n.p.	—
Total	680,922	125,481	57,722	49,707

(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 fruit and many growers are now 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 recent restrictions on the importation of low-cost citrus juice from overseas.

VICTORIA—TREE FRUIT PRODUCTION
(tonnes)

Type of fruit	Year ended 31 March—				
	1974	1975	1976	1977	1978
Pears	132,781	125,496	103,429	103,675	80,055
Apples	61,604	81,357	51,830	61,139	62,880
Peaches	34,345	38,441	32,017	24,329	24,670
Apricots	9,308	8,949	7,598	6,712	6,268
Cherries	3,693	3,503	3,139	2,562	2,436
Plums	2,753	3,009	3,575	2,946	2,494
Olives	1,109	1,120	814	1,889	712
Nectarines	1,258	820	1,218	1,119	1,009
Prunes	266	266	169	306	56
Quinces	194	143	118	148	127
Figs	14	25	16	10	17
Oranges—					
Valencias	21,130	25,550	24,647	21,472	24,100
Navels	13,307	14,592	14,570	13,056	14,023
Other	594	579	371	764	519
Lemons and limes	5,417	5,666	5,365	6,000	5,361
Grapefruit	3,415	3,561	3,728	3,000	2,845
Mandarins	2,529	2,762	2,407	2,842	1,980

(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. In 1972, the Commonwealth Government introduced the Fruit Growing Reconstruction Scheme to help growers who wanted to reconstruct or reduce their orchard area, or to leave the industry.

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 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 river valleys north of the 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—				
	1974	1975	1976	1977	1978
Strawberries	1,333,615	1,138,339	910,069	1,004,395	945,646
Youngberries	222,448	202,072	125,762	129,756	80,445
Raspberries	160,106	114,385	91,167	88,995	80,949
Gooseberries	26,816	14,494	13,669	11,096	9,103
Loganberries	9,425	5,417	2,189	5,511	5,635
Other berries	14,671	13,494	17,696	15,779	16,783
Passionfruit	16,100	25,169	11,968	5,377	653

(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 hills.

Since the early 1970s, many orchardists and farmers who wanted to diversify, have shown interest in planting nuts. Although it has been difficult to obtain young trees with proven capacity, several new plantations have been established in suitable localities. In the Northern Mallee Division, two large almond groves of about 150 to 300 hectares have been established. These groves are just starting to come into production.

(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 1977–78, production reached 99,000 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—				
	1974	1975	1976	1977	1978
Walnuts	72,898	70,800	66,345	67,403	77,176
Chestnuts	17,105	13,234	20,028	18,172	19,851
Almonds	3,734	15,475	13,548	10,401	98,975
Filberts	355	73	586	100	4,342

(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.

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 1978, the intake of grapes by wineries had increased from 11,000 tonnes to 53,000 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. 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 increases in production of dried vine fruit, especially in Afghanistan, Greece, and Turkey, have increased the world supply. This fact and other factors concerning the export of fresh and canned tree fruits have had a detrimental effect on the export market. Currently, 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.* The traditional table grape production in closed containers, in recent years, has increased to 11,000 tonnes. A direct sales market based largely on sultanas, Waltham Cross, and Black Muscats, and using open returnable cases, has developed in recent years. It is estimated to take around 20,000 tonnes annually. 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 some development in the small table grape export trade.

VICTORIA—VITICULTURE: NUMBER OF GROWERS, AREA, AND PRODUCTION

Season	Number of growers	Area		Production for —		
		Bearing	Non-bearing	Wine making	Drying *(a)*	Table and other use
		hectares	hectares	tonnes	tonnes	tonnes
1973–74	2,405	20,000	1,597	44,425	156,246	5,725
1974–75	2,338	20,541	1,807	53,021	220,560	8,682
1975–76	2,246	19,625	1,652	60,869	218,528	8,199
1976–77	2,202	19,598	1,197	63,252	201,090	8,246
1977–78	2,106	19,148	1,232	53,406	230,085	11,430

(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	
	1976–77 *(a)*	1977–78 *(a)*	1976–77 *(a)*	1977–78 *(a)*
	hectares		tonnes	
Potatoes	9,892	10,043	243,625	303,433
Onions	843	825	18,807	17,161
Carrots	916	864	30,370	26,739
Parsnips	166	183	5,045	5,664
Beetroot	43	38	869	901
Tomatoes	2,649	2,826	65,971	74,146
French beans	1,137	1,008	5,048	3,821
Green peas—				
Sold in pod	308	270	614	555
Processing	4,433	1,569	*(b)*10,102	3,073
Cabbage and Brussels sprouts	941	1,065	29,520	39,236
Cauliflowers	884	900	27,770	44,222
Lettuce	783	867	23,990	17,496
Pumpkins	1,004	784	13,021	10,805

(a) See footnote to table on page 339.
(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 15,100,000 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. While 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, and is increasing. 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, and blue mould-resistant burley breeding lines currently show promise. Other advances in tobacco production include improved nursery practices to give more effective and economical control of blue mould in seedlings, 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 techniques of producing high quality burley tobacco.

VICTORIA—TOBACCO PRODUCTION

Season	Area	Production	Average yield per hectare
	hectares	tonnes (dry)	tonnes (dry)
1973–74	3,940	5,634	1.43
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

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 present decade. 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 about 70 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 practically 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 and control of certain soil-borne-diseases. 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	Production	Average yield per hectare
	hectares	tonnes	tonnes
1973–74	508	915	1.80
1974–75	478	831	1.74
1975–76	469	746	1.59
1976–77	424	809	1.91
1977–78	433	959	2.21

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 bushhouses; 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 26,000 sheep, 100 cattle, and 57 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 seven years 1972 to 1978. 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
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

(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 1973-74 to 1977-78:

VICTORIA—LIVESTOCK SLAUGHTERED
('000)

Particulars	1973-74	1974-75	1975-76	1976-77	1977-78
Sheep	3,134	4,147	5,677	r 4,922	4,256
Lambs	5,258	5,685	5,696	r 5,550	5,590
Cattle	1,696	1,814	2,253	2,398	2,386
Calves	564	684	1,044	1,197	1,115
Pigs	1,081	969	882	r 935	1,001

Sheep

Distribution

Sheep are widely distributed throughout Victoria's grazing areas. The greatest densities of sheep are found in the Central Highlands and South Western statistical divisions (3.7 and 3.2 sheep per hectare of rural holdings, respectively, at 31 March 1978). The numbers of sheep in each division are shown in the table below.

During 1977-78, the Victorian sheep population increased 4.4 per cent to 22.0 million head—34.9 per cent below the 1971 peak of 33.8 million.

VICTORIA—SHEEP AND LAMBS IN EACH STATISTICAL DIVISION AT 31 MARCH 1978
('000)

Statistical division	Rams	Ewes	Wethers	Lambs	Total
Melbourne	4	112	83	41	240
Barwon	19	658	269	275	1,221
South Western	81	3,272	1,614	1,472	6,439
Central Highlands	35	1,573	1,152	675	3,435
Wimmera	40	1,690	978	616	3,324
Northern Mallee	15	633	113	197	958
Loddon-Campaspe	30	1,295	767	486	2,578
Goulburn	29	1,167	454	366	2,016
North Eastern	8	269	89	85	451
East Gippsland	7	364	176	157	704
Central Gippsland	8	321	107	162	598
East Central	1	41	2	13	57
Total	277	11,395	5,804	4,545	22,021

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
Crossbreed (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, or 1978.

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.

Poor seasonal conditions in the year ended 31 March 1978 contributed to the poor lambing. Only 7.5 million lambs were marked from 9.4 million ewes mated (79 per cent). 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	Proportion of lambs marked to ewes mated
	'000	'000	per cent
1973-74	9,885	8,182	83
1974-75	10,622	8,823	83
1975-76	10,376	8,359	81
1976-77	9,551	6,566	69
1977-78	9,462	7,482	79

Wool production

In 1977–78, Victoria produced 131.6 million kilograms of wool (greasy basis), 1 per cent higher than in 1976–77, and this represented 18 per cent of Australian production and 5 per cent of the world total.

Victoria reached a peak of 201 million kilograms in 1970–71, although the most valuable clip ($254m) was produced in 1972–73 during a brief period of boom prices. Since 1970–71, the size of the clip has declined in line with the continued decline in sheep

numbers. 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. A small number of speciality carpet wool sheep, which grow a proportion of hairy fibres, have recently been introduced from New Zealand.

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
1973–74	24,564	5,982	120,957	8,256	4.92	1.38
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	r 21,449	5,194	96,421	6,867	4.50	1.32

VICTORIA—SHEEP AND LAMBS SHORN, SEASON 1977–78

Statistical division	Shorn		Wool clipped (including crutchings)		Average	
	Sheep	Lambs	Sheep	Lambs	Per sheep	Per lamb
Melbourne	239,714	48,443	1,119,294	66,179	4.67	1.37
Barwon	1,184,712	310,352	5,022,694	384,616	4.24	1.24
South Western	6,254,438	1,737,868	27,397,578	2,337,638	4.38	1.35
Central Highlands	3,379,652	647,003	14,482,918	852,196	4.29	1.32
Wimmera	3,379,145	729,074	16,036,173	980,930	4.75	1.35
Northern Mallee	885,281	222,683	4,318,131	297,544	4.88	1.34
Loddon-Campaspe	2,562,305	566,917	12,284,376	751,378	4.79	1.33
Goulburn	1,961,721	435,830	8,754,815	561,405	4.46	1.29
North Eastern	415,861	95,788	1,769,871	120,890	4.26	1.26
East Gippsland	649,049	161,630	2,897,579	197,996	4.46	1.22
Central Gippsland	489,492	216,749	2,130,940	287,702	4.35	1.33
East Central	47,732	21,213	206,954	28,438	4.34	1.34
Total	21,449,102	5,193,550	96,421,323	6,866,912	4.50	1.32

VICTORIA—TOTAL WOOL PRODUCTION

Season	Clip	Stripped from and exported on skins, etc. (greasy)	Total quantity (greasy)
	'000 kg	'000 kg	'000 kg
1973–74	129,212	26,143	155,355
1974–75	138,501	27,043	165,544
1975–76	110,818	27,152	137,970
1976–77	r97,147	r28,996	r126,143
1977–78	103,288	28,346	131,634

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 1977–78, Victoria produced 85,000 tonnes of mutton (70 per cent for export), well down on the 1971–72 peak of 247,000 tonnes.

Prime lamb production increased by 5 per cent to 95,000 tonnes in 1977–78. 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 Divisions of the State.

Export of live sheep

Exports of Australian live sheep for slaughter in the country of destination have grown from approximately 150,000 head in 1965, mostly to Singapore, to 4.5 million head in 1977; 97 per cent of these were consigned to Middle East markets, notably Iran (4.4 million). In 1977, live sheep exports accounted for about 12 per cent of the total turn-off from Australian flocks.

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. Victorian flocks contributed approximately 500,000 head to shipments from Victorian and South Australian ports during 1977.

Middle East demand for sheep meat has been enhanced by rapidly growing populations and increasing wealth from oil revenues. Local custom (and the lack of refrigeration) favours meat from freshly killed sheep. However, the high costs of importing live sheep and a growing demand for lamb and young mutton (not suitable for live transport) are among factors which have encouraged a parallel expansion in carcase meat imports. These have been built up as rapidly as suitable refrigerated storage and distribution facilities could be 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 1978, taking 34,000 head. Of these, 31,500 head were consigned to Iran from Victorian ports (not necessarily all derived from Victorian flocks).

Beef 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 beef cattle imported from Britain.

In its early years, the beef 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 beef 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 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 to 3.5 million from 1968 to 1973. There was no increase in the number of beef cattle from 1972 to 1973, reflecting the drought conditions prevailing in many areas during the summer of 1972–73; however, a further increase to 4.0 million occurred in 1974 because producers, who were retaining animals for slaughter at older ages when high prices were being paid for bullocks suitable for export, withheld these animals from sale when prices dropped. With the continuation of low prices during 1975, there was a further increase in beef cattle numbers to 4.2 million. However, a combination of dry conditions and low prices resulted in a drop in numbers from 4.0 million head to 3.5 million head in 1976 and 1977, respectively.

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 beef cattle in each statistical division at 31 March 1978:

VICTORIA—DISTRIBUTION OF BEEF CATTLE AT 31 MARCH 1978
('000)

Statistical division	Bulls for service		Cows and heifers	Calves under 1 year	Other	Total
	1 year and over	Under 1 year				
Melbourne	4	2	82	45	28	161
Barwon	3	1	75	40	24	143
South Western	16	3	338	156	119	632
Central Highlands	3	1	85	45	32	166

VICTORIA—DISTRIBUTION OF BEEF CATTLE AT 31 MARCH 1978—*continued*
('000)

Statistical division	Bulls for service		Cows and heifers	Calves under 1 year	Other	Total
	1 year and over	Under 1 year				
Wimmera	2	1	48	33	12	96
Northern Mallee	2	1	43	29	12	87
Loddon-Campaspe	5	2	104	63	36	210
Goulburn	10	3	203	116	77	409
North Eastern	6	1	158	86	71	322
East Gippsland	5	2	129	73	37	246
Central Gippsland	8	2	173	107	111	401
East Central	2	1	39	24	24	90
Total	66	20	1,477	817	583	2,963

Most of the Victorian breeding herd (bulls and cows) are in the South Western, Goulburn, North Eastern, and Gippsland Divisions, with a high proportion of "other" (steers and bullocks) in the East Central Division. There were large decreases from 1976 in the total meat cattle populations of the Wimmera, Loddon-Campaspe, and Goulburn Divisions.

In the early 1970s, beef production increased rapidly. Producers withheld some stock in 1974 and 1975 and hence, production declined marginally. Production peaked in 1976 at 493,000 tonnes. Exports constituted about 37 per cent of Victorian beef and veal production in 1977–78 and the main markets were U.S.A., Japan, Soviet Union, and other Eastern European countries. The new Middle East and Asian markets continued to increase in importance during 1977–78.

The low prices for beef on the domestic market saw the estimated apparent consumption of beef and veal increase from about 40 kilograms per head per annum during the early 1970s, to peak at 70 kilograms in 1975–76 and remain just below this record level at 65 kilograms in 1976–77. Attention is drawn to the historical table of livestock numbers on page 364, and the table on livestock slaughterings on page 365.

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

Dairy cattle

Distribution

Until recent years, dairy farming was conducted over a very large area of Victoria. However, in the past few years, the costs/prices squeeze on dairy farmers has resulted in dairying becoming more and more confined to those areas in the State that are most suitable for it. As a result, dairying is now mainly in the higher rainfall areas of Gippsland and the Western District, and also in the northern irrigation areas.

In general, the trend has been to milk more cows, but on fewer farms. In 1977–78, about 13,600 Victorian dairy farmers milked 1.2 million cows, with the average number of milking cows per farm being 88.

VICTORIA—DISTRIBUTION OF DAIRY CATTLE AT 31 MARCH 1978
('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	—	36	11	6	1	55
Barwon	2	—	73	16	13	1	105
South Western	6	2	221	45	39	2	315
Central Highlands	1	—	13	4	3	1	22
Wimmera	—	—	4	1	1	2	8
Northern Mallee	1	—	25	6	5	1	38

VICTORIA—DISTRIBUTION OF DAIRY CATTLE AT 31 MARCH 1978—*continued*
('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		
Loddon-Campaspe	2	1	91	19	17	1	131
Goulburn	5	2	224	47	40	2	320
North Eastern	1	1	47	11	10	1	71
East Gippsland	1	—	59	13	11	1	85
Central Gippsland	7	2	288	54	49	1	401
East Central	1	—	43	8	6	—	58
Total	28	8	1,124	235	200	14	1,609

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 labor 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—				
	1974	1975	1976	1977	1978
Butter	2,652,686	2,435,763	2,186,791	1,804,081	1,505,882
Cheese	433,675	420,693	489,095	471,247	518,989
Processed milk products	342,568	415,585	410,504	496,463	533,833
Other purposes	487,599	472,591	431,373	440,456	452,373
Total milk produced	3,916,528	3,744,632	3,517,763	3,212,247	3,011,077

Marketing of milk

Average daily consumption of milk in Victoria had fallen from 0.385 litres per head in 1960 to 0.327 litres per head in 1976. The Victorian Government was concerned about this long-term decline in milk sales and in July 1977 created the Victorian Dairy Industry Authority which was charged with the task of providing for the orderly marketing of milk throughout the State, and averting the declining sales of milk in Victoria.

The Victorian Dairy Industry Authority reasoned that the most effective means of improving the declining profitability of the dairy industry was to adopt marketing strategies which would increase the total and per capita consumption of wholemilk and cartoned flavoured milk. A study of a wide range of Victorian consumers helped to explain why milk sales were declining.

This study showed that, while milk had a positive "image" among houswives, young children, and adults, teenagers did not regard milk highly and rejected it in favour of alternatives such as soft drinks. In view of these research findings, the Authority decided to mount a campaign which would increase milk sales among the 14–19 year old age group.

The Authority decided that as long as acceptable flavours could be developed, and a uniformly high standard of merchandise could be produced, then the addition of

flavouring to white milk would be most likely to increase sales. To do this, a uniform product needed to be available throughout Victoria. This involved the ready co-operation of the milk processors.

A new marketing "image" was thus created, which was communicated as a contemporary fun drink, a beneficial part of the teenager's life style, and a preferable alternative to soft drinks. The product was named "Big M".

The initial objective for "Big M" was to gain 4 per cent of the total market during the first 12 months. The share was almost 8 per cent and "Big M" gained 10 per cent of the non-alcoholic beverage market. Victorian farmers for the first time in many years saw profitability return to the industry.

Further reference: Australian Dairy Corporation, *Victorian Year Book* 1977, p. 456

Pigs

Victoria is a major pig-producing State in Australia. In the past, a substantial part of its supplies of pig meat came from other States, but as a result of the development of the pig industry, most of the pig meat consumed in Victoria is now produced in this State.

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 carcases, 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 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 1978 was 401,197. The following table shows classification (in statistical divisions) of pigs, together with the numbers of pig

keepers. This historical table on page 364 and the table on slaughtering on page 365 contain further information about the pig industry.

VICTORIA—PIGS AND PIG KEEPERS AT 31 MARCH 1978

Statistical division	Boars	Breeding sows	All other	Total pigs	Pig keepers
Melbourne	326	3,999	28,759	33,084	106
Barwon	130	1,504	8,853	10,487	90
South Western	274	2,563	14,567	17,404	251
Central Highlands	205	2,539	21,580	24,324	144
Wimmera	654	5,635	34,722	41,011	621
Northern Mallee	418	3,913	23,577	27,908	364
Loddon-Campaspe	1,130	15,052	104,949	121,131	525
Goulburn	866	10,418	59,355	70,639	428
North Eastern	330	3,438	22,558	26,326	201
East Gippsland	91	764	3,966	4,821	95
Central Gippsland	272	3,131	17,227	20,630	184
East Central	44	549	2,839	3,432	30
Total	4,740	53,505	342,952	401,197	3,039

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 3.4 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 30,000 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.

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, and the cockerels discarded. 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				
1973–74	41,902	32,089	..	n.a.	n.a.	*(d)* 32,089
1974–75	34,772	27,306	..	n.a.	n.a.	*(d)* 27,306
1975–76	40,738	33,219	..	n.a.	n.a.	*(d)* r33,219
1976–77	42,615	34,694	..	n.a.	n.a.	*(d)* 34,694
1977–78	47,882	38,441	..	n.a.	n.a.	*(d)* 38,441
		EGG STRAINS *(e)*				
1973–74	17,657	351	6,027	176	28	6,582
1974–75	14,924	316	5,005	196	39	5,556
1975–76	11,480	196	4,012	145	36	4,389
1976–77	r11,842	173	3,804	141	28	4,146
1977–78	8,565	157	2,975	90	27	3,249

(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 ten 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 20,000 to 50,000 broilers about five times a year. A one man or one family farm raises approximately 175,000 to 500,000 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 near the processing works and the main centres of consumption on the Mornington Peninsula, in areas east and south-east of Melbourne, and in the Geelong area. 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 all known Victorian hatchers and all poultry slaughterers slaughtering more than 1,000 birds annually:

VICTORIA—POULTRY SLAUGHTERED FOR HUMAN CONSUMPTION ('000)

Period *(a)*	Chickens (i.e., broilers, fryers, or roasters)	Hens and stags	Ducks and drakes
1973–74	27,256	1,752	124
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

DRESSED WEIGHT OF POULTRY SLAUGHTERED *(b) (c)* ('000kg)

Period *(a)*	Fresh and frozen	Fresh and frozen	Fresh and frozen
1973–74	34,333	2,754	188
1974–75	33,140	3,196	166
1975–76	36,332	2,610	131
1976–77	39,785	2,881	r249
1977–78	44,230	3,149	441

(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

Bees

Honey production in Victoria rose from 1,713 tonnes in 1976–77 to 3,106 tonnes in 1977–78. The bulk of the honey produced from the 455 beekeepers with 40 or more beehives in Victoria, is sold to large processors who clarify and pack the honey. About one-third 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
1974	1,160	98,539	3,161	47
1975 *(a)*	r 468	r 87,972	r 2,788	r 35
1976 *(a)*	492	91,203	3,476	61
1977 *(a)*	529	92,734	1,713	30
1978 *(a)*	455	81,569	3,106	46

(a) Not comparable with figures for previous years. Information from beekeepers with 40 or more registered hives, instead of 5 or more as previously.

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

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 1979, the number had risen to 8,750. 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 1978–79 was 12,884 kilograms.

Goat milk production has 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.

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.

Deer

Deer produces two valuable products, namely, venison and antler velvet. Farming of deer has begun on a small scale, and in 1978 there were about 635 domesticated deer in Victoria. The main breeds of deer are the fallow and red deer.

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 the 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.

Further references: 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.

In this section, more detail is given about the activities of the Department of Crown Lands and Survey in issuing leases and licences for land occupation and the Department of Agriculture's role in regulating farm activities. Further reference to other organisations engaged in the regulation of land utilisation can be found elsewhere in this *Year Book*.

Department of Crown Lands and Survey

The present legislation dealing with Crown land in Victoria is the successor of some of the earliest legislation enacted for the then infant Colony of New South Wales. The legislation, which is mostly contained in the *Land Act* 1958, enables Crown land to be licensed, leased, or sold, or to be reserved from occupation or sale for a wide variety of public purposes.

The main types of licences fall broadly into three categories: those which simply entitle a licensee to enter Crown land, usually for a short-term and for a particular purpose; those which allow a licensee to occupy Crown land from year to year for a particular purpose; and those of a similar type to the latter, but with the added benefit that a Crown grant in fee simple may eventually issue.

Of the first type of licence, the most usual are those granted for the removal of material, such as gravel, sand, etc., and are issued upon payment of a fee and an amount of royalty per cubic measure of material taken.

The second category of licence covers a very wide range of purposes. Included are: the grazing of stock; the occupation of unused roads and rivers or lake frontages; the production of eucalyptus oil; the operation of bee farms and ranges; the construction of jetties and slipways; the operation of market gardens; provision of car parks; and general industrial purposes. These licences require the payment of annual rentals and are granted subject to conditions appropriate to the purposes for which they are issued, including in some cases, limitation on the area to be licensed or on the number of stock to be grazed, and restrictions as to use or development.

The third form of licence mainly refers to those granted for purposes that require the establishment of improvements, often of a substantial nature. These licences may be for houses, factories, shops, warehouses, or other industrial purposes. They are also subject to

a variety of appropriate conditions and call for the payment of annual rental, which is credited over a period of years towards the purchase of the licensed land.

Leases of Crown land are now granted either for terms ranging up to 50 years without the right of purchase, or for generally shorter terms with the right of purchase, upon the payment by instalments of the purchase money and the fulfilment of pre-determined conditions. These may demand residence on or close to the leased land, or the development of the land to a certain stage. The usual form of this latter type is known as an Improvement Purchase Lease.

Leases are granted without the right of purchase for the purpose of grazing stock; for many different sorts of amusement and recreation facilities, such as golf courses, bowling greens, rifle and pistol ranges, and car-racing tracks; for commercial and industrial purposes; for providing tourist accommodation and facilities; and for ski-lodges and ski-tows.

Leases with the right of purchase are granted for the commercial growth of trees, for general farming purposes, for residence in certain limited circumstances, and for industrial purposes outside the Melbourne metropolitan area.

Department of Agriculture

The Department of Agriculture is responsible for the administration of appropriate legislation within Victoria including the registration and inspection of dairy farms and dairies, and factories producing butter, cheese, and other dairy produce, to ensure proper standards of hygiene and equipment; the registration and control of farm produce merchants and commission agents; the inspection, packing, and grading of fruit and vegetables; the inspection of orchards and insistence on proper methods for preventing and controlling plant diseases and insect pests, including measures to be taken against outbreaks of fruit fly; the registration of fertilisers, pesticides, stock foods, stock medicines, and sheep branding fluids; the licensing of abattoirs, pet food manufacturers, and meat transport vehicles; the inspection of meat; the prevention, control, and eradication of stock diseases; the assessment and payment of compensation to owners of cattle, swine, and bees condemned because of infections with prescribed diseases; the elimination of bulls not of a reasonable standard in respect of type, conformation, and breeding; the control and regulation of the artificial breeding of stock; the control of processing of poultry intended for sale; the inspection and testing of seeds for sale to ensure compliance with prescribed standard of purity and germination; the conduct of seed certification schemes; the control of the spraying of agricultural chemicals from aircraft; the control of rain-making operations; and the control of agricultural colleges.

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 reference: Vermin and Noxious Weeds Destruction Board, *Victorian Year Book* 1978, pp. 392–3

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.

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 (est. 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 Division of the Department of Agriculture, each has its own characteristics which reflect the needs of the community in its region. For example, since 1976 Dookie and Longerenong Agricultural Colleges have both offered three-year courses leading to a Diploma in Agriculture. These 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 a two-year course leading to the Diploma in Farm Management, and Burnley Horticultural College provides a three-year course for the Diploma of Horticultural Science. 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 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. Whereas the main emphasis of this service for many years was on the answering of farmers' questions and the dissemination of research results and other information, it is now devoting increasing attention to educational programmes which help to train farmers to make decisions according to their individual circumstances. Consequently, special emphasis is given to farm economics and financial management.

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, or horticulture. A growing team of agricultural economists is serving at regional and district centres. 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 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 financial 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, refinance, 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—				
	1974	1975	1976	1977	1978
Lending—					
Primary industry—					
Ordinary lending	2,488	2,806	3,139	5,137	5,349
Agency lending—					
General	946	1,220	1,057	1,548	3,984
Rural reconstruction	7,502	7,067	6,180	4,172	201
Rural adjustment *(a)*	..	..	..	2,978	11,699
Dairy adjustment	96	4,636	10,645	7,145	509
Fruit growing	343	131	146	751	239
Beef industry	..	24	2,177	1,169	433
Secondary industry—					
Ordinary lending	3,068	2,484	426	2,217	134
Agency lending	959	679	3,401	100	384
Land settlement	8	59	692	2,893	108
Total lending	15,410	19,106	27,863	28,110	23,040
Loans outstanding at 30 June—					
Ordinary lending	29,356	31,447	31,283	34,484	35,023
Agency lending—					
General	8,740	9,278	12,221	10,778	11,748
Rural reconstruction	29,128	33,891	37,137	37,774	34,636
Rural adjustments *(a)*	..	..	..	2,939	14,355
Dairy adjustment	355	4,808	14,757	19,998	18,379
Fruit growing	433	564	710	1,461	1,677
Beef industry	..	24	2,168	3,271	3,516
Land settlement	14,661	14,031	13,908	15,669	14,859
Soldier settlement	30,128	28,315	26,538	24,744	22,569
Total loans outstanding	112,801	122,358	138,722	151,118	156,762

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

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

BIBLIOGRAPHY

ABS publications

Victorian Office

Agriculture: preliminary statement (7101.2)
Apiculture (7204.2)
Apples and pears in cool stores (monthly: March-November) (7302.2)
Fruit and vegetables (7301.2)
Land utilisation and crops (7105.2)
Livestock (7202.2)
Livestock: preliminary numbers (7201.2)
Nursery and cut flower census (7303.2)
Potatoes (7306.2)
Principal cereal crops: area survey (7304.2)
Value of primary commodities produced (excluding mining) (7501.2)
Viticulture (7309.2)

Central Office

Beekeeping (7214.0)
Crop statistics (7302.0)
Dairying and dairy products (7209.0)
Fruit statistics (7303.0)
Livestock statistics (7203.0)
Meat statistics (7206.0)
Wheat statistics (7307.0)
Wool statistics (7212.0)