

## RURAL INDUSTRY

### FARMING IN VICTORIA

#### 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, by 1836 settlement had extended some 130 kilometres inland.

Efforts were made to legalise the position of the squatters and in 1836 regulations were made to enable them to acquire for £10 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 as 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. 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 on pages 93-103 of the *Victorian Year Book 1973*.

#### Alienation of land

The following tables show utilisation of land in Victoria :

#### VICTORIA—ALIENATION OF LAND AT 30 JUNE 1975

Particulars	Area
	hectares
Lands alienated in fee-simple	13,641,510
Lands in process of alienation	122,724
Crown lands	8,995,766
Total	22,760,000

## VICTORIA—CROWN LANDS AT 30 JUNE 1975

Particulars	Area
	hectares
Land in occupation under—	
Perpetual leases	15,448
Grazing leases and licences	2,406,080
Other leases and licences	13,238
Reservations—	
Reserved forest	2,295,236
Timber reserves (under Land Act)	59,664
Water catchment and drainage purposes	85,665
National Parks (under National Parks Act)	227,320
Wildlife reserves	59,925
Water frontages, beds of streams, and lakes (not included above)	342,535
Other reserves	116,063
Unoccupied and unreserved but including areas set aside for roads	3,374,592
Total	8,995,766

Crown lands alienated in fee simple during the years ended 30 June 1972, 1973, 1974, and 1975 were 24,323, 39,195, 33,019, and 61,200 hectares, respectively.

#### *Improvement purchase leases*

Crown land can be made available for application under improvement purchase lease conditions, and applications received are dealt with by a local land board.

The essential conditions of an improvement purchase lease are as follows :

- (1) That the lessee will make such land improvements within the first six years as are specified. "Land improvements" means the clearing, draining, or grading of land, the preparation of land for the sowing of crops and pasture, and soil improvement and maintenance.
- (2) That the lessee will commence to carry out the land improvements within one year and will complete one quarter within three years.
- (3) That the lessee will not sell, assign, or part with possession of the leasehold during the first six years.
- (4) That the lessee will not mortgage his interest in the leasehold during the first six years without first obtaining the consent of the Department of Crown Lands and Survey.
- (5) That the lessee will reside in person on or within 40 kilometres of the leasehold during the first six years.

The purchase money is payable in twenty annual instalments, and on satisfactory compliance with the conditions of the lease and on payment of the balance of purchase money and fees, a Crown grant will be issued at any time after the first six years except where the lease contains a soil erosion prevention condition. The period is then twelve years or such further period as is provided in the lease.

#### **Land utilisation**

The climatic conditions of Victoria (for details see pages 85–104), especially the varying incidence of rain, have resulted in the development of a wide range of farming practices, but at the same time have been largely responsible for restricting the range of activities on individual farms.

The pattern of land-use conforms more or less to each of the agricultural districts. Thus the Mallee and the northern part of the Wimmera Agricultural District are used mainly for cereal production and sheep raising. The more intensive carrying of livestock in these districts has been made possible by a channel system of domestic and stock water supply originating in the mountainous areas of the Grampians to the south. The agriculture of the Northern Agricultural

District is based largely on irrigation, and ranges from dairying to fruit production. The non-irrigated parts of the district are used for cereal and sheep production. In the Western, Central, North Central, North Eastern, and Gippsland Agricultural Districts, the rainfall is heavier and more reliable; consequently, there is more diversity in land utilisation. In these districts, sheep grazing and dairying are the most important industries. Cultivation is generally limited. Some wheat is grown in the North Eastern and Western Agricultural Districts, and there is some production of potatoes, vegetables, and other intensive cultivation crops on the more fertile soils in the higher rainfall parts.

Considerable areas in Victoria are retained as forest reserves and for water catchments (see page 410).

#### *Soil Conservation Authority*

Information about the activities of the Soil Conservation Authority can be found on pages 52-4 of this *Year Book*.

#### *Land Conservation Council*

Information about the activities of the Land Conservation Council can be found on pages 50-2 of this *Year Book*.

### **Agricultural districts**

#### *Mallee Agricultural District*

This district is situated in the far north-west of Victoria and has a total area of 4.4 million hectares. However, there are extensive areas in the north and west of it which, because of water shortage and the liability to severe soil erosion, have not been settled, and the total area occupied is 3.1 million hectares. The use of Crown land in the Mallee is under review at the present time by the Land Conservation Council.

The soils of the district being light in texture are easily and cheaply cultivated, and the main farming activity is cereal cropping associated with wool and prime lamb production. Cattle production is growing in importance, cattle numbers having increased four-fold during the 1970s. Wheat is the principal crop grown, in addition to oats for grain, hay, and grazing, and barley. Yields from cereal crops vary widely according to seasonal conditions. The following table shows the areas sown and average yields per hectare for the season 1974-75:

MALLEE AGRICULTURAL DISTRICT—CEREAL CROPS,  
SEASON 1974-75

Crop	Area	Average yield per hectare
	hectares	tonnes
Wheat	571,255	1.94
Oats—grain	32,534	0.90
hay	3,748	2.73
grazing	4,173	..
Barley	117,961	1.32

In the past, lack of suitable pasture species was a major problem in pasture development, and the grazing was provided largely by native pastures, green cereal crops, and crop stubbles. The discovery and introduction into crop rotations of suitable medics has resulted in marked benefit to both crop

production and grazing. The use of medics is now widespread in the district, and has greatly improved the conditions for production of early prime lambs, mainly for the Melbourne market. Dry land lucerne has also contributed to the vastly improved grazing afforded by the pastures.

At 31 March 1975 the district carried 1.7 million sheep and lambs. The total wool clip was 8.0 million kilograms.

Irrigation areas located close to the Murray River, which marks the northern boundary of Victoria, produce 98 per cent of the State's dried vine fruits, 75 per cent of the citrus fruits, and 75 per cent of the olives.

#### *Wimmera Agricultural District*

The Wimmera occupies the central western part of Victoria and has an area of 3 million hectares, of which 2.5 million hectares are occupied. Average annual rainfall in the north is about 406 mm per year, increasing in the south to 508 mm. The Grampians in the south of the district have a higher rainfall. This area is unsuited to agricultural production, and is retained by the Crown as a watershed area and forest reserve.

There are wide variations in soil type, but the district includes substantial areas of fertile self-mulching clay loams, which are among the most productive wheat-growing soils in Australia. South and east of the Grampians the soils are podsoles, and in the south-west there is a large area of light-textured grey soils.

Wheat farming in association with fine-wool growing or prime lamb production is the main farm activity over the north and central Wimmera. Oilseed crops, e.g., sunflowers and grain legumes (lupins), are also beginning to play an important role in the district. Both climate and soils are suited to cereal cropping, and yields obtained are high. In recent years the development of suitable strains of medics and clovers has resulted in the inclusion of a pasture phase in crop rotations.

The following table shows the areas of the cereal crops sown and average yields for the season 1974-75 :

WIMMERA AGRICULTURAL DISTRICT—CEREAL CROPS,  
SEASON 1974-75

Crop	Area	Average yield per hectare
	hectares	tonnes
Wheat	335,426	1.94
Oats—grain	63,400	0.83
hay	3,594	2.76
grazing	1,650	..
Barley	66,033	1.33

In addition to mixed sheep and wheat farming, there are extensive areas, particularly in the south and west of the district where rainfall is higher and which are used solely for grazing. About three quarters of the sheep carried in the area are Merinos, and, although a number of early fat lambs come from the wheat growing areas, emphasis here is more generally on fine-wool production and breeding. At 31 March 1975 the district carried 5.2 million sheep and lambs and produced 29.2 million kilograms of wool. As is the case in the Mallee, dairying and beef cattle production are only of minor importance.

#### *Northern Agricultural District*

This is an area of plains country extending from the Central Highlands in the south to the Murray River in the north. The total area of the district

is 2.6 million hectares, of which 2.3 million hectares are occupied for agricultural purposes. The soils vary from typical light Mallee soils in the north-west to fertile red-brown earths in the east. Average annual rainfall is 356 mm in the north-west increasing to 635 mm over the foothills of the ranges, which are on the eastern boundary of the district. The district includes the major irrigation areas of Victoria, and, because of this, several different farming activities are carried out.

Wheat growing is an important industry, and, because of climatic and soil differences, yields vary widely across the area. As in the other wheat producing districts, oat crops are an important feature in rotations and for grazing. In the 1974-75 season the following areas of cereal crops were sown :

NORTHERN AGRICULTURAL DISTRICT—CEREAL CROPS,  
SEASON 1974-75

Crop	Area	Average yield per hectare
	hectares	tonnes
Wheat	194,124	1.49
Oats—grain	43,422	0.93
hay	13,548	3.50
grazing	3,569	..
Barley	34,912	1.19

In 1974-75 the district carried about 3.3 million sheep and lambs, largely on wheat farms, mainly for prime lamb production rather than fine-wool growing. Extensive irrigation has made it possible to establish highly productive perennial pastures which are used mainly for dairy production. In addition, the irrigation areas fatten sheep and lambs from non-irrigated parts of Victoria and New South Wales. The milk produced is mostly used for butter, cheese, and other manufactured products, with relatively small quantities for city wholemilk supply. In 1974-75 there were over 527,000 dairy cattle in the district.

Apart from dairying, irrigation has permitted the establishment of an important fruit growing industry. This area supplies fresh fruit to Victorian and interstate markets, and also provides fruit, mainly apricots, pears, and peaches, for the important canneries operating in the district. Tomatoes are also produced on a large scale.

*North Central Agricultural District*

This district includes much of the Central Highlands area. The average annual rainfall is generally over 700 mm, but on the northern slopes it is as low as 550 mm. There is wide variation in topography and soils, and much of the area is used for grazing sheep and beef cattle. However, the district is relatively small, containing only 1.2 million hectares, of which 0.8 million hectares are used for farming production.

Emphasis is on sheep production associated with beef production. In 1974-75 the district carried 2.1 million sheep and lambs and 310,000 beef cattle. Cereal cropping is unimportant, but potatoes in the volcanic hills east of Ballarat and pome fruits in the Harcourt area are the most important crops grown. Although dairy farms are scattered throughout the district, it is marginal for this form of production.

*North Eastern Agricultural District*

This district has a total area of 2.9 million hectares, but includes substantial areas of Crown lands, much of which is very steep and heavily timbered. The area occupied is 1.5 million hectares. Average annual rainfall varies from 500

mm in the north-western corner of the district to in excess of 1,500 mm over the mountains. Almost all of the area used for rural production has a 500 mm to 760 mm rainfall.

Although cereal cropping is not general, there is an interesting development of ley farming based on subterranean clover pastures. However, areas concerned and production are small in relation to the State totals. The fertile river valleys are suited to speciality crop production, and in 1974-75 3,800 hectares of tobacco and 460 hectares of hops were grown in these areas. In 1974-75 the district carried 98,000 dairy cattle, mainly along the river valleys.

Prime lamb growing and crossbred wool production are the main sheep activities in the north-western and western parts of the district, but fine-wool growing is common on the unimproved pastures along the Murray valley and in the Omeo area. The district carries about 1.2 million sheep.

The North Eastern Agricultural District is an important beef cattle breeding and fattening area, and in 1974-75 over 592,000 head were carried. The cattle make good use of the rough pastures of the foothill country, and the productive pastures of the flats provide suitable fattening areas.

#### *Western Agricultural District*

Most of the district is in the 630 mm to 760 mm average annual rainfall belt, but an area north and east of the Otways is influenced by a rain shadow effect so that the average annual rainfall is about 600 mm. In the Otway Ranges the average annual rainfall is as high as 1,800 mm. The soils of the district vary considerably in type and fertility. Basaltic soils cover the great bulk of the plains area. In the north the soils are similar to those of the southern Wimmera. The total area of the district is 3.5 million hectares of which 2.8 million hectares are occupied. There are substantial areas of forest reserve in the Otways in the south-eastern part of the district.

The major cereal crop grown is oats, which is used as a fodder crop, cut for hay, or harvested for grain which is used largely to feed stock. The more fertile arable soils produce both potatoes and onions, and about 60 per cent of Victoria's onion area is located on volcanic tuff soils near Colac and Warrnambool. However, emphasis is placed on animal production as climatically the district is more suited to the development of improved pastures than for broad area cropping. It is the major wool producing area of the State, and at 31 March 1975 there were 10.0 million sheep and lambs in the district. The Western Agricultural District is also an important beef cattle breeding and fattening area, and in 1974-75 carried 1,118,000 head. Many of Victoria's leading stud herds are located in the district; many sheep properties also carry beef cattle.

Dairying is an important industry here, and there is widespread distribution of dairy cattle. The main concentrations are in the following areas: Colac, Camperdown, Koroit, Allansford, and the Portland region. A proportion of production is used as wholemilk for town supply, but a considerable proportion of Victoria's total processed milk products and butter is produced in the district, which in 1974-75 carried 478,000 dairy cattle.

#### *Central Agricultural District*

Average annual rainfall varies from 600 mm within the rain shadow area north of Geelong to more than 900 mm over the ranges north and east of Melbourne. Topographically there is variation from the plains country on the western side of Port Phillip Bay to the steep hill country north and east of Melbourne. There is also a wide variation in soil type and fertility. The total area of the district is 1.6 million hectares of which 1.0 million hectares are occupied, the remainder being reserved as forest and watershed areas.

The climate is suited to the production of malting barley, and in 1974-75 15,819 hectares of barley were grown—mainly on the plains to the west. Potatoes are grown in the Romsey-Ballararat area, on the Bellarine Peninsula, and on the Koo-Wee-Rup swamp. There is increased interest in cereal and oilseed crops.

Market gardening is important in the area extending from the south-eastern suburbs of Melbourne to the northern shores of Western Port, and also on the irrigation settlements near Werribee and Bacchus Marsh.

The district is Victoria's major producer of apples; dessert types of pears and peaches and other stone fruits are also important. Orchards are located in the eastern metropolitan area, on the Mornington Peninsula, and near Bacchus Marsh and Pakenham. Ninety per cent of the State's strawberry crop is grown in the Dandenong Ranges some 40 kilometres east of Melbourne.

In 1974-75 the district carried 1.7 million sheep and lambs, production being almost evenly divided between fine-wool growing and fat lamb production.

Beef cattle are grazed in conjunction with sheep over most of the area, but in the east they are run with dairy cows to produce vealers. At 31 March 1975 the district carried 567,000 head of beef cattle.

The major dairying area is in the east, and this forms part of the most important dairying area of the State. The area is a major supplier of wholemilk for city supply and for butter and cheese manufacture. In 1974-75 there were 230,000 dairy cattle in the district. Pig production is also important.

#### *Gippsland Agricultural District*

The total area of this district is 3.5 million hectares, but the northern and eastern parts are mountainous and are reserved by the Crown. The area occupied is 1.8 million hectares, the bulk of settlement being south of a line between Dandenong and Bairnsdale. Average annual rainfall varies from just under 550 mm within the rain shadow near Maffra and Sale to 1,500 mm and above in the highlands. An intensive irrigation scheme has developed around Maffra with highly productive dairying. Average rainfall over most of the settled areas in the west is sufficient for the development of fertile perennial pastures. The soils range from poor sands to relatively fertile loams. The highly fertile alluvial soils of the river valleys are important sources of production.

With the exception of forage crops, cropping is not important in the area, although certain speciality crops, such as maize, beans, and potatoes, contribute substantially to Victoria's total production.

Gippsland is the main dairying district of the State, and dairying is by far the most important rural industry in the district. The highly productive pastures of the 760 mm to 1,000 mm average annual rainfall areas are the basis of the industry. The district supplies the greater part of the wholemilk requirements for the Melbourne market, and plays a major role in Victoria's production of butter, cheese, and other processed dairy products. In addition, the dairy herds contribute to veal and beef production. In 1974-75 the district carried about 540,000 dairy cattle and 703,000 beef cattle. Pig raising is often associated with dairy farming, and there were 27,000 pigs carried in the area at 31 March 1975.

In western and southern Gippsland, sheep production is small and consists largely of fat lamb producing flocks run in conjunction with dairy cattle. In parts of the district east of Rosedale, fine-woolled sheep and beef cattle are significant activities.

#### **Rural finance**

Australia's national policy for permanent land settlement has been based on the family unit farm. Financially this has seldom been easy because even

in the early days settlers found it difficult to earn enough to maintain themselves while they were clearing and developing their blocks. The conditions of purchase were made very easy, but considerable aggregation of holdings took place because settlers failed. Later, some of these large estates were re-purchased, subdivided, and the smaller farms made available to settlers under closer settlement schemes.

After each world war these schemes were expanded to enable ex-servicemen to acquire farms under generous terms of settlement. In addition, money was advanced to returned servicemen to enable them to buy their own "single unit" farms. Soldier settlers were also granted loans for the purchase of stock, plant, and equipment.

The Australian farmer is dependent for a large proportion of his earnings on the export market. Commodities over recent years have shown wide fluctuations of prices and the reliance by the Australian farmer on fluctuating and often rapidly declining income on the one hand and the burden of fixed or increasing costs on the other make him particularly vulnerable financially. Recent financial measures have been aimed at schemes which help the individual farmer adjust to the changing situation. Various schemes have been established, such as the Rural Reconstruction Scheme, and this trend is likely to increase in the future.

#### *Rural Finance and Settlement Commission*

The Rural Finance and 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.

#### *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, payment of probate, and seasonal advances. Loans to secondary industry have resulted in the establishment of a number of successful country industries over the years. The Victorian Development Corporation was established towards the end of the 1972-73 financial year and the Commission is working in close co-operation with the new body in respect of loans to establish new country industries and to expand and improve existing facilities. It is anticipated that the Corporation will now be the major channel through which Victorian Government loan assistance is made available to secondary industry located outside the Melbourne metropolitan area. The Commission, however, will still have a role to play in selected cases and industries.

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 members of 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



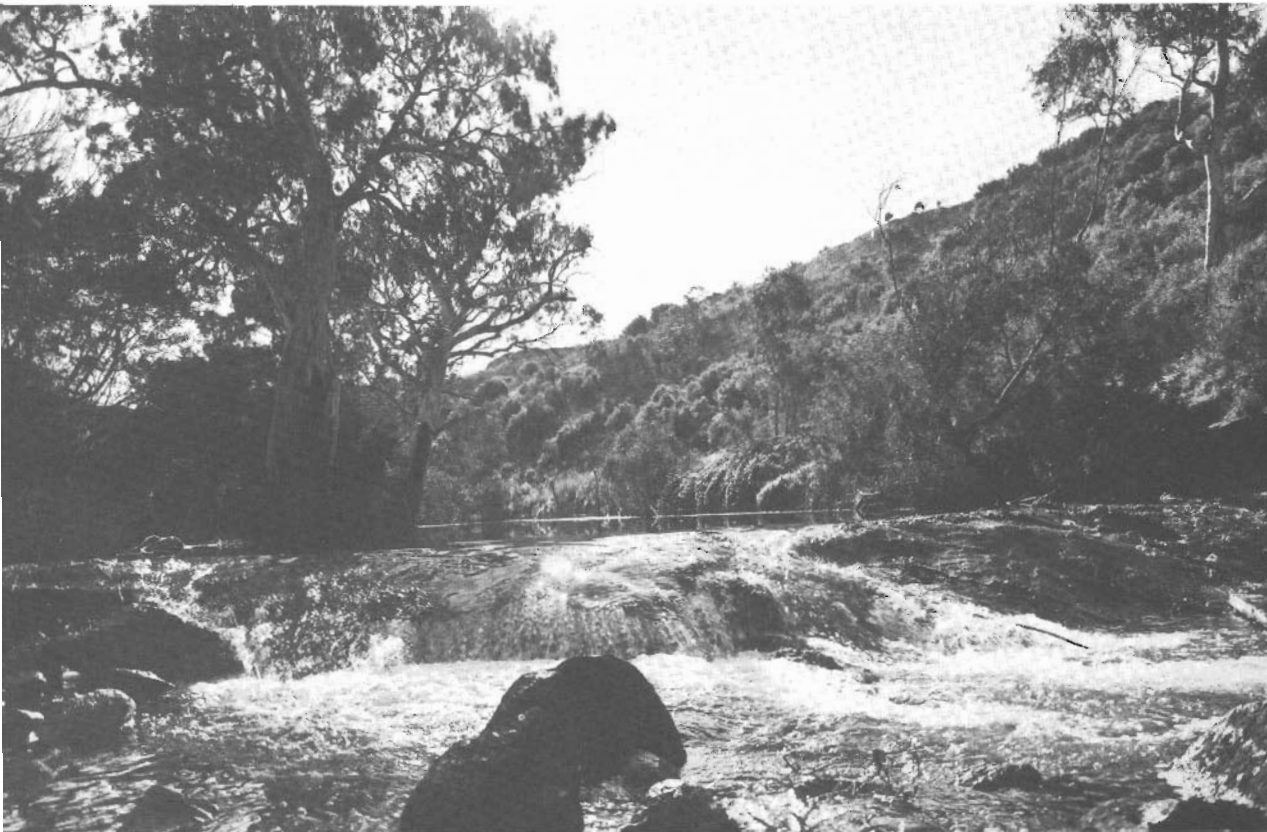


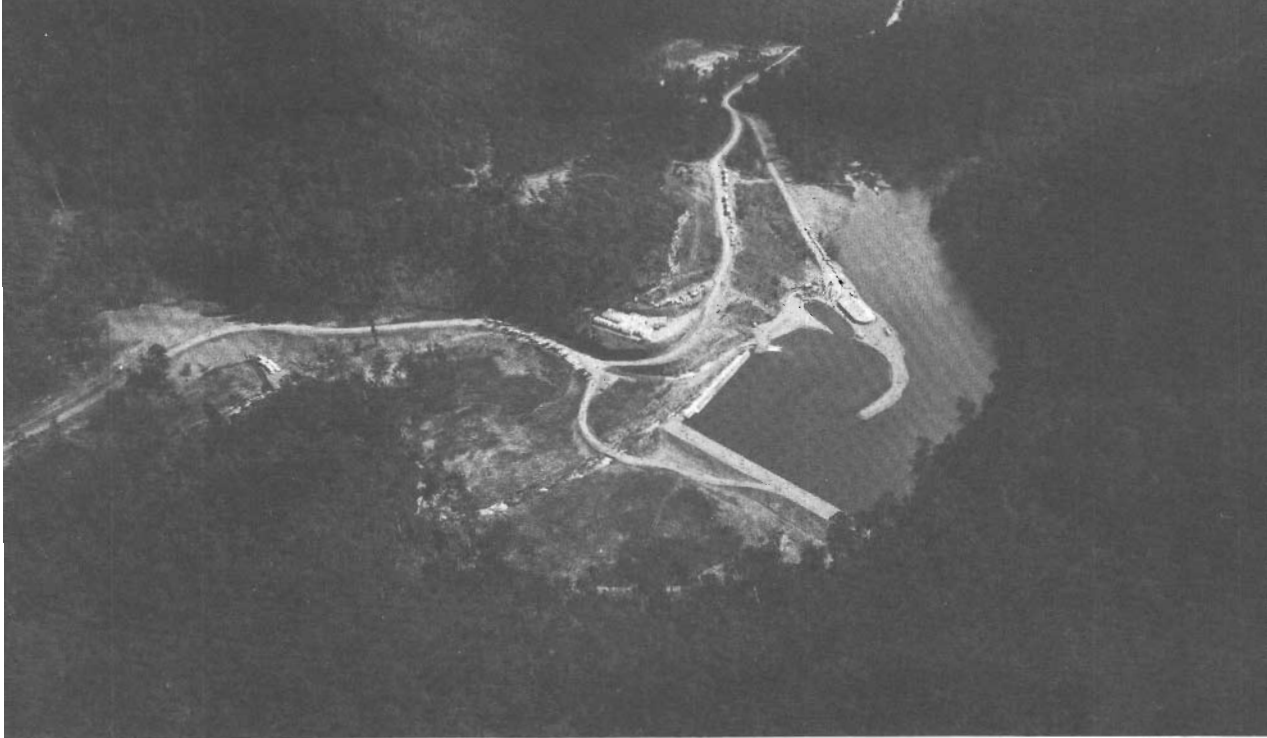
A scenic view in Jells Park, the first section of the proposed Dandenong Valley Metropolitan Park to be opened to the public.

*Melbourne and Metropolitan Board of Works*

A picturesque part of the Maribyrnong River, adjacent to Brimbank Park in Keilor.

*Melbourne and Metropolitan Board of Works*



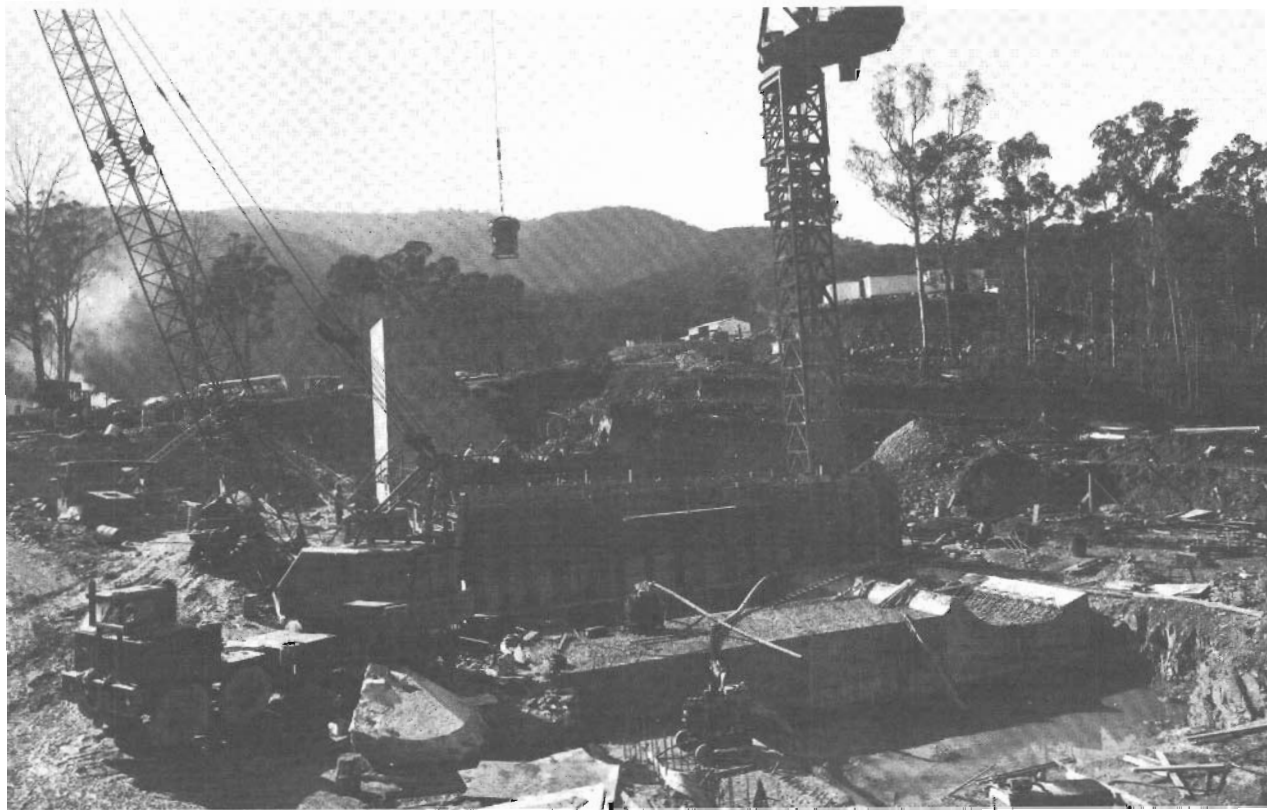


An aerial view of Easton Portal, the inlet of the first stage of the Thomson River dam scheme.

*Melbourne and Metropolitan Board of Works*

Work on the Swinger Weir, a major component of the second stage of the Thomson River dam scheme.

*Melbourne and Metropolitan Board of Works*



ordinary lending are made available to particular industries. Major Australian-State Government schemes such as the Rural Reconstruction Scheme, the Marginal Dairy Farms Reconstruction Scheme, the Fruitgrowing Reconstruction Scheme, the Dairy Adjustment Programme, and the Beef Industry Carry-on Scheme, have also been administered in Victoria by the Commission under an agency direction from the Treasurer pursuant to section 35 of the Rural Finance Act.

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

Particulars	(a)1970-71	1971-72	1972-73	1973-74	1974-75
Primary industry—					
Ordinary lending	4,529	2,519	2,347	2,488	2,806
Agency lending—					
General	74	240	1,229	946	1,220
Rural reconstruction—debt reconstruction and rehabilitation	..	9,271	9,178	2,033	443
Rural reconstruction—farm build-up	..	2,259	5,909	5,469	6,624
Dairy adjustment	..	221	75	96	4,636
Fruit growing	..	..	90	343	131
Beef industry	..	..	..	..	24
Secondary industry—					
Ordinary lending	441	865	1,301	3,068	2,484
Agency lending	4,000	230	1,415	959	679
Land settlement	1,841	1,240	..	8	59
<b>Total lending</b>	<b>10,885</b>	<b>16,845</b>	<b>21,544</b>	<b>15,410</b>	<b>19,106</b>
Loans outstanding at 30 June—					
Ordinary lending (a)	30,875	30,924	29,223	29,356	31,447
Agency lending—					
General (a)	9,376	8,774	9,824	8,740	9,278
Rural reconstruction	..	11,499	25,312	29,128	33,891
Dairy adjustment	..	220	291	355	4,808
Fruit growing	..	..	90	433	564
Beef industry	..	..	..	..	24
Land settlement	15,799	16,468	15,927	14,661	14,031
Soldier settlement	39,860	37,920	33,995	30,128	28,315
<b>Total loans outstanding</b>	<b>95,910</b>	<b>105,805</b>	<b>114,662</b>	<b>112,801</b>	<b>122,358</b>

(a) Includes secondary industry lending.

*Rural reconstruction scheme*

Following the economic problems experienced by the farming community in 1969 and 1970, with markedly depressed prices and rising costs, a scheme for rural reconstruction was introduced in 1971, after conferences between the Commonwealth and the State Governments.

Initially, the Commonwealth Government agreed to provide \$100m to the States (of which Victoria's share was \$22.07m) for the purposes of the scheme, to be expended over four financial years. It was later agreed to concentrate this expenditure into two financial years to 30 June 1973, and to continue the scheme for a further three financial years beyond that date. Additional funds allocated to Victoria to 30 June 1976 totalled \$22.69m. In addition, Victoria had available an amount of \$4.5m from funds received as repayments of the farmers' debts adjustment scheme of the 1930s.

The scheme provides for three main forms of assistance:

(1) *Debt reconstruction.* The purpose of this was to assist a farmer who,

although having sound prospects of long-term commercial viability, had used all his cash and credit resources and could not meet his financial commitments.

(2) *Farm build-up.* The object of this was to supplement the normal processes under which uneconomic properties were amalgamated with adjoining holdings or were subdivided and the subdivided portions added to adjoining holdings. It also aimed at assisting the farmer in a sound financial position, whose property was too small to be economic, to purchase additional land to build up his property to at least an economic size.

(3) *Retraining and rehabilitation.* This aimed at providing assistance, where necessary, in retraining for some other occupation for those who were obliged to leave the industry. Loans up to \$3,000 could also be made available to alleviate personal hardship.

Initially, expenditure under the scheme was concentrated on debt reconstruction, with only a small interest being shown in farm build-up. As confidence in the rural sector increased, particularly because of the higher prices being obtained for products such as wool, the emphasis shifted from debt reconstruction to farm build-up. Loans made for debt reconstruction purposes carry an interest rate of 4 per cent, and loans for the purpose of farm build-up carry an interest rate of 6.25 per cent.

To 31 December 1975, 3,005 applications were received for debt reconstruction loans, of which 833 were approved, while 1,622 applications were received for farm build-up loans, of which 857 were approved. Expenditure to 31 December 1975 totalled \$21.7m for debt reconstruction and \$22.9m for farm build-up.

#### *Dairy adjustment programme*

This scheme superseded the Marginal Dairy Farms Reconstruction Scheme introduced in 1970, which created little interest among dairy farmers in Victoria. The new scheme is wider in definition and includes new categories. Basically, it has three main elements. It provides interest free loans to dairy-farmers who at present supply cream or water-cooled bulk milk, to enable them to meet the cost of conversion after 21 August 1974 to bulk refrigerated milk supply; it provides finance to assist the purchase of uneconomic dairy farms for amalgamation with an existing farm; and in special circumstances the dairy farm may be disposed of to persons prepared and able to use the farm for forestry purposes. Where an uneconomic dairy farm has potential, it may be possible to assist the farmer to purchase additional land to bring his property to a viable size. There is also scope for assistance for improvement of dairy properties to bring them to a suitable standard. Relocation assistance up to \$3,000 is available to a dairy farmer who may suffer personal hardship on leaving the industry and disposing of his farm after 21 August 1974.

To the end of December 1975, the Commission had received 1,838 applications for bulk vat conversion loans, of which 1,486 were approved, while 597 applications were received for farm purchase and development, of which 320 were approved. Although due to run to June 1976, funds under the scheme were exhausted by August 1975. Total commitment was \$16.2m.

#### *Fruit growing reconstruction scheme*

During 1971 and 1972, growers in the canning fruit and export apple and pear industries continued to experience financial difficulties brought about by restriction of market outlets. The industry, in general, was experiencing high levels of stocks. Against this background, proposals were put forward by the industry for the curtailment of production by means of a tree removal scheme. The Commonwealth Government, after consultation with the States, offered to finance a scheme within the context of the rural reconstruction measures, with the emphasis on relief being given to the individual grower. Legislation was

passed in 1972 to establish the scheme. A total of \$4.3m was made available to the States under the scheme to pay compensation to growers for the removal of trees. Half the amount available was to be applied to canning-peach and pear trees, and the other half to fresh apples and pears. State authorities were to administer the scheme so that the average rate of assistance did not exceed \$350 per acre for canning-peaches and canning-pears and \$200 per acre (later amended to \$250 per acre) for fresh apples and fresh pears. Compensation in respect of trees was to be assessed after having given due regard to age, yield, and condition of the trees, and market access availability.

Eligibility for admission to the scheme was divided into two categories: (1) Clear fell for the grower in severe financial difficulties who intended to clear fell his orchard, leave the industry, and convert his land to other use; and (2) partial fell for the grower who did not have adequate resources to withstand the short-term effect on his economic viability of removing surplus trees without assistance.

To 31 December 1975, 321 applications had been received, of which 16 were later withdrawn and 82 rejected. At that date 86 applications were pending and offers had been made in 137 cases, of which 97 had accepted, involving compensation totalling \$696,234.

#### *Beef industry carry-on scheme*

Following the depressed prices for beef caused by loss of export markets during 1974, many beef producers experienced financial hardship, and the Victorian Government provided a special fund of \$2m to assist beef producers who could not be assisted under any other rural assistance scheme. On 28 April 1975, agreement was reached on a joint Commonwealth-State Government scheme to provide carry-on finance to beef producers where the State assistance was matched by a similar allocation of Commonwealth Government funds, the total sum available in Victoria being \$4m. Those eligible are specialist beef producers who still have a sound asset structure and would be viable if there were a long term market recovery, but who lack the finance needed to carry on in the period of low market return. The maximum loan available to any individual is \$10,000. The Commission had made 247 loans totalling \$1,863,879 to 31 December 1975.

#### *Soldier settlement and land settlement*

The Commission administers the Soldier Settlement Act and the *Land Settlement Act* 1959. Allocation of soldier settlement ceased some years ago. In total, 6,171 ex-servicemen were assisted, either to obtain farms of their own choosing or allocated a farm under the various general settlement projects. At 30 June 1975, 3,901 of these farmers had completely repaid their liabilities to the Commission.

Under the Land Settlement Act, the Commission has developed land on five projects: at Heytesbury near Cobden, Yanakie on Wilsons Promontory, East Goulburn Irrigation Area near Shepparton, the Rochester Irrigation Area, and Palpara in the south-west of Victoria. The Yanakie and East Goulburn Irrigation Area Schemes were completed and all farms allocated to settlers by the mid-1960s.

When the Victorian Government decided in 1970 to refrain from making further land available for dairying, 573 farms had been allotted under the Land Settlement Act (381 dairy farms under rainfall conditions, 113 irrigation dairy farms, and 79 soft fruit orchard holdings) on all projects.

The Victorian Government's decision was revised in November 1973, and by the beginning of 1976, 17 farms at Rochester and 15 farms at Heytesbury had been allocated, and a further 90 farms were in the process of being established.

*Other rural finance facilities**State Bank of Victoria*

State Bank loans for rural purposes are available on the security of first mortgage over freehold property. Loans are repayable over periods varying between 16 and 24 years. Interest is charged at the rate ruling from time to time—in 1975 from 10.5 per cent per annum, depending on the amount of the loan and whether the property is worked by the applicant. The maximum loan must not exceed two thirds of the value of the property.

Particulars for the year ended 30 June 1976 may be found in Chapter 21.

*Reserve Bank of Australia—Rural Credits Department*

The Rural Credits Department was established in 1925 as a department of the Commonwealth Bank of Australia and is now part of the Reserve Bank of Australia. The Department may make advances to rural marketing authorities formed under Commonwealth, State, or Territory law and to co-operative associations of primary producers to assist in the marketing, processing or manufacture of primary produce. Advances, which may not be made for a period of more than one year, are used by borrowers principally for making payments to growers for their primary produce pending its sale, and to finance marketing expenses, which in some cases include processing and packing of the commodity.

Among the commodities financed are wheat, barley, canned and dried fruits, cotton, dairy produce, eggs, rice, sugar, superphosphate, and wine and spirits. Lending rates on the Department's loans were increased from 7.0—7.25 per cent to 9.5—10.0 per cent per annum on 15 July 1974.

The profits of the Rural Credits Department each year are distributed equally between the Department's Reserve Fund and the Rural Credits Development Fund. This Fund was established in 1925 to be used for the promotion of primary production. It is distributed by way of grants to various organisations engaged in rural research work and extension activities.

*Farm Development Loan Fund*

The Farm Development Loan Fund was established in 1966 to provide rural producers, particularly small producers, with greater access to medium and long-term finance. Initially, this lending was to be mainly for farm developmental purposes which would directly raise productivity. However, from November 1972, resources from the Fund can also be made available for such purposes as financing farm property purchases, assisting where the death of a farm proprietor creates financing difficulties in holding together a farming enterprise, and, in appropriate cases, financing repayment of existing short-term debt. Loans are made by the trading banks from their Farm Development Loan Fund Accounts with the Reserve Bank and are designed to supplement other loans available from the banking system.

*Commonwealth Development Bank*

A brief outline of the functions of the Commonwealth Development Bank, together with particulars of rural loans outstanding at 30 June 1975, may be found in Chapter 21. Rural loans are made for a variety of purposes, e.g., clearing, fencing, pasture improvement, farm water conservation, erection of essential farm buildings, and the basic stocking of properties. Other aspects of assistance granted include aid to successful applicants in government sponsored rural development schemes and land ballots. Special attention is also given to providing finance to applicants opening up new areas.

*Advances by major trading banks*

The extent of rural lending in Victoria by the Commonwealth Trading Bank and other major trading banks is shown in the following table, which

details bank advances to borrowers outstanding at the end of June for the five years 1971 to 1975 :

VICTORIA—COMMONWEALTH TRADING BANK AND PRIVATE  
TRADING BANKS : BUSINESS ADVANCES OUTSTANDING TO  
RURAL INDUSTRY BORROWERS AT END OF JUNE  
(\$m)

Industry of borrower	1971	1972	1973	1974	1975
Sheep grazing	78.9	67.3	53.5	55.7	63.7
Wheat growing	27.2	25.6	26.4	29.4	25.7
Dairying and pig raising	45.5	44.9	57.0	65.3	73.2
Other rural	51.8	59.4	73.9	88.1	98.6
Total	203.4	197.2	210.8	238.5	261.2

Advances to rural industry borrowers represented 12.5 per cent of trading banks' business advances outstanding at the end of June 1975, and 9.3 per cent of all advances outstanding. The maximum rate of interest on bank overdrafts at 30 June 1975 was 11.5 per cent per annum for amounts under \$50,000 but the average rate on rural loans would probably be below this level. Actual rates for amounts \$50,000 and over are now a matter for negotiation between banks and their customers.

*Advances of pastoral finance companies*

The following table shows total rural advances outstanding to pastoral finance companies at 30 June for the five years 1971 to 1975 :

VICTORIA—RURAL ADVANCES (a)  
OF PASTORAL FINANCE COMPANIES  
(\$m)

At 30 June—	Advances outstanding
1971	57.2
1972	57.2
1973	68.0
1974	86.1
1975	55.8

(a) Held by branches located in Victoria, which is not necessarily the State of residence of the borrower.

**Government assistance to the farming industry, 1964**

**Water supply and land settlement**

Information about water supply and land settlement can now be found in Chapter 13 of the *Year Book*, but previous references to this subject when it appeared in this chapter are as follows :

**Irrigation, 1962 ; Wimmera-Mallee region water supply, 1963 ; Flood protection, river improvement, and drainage, 1963 ; Underground water, 1964 ; Water supply in Victoria, 1964 ; Goulburn-Murray Irrigation District, 1965 ; Spray irrigation in agriculture and dairying, 1965 ; Private irrigation development, 1966 ; Water Research Foundation, 1966 ; River improvement, 1967 ; Rivers and streams fund, 1967 ; Dandenong Valley Authority, 1968 ; Water conservation, 1969 ; Water supply to Western Port, 1971 ; Lake William Hovell dam, 1972 ; River Murray Agreement and the River Murray Commission, 1972 ; Ten year plan, 1974 ; Millewa pipeline project, 1974 ; Snowy Mountains Hydro-Electric Scheme, 1974 ; Millewa Scheme, 1975 ; Tarago-Western Port pipeline, 1975**



**Department of Agriculture***Functions*

The functions of the Department of Agriculture may be described briefly as providing regulatory, research, diagnostic, and extension services in the fields of animal health, animal industry, agriculture, dairying, and horticulture ; discharging the statutory responsibilities imposed by the legislation administered directly by the Department ; and administering Victoria's agricultural and horticultural colleges.

The current administrative and functional pattern originated in 1911. The Department comprises the Central Administration and eight divisions: Agricultural Chemistry, Agricultural Education, Agriculture, Animal Health, Animal Industry, Dairying, Extension Services, and Horticulture, as well as the two major servicing branches—Economics and the Victorian Plant Research Institute (Biology). The Department operates a number of agricultural research establishments, veterinary laboratories, and offices throughout Victoria, in addition to the colleges.

*Regulatory activities*

The Minister of Agriculture administers more than forty Acts of Parliament, a number of which establish statutory authorities.

The Department is responsible for the administration of legislation within the Department 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 of manufacturers of margarine and the limitation of the quantity of table margarine which may be made by each manufacturer ; 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 infection by 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 standards 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 ; the inspection of accommodation provided for shearers to ensure that it conforms to prescribed standards ; 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.

Since 1971, apart from a number of amendments to established legislation, the Bees Act, the Fertilizers Act, and the Seeds Act have been reviewed and updated as new pieces of legislation ; additional legislation has been enacted to provide for the stabilisation of the egg industry and for the transfer of the Veterinary Research Institute and of the control of abattoirs and meat inspection to the Department of Agriculture.

The *Bees Act* 1971 contained substantially the same provisions as the *Bees Act* 1966 relating to the registration and inspection of apiaries to control



diseases and maintain proper hygiene standards in the preparation of honey, with the addition of sections to provide for a compensation scheme to alleviate the losses experienced by beekeepers when disease occurs in their apiaries. The *Seeds Act* 1971 took cognisance of developments in the seed industry over a number of years. The legislation relates to seed sold or intended for sale for the purpose of sowing (other than seeds of wheat, oats, barley, and cereal rye), except where the seeds are used or intended to be used for mixing with other kinds of seeds to form a seed mixture. Significant new principles in the Act were the compulsory examination of all seed prior to sale in relation to physical purity and germination, the follow-up examination at prescribed periods, and the registration of all seed cleaning plants. The *Fertilizers Act* 1974 consolidated and amended the law relating to the sale of agricultural limes, fertilisers, and soil conditioners.

The *Veterinary Research Institute Act* 1972 provided for the transfer of the Institute and appropriate staff from the University of Melbourne to the Department of Agriculture as part of a programme of establishment and development of veterinary diagnostic and research laboratories by the Department throughout Victoria. The *Abattoir and Meat Inspection Act* 1973 provided for the transfer of the control of abattoirs and meat inspection (other than the public health control of meat at retail outlets, which is still exercised by the Department of Health and municipal health inspectors), previously exercised by the Department of Health and municipal councils under the provisions of the Health Act, to the Department of Agriculture. The legislation provided for the establishment of a Victorian Abattoir and Meat Inspection Authority and for the licensing of abattoirs, slaughterhouses, meat inspection depots, meat processing works, knackeries, and pet food establishments. The *Egg Industry Stabilization Act* 1973 provided for the stabilisation of the egg industry by the introduction of a poultry farmer licensing scheme, and the allocation of a hen quota to each licensee.

### **Agricultural education**

#### *Agricultural colleges*

The Department of Agriculture administers four colleges through its Division of Agricultural Education. The main purpose of the colleges is to provide appropriate education for practising and future farmers and for those wishing to work in industries related to farming. The colleges are financed chiefly from Victorian Government funds.

Dookie Agricultural College, established in 1886, and Longerenong Agricultural College, established in 1889, provide a three year course leading to the Diploma of Agriculture. The course for the Diploma of Agriculture has developed from the needs of those whose first wish is to follow a career in farming or in an allied field as an alternative. To meet these dual needs, it was necessary to provide a course of study reaching tertiary level which emphasised the training of technologists to assist in agricultural research and extension and in the many government and private enterprises which service agriculture.

Training is given in the basic technical, scientific, and economic principles underlying all aspects of production management and business management relevant to farming in southern Australia. Lectures on all topics are complemented by laboratory work, field demonstrations, personal assignments, visits to commercial farms and agricultural industries, and by practical work on the farm which is part of each college campus.

Burnley Horticultural College, established in 1891, provides a three year course for the Diploma of Horticultural Science. The course is comprehensive, giving tuition and practical experience in fruit and vegetable production, ornamental horticulture, nursery management, and landscape design, as well as training in the basic physical, biological, and applied sciences.

Glenormiston Agricultural College, established in 1971, has an annual intake of about 60 students. It was established to meet the needs of those young men and women who, having already gained some experience in farming, wish to be trained in the principles and practices of farm management before returning to a farm career. The college provides high standard facilities for the many educational functions for which it is used.

In December 1974 the Victorian Government decided to establish, at Warragul, a new agricultural college to provide for the continuing education of primary producers, principally those in the Gippsland region.

#### *Other facilities*

##### *Victorian Government*

A significant change in the concept of adult farmer education has taken place since 1971 when the Department established a regionally structured Extension Services Branch which became a Division in 1974. All colleges are now involved in an active programme of adult farmer education in co-operation with this Division to provide a wide variety of activities, including short courses and seminars based on regional needs.

Part-time evening classes are conducted at the colleges, the majority being given at Burnley Horticultural College. Subjects in horticultural, agricultural, and associated sciences were available to the 1,350 persons enrolled in 1973, and included such specialist areas of instruction as greenkeeping, weeds and their control, and the genetics of sheep breeding.

Apprenticeships in general farming and fruit growing were offered for the first time in Australia in 1975. Courses were set up 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.

##### *University of Melbourne—School of Agriculture*

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.

The purpose of the four year 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 Mount 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.

Since the establishment of the Faculty of Agriculture, more than 1,000 graduates have entered the profession, the number of graduates averaging about 55 per annum. There are some 30 students working for higher degrees (Ph.D. and M.Agr.Sc.) either at the University or at Mount Derrimut, and about ten postgraduate students attend the course for the Diploma in Agricultural Extension.

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

The University of Melbourne also offers training in the more mechanical 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 maximised 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.).

*Latrobe University—School of Agriculture*

Latrobe 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 crops and animal husbandry. These on-campus facilities are supplemented by the provision of at least twelve weeks practical experience on approved farms.

*Marcus Oldham Farm Agricultural College*

Founded privately near Geelong in 1961, the Marcus Oldham Farm Agricultural College specialises in farm management education for the sheep, cattle, and cropping industries. Students with previous practical experience attend the College for two years during which they complete a "sandwich" course of an eight month academic period, an eight month practical period on an approved farm, and then a second eight month academic period. In this way, 105 students complete the course every two years, although only 70 are in residence at any one time.

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.

**Agricultural extension services**

Advancing technology and increasing competition on world markets have intensified the need for farmers to be advised quickly about each new development and to establish sound bases for the many decisions which are necessary

as a consequence of rapid change. Extension services to provide advice and training in these matters are conducted by several government departments and also by commercial firms such as the manufacturers of agricultural chemicals, farm machinery, and stock foods and medicines. Some farmers employ professional consultants to advise them personally.

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 co-ordinated throughout Victoria by a regionalised Extension Services Division, administered locally by regional centres located at Ballarat, Bendigo, Benalla, and Warragul. Within each region, district offices have the appropriate staff to serve a more limited area. Each Regional Officer co-ordinates the activities of a group of extension specialists, according to the needs of his region, 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 regional 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 walks involving up to 20 farmers provide effective informal discussions about current methods and problems.

Occasionally groups within a district combine to hold schools for farmers or to tour together to other similar areas in Victoria, other States, and even 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, the *Journal of Agriculture*, industry

digests for dairy farmers, fruit growers, and apiarists, a wide range of books and pamphlets, 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.

### **Research activities of the Department of Agriculture**

The first experimental farm was established over 100 years ago at Royal Park by the Port Phillip Agricultural Society. The venture failed, but after the Department of Agriculture was formed in 1872 other experimental farms were established at Rosedale, Whitfield, Wyuna, and Rutherglen. However, agricultural research as it is known today dates from 1912 with the establishment of the State Research Farm at Werribee and the Rutherglen Research Station. The Department now conducts research in institutions strategically situated throughout the State and provides a scientific service for all aspects of agriculture in Victoria. Some research is also conducted on private properties, thus enabling results obtained on research stations to be extended over a wide range of environments and on subjects not covered at research stations.

The research stations and institutes occupy about 4,455 hectares, and are staffed by more than 200 graduate officers assisted by about 600 diploma and ancillary staff. Wherever possible the various research stations and institutes co-operate in work with other departments in Victoria, with the C.S.I.R.O., and with the universities.

### **Control of pests and diseases**

In recent years, there has been a growing awareness of the dwindling food resources of the world, as well as of the need to exercise control over those agents, such as fungicides and insecticides, which have made it possible to meet current needs. As a result, the role of agencies such as the Victorian Department of Agriculture and the Department of Crown Lands and Surveys has changed to become not only a regulatory one, but also an initiator of new uses and efficient applications of pest and disease control methods.

### *Department of Agriculture*

The Department of Agriculture exercises control of agrochemical pesticides through the *Pesticides Act 1958* and maintains close contact with the industry to achieve compliance with its provisions. Insecticides, fungicides, and herbicides used on orchards and wheat crops are controlled primarily through the requirement to register new products with an approved label. All are carefully examined by the Victorian Pesticides Review Committee before being registered for sale. This Committee, comprising representatives of the Departments of Conservation, Health, Agriculture, Lands, the Forests Commission, and the State Rivers and Water Supply Commission, represents a broad cross section of the many interests likely to be affected by the use of pesticides, and provides expert knowledge on problems regarding efficacy, human safety, safety to wildlife, and associated considerations.

### *Victorian Plant Research Institute*

At the Department of Agriculture's Victorian Plant Research Institute the programme includes work on pest and disease control, and development of

practical control measures, with emphasis on non-chemical and integrated approaches to solutions of problems. Important developments include multiplication schemes for fruit tree budwood, grapevines, seed potatoes, and ornamental plants using disease-free, high yielding, high quality plants which are multiplied under strict control for sufficient generations to supply commercial demands. Disease-free fruit tree budwood for multiplication schemes is available from the National Fruit Variety Foundation, which is a repository for virus-tested stone fruits and grape vines.

The biological control of plant diseases is another significant development, using organisms antagonistic to plant pathogens in soils.

The Institute was involved in the introduction into Australia of the rust fungus as a biological control of skeleton weed. Pests of stored grain have been a critical problem area, and collaborative research with the C.S.I.R.O. has been undertaken. Another approach is the study of juvenile hormone analogues which function by disrupting certain stages of insect development and may provide a safe substitute for chemical insecticides.

Integrated control of deciduous fruit pest and mite species has given promise of more economic methods of controlling Codling moth on pome fruits and Oriental fruit moth on peaches. Red scale, the major pest of citrus, is now under almost complete biological control.

Methods developed to control Queensland fruit fly have made it possible to treat infested areas much more quickly and there are good indications that this pest might eventually be eradicated from Victoria. The research programme has also indicated that insect viruses could be of great value in controlling pests.

*Department of Crown Lands and Survey—Vermin and Noxious Weeds  
Destruction Board*

In 1962 the Vermin and Noxious Weeds Destruction Board established the Keith Turnbull Institute at Frankston as its research headquarters. Major research projects have been the study of myxomatosis for rabbit control; studies into use of the poison 1080 for vermin control; aerial baiting of rabbits; trials in the control of sparrows and starlings; and the use of grain-based pellets for rabbit control. Another significant contribution has been the research on the food habits and parasites of the fox and the dingo.

Research on the ecology and control of noxious weeds has resulted in the development of more effective control measures. Herbicides provide the main methods of control. Research has been directed towards finding the most suitable herbicides, dose rates, and method of application for the control of each noxious weed. More detailed research has been concentrated on the ecology and management of blackberry, ragwort, skeleton weed, horehound, Paterson's Curse, spiny burr grass, Californian thistle, slender thistle, soursob, African feather grass, boneseed, and wild garlic. Projects have also been undertaken on the control of roadside weeds. Considerable emphasis is now being given to investigations into methods of biological control of weeds.

The staff of extension officers provides an effective means of disseminating results of research throughout Victoria. A recent development at the Keith Turnbull Institute has been the introduction of a training scheme for Inspectors of Lands. Training is provided, in conjunction with the Education Department, for both new inspectors and the existing inspection staff.

### Fertilisers

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 and Ocean and

Christmas Islands 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 phosphorus, its sulphur content is also essential for plants in certain areas of Victoria, and it comprises about 85 per cent of Victoria's annual usage of fertilisers. In 1974-75 more than 877,000 tonnes of artificial fertiliser were used, of which pastures received 654,000 tonnes and crops 223,000 tonnes.

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.

Superphosphate prices increased significantly during 1975, because of increases in rock phosphate and manufacturing costs. Rising fertiliser costs and, to some extent, environmental considerations have forced major economies, particularly on pastures. A side effect is the increased utilisation of animal manures, but the scope for this remains small.

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 1974-75 artificial fertilisers were used on 970,121 hectares of wheat; 347,940 hectares of other cereal crops; 21,094 hectares of vegetables; 22,502 hectares of orchards; 21,357 hectares of other crops; and 3,486,725 hectares of pastures. Superphosphate is the main fertiliser used on both crops and pastures and in 1974-75 amounted to 750,652 tonnes of single strength equivalent, or 86 per cent of the total artificial fertiliser used. Of this total, 560,875 tonnes (or 75 per cent of the superphosphate) was used on pastures.

#### VICTORIA—ARTIFICIAL FERTILISERS

Year	Crops		Pastures	
	Area fertilised	Quantity used	Area fertilised	Quantity used
	'000 hectares	'000 tonnes	'000 hectares	'000 tonnes
1970-71	1,529	326	3,979	695
1971-72	1,585	237	3,763	684
1972-73	1,565	232	4,277	782
1973-74	1,547	240	4,488	869
1974-75	1,383	223	3,487	654

#### Superphosphate, 1971

#### Farm machinery

The numbers of selected items of farm machinery on rural holdings at 31 March during each of the five years 1971 to 1975 are given in the following table :

## VICTORIA—FARM MACHINERY ON RURAL HOLDINGS AT 31 MARCH

Particulars	1971	1972	1973	1974	1975
Milking machines—Units	(a)	108,745	113,335	(a)	(a)
Shearing machines—Stands	(a)	42,876	(a)	(a)	28,894
Tractors—Wheeled type	79,369	79,396	79,449	79,350	78,332
Crawler type	3,071	3,101	3,119	3,109	3,005
Rotary hoes	12,373	12,736	12,229	12,501	12,349
Fertiliser distributors and broadcasters	29,337	28,552	27,829	27,595	26,681
Grain drills—Combine	19,710	20,175	19,999	19,838	19,070
Other	8,395	7,202	6,948	6,699	6,472
Maize planters	811	837	790	1,210	(a)
Headers, strippers, and harvesters	13,289	13,068	12,549	12,270	11,808
Pick-up balers	14,692	14,822	14,814	15,263	15,107
Forage harvesters	2,134	2,217	2,211	2,255	2,228

(a) Not collected.

### Marketing of agricultural products

Marketing is the performance of all business activities involved in the flow of goods and services from the initial agricultural production until they are in the hands of the ultimate consumer. However, the marketing process really begins on the farm, as it is essential that the agricultural resources are utilised in producing the commodities in the quantities and qualities desired by the consumers.

Farmers face special problems in selling their products. Variable seasons may cause alternate surplus or scarcity, with fluctuations of prices and farm incomes. A high proportion of Australian farm output is sold on overseas markets which tend to be more uncertain than domestic markets and which present problems of distance, freight rates, different currencies and associated matters.

Agricultural marketing in Victoria ranges from a highly individualistic and competitive situation as in the case of vegetables, to highly organised statutory marketing, as in the case of tobacco. Orderly marketing, a very comprehensive term, is simply defined as a coming together of individual producers in order to co-ordinate their marketing arrangements.

At present there are few commodity marketing boards constituted under the Victorian Marketing of Primary Products Act; they cover: chicory, citrus, egg, and tobacco. These have the general aim of achieving security and stabilisation of income for producers, while ensuring to consumers a reliable supply of farm products at reasonable prices. It is argued that these boards also induce greater efficiency of resources use by reducing the risk in farming.

The effectiveness of marketing boards in stabilising prices has been affected by Section 92 of the Commonwealth Constitution which requires trade and commerce between States to be absolutely free. This means that neither Commonwealth nor State Governments can legislate to prevent growers selling their products interstate. However, marketing schemes have been introduced under complementary Commonwealth and State legislation and where they have had the co-operation of growers, they have been successful.

An example of such a scheme is wheat. Complementary Commonwealth and State legislation requires all wheat produced in Australia (except for small quantities retained on farms) to be marketed through a statutory authority, the Australian Wheat Board. Growers usually deliver grain to the State bulk handling authorities, who act as authorised receivers for the Wheat Board.

The wheat is weighed, and the growers are given receipts for the quantities delivered. The Wheat Board makes an advance payment soon after delivery, credit being supplied by the Reserve Bank on the basis of Commonwealth Government guarantee. Wheat is sold on the home or export market, and the



proceeds are pooled. The Reserve Bank loan is repaid and growers receive additional payments as funds become available from sales.

The pools may take several years to finalise but ultimately each grower receives a return based on the quantity of wheat he has delivered and the average price realised, subject to premiums or deductions for quality.

More than 80 per cent of shorn wool produced in Australia is sold by public auction, the rest mainly by private treaty. Wool auctions are held regularly at fourteen selling centres under rules agreed upon between producers, selling brokers, and buyers. Most of the wool offered at auction is displayed and inspected by the buyers before sale. However, in recent years, there has been an increase in the use of objective measurement and sale by sample. In 1973-74, some 15 per cent of the wool clip was sold in this way.

There is no government control over the marketing of wool, but a statutory body, the Australian Wool Corporation, performs a number of functions aimed at assisting the orderly and efficient disposal of wool, as well as encouraging demand for that commodity. The chief activity of the Wool Corporation in the field of wool marketing is the operation of a flexible reserve price scheme for wool sold at auction. The scheme is operated to moderate excessive fluctuations of wool prices at auction. Under the scheme, the Wool Corporation buys wool which fails to reach a reserve price.

This scheme was introduced by the former Wool Commission in November 1970, mainly to provide a measure of protection to woolgrowers against unduly low prices resulting from temporary irregularities of demand at auctions.

Most livestock is sold through auction markets which are situated in all State capital cities and in country centres. Bids are usually made on the basis of visual inspection only, although livestock scales have been introduced at some auction centres and are becoming more popular. Direct transactions between producers and buyers are also common; sales in these cases are negotiated mostly in the producer's paddock but are also made "over the hooks" at meatworks, on a carcass weight and grade basis.

Some abattoirs are operated by State and local government authorities, slaughtering on a fee basis, while others are run by private firms, mainly as a segment of their marketing operations.

About one half of Australia's meat production is sold overseas. The Australian Meat Board, a statutory authority, regulates exports of beef, veal, mutton, lamb, offals, and processed meats through a licensing system. The Meat Board is also involved in the promotion of meat. Finance for the Meat Board's activities comes from levies on livestock slaughterings.

The marketing of dairy products is broken down into two major areas, i.e., fluid milk (for human consumption) and manufactured dairy products.

In Victoria, marketing of fluid milk has been controlled by the Victorian Milk Board, a Victorian Government statutory authority which co-ordinates the collection of milk from farmers, its pasteurisation, and its wholesaling and retailing. Pricing of milk is set by the Milk Board, following the results of public inquiries which it holds from time to time.

Manufactured dairy products (butter, cheese, skim milk powder, etc.) are marketed throughout Australia by the individual processors of these products or their agents. Prices for butter and cheese are determined on the basis of submissions to the Prices Justification Tribunal.

As only 3 per cent of the world's dairy products are exported, while Australia has a large surplus, this market tends to be very volatile with regard to price. Although international agreements exist for some products, these are by no means any form of guarantee to ensure a satisfactory price to farmers. Export marketing is operated through the Australian Dairy Corporation, and individual exporters.

The method of marketing fruit and vegetables is largely dependant on whether it is for fresh consumption, or for further processing before being eaten. For fruit and vegetables for fresh consumption, the Melbourne Wholesale Fruit and Vegetable Market is most important in the marketing chain. This is the major receipt and distribution point in Victoria for fresh fruit and vegetables. It is estimated that 60 per cent of produce consumed fresh passes through this market which is also important for the other 40 per cent, as prices paid elsewhere for fresh fruit and vegetables are usually based on prices set at the New Footscray Road Market.

Growers either sell their own produce at the market or deal through consumer agents or wholesalers. Organisation of growers for the purpose of marketing is almost non-existent. The major exception is the Citrus Marketing Board which sets prices for sale of Victorian citrus growers' produce in the market, and also attempts to influence the quality and quantity of produce being sold.

For fruit and vegetables which are sold for processing, the marketing is not as centralised. Most fruit and vegetables for processing go direct from grower to processor. The prices paid for such produce are determined in a number of ways. For deciduous canning-fruit and all citrus fruit, the prices for processing are institutionally set each season. The organisation which does this price setting is called the Fruit Industry Sugar Concession Committee. This organisation is established under the Sugar Agreement Act. Processors must pay at least the determined price to receive sugar used in processing at a concessional price.

Dried vine fruit is the major fruit outside this price-setting agreement. Domestic marketing for dried vine fruit is closely regulated by an industry association and four State boards. To control export marketing, there is a Commonwealth statutory authority.

For processed vegetables, there is little organised marketing. Vegetables are normally supplied under contract on an individual grower-processor basis. However, in the case of tomatoes, the Victorian Government has introduced legislation to standardise grower-processor contracts and to provide machinery for arbitration on price if grower organisations and processors cannot agree on a price level.

In recent years, there has been renewed interest in grower marketing co-operatives. These have been encouraged by farmers' attempts to seek a greater share of the consumer's dollar.

Moreover, in many cases, as a result of increased affluence, and the advent of the one-stop supermarket, consumers are demanding more processed and packaged food. A farm co-operative could provide a means by which farmers could vertically integrate to provide these added benefits to the consumer.

**Further reference, 1976 ; Mechanisation of farming, 1962 ; Farm management, 1967 ; Agricultural extension services, 1968 ; Size distribution of rural holdings, 1969 ; Research and extension activities of the Department of Agriculture, 1970 ; Application of scientific research to agriculture, 1970 ; Research stations of the Department of Agriculture, 1971 ; Bureau of Agricultural Economics: activities in Victoria, 1972 ; Research activities of the Department of Agriculture, 1974 ; Farming for unstable markets, 1975 ; Plant breeding, 1976 ; Aerial agricultural services, 1976**

## RURAL STATISTICS

### General

#### *Collection of statistics*

Before 1904, agricultural and pastoral statistics were collected by the municipal authorities, who were required by statute to furnish information on such forms and in such manner as was required by the Governor in Council. During the period 1904 to 1966, police officers were required to collect agricultural, pastoral,

and dairying statistics from landholders in Victoria. Commencing with the 1966-67 farm census, the collection of these statistics has been carried out on a direct postal basis by the Australian Bureau of Statistics.

The rural statistics contained in this section are mainly compiled from annual returns of agricultural and pastoral production collected from some 63,000 rural holdings in Victoria at 31 March each year. Statistics from these schedules are compiled for each county and local government area.

Every holding used for the commercial production of agricultural products, or for the raising of livestock and the production of livestock products, is required to supply full particulars of the area occupied, the number of persons employed, the area and yield of each kind of crop cultivated, artificial fertiliser usage, numbers of certain items of farm machinery, the number and description of livestock, the quantity of wool clipped, and other relevant matters.

Data relating to area sown, production, yield per hectare, and number of holdings growing crops are for the season ended 31 March, thus including crops which are sown and harvested, or harvested, during the twelve months ended 31 March. In cases where harvesting of certain crops has not been completed by 31 March (potatoes, fruit, vines, etc.), supplementary collections are made later in the year. Livestock numbers and farm machinery on rural holdings are reported at 31 March.

#### Summary of Australian statistics

The following table, which summarises the principal farming activities in Australia during the 1974-75 season, shows the position of farming in Victoria relative to other States :

#### AUSTRALIA—PRINCIPAL ITEMS OF FARM ACTIVITY, 1974-75

Particulars	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T. and A.C.T.	Australia
Rural holdings—								
Number	74,962	62,926	39,772	28,185	20,500	9,052	527	235,924
Area ('000 hectares)	68,880	15,226	154,155	63,825	115,601	2,492	79,439	499,618
Principal crops—								
Wheat—								
Area ('000 hectares)	2,646	1,141	489	1,220	2,810	2	..	8,308
Production ('000 tonnes)	3,809	2,091	692	1,486	3,277	2	..	11,357
Oats—								
Area ('000 hectares)	270	198	25	135	262	6	..	897
Production ('000 tonnes)	293	186	28	112	250	5	..	874
Barley—								
Area ('000 hectares)	327	243	156	701	387	12	..	1,826
Production ('000 tonnes)	408	319	297	1,134	327	27	..	2,513
Hay—all types—								
Area ('000 hectares)	259	505	49	190	164	81	3	1,251
Production ('000 tonnes)	969	2,017	259	662	508	406	5	4,826
Tobacco—								
Area (hectares)	898	3,926	4,424	..	..	..	..	9,248
Production (dried leaf '000 kg)	1,369	6,086	8,007	..	..	..	..	15,462
Onions—								
Area (hectares)	1,110	685	1,184	778	157	477	4	4,395
Production (tonnes)	23,821	17,547	24,245	19,240	6,236	16,964	49	108,102
Potatoes—								
Area (hectares)	9,302	13,010	6,068	2,747	2,356	4,143	(b)	37,626
Production (tonnes)	117,903	282,547	107,587	70,849	61,479	95,610	(b)	735,975
Other vegetables—Area (hectares)	17,333	16,495	17,690	6,652	3,284	6,901	182	68,537
Fruit—Area (hectares)	31,597	21,784	20,149	16,620	7,822	4,748	40	102,760
Vineyards—								
Area (hectares) (a)	14,463	22,349	..	30,366	2,672	..	..	69,850
Table grapes (tonnes)	5,058	8,682	..	1,388	2,366	..	..	17,494
Wine made ('000 litres)	74,314	54,278	(b)	221,910	(b)	(b)	..	352,949
Currants (tonnes)	383	2,334	..	2,370	1,166	..	..	6,253
Sultanas (tonnes)	7,314	43,375	..	2,087	13	..	..	52,789
Livestock numbers, 31 March 1975—								
Sheep ('000)	54,985	26,411	13,908	17,618	34,476	4,136	118	151,653
Cattle ('000)	8,938	6,192	10,879	1,868	2,544	921	1,463	32,805
Pigs ('000)	727	383	400	349	264	64	7	2,195
Livestock slaughtered for human consumption—								
Sheep ('000)	2,944	4,147	765	1,134	2,978	403	5	12,377
Lambs ('000)	5,851	5,685	514	1,850	1,329	577	173	15,980
Cattle ('000)	2,084	1,814	1,740	389	526	225	89	6,867
Calves ('000)	305	684	306	76	15	38	7	1,431
Pigs ('000)	979	969	634	344	389	101	31	3,447
Wool production (million kg)	254	165	66	108	180	19	1	794

AUSTRALIA—PRINCIPAL ITEMS OF FARM ACTIVITY, 1974-75—*continued*

Particulars	N.S.W.	Vic.	Qld.	S.A.	W.A.	Tas.	N.T. and A.C.T.	Australia
Wholemilk production—								
All purposes (million litres)	958	3,745	655	426	242	461	3	6,489
Tractors on rural holdings (number)	88,558	81,327	74,793	38,355	36,120	12,661	746	332,560
Gross value of production—								
Crops (\$m)	822	534	868	435	484	49	1	3,193
Livestock slaughtering and other disposals (\$m)	338	241	193	103	102	32	10	1,019
Livestock products (\$m)	493	507	164	170	258	58	5	1,655

(a) Total area, including non-bearing area.

(b) Not available separately.

*Land occupied in different districts of Victoria, 1974-75*

For the season 1974-75 the number of rural holdings was 62,926, the area cropped was 1,775,306 hectares, and the total area occupied 15,226,176 hectares.

It should be noted that statistics in this section of the *Year Book* have been compiled for agricultural districts, which are groups of counties, i.e., land areas with immutable boundaries.

The following table shows the land in occupation for agricultural and pastoral purposes in each agricultural district for the season 1974-75 :

## VICTORIA—LAND IN OCCUPATION FOR AGRICULTURAL AND PASTORAL PURPOSES IN EACH AGRICULTURAL DISTRICT, SEASON 1974-75

Agricultural district	Total area of district	Number of holdings	Area of crops	Area of sown pasture and lucerne	Area of native pasture	Balance of holding	Total area of holding
	'000 hectares		'000 hectares	'000 hectares	'000 hectares	'000 hectares	'000 hectares
Central	1,645	12,113	55	570	154	198	977
North Central	1,186	4,198	23	407	229	140	799
Western	3,551	11,737	91	1,951	352	313	2,707
Wimmera	2,992	5,342	478	1,070	310	610	2,468
Mallee	4,364	5,439	762	695	465	1,099	3,021
Northern	2,565	10,750	318	1,087	411	405	2,221
North Eastern	2,922	4,974	31	499	359	430	1,319
Gippsland	3,537	8,373	17	701	358	639	1,715
Total	22,762	62,926	1,775	6,980	2,640	3,836	15,226

*Crops and growers*

The following information on numbers of growers includes some duplication, since some growers cultivate more than one of the crops specified:

## VICTORIA—NUMBER OF GROWERS OF CERTAIN CROPS, SEASON 1974-75

Crops grown	Agricultural district								Total
	Central	North Central	Western	Wimmera	Mallee	North-ern	North-Eastern	Gipps-land	
Grain crops—									
Wheat	208	203	449	3,147	2,292	2,654	303	32	9,288
Oats	699	535	2,027	1,830	915	2,648	615	511	9,780
Barley (2 row)	360	95	237	1,417	1,472	988	29	47	4,644
Maize	48	3	25	3	3	9	11	106	208
Rape	19	12	54	8	..	10	9	41	153
Safflower	4	4	10	10	9	75	..	..	112
Sunflower	12	9	46	70	19	147	6	10	319
Other—									
Vegetables	1,275	239	364	27	333	382	57	400	3,077
Orchards	772	78	25	37	892	688	97	32	2,621
Vineyards	23	13	8	9	2,118	134	32	1	2,338
Tobacco	..	..	..	..	..	19	323	..	342

A summary of the area under cultivation and yield of crops in each agricultural district of Victoria for the season 1974-75 is given in the following tables:

VICTORIA—AREA UNDER CULTIVATION, SEASON 1974-75  
(hectares)

Crop	Agricultural district								Total
	Central	North Central	Western	Wimmera	Mallee	Northern	North Eastern	Gippsland	
Grain crops—									
Wheat	5,889	7,001	12,878	335,426	571,255	194,124	13,473	607	1,140,653
Oats	3,985	5,209	43,617	63,400	32,534	43,422	5,141	499	197,807
Barley	15,819	1,829	4,579	66,033	117,961	34,912	545	1,274	242,952
Rye	6	..	14	73	1,599	45	5	8	1,750
Maize	..	..	..	1	39	32	15	456	1,543
Field peas	585	127	528	324	25	203	..	18	1,810
All hay	58,050	30,513	142,540	40,781	19,416	115,687	29,435	69,187	505,609
Green fodder	6,966	2,210	11,092	4,153	6,897	10,351	4,366	8,782	54,817
Tobacco	..	..	..	..	..	131	3,795	..	3,926
Potatoes	6,087	2,328	1,871	14	66	413	110	2,121	13,010
Onions	358	..	220	1	99	1	..	6	685
All other vegetables	7,308	122	2,696	23	1,396	2,019	168	2,779	16,511
Vines	99	195	122	400	20,395	491	644	4	22,350
Fruit	4,780	507	119	495	3,897	11,275	563	148	21,784
All other crops	1,640	620	9,748	2,778	615	6,117	1,276	2,610	25,404
Total area under cultivation	111,572	50,661	230,024	513,902	776,194	419,223	59,536	88,499 (a)	2,249,611

(a) The total area under crop includes 6,553 hectares double-cropped.

VICTORIA—PRODUCTION OF PRINCIPAL CROPS, SEASON 1974-75

Crop	Agricultural district								Total
	Central	North Central	Western	Wimmera	Mallee	Northern	North Eastern	Gippsland	
Grain crops—									
Wheat tonnes	8,774	9,451	15,350	650,641	1,108,473	289,219	8,656	739	2,091,303
Oats	3,672	5,117	50,791	52,311	29,438	40,573	3,607	514	186,023
Barley	25,171	1,913	5,039	88,008	155,361	41,656	855	1,855	319,358
Maize	..	..	..	1	127	88	29	1,667	1,912
Field peas	681	109	403	553	16	167	..	32	1,961
All hay	247,660	116,619	595,959	125,002	53,512	440,815	119,062	317,894	2,016,523
Linseed	164	..	3,174	..	17	30	33	394	3,812
Rapeseed	211	74	1,017	95	..	224	127	540	2,288
Tobacco	..	..	..	..	..	162	5,924	..	6,086
Potatoes	127,247	52,971	36,430	232	1,088	11,609	2,153	50,817	282,547
Onions	7,140	..	4,001	15	6,320	12	1	58	17,547
Wine made kilolitres	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	54,282
Dried vine fruits—									
Raisins tonnes	..	..	5	..	4,000	4	..	..	4,009
Sultanas	..	..	43,355	..	20	..	..	..	43,375
Currants	14	..	8	..	2,312	..	..	..	2,334

(a) Details for individual districts are not available for publication.

## BROAD AREA CROPS

### Land utilisation within the cropping industries

The principal agricultural crops (excluding potatoes and other vegetable or tree crops) in Victoria are the cereals—wheat, oats, and barley. Although there is some variation from year to year, these crops, including cereal hay crops, account for some 75 per cent of the total crop area in Victoria. Wheat for grain is by far the most extensively grown crop. The average area of wheat sown annually for grain in the ten year period, 1965-66 to 1974-75, was 1.21 million hectares, compared with 0.39 million hectares for oats and 0.18 million hectares for barley. The average area sown to all cereals in the same period, 1.80 million hectares, is fairly constant.

In 1968-69, record levels of Australian and Victorian wheat production coincided with an oversupplied world wheat market. A quota system limiting wheat deliveries was introduced under the Wheat Marketing Act for the 1969-70 growing season. A reduction in quotas in 1970-71, and a large carryover of over quota wheat from 1969-70, resulted in the smallest area sown to wheat in Victoria since 1958-59. A corresponding larger area was sown to oats, barley, and oilseeds, especially rapeseed, as wheat growers sought to maintain their incomes. The world wheat market had stabilised by 1972 and subsequently moved to a situation of world shortage. The application of quotas was discontinued in 1972. However, legislative control of this nature is not normally the main determinant of land utilisation. Wheat quotas and Second World War National Security Regulations have been the only two examples.

To a considerable extent, the main agricultural crops compete for the same area of land, consequently major cropping activities are not mutually exclusive. Climate, soil type, fertility, costs of production, farmer liquidity, product price, and market demand for crop and animal products, all contribute to conferring a comparative advantage on one activity over another. Less tangible influences such as individual preference and the capital constraints on rapid changes from one type of production to another are also important. A measure of the influence of comparative advantage for specific activities may be observed in the State-wide distribution of cropping enterprises. More than 85 per cent of the area sown to cereals is in the Mallee, Wimmera, and Northern Agricultural Districts which are bounded by the 300 mm and 600 mm rainfall isohyets. This does not imply that cereals cannot be grown successfully or profitably in other districts, but in general, other activities such as livestock production enjoy a comparative advantage over cereals in the higher rainfall districts.

Cereals have three principal requirements for grain production: adequate rainfall to maintain vegetative growth and fill the grain, high temperatures, and a relative freedom from rainfall after grain maturity. The climatic pattern of the main cereal belt satisfies these requirements. Vegetative growth coincides with autumn, winter, and spring rainfall, and grain maturity coincides with the beginning of the summer period with its higher temperatures and low rainfall.

In contrast, the annual winter growing oilseeds, such as rapeseed and linseed, need a more temperate climate at maturity for satisfactory yields. Consequently, production of these crops tends to be concentrated in the more temperate areas south of the Great Dividing Range or in the higher rainfall districts of the north-east of the State. The currently available varieties of rapeseed are subject to seed pod shatter when ripe and particularly at harvest, under hot dry conditions. While a number of successful rapeseed crops were grown in the cereal belt during the 1969-70 to 1970-71 period of restricted wheat production, the variability in yields was high, and a number of failures were recorded. Consequently, until more suitable varieties are available, rapeseed production is unlikely to be an acceptable alternative to cereals in the cereal belt. Since 1971-72, factors such as strong market demand and relatively high rapeseed prices have not provided a high enough incentive to farmers to adopt rapeseed production in the cereal belt. The area sown to rapeseed in Victoria fell markedly from 18,700 hectares in 1970-71 to 3,700 hectares in 1974-75. Wet seasons in 1973-74 and 1974-75 also contributed to the reduced sowings.

The production of other oilseed crops in Victoria suffers from similar biological constraints. Sunflowers and soybeans need higher temperatures than cereals for germination. To satisfy this requirement, these crops must be sown in spring. However, the soils of the Victorian cereal belt do not normally retain enough moisture to carry these crops through the summer period to maturity. To obtain acceptable yields, irrigation must supplement rainfall. Consequently, the existing varieties of sunflowers and soybeans are poorly adapted to most

districts in Victoria. Safflower is a late maturing winter growing crop which has potential in the cereal belt. The principal problem is its slow winter growth and poor ability to compete with weeds, and its requirement for good reserves of subsoil moisture to carry the crop to maturity.

In the higher rainfall districts of Victoria, such as the north-east and south-west regions, soil type can be a major constraint on crop production. Relatively high winter rainfall, combined with poorly drained soils, severely limit cropping opportunities. These regions are dominated by grazing industries with relatively discrete pockets of cropping on the better drained soils. Because of the association with grazing animals and a tolerance for waterlogged conditions, oat production is the most extensive cropping activity. Barley, rapeseed, and linseed are also grown on the most favourable soils. In these regions, many oat crops have a dual function of providing winter grazing and a subsequent grain or hay crop. More than half the oat grain produced in Victoria is normally held on farms or used within the State for stock feed or as drought reserves. In the grazing districts, cropping is frequently regarded as a means of recouping the cash costs involved in pasture renovation rather than as a major activity. Also, oats may be grown successfully with a less demanding level of crop management than other cereals or oilseeds. Even during periods of low returns from stock, pastoralists are unwilling to switch to cropping because of the considerable capital investment in machinery which is needed.

### Principal crops

#### *Wheat*

Wheat is Victoria's largest crop. The average area sown in the five year period 1970-71 to 1974-75 was 1.07 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 virtually unsaleable 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.

In 1970-71, because of a large carryover of over quota wheat from the previous year and an associated reduction in delivery quotas, the area of wheat sown for grain was reduced to 760,000 hectares—the smallest area sown since 1958-59. By 1972-73, the world wheat market had reverted to a tight supply situation following reduced production in the principal exporting countries and a rapid rundown of stockpiles. World market prices showed a strong upward trend as importers sought to ensure supplies. 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.

More than 90 per cent of Victorian wheat is grown in the Mallee, Wimmera, and Northern Agricultural Districts. 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 districts. With the exception of a small area of intensive cropping in the Wimmera, wheat is grown on a ley system of farming in which wheat 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 test introduced by the Department of Agriculture in 1974 now adds precision to the complex decision on cropping rotations within the ley farming system.

Since the adoption of legume (subterranean clover or medic) based pastures 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 Mallee, and on intensively cropped land in the Wimmera and southern districts. Superphosphate is applied at seeding to virtually all crops to correct a phosphorus deficiency inherent in nearly all Australian soils. Increases in the cost of superphosphate in 1974 and 1975, as a result of the additional cost of raw materials, are likely to lead to a reduction in the amounts of superphosphate applied to wheat crops in Victoria.

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, root diseases, and weather damage. The Department of Agriculture's estimate of losses resulting from these diseases is conservatively set at 1,000,000 tonnes, of which 700,000 tonnes is considered to have been due to stem rust.

During the 63 year period 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. While several rust-resistant lines have been produced, they have not been released because of susceptibility to other diseases, lower yields or poorer quality than existing varieties, and changes in strains of rust. Another disease problem, the ball smut fungus, is effectively controlled by the use of fungicide applied when the seed is graded. Crop failures following the use of seed which had been "pickled" with fungicide in 1973 and sown in 1974, and field experiments by the Department of Agriculture, emphasised the fact that "pickled" seed should not be carried over from one season to the next as seed viability is greatly reduced and resowing costs are high.

The most serious problem facing the cereal industries, particularly wheat, 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, resistant to rates of insecticides approved for the international grains trade, have developed. The Department of Agriculture therefore initiated a campaign in 1973 to improve awareness of farmers to the problem and to ensure the delivery of insect-free cereal grains to the export terminal. Processors and retail outlets are also being 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 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). These monies are 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, but limited areas of the newer hard variety Condor are now sown in the eastern Mallee 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 1974-75	Season 1973-74		Season 1974-75	
	Hectares sown	Percentage of total area sown	Hectares sown	Percentage of total area sown
Halberd	422,248	33.3	520,043	45.2
Olympic	216,579	17.1	302,574	26.3
Summit	204,305	16.1	122,199	10.6
Insignia	185,909	14.6	67,083	5.8
Emblem	70,313	5.5	38,112	3.3
Heron	59,931	4.7	34,503	3.0
Pinnacle	50,468	4.0	32,921	2.9
Insignia 49	36,399	2.9	13,283	1.2
All other (including mixed and unspecified)	22,557	1.8	19,378	1.7
Total	1,268,709	100.0	1,150,096	100.0

Marked improvement in wheat quality has been achieved by plant breeding during the past thirty years, and the leading soft wheats grown at present have excellent bread making characteristics.

## VICTORIA—WHEAT FOR GRAIN

Season	Holdings growing wheat (8 hectares and over)	Area	Production	Average yield per hectare	Estimated gross value	A.S.W. (a) wheat standard (b)
1970-71	9,669	760	1,004	1.32	50,270	81.4
1971-72	10,273	1,040	1,894	1.82	101,950	80.4
1972-73	10,002	1,087	1,405	1.29	76,763	82.3
1973-74	9,238	1,258	1,490	1.18	156,518	77.5
1974-75	n.a.	1,141	2,091	1.83	225,933	81.2

(a) Australian Standard White.

(b) See wheat standard on page 440.

*Australian Wheat Board*

Virtually the whole of the wheat crop is handled, stored, and transported in bulk. The crop is marketed through the Australian Wheat Board. The greater part of the crop is marketed as one grade known as Australian Standard White (A.S.W.). Small amounts of low protein soft wheat grown in the Wimmera are segregated for biscuit production.

After the outbreak of the Second World War, the Australian Wheat Board was established in September 1939 under national security legislation. When the war ended in 1945 the Board continued to operate until 1948 as an agent for the Commonwealth Government under "transitional legislation".

In 1948 agreement was reached between the Commonwealth and State Governments for the first of the wheat industry stabilisation schemes. For constitutional reasons, it was necessary for each State to pass legislation accepting the Australian Wheat Board as the central marketing authority, and to permit it to operate within the States. Before the outbreak of the war, progress had been made in Commonwealth-State Government conferences towards a comprehensive stabilisation scheme. The war intervened and full control over the sale of Australian wheat was given to the Board under the exigencies of war-time conditions.

The marketing experience of the Board and the desires of the growers were finally combined in the wheat stabilisation legislation of 1948 and renewed under successive five year schemes, with the exception that the *Wheat Stabilization Act* 1968 was extended to include the 1973-74 season to give the Commonwealth

Government time to review the next five season proposal. The Australian Wheat Board now functions under the *Wheat Stabilization Act* 1974. This Act authorises the Board to market all wheat harvested between 1 October 1974 and 30 September 1981 (seven seasons), but limits the provisions relating to the average export price and the stabilisation price to wheat harvested between 1 October 1974 and 30 September 1979 (five seasons). These new provisions replace the guaranteed price provision in the previous Act.

The Board comprises fourteen members—two growers from each of the mainland States, together with a chairman, a finance member, a millers' representative, and an employees' representative.

Under complementary Commonwealth and State legislation :

- (1) The Board is the sole authority for the marketing of wheat in Australia and both wheat and flour for export ;
- (2) growers are required to deliver to the Board all wheat grown by them except that required as seed or feed on the farms where it is grown ; and
- (3) the Board becomes the owner of all wheat delivered to it.

The Board employs various bulk handling authorities for the receipt of bulk wheat. Total deliveries by wheat growers to the Victorian branch of the Board during the 1974-75 season were 2,147,138 tonnes, which includes wheat grown in southern New South Wales but delivered either to storages in Victoria or to storages at railway sidings operated by Victorian Railways in New South Wales.

#### *Wheat standard*

The Australian Standard White (A.S.W.) standard is determined each season by a State committee and is the basis for sales of each crop.

Samples of wheat from various districts are obtained each year and mixed to obtain a representative sample of the whole crop. The A.S.W. weight is then determined by use of the Schopper 1 litre scale chondrometer. The A.S.W. standard was set at 81.2 kg per hectolitre for 1974-75.

#### *Grain Elevators Board of Victoria*

In 1934 an Act was passed to provide for the handling of wheat in bulk in Victoria. The Act gave the Victorian Government power to constitute a Board of three members to implement the provisions of the Act. As a result of submissions made by the Board to, and approved by, the Victorian Government, 226 country receiving elevators and an 824,000 tonnes capacity shipping terminal at Geelong and storage facilities for 109,000 tonnes at Portland have been constructed, the necessary finance being obtained from loans and internal sources. Repayment of the principal and interest is guaranteed by the Victorian Government. In 1963 the Act was amended to provide for the handling of barley in bulk by the Grain Elevators Board, and in 1975 further amended to provide for the handling of other grains and oilseeds.

The Grain Elevators Board first received and shipped Victorian wheat in bulk for the 1939-40 season and first received barley in bulk for the 1963-64 season.

The main shipping terminal is at Geelong where the Board's pier has accommodation for two vessels. The storage comprises concrete vertical storage bins with a capacity of 213,000 tonnes and horizontal shed type storage with a capacity of 610,000 tonnes. Grain can be received from rail trucks at the rate of 1,600 tonnes per hour and loaded into ships at the rate of 2,000 tonnes per hour.

At Portland, the shipping rate is 600 tonnes per hour, and the rail truck receipt rate is 500 tonnes per hour.

The Grain Elevators Board has under its control storage for 3.8 million tonnes of wheat and barley. In comparison with the season 1973-74, when a quantity of 1.52 million tonnes of bulk wheat and 233,000 tonnes of bulk

barley were delivered to the Board, the receivals for the 1974-75 season were 2.14 million tonnes of bulk wheat and 278,000 tonnes of bulk barley. Wheat quotas were introduced for the 1969-70 season, Victoria's quota being fixed at 1.77 million tonnes, the balance of the receivals, 566,000 tonnes, being over quota wheat. The Victorian quota for 1973-74 was 2.49 million tonnes; however, quotas have ceased to be in operation in Victoria since 30 September 1975.

VICTORIA—GRAIN ELEVATORS BOARD: REVENUE, EXPENDITURE, ETC.  
(\$'000)

Particulars	Year ended 31 October—				
	1971	1972	1973	1974	1975
<b>Revenue—</b>					
Grain handling charges	5,506	5,818	5,133	6,245	7,524
Interest on investments	649	765	862	1,143	1,249
Other	..	..	..	..	39
<b>Total revenue</b>	<b>6,155</b>	<b>6,583</b>	<b>5,995</b>	<b>7,388</b>	<b>8,812</b>
<b>Expenditure—</b>					
Operating and maintenance expenses	2,329	2,568	1,849	2,872	3,807
Administration expenses	582	648	667	799	972
Depreciation and renewals	576	589	587	570	628
Interest on loans	1,638	1,631	1,646	1,693	1,796
Sinking fund charges	301	304	306	290	310
Appropriations to reserves	558	973	940	1,164	1,299
Other	41	..	..	..	..
<b>Total expenditure</b>	<b>6,025</b>	<b>6,713</b>	<b>5,995</b>	<b>7,388</b>	<b>8,812</b>
Net surplus	130	-130	..	..	..
Fixed assets at 31 October	31,668	31,839	31,305	32,886	34,120
<b>Loan indebtedness at 31 October—</b>					
Victorian Government	1,598	1,568	1,526	1,490	1,446
Public	27,232	27,164	27,000	25,242	26,893

**Alternative crops to wheat, 1974**

*Barley*

More than 95 per cent of the barley grown in Victoria is of the two-row type. Barley production in Victoria increased significantly between 1965-66 and 1974-75. In 1971-72, a record 296,000 hectares of barley produced a record 395,000 tonnes harvest. By comparison, production in 1965-66 was only 73,000 tonnes from 78,000 hectares. 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 Mallee. In other districts 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 districts, production has been traditionally centred in two distinct areas where high quality grain is produced. The largest production is in the south-western 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. Since the new variety, Weeah, was introduced in 1968, it has steadily displaced Prior to a significant extent. Superphosphate is the only fertiliser normally used for barley.

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

Introduced in 1971, the variety Lara has displaced Research types as the main variety. Lara suffered some initial resistance to its acceptance by growers in spite of its inherent higher yielding potential than the Research type varieties. A 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 Victoria is now self-sufficient in barley for malting, feed and manufacturing in the distilling, pearling, and prepared stock feed industries. It can also contribute to Australian export market. In Victoria most barley is sold through the Australian Barley Board on a pool basis. The Board is responsible for setting prices for both domestic and export sales. 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			Estimated gross value \$'000
	2-row	6-row	2-row	6-row	2-row	6-row	Total	
	'000 hectares	'000 hectares	'000 tonnes	'000 tonnes	tonnes	tonnes	tonnes	
1970-71	259	10	306	12	1.18	1.20	1.18	16,379
1971-72	286	9	382	13	1.34	1.44	1.34	15,689
1972-73	269	9	207	7	0.77	0.78	0.77	11,352
1973-74	217	4	281	5	1.29	1.25	1.29	24,308
1974-75	238	5	314	5	1.32	1.00	1.31	32,674

#### Australian Barley Board, 1976

#### Oats

The second largest crop in Victoria is oats, sown both for grain production and for hay production. The average annual area sown between 1970-71 and 1974-75 was 359,000 hectares of which about 80 per cent was harvested for grain, some of it after being grazed during the winter. During the last decade, the position of oats has been seriously challenged by barley, particularly on the lighter soils where winter waterlogging is not a problem.

The predominance of oats in the higher rainfall districts has been maintained by the greater tolerance shown by oats to wet conditions and by the demand for oats for stock feed. More than half the grain produced in Victoria is held on farms or used as stock feed, especially during periods of seasonal shortage or in drought conditions. About 25 per cent of the crop goes to mills, but only a small fraction 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 the only other significant importer.

The following table shows the area, yield, and gross value of oats for grain for each of the five seasons 1970-71 to 1974-75 :

## VICTORIA—OATS FOR GRAIN

Season	Area	Production	Average yield per hectare	Estimated gross value
	'000 hectares	'000 tonnes	tonnes	\$'000
1970-71	399	467	1.17	13,558
1971-72	329	449	1.36	11,334
1972-73	255	238	0.93	8,345
1973-74	271	233	0.86	11,373
1974-75	198	186	0.94	11,991

*Maize*

Maize is grown 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, yield, and gross value of maize for each of the five seasons 1970-71 to 1974-75 are shown in the following table :

## VICTORIA—MAIZE PRODUCTION

Season	For green fodder	For grain						Average yield per hectare	Estimated gross value
		Area			Production				
		Hybrid	Other	Total	Hybrid	Other	Total		
	hectares	hectares	hectares	hectares	tonnes	tonnes	tonnes	tonnes	\$'000
1970-71	546	520	15	535	1,546	32	1,578	2.95	101
1971-72	806	370	5	375	1,907	12	1,919	5.12	122
1972-73	636	493	3	496	1,490	16	1,506	3.04	96
1973-74	536	646	8	654	1,873	17	1,890	2.89	190
1974-75	485	536	10	546	1,891	36	1,927	3.53	171

*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 Mallee Agricultural District. There is some

interest in it for winter grazing in cold districts during the winter months. The following table shows the area, yield, and gross value of rye for each of the five seasons 1970-71 to 1974-75 :

VICTORIA—RYE FOR GRAIN

Season	Area	Production	Average yield per hectare	Estimated gross value
	hectares	tonnes	tonnes	\$'000
1970-71	4,992	2,746	0.55	111
1971-72	5,062	2,597	0.51	81
1972-73	2,615	975	0.37	47
1973-74	2,956	882	0.30	71
1974-75	1,750	671	0.38	69

#### *Oilseeds*

Demand for high-protein oilseed 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 with some oilseeds and wet sowing conditions, culminated in a marked decline in the production of oilseeds in Australia from 1972-73.

#### *Linseed*

Commercial production of linseed, a major oilseed crop, began in Victoria in 1947. For more than twenty years it was Victoria's only commercial oilseed crop, to be surpassed briefly in both area and production by rapeseed for the three years 1970-71 to 1972-73. Linseed meal is a valuable stock food. The oil is used in the production of oil-based paints, varnishes, and linoleum. Dissatisfaction with acrylic paints in the extreme winters of the northern hemisphere and a resultant swing back to oil-based paints resulted in a world shortage of linseed oil by 1973. Contract prices for linseed in Victoria for the 1973-74 crop almost doubled to an average \$205 a tonne.

Linseed is grown mainly in the Western and Central Agricultural Districts of Victoria. The crop is normally grown without fallow and with superphosphate as the only fertiliser. Following the introduction by the Department of Agriculture of disease resistant and better adapted varieties after 1955, the industry has exhibited greater stability in yields. The average yield is about 1 tonne a hectare. Linseed is very susceptible to competition from weeds and needs thorough preparation of the seedbed. The development of a number of selective herbicides has benefited linseed growers considerably.

#### *Rapeseed*

The introduction of wheat quotas in 1969-70 and a need to find suitable alternative crops, together with increased domestic and global demand for edible vegetable oils, led to a rapid expansion of rapeseed production in Victoria. From a base area of 4,000 hectares in 1969-70, yielding 4,000 tonnes of seed, production expanded in 12 months to a peak of almost 19,000 hectares, yielding over 16,000 tonnes of seed. However, by 1974-75, the production of rapeseed had declined to a harvested 2,288 tonnes from 3,707 hectares.

Despite continuing high levels of demand for rapeseed, the crop is unlikely to be grown extensively in Victoria until certain agronomic weaknesses are overcome or until wheat and coarse grain markets weaken.

Rapeseed is normally grown under contract to the oilseed crushers. Sustained demand for edible vegetable oils together with an increased crushing capacity in Victoria offer growers a ready outlet for their production.

*Safflower*

Following its introduction in 1970-71 when 5,000 hectares were sown, safflower has been grown to a small extent in the Victorian cereal belt, particularly on land where wheat could not be sown due to winter flooding. Safflower produces a dual purpose vegetable oil with application in the paint and textile industries, and in salad oils and table margarine. The area sown fell to 550 hectares in 1972-73, but recovered to 1,000 hectares in 1973-74, and 520 tonnes of seed were harvested. This continued to increase to 2,813 hectares in 1974-75, 1,269 tonnes being harvested. This crop is generally grown under contract to oilseed crushers.

*Sunflower*

Sunflowers are summer growing plants which are not well adapted to dryland production in Victoria. In 1968-69, 380 hectares of sunflowers were sown in Victoria. By 1974-75, this area had been expanded to 7,973 hectares of which about 70.2 per cent was grown in the Northern Agricultural District where irrigation is available to supplement low summer rainfall. Under favourable conditions, yields of 2.2 to 2.8 tonnes per hectare have been produced under irrigation.

Periodically, very high prices for sunflower seed have been obtained from sales to the bird seed trade, but most crops are grown under contract to oilseed crushers. The oil is edible and of high quality, and is used in salad and cooking oils and margarine.

The following table shows the area, yield, and value of selected oilseeds for each of the five seasons 1970-71 to 1974-75:

VICTORIA—SELECTED OILSEED PRODUCTION				
Season	Area	Production	Average yield	Estimated
	hectares	tonnes	per hectare	gross value
	hectares	tonnes	tonnes	\$'000
LINSEED				
1970-71	6,830	6,472	0.95	763
1971-72	3,694	3,388	0.92	343
1972-73	5,843	5,471	0.94	590
1973-74	4,336	4,668	1.08	999
1974-75	4,924	3,812	0.77	781
RAPESEED				
1970-71	18,740	16,110	0.86	1,401
1971-72	14,881	12,610	0.85	1,152
1972-73	13,674	8,016	0.59	751
1973-74	5,967	3,498	0.59	479
1974-75	3,707	2,288	0.62	515
SAFFLOWER				
1970-71	5,071	1,569	0.31	153
1971-72	1,272	722	0.57	70
1972-73	556	328	0.59	34
1973-74	971	520	0.54	87
1974-75	2,813	1,269	0.45	292
SUNFLOWER				
1970-71	1,422	1,583	1.11	171
1971-72	2,141	2,384	1.11	274
1972-73	2,129	2,046	0.96	261
1973-74	3,325	2,526	0.76	624
1974-75	7,973	4,766	0.60	1,044

*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 has shown that lupins have some potential.

The average area sown to field peas in the decade 1965-66 to 1974-75 was about 5,380 hectares, more than 60 per cent of this area and 55 per cent of total production being in the Western and Central Agricultural Districts. On the light Mallee soils, field peas are occasionally grown in preference to wheat as they are less demanding on soil moisture and fertility; and cropping soils infested with cereal cyst nematode may also be sown to field peas to provide a break in the life cycle of this pest. While peas contain on average 20 per cent to 22 per cent protein, these levels are not high enough for general use in stock feeds.

Lupins, which contain up to 30 per cent protein, are acceptable as a substitute for soybean meal in rations for poultry and pigs. A potential market also exists in the production of meat substitutes for human consumption. The lupin industry in Victoria is at present in its infancy and will depend on the development of domestic and export markets and on production economics relative to other crops.

## PASTORAL AND DAIRYING

### Pastoral

#### Livestock

The first significant development in Victoria, or as it was then known, the Port Phillip District, was the pastoral interest. 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 1861 to 1961, and the numbers of livestock on rural holdings for each of the five years 1971 to 1975. From 1957, no allowance has been made for the small number of livestock not on rural holdings.

VICTORIA—LIVESTOCK : NUMBERS (a)  
(‘000)

Year	Horses (including foals)	Cattle (b)		Sheep	Pigs
		Dairy	Beef		
1861 at 31 March	77	722		5,781	61
1871 " "	167	721		10,762	131
1881 " "	276	1,286		10,360	242
1891 " "	436	1,783		12,693	282
1901 " "	392	1,602		10,842	350
1911 at 1 March	472	1,548		12,883	333
1921 " "	488	1,575		12,171	175
1931 " "	380	1,430		16,478	281
1941 " "	318	1,922		20,412	398
1951 at 31 March	186	1,489	727	20,012	237
1961 " "	64	1,717	1,147	26,620	319
1971 " "	(c)	1,974	3,086	33,761	520
1972 " "	(c)	1,927	3,508	29,496	590
1973 " "	(c)	1,957	3,488	24,105	585
1974 " "	(c)	1,933	3,906	25,787	424
1975 " "	(c)	1,268	4,924	26,411	383

(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 years before 1943.

(c) Not collected.



Following an investigation into the adequacy of the wording and layout of the cattle sections of the Agricultural Census form, changes were introduced to the 1963-64 form.

Before 1964 farmers were asked to classify their herds as either "beef cattle" or "dairy cattle". As these terms tended to confuse breed and purpose, farmers were asked in the new design to classify their cattle, with the exception of bulls, according to the main purposes of (i) milk production and (ii) meat production, irrespective of breed, and to report separately the number of cows and heifers kept for their own domestic milk supply; bulls were to be reported according to their breed and age, i.e., dairy or beef and over or under one year of age. Consequently, the detailed statistics of cattle for 1975 shown in the following table are not comparable with those for years before 1964.

VICTORIA—DISTRIBUTION OF LIVESTOCK AT 31 MARCH 1975  
(<sup>'000</sup>)

Particulars	Agricultural district							Total	
	Central	North Central	West- ern	Wim- mera	Mallee	North- ern	North East- ern		Gipps- land
<b>Cattle—</b>									
<b>Bulls for service—</b>									
<b>Bulls, 1 year and over—</b>									
Dairy breeds	4	1	8	1	(a)	7	1	9	32
Beef breeds	12	6	26	5	3	12	11	14	90
<b>Bull calves—under 1 year—</b>									
Dairy breeds	1	(a)	3	(a)	(a)	2	(a)	2	10
Beef breeds	4	2	8	1	1	4	3	4	27
<b>Cows and heifers for milk and cream—</b>									
<b>Cows in milk and dry</b>									
Heifers—1 year and over	150	15	318	7	14	341	62	361	1,269
Heifer calves—under 1 year	40	12	78	2	4	87	18	85	327
House cows and heifers	34	4	71	2	4	89	16	82	301
<b>Other cattle and calves for meat production—</b>									
Cows and heifers	3	1	4	3	2	3	2	2	19
Calves—under 1 year	285	153	605	116	59	261	300	331	2,110
Other	163	84	296	76	43	193	165	207	1,227
	104	64	183	32	21	117	113	146	781
<b>Total cattle</b>	<b>800</b>	<b>343</b>	<b>1,600</b>	<b>245</b>	<b>150</b>	<b>1,117</b>	<b>692</b>	<b>1,244</b>	<b>6,192</b>
<b>Pigs</b>	<b>54</b>	<b>14</b>	<b>34</b>	<b>54</b>	<b>30</b>	<b>141</b>	<b>30</b>	<b>27</b>	<b>383</b>
<b>Sheep</b>	<b>1,738</b>	<b>2,063</b>	<b>9,991</b>	<b>5,151</b>	<b>1,706</b>	<b>3,344</b>	<b>1,219</b>	<b>1,197</b>	<b>26,410</b>

(a) More than nil but less than 500.

The following table shows details of the stock slaughtered in Victoria during each of the five years 1970-71 to 1974-75:

VICTORIA—LIVESTOCK SLAUGHTERED  
(<sup>'000</sup>)

Particulars	1970-71	1971-72	1972-73	1973-74	1974-75
Sheep	8,554	11,954	7,856	3,134	4,147
Lambs	7,880	8,129	6,673	5,258	5,685
Cattle	1,382	1,516	1,895	1,696	1,814
Calves	464	559	665	564	684
Pigs	941	1,051	1,210	1,081	969

*Fodder**Hay*

The pattern of hay production in Victoria changed considerably in the 1950s. More complete mechanisation and the virtual disappearance of the working horse removed the previous emphasis from cereal hay. The harvesting of large areas of cereal crops, particularly oats, grown specifically for the production of hay for the maintenance of horse teams, is no longer necessary and so there has been a marked decline in the amount of cereal hay produced.

On the other hand, there were spectacular increases in the production of other forms of fodder. The annual production of meadow hay increased from about 400,000 tonnes to over 2,000,000 tonnes during this period. There was also a substantial increase in the amount of lucerne hay conserved. Ensilage made mainly from pasture growth increased from about 25,000 tonnes annually to over 300,000 tonnes in the 1950s, yet it supplies something under 10 per cent of the dry nutrients in Victoria's fodder reserves.

This increase in fodder conservation has resulted in more efficient utilisation of the extra herbage grown as the result of pasture improvement in all districts. Large numbers of livestock are now being maintained with greater safety following the conservation of portion of the surplus spring growth for feeding out during periods of seasonal shortage or in drought.

As pastures have been improved and livestock production intensified, the provision of supplementary fodder has become an important factor in the Victorian grazing industry. The conservation of meadow hay fits in well with farm management routine and is a convenient method of ensuring continuity of fodder supplies.

VICTORIA—HAY PRODUCTION, 1974-75

Variety	Area	Production	Average yield per hectare
	hectare	tonne	tonne
Wheaten	5,440	15,220	2.80
Oaten	38,250	136,353	3.56
Lucerne	44,730	189,939	4.25
Barley and rye	2,304	7,313	3.17
Meadow and other	414,885	1,667,704	4.02
Total	505,609	2,016,529	3.99

*Ensilage*

Much ensilage is still made in open stacks using a mower and buckrake. This is simple, but wastage is high. The flail-type forage harvester is popular because of its simple cutting action and relative cheapness. It consists of swinging blades which rotate at high speed on a horizontal shaft. The crop is thrown into an accompanying trailer or truck for transport to storage. Flail cutting has opened the way to more effective ensilage making and control of the process, because the cut material packs better in storage. This excludes air and so prevents the heating which destroys nutrients and lowers digestibility of the resulting ensilage. Improved storage and feeding techniques are generally leading to more effective use of ensilage than is possible with high wastage open stack methods. Trenches and pits, if suitably sited and well made, provide excellent storage conditions. Stacks with clamp sides or bunkers give good storage, while plastic sheeting can also be used to exclude air and water and thus reduce waste when properly applied.



The Dartmouth Dam site, viewed from downstream, showing the Mitta Mitta River and the access road.

*State Rivers and Water Supply Commission*

Embankment construction at the Dartmouth Dam site. The core zone in the centre is flanked by filter and rock zones.

*State Rivers and Water Supply Commission*





Starving stock and bare pastures illustrate the drought conditions on this property in the Gippsland region of Victoria.

*Department of Agriculture*

Fire control in forests relies on rapid suppressive measures. Forest workers at work on a pine plantation at Creswick, near Ballarat.

*Forests Commission, Victoria*



**VICTORIA—ENSILAGE MADE AND FARM STOCKS  
OF ENSILAGE AND HAY**

(tonne)

Agricultural district	Ensilage made, 1974-75	Stocks at 31 March 1975	
		Ensilage	Hay
Central	35,397	32,512	333,973
North Central	6,000	8,967	160,349
Western	21,867	30,410	827,321
Wimmera	2,895	11,333	247,062
Mallee	2,468	7,193	114,147
Northern	16,880	24,366	612,450
North Eastern	8,205	17,524	239,011
Gippsland	46,179	31,960	424,768
<b>Total</b>	<b>139,891</b>	<b>164,265</b>	<b>2,959,081</b>

**Further reference, 1976; Fodder conservation, 1975**

*Sheep industry*

*Sheep breeds*

The first sheep to arrive in Victoria were Tasmanian Saxon Merinos which were brought to the Portland area by Edward Henty in December 1834. In the following year, William Furlonge landed Saxon Merinos at Port Phillip, and shared with Henty the distinction of founding the sheep industry in Victoria. Sheep numbers increased rapidly until the early 1840s, due largely to New South Wales pastoralists bringing their flocks southwards and John Batman's Port Phillip Association landing Saxon Merinos from Tasmania. In November 1836 there were only 41,000 sheep in Victoria, increasing to 310,000 by 1838, 782,000 by 1840, and 6,000,000 by 1852 when most of the available pastoral land had been taken up and was being used for grazing. Despite periodic droughts there was a steady increase in Victorian sheep numbers until the early 1960s, followed by short-term fluctuations with peaks in 1967 and 1971, and troughs resulting from a severe drought in 1968 and poor economic returns for sheep, wool, and meat since 1971. It is unlikely that sheep numbers will ever resume the upward trend so evident in Victoria's early history, particularly as cattle numbers have increased significantly and compete with sheep for grazing land, often on the same property. As a result of the expanding movement towards diversification, of the total of 28,000 producers carrying sheep in 1971, 21,000 also ran cattle.

The major proportion (38 per cent in 1975) of the Victorian sheep flocks are in the Western Agricultural District, followed by the Wimmera (20 per cent). Although the Mallee has relatively few sheep, the major proportionate gains have been made in this region during recent years.

Relative to other States except Tasmania, the most noticeable feature of Victorian sheep numbers during 1974 was the smaller proportion of Merinos (48 per cent) and the larger proportion of crossbred and comeback sheep (32 per cent) and breeds other than Merino (20 per cent). By comparison, the Australian flock consists of Merinos (73 per cent), comebacks and crossbreds (15 per cent), and other recognised breeds (12 per cent). These figures indicate the importance to Victoria of the prime lamb industry, which is largely based on first cross ewes (Border Leicester by Merino) and British breed rams.

Although Victoria has relatively fewer Merinos, it produces the finest quality wool. In particular, wools from the Western Agricultural District have a world-wide reputation for their colour, style, fineness of spinning count, and high yielding properties. With the exception of the Mallee and Wimmera, and parts of the Northern Agricultural District where the South Australian types of Merino are more numerous, most Merinos in Victoria are fine-woolled and medium-woolled types.

In 1974, 10 per cent of Victorian sheep were Corriedales, a breed noted for both high quality fine crossbred wool and meat producing ability. The breed originated in 1874 in New Zealand and was established in Australia in 1882. Corriedales are found throughout most of Victoria with a heavier concentration in the Western District.

Like the Corriedale, the Polwarth is a dual purpose animal and was developed in Victoria for areas too wet and cold for Merino wool growing. Polwarths comprise 3 per cent of the State's sheep numbers in 1974 and are concentrated in the southern parts of the Western District, the Central District, and the North Eastern District.

The main British breeds of sheep in Victoria are the Romney Marsh, Border Leicester, Dorset Horn, Poll Dorset, and Southdown. Romney Marsh and Border Leicester rams are often joined with Merino ewes to produce prime lamb dams. Southdown, Dorset Horn, and Poll Dorset rams are the most important sires for prime lamb production.

There are small changes in the proportions of each breed to total sheep numbers as the relative prices for sheep meats and wool change. In response to the recent pattern of prices, there has been a reduction in the proportion of Merinos, while crossbreds, which are largely used in the prime lamb industry, have increased proportionately. As the proportionate distribution has not changed significantly since 1971, the table on page 453 of the *Victorian Year Book 1975* indicates the pattern.

### Wool production

#### VICTORIA—SHEEP AND LAMBS SHORN, SEASON 1974-75

Agricultural district	Shorn		Wool clipped (including crutchings)		Average	
	Sheep	Lambs	Sheep's	Lambs'	Per sheep	Per lamb
	'000	'000	'000 kg	'000 kg	kg	kg
Central	1,675	439	7,893	640	4.71	1.46
North Central	2,174	448	10,820	665	4.98	1.48
Western	10,277	2,533	48,038	3,756	4.67	1.48
Wimmera	5,156	1,233	27,265	1,976	5.29	1.60
Mallee	1,433	445	7,279	692	5.08	1.56
Northern	3,302	853	16,523	1,283	5.00	1.50
North Eastern	1,273	286	5,801	368	4.56	1.29
Gippsland	1,095	353	4,995	506	4.56	1.43
<b>Total</b>	<b>26,384</b>	<b>6,591</b>	<b>128,614</b>	<b>9,887</b>	<b>4.87</b>	<b>1.50</b>

#### VICTORIA—SHEEP SHORN AND WOOL CLIPPED

Season	Shorn		Wool clipped (including crutchings)		Average	
	Sheep	Lambs	Sheep's	Lambs'	Per sheep	Per lamb
	'000	'000	'000 kg	'000 kg	kg	kg
1970-71	32,363	8,390	r151,269	11,623	r4.67	1.39
1971-72	31,316	7,502	r141,395	r10,237	4.52	1.36
1972-73	r27,454	r6,389	r122,076	r7,910	4.45	1.24
1973-74	24,564	5,982	120,957	8,256	4.92	1.38
1974-75	26,384	6,591	128,614	9,887	4.87	1.50

## VICTORIA—TOTAL WOOL PRODUCTION AND VALUE

Season	Clip	Stripped from and exported on skins, etc. (greasy)	Total quantity (greasy)	Estimated gross value	Average price per kg
	'000 kg	'000 kg	'000 kg	\$'000	cents
1970-71	163,296	37,991	201,287	118,123	58.68
1971-72	151,683	45,831	197,514	134,513	68.10
1972-73	129,075	43,248	172,323	254,434	147.65
1973-74	129,212	26,143	155,355	248,232	159.78
1974-75	138,509	p27,043	p165,552	193,623	116.96

The largest proportion of the Australian wool clip is sold in Victoria, although this is not the largest producing State. This is because a good deal of the wool sold in Victoria comes from interstate, especially from southern New South Wales.

*Mutton and lamb meat production*

Victoria has generally been Australia's biggest mutton-producing State, producing about the same amount of lamb as New South Wales. As with wool, the relation between where the meat is grown and where it is slaughtered is not exact, statistics being available only for the point of slaughter. In fact, many sheep and lambs which are slaughtered in Victoria come from other States, especially from the Riverina District of New South Wales. Mutton production in Victoria, at a peak in 1971-72 because of unsatisfactory wool prices, declined significantly in response to much improved wool prices. During the same period, lamb slaughterings also increased, but not to the same extent. In 1971-72, more than 10 million adult sheep and 8 million lambs were slaughtered, declining to 4.5 million sheep and 6 million lambs in 1972-73. Since then, slaughterings have been a little lower than expected because of lack of ready markets for mutton, largely caused by surpluses of beef in many major producing countries, together with restrictions aimed at controlling inflation in many major importing countries. Thus mutton has been displaced by cheap beef in many of its traditional outlets.

The table on slaughtering on page 447 and the section on the Australian Meat Board on pages 453-4 contain further relevant information.

*Lambing*

Climatic conditions play a large part in determining the proportion of lambs marked to ewes mated, and thus the natural increase from season to season may vary considerably (as indeed may the number slaughtered). The following table shows the number of ewes mated and lambs marked in each of the five seasons 1970-71 to 1974-75 :

## VICTORIA—LAMBING

Season	Ewes actually mated	Lambs marked	Proportion of lambs marked to ewes mated
	'000	'000	per cent
1970-71	14,841	12,724	86
1971-72	13,774	11,583	84
1972-73	11,381	9,452	83
1973-74	9,885	8,182	83
1974-75	10,621	8,823	83

*Sheep and lambs in agricultural districts*

The following table shows the number of rams, ewes, wethers, and lambs depastured in each agricultural district of Victoria at 31 March 1975 :



VICTORIA—SHEEP AND LAMBS IN EACH AGRICULTURAL DISTRICT  
AT 31 MARCH 1975  
(’000)

Particulars	Agricultural district								Total
	Central	North Central	Western	Wimmera	Mallee	North-ern	North Eastern	Gipps-land	
Rams	22	22	126	52	21	44	17	15	319
Ewes	904	930	4,965	2,445	1,069	1,917	672	643	13,545
Wethers	440	751	2,696	1,604	198	700	286	250	6,925
Lambs	371	361	2,204	1,050	419	683	245	289	5,622
Total	1,737	2,064	9,991	5,151	1,707	3,344	1,220	1,197	26,411

*Australian Wool Corporation*

In 1972 the Australian Wool Industry Conference recommended to the Commonwealth Government that the activities of the Australian Wool Board and the Australian Wool Commission be amalgamated. On 1 January 1973 the Australian Wool Corporation was established, bringing the activities of the Board and the Commission under one body. There are two divisions within the Corporation :

- (1) The Corporate Services and Research Division which conducts all research, administrative, and service functions; and
- (2) the Marketing Division which conducts all activities associated with purchases, processing, sale, and promotion of wool and wool products. A significant part of this activity takes in the Floor Price and Reserve Price operations of the Corporation in the Australian wool market.

The Australian Wool Testing Authority is also part of the Corporation structure.

The Corporation has a full-time chairman and nine Corporation members, comprising four woolgrower representatives, four persons with special qualifications, and one Commonwealth Government representative.

**Australian Wool Board, 1972 ; Australian Wool Corporation, 1975**

*Beef cattle*

Cattle were introduced from Africa into the Colony of New South Wales by the first settlers. These early introductions were poor stock intended to meet the needs of draught, milk, and meat, and were quickly replaced by herds of the beef cattle breeds imported from Britain. The natural increase in their numbers would have provided the cattle which were available for the settlement of Victoria. Although the Victorian beef cattle industry initially faced many natural hazards, including drought, disease, and pests, changing economic conditions and patterns of land-use have been most important in determining the size and distribution of beef cattle herds. Refrigeration, pasture improvement, the relative prices for other primary products, and the development of overseas markets for beef meat have all been important factors.

High prices for beef meat and marketing difficulties in the sheep, dairy, and wheat industries, encouraged farmers to withhold stock from slaughter in order to build up breeding herds. As a result, from 1968 to 1972, beef cattle numbers in Victoria rose from 1.5 million to 3.5 million. With 2.0 million dairy cattle, total cattle numbers were 5.5 million in 1972. There was no increase in total cattle numbers from 1972 to 1973; in fact, there was a slight fall in beef cattle numbers, reflecting the drought conditions in many areas during the summer of 1972-73. A 17 per cent increase in beef cattle to 3.9 million in 1974 resulted in part from a 33 per cent increase in the number of steers and bullocks together with a 14 per cent increase in breeding females, which now number just below 2.0 million. The large increase in steers and bullocks was



due, in part, to the trend in 1972-73 and early 1973-74 towards keeping animals for slaughter at older ages. This, together with the drop in price for cattle suitable for export markets, resulted in producers withholding fat stock from sale.

More than 60 per cent of Victorian farms run cattle for meat production, although the majority of herds are small. On most of these farms, beef is associated with other activities, including sheep, dairying, and cropping. The Victorian environment is very favourable for beef production, cattle being able to graze pasture throughout the year. Levels of reproductive performance are high; growth rates of slaughter animals are high; and animals can be sold for slaughter while young. Turn-off of slaughter animals from breeding herds is therefore high. During the early 1970s, beef production again increased rapidly and in 1973-74, Victorian beef and veal production was 378,000 tonnes. In that year, Victoria was the major beef producing State, being responsible for 29 per cent of Australian production.

The amount of beef and veal exported by Victoria declined by 25,000 tonnes from 1973 to 1974, closure of the Japanese and European Economic Community markets resulting in a reduction of exports. The quantity of meat exported to the U.S.A. also declined because of low prices and high shipping charges. The decline in domestic prices resulted in the annual use of beef and veal on the domestic market increasing from 42 to 44 kilograms per head of population.

Numbers and classes of livestock on Victorian properties and a table showing distribution of livestock at 31 March 1975 appears on page 447. Attention is also drawn to the historical table on page 446 and the table on slaughterings on page 447.

#### *Australian Meat Board*

The Australian Meat Board, which first met in 1936, was reconstituted in 1946 and again in 1964. It operates under the *Meat Industry Act 1964-1973*. The Board's chairman is appointed by the Commonwealth Minister for Primary Industry; six members represent livestock producers, two represent the meat exporting industry, and there is a member representing the Commonwealth Government. The Board advises the Commonwealth Government on conduct of the Australian livestock and meat industries and their long-term interests; it works closely with the Commonwealth Government in negotiating meat trade agreements with other countries.

The Board is financed by levies, paid by the producer, on cattle and sheep slaughtered for human consumption. The levy on cattle at 30 June 1975 was 56 cents per head of which 25 cents went towards industry research. On sheep, the levy was 4.85 cents per head of which 1.75 cents went towards research. A further levy, of 1 cent on cattle and 0.1 cent on sheep, was paid by the owner of the stock at the time of slaughter and these funds were directed to C.S.I.R.O. research into meat processing industry problems.

After 1 March 1976, the meat export levy and the levy for disease control were suspended by the Commonwealth Government. A charge of 1.6 cents per pound was levied on cattle slaughtered for export and a charge of 1 cent per pound was levied on other meats for export in November 1973. Of the 1.6 cents levy on cattle, 0.6 cents per pound was directed to the Bovine Brucellosis and Tuberculosis Eradication Trust Account. One cent collected in cattle and in other meats for export was directed towards the cost of export meat inspection. From 1 July 1976, a slaughter levy of \$1 per head on all cattle over 90 kilograms dressed weight has applied, funds collected being used in support of the Commonwealth Government's Brucellosis and Tuberculosis Eradication Campaign.

The Board exercises control over meat exports by the issue of licences, which may limit the products exported and the markets served. Detailed data on all export shipments is collected for statistical purposes. The Board also has the

power to trade in meat, as, for example, in its sales to the U.S.S.R. in 1971 and 1975; but generally the industry operates on a private enterprise basis.

While the Australian meat industry's best customer is the domestic market, it now depends heavily on the export trade. In 1972-73 Australian exports of all meats exceeded 50 per cent of production, although exports fell off between 1973 and 1975 as a result of major overseas trading problems. Meat exports from Victoria reached a value of \$239.9m in 1973-74, but fell to \$121.3m in 1974-75. Victoria exported 154,000 tonnes of Australia's 575,000 tonnes shipped weight meat exports in 1974-75, second only to Queensland, while for three years to 30 June 1973 it led all other States in meat exports.

The Board maintains offices in London, New York, Tokyo, and Teheran; these cover Europe, North America, Asia, and the Middle East, and closely observe the meat trade in their regions and act in the interests of the Australian export trade. Promotion of Australian meat at wholesale and retail level is undertaken, often in conjunction with the Commonwealth Department of Overseas Trade and exporting and importing interests. Board expenditure on direct promotion overseas in 1974-75 was \$565,000, of which the major expenditure occurred in Japan.

The Board also engages in research, providing facilities and staff for the Australian Meat Research Committee which co-ordinates research expenditure. Funds are provided for projects conducted by the C.S.I.R.O., universities, State Agriculture Departments, and the Australian Bureau of Agricultural Economics. Between 1963 and June 1976, the Australian Meat Research Committee invested almost \$26m in beef industry research. The lamb and mutton programme which began in 1967 was allocated some \$8.5m to the same date. The Commonwealth Government has supplemented producer contribution to research on a \$1 for \$1 basis.

The Industry Section of the Meat Research Laboratory is financed by a special levy paid by meat processors, expenditure from which is subsidised on a \$1 for \$1 basis by the Commonwealth Government. Allocations of \$163,000 and \$248,000 were approved from these funds in 1974-75 and 1975-76.

#### **Beef cattle industry, 1975**

### **Dairying**

#### *General*

Before the 1870s, dairy production was largely a small sideline on farms in Victoria, developing as a sole farm activity after the passing of the Land Act of 1862, which permitted selectors to take up holdings of up to 320 acres.

Introduction of the cream separator in 1886 led to the rapid establishment of small butter factories, most of which were farmers' co-operatives. Farmers could bring their milk to these factories, or to associated "creameries", or separating stations. Later, when separators became smaller and less costly, they were installed on the farms. By 1905, there were 195 butter factories in Victoria.

Climate eventually induced the industry to concentrate in the two areas most favoured by a good spread of rainfall, namely, west and south Gippsland, and the southern parts of the Western Agricultural District. Victorian Government action brought into being further dairying districts by establishing irrigation settlements on the northern plains, by subdividing former grazing properties into dairy farms, and by developing former problem country in parts of Gippsland and the Western Agricultural District. A specialist type of dairy farming developed to supply milk to Melbourne, Ballarat, Bendigo, and Geelong.

The most far-reaching dairying legislation is the Milk and Dairy Supervision Act in which three formerly separate Acts have been combined. Quality control under this legislation and under portions of the Health Act was further strengthened by the Milk Pasteurisation Act of 1949. Other legislation includes

the Milk Board Act which set up a statutory Board to operate and control the marketing of fluid milk, and Acts controlling filled milk, imitation milk, and margarine.

Capital values of dairy farms have progressively risen from the \$640 paid by an original settler (over 20 years) for a 320 acre selection, to some \$110,000 for the modern fully equipped and stocked dairy farm. This increase in capital investment is largely a reflection of advances in dairy farming technology. Where some farmers in the early 1930s eked out a living by milking 10 to 15 cows, their successors who invested so heavily would have to milk 80 or more to meet all their costs and gain a livelihood. These larger herds tend to detract from the environment by creating mud problems and by adding to the difficulty of preventing animal excreta from entering watercourses. Dairy factories also are forced to protect the environment by treating wastes, especially whey, which are now too voluminous to be released into streams or sprayed on land.

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

#### *Economic structure*

The size of the dairying industry in any district is indicated by the number of cows milked rather than by the number of farms, dairy licence records indicating that the industry is concentrating in three "growth areas"—Gippsland, Northern, and Western. In general, the trend has been to milk more cows, but on fewer farms. The number of cows milked in 1974-75 was 1,288,168, compared with the previous year when 1,263,633 cows were milked. The number of dairy farms with 50 or more dairy cows was 11,900 in 1974-75.

Progress in the mechanisation of milking, development of methods of handling and cooling milk in bulk, improvement of systems of cleaning and sterilising equipment and of disposal of dairy shed wastes, are the advances which have contributed most towards enlargement of the dairy enterprise which one, two, or three men can operate. Advances in pasture production and grazing management and increased mechanisation in growing and harvesting fodder have made it possible to carry larger herds on farms. Aerial topdressing has become an important tool in pasture improvement on hilly country in the southern dairying areas and along the river valleys of the north-east.

Direct financial assistance to the industry has diminished with the phasing out of the former bounty, but the Commonwealth and Victorian Governments each still provide a subsidy of \$71,200 to the herd test movement. The Commonwealth Government contributes to dairy research funds an amount matching that raised by the industry through a levy on its products. Victoria provides a considerable amount of less direct assistance to the industry in regulatory, research, extension, and teaching services.

These services differ from those provided to other industries mainly in that they are carried through to the manufacturing and processing sectors. This has arisen from the perishable nature of milk and dairy foods, and the consequent need to exercise regulatory control over them until they reach the consumer or leave the State.

The marketing function for products is divided between the Australian Dairy Corporation and individual companies within the industry, while the Victorian Milk Board is responsible for marketing liquid milk.

The Department of Agriculture's three main research groups within its Division of Dairying are the farm research workers at Ellinbank Dairy Research Station, the manufacturing research teams at the Gilbert Chandler Institute of Dairy Technology, and the personnel of the Milking Research Centre. The industry also benefits from research done elsewhere such as at the Veterinary Research Laboratories, Westmeadows.

Until recently there has been little formal training especially directed towards dairy farming other than at agricultural colleges or in related skills taught at some technical schools, but a special Dairy Certificate Course has now been commenced at Glenormiston Agricultural College.

As the number of cows milked is diminishing in the northern States and the national population is increasing, Victoria and Tasmania will be relied upon more and more to supply dairy foods for Australians and to supply the growing world demand for dairy products, especially in the developing nations.

#### *Australian Dairy Corporation*

The Australian Dairy Corporation came into being on 1 July 1975, succeeding the former Australian Dairy Produce Board, itself successor to the earlier Dairy Produce Control Board established in 1925 by a producer referendum. The Corporation has eleven members appointed by the Commonwealth Minister for Primary Industry: a chairman, three members representing dairy farmers, three representing manufacturers, two with special qualifications, one representing employees of butter and cheese factories, and one Commonwealth Government representative. A levy imposed upon butterfat production supplies funds for the Corporation's promotional and administrative activities.

The Corporation recommends to the Commonwealth Minister for Primary Industry regulations to control exports of dairy products; reports to the Minister on matters of quality, standards, and grading of dairy products for export; and, subject to the Minister's approval, takes action to improve dairy products and expand the existing markets or secure new markets for them. The Corporation also controls the sale and distribution of dairy produce after export, and gives assistance to manufacturers of Australian butter, cheese, casein, and dried skimmed milk in finance, storage, shipping, insurance, and market information.

#### VICTORIA—DAIRYING

Year	Number of dairy cows (in milk or dry) at 31 March	Estimated total production of milk for all purposes (year ended 30 June)	Estimated gross value of dairy produce (a) (year ended 30 June)
	'000	'000 litres	\$'000
1971	1,244	4,062,068	215,412
1972	1,256	3,973,122	238,190
1973	1,274	3,944,600	237,670
1974	1,244	3,916,529	239,767
1975	1,269	3,744,632	266,659

(a) Includes subsidy.

Further reference, 1976; **Dairying industry, 1975**

#### **Other livestock**

##### *Pig industry*

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 in Victoria, most of the pig meat consumed in Victoria is now produced in the State.

Australians are relatively large meat eaters but eat much less pig meat than most other nations. Pig meat provides about only 11 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, poultry, 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—the 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, bone meal, fishmeal, 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. There have been large variations in the annual production of pigs and these 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 people left the industry and by March 1974 the Victorian pig population had fallen by 27 per cent. In 1974-75 this trend continued as the pig population had fallen by a further 10 per cent. The resultant shortage of pigs has since caused pig prices to rise to record levels. Despite this, high capital costs are tending to deter people from entering the industry. Usually there is ample grain to maintain pig production. There is no scheme to support pig prices in Australia.

In the 1930s and early 1940s Australia exported pig carcasses, mainly to the United Kingdom, where it had a protected market. In 1941 over 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 6-7 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 1975 was 383,144. About 74 per cent of these were held in the Central, Northern, Wimmera, and Western Agricultural Districts. The following table shows classifications (in agricultural districts) of pigs, together with the numbers of pig keepers; the historical table on page 446 and the table on slaughtering on page 447 contain further information.

VICTORIA—PIGS AND PIG KEEPERS AT 31 MARCH 1975

Agricultural district	Boars	Breeding sows	All other	Total pigs	Pig keepers
Central	552	6,453	46,566	53,571	329
North Central	185	1,620	11,705	13,510	199
Western	491	5,064	28,419	33,974	450
Wimmera	779	6,807	45,939	53,525	772
Mallee	531	4,190	25,778	30,499	551
Northern	1,880	20,221	119,120	141,221	892
North Eastern	369	3,826	25,596	29,791	307
Gippsland	450	4,016	22,587	27,053	321
Total	5,237	52,197	325,710	383,144	3,821

#### *Egg industry*

The trend in the Victorian egg industry is towards large specialised farms—egg producers, hatcheries, and pullet growers—utilising modern poultry housing, equipment, and labour saving machinery.

The greater proportion of Victoria's estimated 4.0 million adult female fowls are now included in 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.

One man or one family farms 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 larger farms.

Housing is planned on the intensive principle, with deep litter pens or multiple bird cage units. Most of the new housing is on the laying cage system. A small proportion of layers is kept in fully enclosed, windowless houses under 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). Meatmeal is the major protein supplement. A wide range of commercial, ready-mixed poultry rations are 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 216 eggs per bird per year. Commercial stock of the local breeding farms and hatcheries is tested for profitability at 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 from 5,000 to 90,000 egg capacity. Most commercial egg-type chicks are sexed when a 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 and Egg Pulp 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  
(<sup>'000</sup>)

Period	Hen eggs set (a)	Chicks hatched (b) intended to be raised for—				Total hatched
		Meat production	Egg production	Breeding		
				Pullets	Cockerels	
MEAT STRAINS						
1971-72	35,097	26,951	(c)	n.a.	n.a.	(e)26,951
1972-73	36,487	27,746	(c)	n.a.	n.a.	(e)27,746
1973-74	41,902	32,089	(c)	n.a.	n.a.	(e)32,089
1974-75	34,772	27,306	(c)	n.a.	n.a.	(e)27,306
EGG STRAINS (d)						
1971-72	14,251	431	4,861	153	21	5,466
1972-73	14,354	489	4,875	146	14	5,524
1973-74	17,657	351	6,027	176	28	6,583
1974-75	14,924	315	5,005	196	39	5,555

(a) Includes eggs which failed to hatch.

(b) Excludes chicks destroyed.

(c) Not applicable.

(d) Egg strain chicks reported as "unsexed" have been allocated half to chicks for meat production and half to chicks for egg production. The number so reported was 99,462 in 1971-72; 81,875 in 1972-73; 79,199 in 1973-74; and 98,054 in 1974-75.

(e) Incomplete.

**Egg industry, 1975**

*Broiler industry*

The raising of chickens 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 2.2 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; the use of "high energy" poultry feeds, highly supplemented with vitamins and 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 conducive to fast growth.

The organisation of the broiler industry as a continuous, production-line, factory-like operation has been a major factor in the significant reduction in price 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 cheap and a normal part of the diet.

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

Broiler houses are fully enclosed; each house grows a "crop" of about 10,000 to 30,000 broilers about four times a year. A one man or one family farm raises approximately 120,000 to 200,000 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 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  
(<sup>0</sup>000)

Period	Chickens (i.e., broilers, fryers, or roasters)	Hens and stags	Ducks and drakes
1970-71	19,854	1,908	283
1971-72	23,347	2,140	322
1972-73	23,101	1,919	219
1973-74	27,526	1,751	121
1974-75	26,324	2,044	104

DRESSED WEIGHT OF POULTRY SLAUGHTERED (a),  
AND INTENDED FOR SALE (b)  
(<sup>0</sup>000 kg)

Period	Fresh	Frozen	Fresh	Frozen	Fresh	Frozen
1970-71	15,900	9,301	2,178	915	354	107
1971-72	19,788	10,337	2,519	967	367	123
1972-73	20,297	8,025	2,519	525	269	58
1973-74	24,661	9,672	2,293	450	182	6
1974-75	25,636	7,504	2,175	1,021	144	22

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

(b) Fresh: sold immediately after slaughter or chilled for sale soon after.

Frozen: frozen hard for storage of indefinite duration.

### *Beekeeping*

Beekeeping has been practised in Victoria since the early days of settlement. The native vegetation, especially the eucalypts, provided a rich natural source of nectar for bees, and many farms had a few colonies of bees to provide honey for the family and a surplus for sale. Specialised bee farms were also set up on a full or part-time basis, but yields were comparatively low. With the development of fast reliable road transport, migratory beekeeping became feasible and beekeepers were able to move their apiaries long distances without detriment to the bees, enabling yields to be increased by taking advantage of new honey resources remote from the home base.

With increased alienation and clearing of land for grazing and agricultural purposes, Victoria's natural honey resources became more limited and beekeepers came to rely heavily on reserved State forests and Crown lands. The recent growth of the woodchip industry may also pose a threat to some good honey producing areas. Most parts of Victoria can be used at various times for honey production, either directly or indirectly. There are many tracts of land which, although not noted for their nectar resources, are very useful for building up colony strength between honey flows, or are valuable as wintering sites for bees.

Technological advances in beekeeping have probably been slower than in many other primary industries, a circumstance possibly deriving from the highly specialised nature of the occupation and the relatively small market. The development of the motor truck was the first significant advance in technology. The moveable frame hive increased the efficiency of production by eliminating the necessity to kill the bees and break down the comb to recover the honey. Tools for uncapping combs and extracting honey soon followed, but manual labour was still required for performing all essential tasks. The motorised barrow and the ramp reduced much of the heavy work of loading and unloading bees. The introduction of sophisticated uncapping machines and large scale extractors set up in central plants fed by high speed road transport, have contributed to a degree of mechanisation in the industry. Nevertheless a high labour component still exists in the daily field management of the apiary.

The industry has always been self-supporting even though the prosperity of the beekeepers has fluctuated markedly over the years. The producer does not receive any subsidies, direct or indirect, from the Commonwealth or State Governments. In 1962, the Commonwealth Government established the Australian Honey Board under the *Honey Industry Act* 1962. The functions of the Board are to control the export of honey and export prices, and to provide funds for promotion and research. The Board is financed by a levy on domestic market honey and, more recently, an additional smaller levy on export honey.

Honey generally passes from the hands of the producer to honey packers and semi-co-operatives; speculative buyers seem to have largely disappeared in Victoria. The disposal of crop is in the hands of the packers, who handle both domestic and export sales. Some beekeepers pack honey for a limited regional market and most have some door sales. About half of Australia's honey production finds its way to export markets, Britain being the principal buyer. Other markets include Europe, the Middle East, South East Asia, and Africa. More recently, Japan has become a significant buyer of selected types.

While traditionally the industry has serviced the demand for honey and beeswax, other apiary products have in later years been in increasing demand in Europe, the U.S.A., and to a lesser degree in Australia. Some markets exist for royal jelly and propolis, and a larger market for pollen. While apiary products would return about \$2m of export income, the major value of the industry to the community is the service rendered through pollination of agricultural and horticultural crops.



Research into industry problems in Victoria is carried out by the Department of Agriculture's Apicultural Research Unit at Fern Tree Gully.

VICTORIA—BEE HIVES, HONEY, AND BEESWAX

Season ended 31 May—	Beekeepers	Hives	Production		Estimated gross value	
			Honey	Beeswax	Honey	Beeswax
	number	number	tonnes	tonnes	\$'000	\$'000
1971	1,278	103,454	4,447	55	984	68
1972	1,321	105,709	2,170	24	793	32
1973	1,342	104,235	3,769	50	2,077	65
1974	1,160	98,539	3,161	47	1,947	72
1975(a)	468	87,972	2,783	34	1,448	45

(a) Not comparable with figures for previous years. Information from beekeepers with 40 or more registered hives.

INTENSIVE CROPS

**Fruit**

*General*

In Victoria, the production of fruit began with the first settlement; the Henty family, who settled at Portland in 1834, probably planted the first apple trees in the State. One of the earliest orchards was started on the banks of the Yarra River at Hawthorn in about 1848, and the production of a great variety of fruits for the Melbourne market was the main source of income of many early settlers in areas surrounding Melbourne. In the second half of the nineteenth century, fruit growing gradually extended into the Geelong, Portland, Harcourt, and Stanley districts. The foundation of Mildura in 1887 marked the beginning of the development of one of Victoria's major fruit growing districts. 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.

In Victoria, in 1974-75, the area planted with fruit, nuts, and berries (excluding grapes) was 21,508 hectares, only slightly more than 1 per cent of the total area under crops in Victoria, yet fruit growing makes an important contribution to the State's economy. The estimated gross value of tree fruits, nuts, and berry fruits (excluding grapes) produced in Victoria during 1974-75 is estimated at about \$57.8m. A considerable proportion of the fresh, dried, and preserved crop is exported.

*Fruit growing districts*

Fruit crops have specific requirements of climate, soil, and water, which together with the availability of labour and the access to markets, were the main factors in the development of the fruit growing districts. Most of the fruit growing districts south of the Great Dividing Range receive an annual rainfall of between 600 mm and 900 mm. This rainfall is fairly evenly spread, but, in many areas, supplementary irrigation from natural catchments, rivers, or town supplies is necessary from January to March. In the northern part of Victoria, annual rainfall varies from 600 mm to 1,200 mm in the east to 250 mm in the Mallee Agricultural District, with an average of about 480 mm in the Goulburn Valley. Here the elaborate irrigation schemes of the Murray, Goulburn, and Campaspe Rivers made possible the large scale development of the fruit industry.

A large range of horticultural produce has been grown within an 80 kilometre radius of the City of Melbourne, with extensive plantings on the Mornington Peninsula. More recently, new orchards have been planted mainly beyond the Dandenong Ranges, partly by fruit growers whose land to the north and east

of the city has been taken over by suburban housing development. The other fruit growing districts in southern and central Victoria (Geelong and Bacchus Marsh, Portland, Harcourt, and West Gippsland) have also decreased in area or are only maintaining previous production levels.

The two most important fruit growing districts are the Goulburn and Murray Valley irrigation district and the Mallee. The main crops in the Goulburn and Murray Valleys are peaches, pears, apricots for canning, and apples and pears for local and export markets.

In the Mallee, fruit crops are grown in a narrow band of irrigated land along both sides of the Murray River, mainly at Mildura, Robinvale, and Swan Hill. On the Victorian side, grape vines, citrus fruits, stone fruits, olives, and almonds are grown.

The typical orchard in Victoria is a family enterprise run by one man (usually the owner), often with the help of his family and one permanent man. During particularly busy periods, contractors or seasonal labourers are employed. The number of growers involved in the production of tree fruits and berries (excluding grapes) was 2,888 in 1974-75. Because of the labour intensity of fruit growing in the past, most orchards and vineyards had an area of not more than 6 to 10 hectares. Mechanisation and technological improvements make it possible now for one family to look after a larger area. By providing employment opportunities for women in fruit drying and fruit preserving, the fruit growing industry makes an important contribution to the development of country areas.

#### *Developments in technology*

Changes in population and in the technology of production, handling, and transport have a great effect on the industry, which has high capital and labour requirements. Many of the old, lower producing or marginal orchards have been pulled out. New orchards have been planted on more suitable soil and, with a small number of higher yielding and more popular varieties, and better management practices, including mechanical harvesting, these have contributed to increased productivity. The Department of Agriculture takes an active part in the testing of available machinery on various fruit crops. Suitable machines have been developed and are being used for the mechanical harvesting of grapes, canning-peaches, and nuts. Further tests are being conducted with machines for harvesting canning-pears and bramble berries.

#### *Financial assistance*

Because of the deteriorating situation on overseas markets for Australian dessert and canning fruits, the Commonwealth Government is providing financial assistance to growers involved in export. Following revaluations of the Australian currency, a revaluation compensation for export fresh fruit was introduced as a temporary measure several years ago. In addition, an apple and pear stabilisation scheme was set up to reduce the effect of price fluctuations on overseas markets. In 1972, the Commonwealth Government introduced a fruit growing reconstruction scheme to help growers who wanted to reconstruct, to reduce their orchard area or to leave the industry.

#### *Marketing*

Within the limitations set by the Fruit and Vegetables Act and Regulations (which outline standards of produce, the size and marking of containers) and the relevant provisions of the Health Act, there is no restriction on the marketing of fresh fruit in Victoria. However, to prevent the spread of pests and diseases and, in particular, fruit fly, into the main fruit growing districts, there are restrictions on the introduction of fruit and certain vegetables from other States.

A large number of growers still sell their own produce at the Melbourne Wholesale Fruit and Vegetable Market. Over recent years, increasing amounts of fruit have been sold direct to supermarkets.

Exporters find it increasingly difficult to ensure profit on fruit which is sent to Britain and Europe, because of greatly increased freight charges and Britain's entry into the European Economic Community. However, increased quantities of pears are being shipped to the U.S.A., and the potential of the Japanese, South East Asian, and Middle East markets is being explored. To assist the apple and pear industry in overcoming marketing problems, the Commonwealth Government established the Apple and Pear Corporation in 1974. In addition to taking over the export control role of the Apple and Pear Board, the Corporation has powers to trade in its own right. It also has an important role in promotion and research concerning both apple and pear products and fresh fruit.

In 1973 the Citrus Marketing Board was established in Victoria to ensure that all citrus fruits are marketed in an orderly manner. Over the last two years, there has been a significantly increased demand for citrus fruits, especially Valencia oranges, for processing to satisfy the local juice market.

### Research

The Department of Agriculture and other research institutions conduct basic and applied research aimed at increasing the efficiency and productivity of fruit growers.

### Fruit growing statistics

Particulars of fruit production, including nuts but excluding vines, for the five seasons 1970-71 to 1974-75 are shown in the following table :

VICTORIA—FRUIT GROWING

Particulars	Unit	1970-71	1971-72	1972-73	1973-74	1974-75
Number of growers		3,660	3,388	3,268	3,164	2,888
Area	hectare	26,957	26,851	25,784	23,041	21,774
Estimated gross value of fruit	\$'000	46,723	42,107	49,855	53,993	56,811
Production—						
Apples	bushel	5,078,604	3,628,886	5,081,703	3,220,272	4,252,863
Pears	"	7,061,229	7,145,265	7,211,184	6,207,635	5,867,060
Quinces	"	15,346	13,474	11,008	10,230	7,531
Apricots	"	677,143	618,389	589,567	427,560	411,057
Cherries	"	184,079	189,150	199,318	169,631	160,930
Nectarines	"	35,897	42,618	61,198	55,486	36,158
Peaches	"	2,925,282	2,924,656	3,258,556	1,682,768	1,883,419
Plums	"	159,116	142,488	160,859	104,925	114,674
Prunes	"	16,516	15,149	13,251	10,150	10,154
Lemons and limes	"	236,450	229,415	265,119	248,839	260,265
Oranges—						
Navels	"	641,704	679,874	727,507	611,239	670,296
Valencias	"	1,111,198	980,581	1,290,147	970,592	1,173,649
Other	"	32,870	17,094	20,680	27,273	26,611
Mandarins	"	110,606	118,415	119,887	116,186	126,860
Grapefruit	"	133,805	149,831	152,588	146,644	152,878
Figs	"	1,840	2,599	2,058	702	1,265
Passionfruit	"	3,274	2,269	1,052	1,044	1,632
Olives	"	29,591	37,589	40,296	43,669	44,087
Gooseberries	kg	44,452	36,222	48,163	26,816	14,494
Loganberries	"	57,711	12,599	11,259	9,425	5,417
Raspberries	"	173,236	152,559	136,013	160,106	114,385
Strawberries	"	1,514,721	1,400,924	1,351,925	1,333,615	1,138,339
Youngberries	"	226,832	248,626	261,881	222,448	202,072
Other berries	"	44,300	35,308	23,520	14,671	13,494
Almonds	"	5,170	15,230	3,661	3,734	15,475
Filberts	"	1,724	528	662	355	73
Walnuts	"	122,663	71,538	46,435	72,898	70,800
Chestnuts	"	18,682	19,605	14,053	17,015	13,234

The extent of cultivation of each important class of fruit and nuts grown on commercial holdings (except grapes) during the seasons 1973-74 and 1974-75 is shown in the following table :

VICTORIA—FRUIT TREES AND BERRY PLANTS IN ORCHARDS  
AND MARKET GARDENS (a)

Fruits and nuts	1973-74			1974-75		
	Bearing	Not bearing	Total	Bearing	Not bearing	Total
	number of trees					
Apples	1,210,426	261,394	1,471,820	1,116,022	236,202	1,352,224
Pears	1,356,513	178,955	1,535,468	1,389,961	145,689	1,535,650
Quinces	2,955	1,750	4,705	2,692	1,772	4,464
Plums	101,527	40,281	141,808	96,518	33,865	130,383
Prunes	9,164	1,706	10,870	8,655	1,192	9,847
Cherries	136,375	44,906	181,281	117,594	38,536	156,130
Peaches	726,581	215,928	942,509	669,183	216,545	885,728
Apricots	232,035	41,076	273,111	207,714	32,871	240,585
Nectarines	36,312	13,707	50,019	35,044	12,291	47,335
Oranges—						
Navels	211,300	43,086	254,386	205,981	42,691	248,672
Valencias	319,922	46,007	365,929	313,782	97,625	411,407
Other	8,125	593	8,718	6,823	1,305	8,128
Mandarins	50,098	9,199	59,297	50,895	6,728	57,623
Grapefruit	36,709	26,327	63,036	38,917	34,204	73,121
Lemons and limes	79,319	43,844	123,163	80,772	50,077	130,849
Figs	695	1,231	1,926	616	287	903
Olives	90,395	22,334	112,729	93,697	16,811	110,508
	hectares					
Passionfruit	6	6	12	16	6	22
Raspberries	44	4	48	30	4	34
Loganberries	4	..	4	3	..	3
Strawberries	154	28	182	133	20	153
Gooseberries	9	12	21	8	4	12
Youngberries	48	1	49	41	1	42
Other berries	4	3	7	7	2	9
	number of trees					
Almonds	6,080	48,265	54,345	20,831	88,070	108,901
Walnuts	5,131	4,047	9,178	4,877	3,290	8,167
Filberts	747	1,514	2,261	664	1,372	2,036
Chestnuts	825	7,047	7,872	892	7,166	8,058

(a) Berries and passionfruit collected on an area basis only.

The distribution of the fruit industry over Victoria is shown in the following table, where the number of trees of each kind in each agricultural district is given for the season 1974-75 :

VICTORIA—NUMBER OF FRUIT TREES, PLANTS, ETC., SEASON 1974-75

Particulars	Unit	Agricultural district								Total
		Central	North Central	Western	Wimmera	Mallee	Northern	North Eastern	Gippsland	
Growers	number	1,001	84	30	38	895	694	104	42	2,888
Area	hectare	4,771	507	119	495	3,897	11,284	563	148	21,784
Apples	tree	764,069	86,645	23,085	7,281	9,590	355,759	76,182	29,613	1,352,224
Pears	"	63,630	35,045	304	3,194	1,473	1,482,033	824	370	1,586,873
Peaches	"	96,191	377	145	4,362	9,226	771,763	2,532	1,132	885,728
Apricots	"	10,279	328	41	1,737	69,471	158,344	182	203	240,585
Plums	"	41,462	1,579	18	515	52,878	33,849	69	13	130,383
Prunes	"	198	..	..	701	1,921	7,027	..	..	9,847
Cherries	"	132,079	1,489	..	547	705	14,672	5,631	1,007	156,130
Quince	"	2,459	16	..	64	44	1,881	..	..	4,464
Nectarines	"	20,699	61	..	57	21,276	5,032	173	37	47,335
Figs	"	404	..	..	..	99	400	..	..	903
Olives	"	338	1,160	..	45,157	61,629	804	1,420	..	110,508
Oranges	"	1,407	33	850	..	542,716	122,767	434	..	668,207
Mandarins	"	..	..	..	..	55,165	2,458	..	..	57,623
Grapefruit	"	474	..	400	..	60,652	11,561	34	..	73,121
Lemons and limes	"	41,692	103	40	110	55,281	32,570	536	467	130,799
Passionfruit	hectare	3	1	..	..	3	..	7	8	22
Strawberries	"	141	3	3	..	..	1	4	1	153
Raspberries	"	34	..	..	..	..	..	..	..	34
Loganberries	"	3	..	..	..	..	..	..	..	3
Gooseberries	"	10	..	..	..	..	..	..	2	12
Youngberries	"	42	..	..	..	..	..	..	..	42
Other berries	"	8	..	..	..	..	..	1	..	9
Almonds	tree	809	86	..	3,300	101,451	744	2,510	1	108,901
Walnuts	"	1,190	302	..	..	466	293	5,387	529	8,167
Filberts	"	305	1,105	..	..	4	..	622	..	2,036
Chestnuts	"	317	104	50	..	..	..	7,387	200	8,058

### *Cool storage*

The cool storage of fruit in Australia dates from 1891 when the first Government cool store was established in Flinders Street, Melbourne. It was replaced in 1914 by a new store alongside Victoria Dock, mainly used for cooling export fruit, and for some local storage. Other early stores were also operated by the Victorian Government until the co-operative movement began in 1911, using stores built for the purpose by the Victorian Government in various apple growing areas. However, the first cool store used solely for fruit was a privately owned store at Pakenham, built in 1900. From the late 1930s, with electric power available in rural areas, large numbers of privately owned stores were erected. This trend has continued, the greatly increased size of stores leading to renewed interest in co-operative storage and marketing operations.

Much of the storage capacity in the Goulburn Valley is used for canning types of pears and peaches. These stores operate for only about five months a year, but are essential in the production of good quality canned fruits. Many other stores in the same area also have a fairly short operational period as they are used for the pre-cooling and storage of export apples and pears. Some very small private stores are used for pre-cooling fruit and vegetables for local and interstate markets, mainly fruits with a short life, such as apricots, peaches, grapes and berry fruits, or for salad vegetables such as lettuce and celery. Most orchard cool stores are used throughout the year for apples and pears, including controlled atmosphere storage.

Research into the problems associated with fruit storage began in 1923, and is now carried out at the Scoresby Horticultural Research Station. The introduction of controlled atmosphere storage in 1968 was an important development in improving the storage quality of apples, requiring the conversion of existing cool stores or the construction of new gas-tight stores. As a result, apples and pears are now available throughout the whole year. This is unlikely to be achieved with stone fruit, but better quality and longer storage are still being sought.

The development of fruit and vegetable areas further away from Melbourne will require some additional pre-cooling and storage facilities, but the existing cool storage capacity is able to meet most of the demands which might be anticipated in the near future.

### *Vine fruits*

Although the earliest recorded arrival in Victoria of vine material was that brought by Edward Henty from Launceston to Portland in 1834, the first recorded Victorian vineyard was at Yering, near Lilydale, probably planted in 1837. Four hectares were planted at Pascoe Vale in 1840 and the first planting at Geelong was probably in 1842. The Rutherglen vineyards began during the early 1850s and those at Great Western about 1860. All these vineyards were planted with the aim of producing light beverage-type table wines, comparable to the expensive wines of France and Germany. Swiss settlers were prominent in the early days of the industry.

The vine area increased steadily, encouraged by the successes of the wines at Colonial exhibitions and European wine shows, 586 hectares being planted by 1861, and 1,554 hectares by 1869.

The *Phylloxera* devastation of the Geelong district vineyards in the 1870s was counterbalanced by the establishment of the Sunraysia vineyards by the Chaffey brothers after 1886 and the reconstitution of some vineyards in the Rutherglen area.

The development of an export trade in dry red wines to London was an important achievement. Beginning in 1871, it increased steadily to nearly 4,500,000 litres a year but declined markedly after the outbreak of *Phylloxera* in the late nineteenth century.

After the First World War, vineyard development by soldier settlers favoured the dried vine fruit blocks of Sunraysia, while after the Second World War the economic boom led to dried vine fruit plantings in excess of 20,000 hectares in the Murray River irrigation districts of Mildura, Robinvale, and Swan Hill. In the 1960s and 1970s, vineyards have re-appeared in old districts and in some new ones—notably in south-west Victoria.

The demand for dry red wine and white table wine has been steadily increasing since the early 1950s, and planting of grapes for wine production accelerated in the mid-1960s in response to an acute shortage of suitable grapes at that time and a possible continuing shortage.

Allowing for a marked seasonal variation, dried vine fruit production has remained more or less constant since the early 1960s. In contrast, the production of wine grapes has been steadily increasing in the dried vine fruits districts, as also has the diversion of potential dried vine fruit to wine making, culminating in the establishment of several wineries in the Mildura, Robinvale, and Swan Hill districts. The wineries are usually associated with, or established by, major Australian wine companies. They process the increasing quantities of wine grapes available in the areas and also absorb the larger quantities of grapes that would normally be dried. Their aim is to supply the large market for relatively cheap fair quality beverage table wine that currently exists in Australia. The appearance of the option of selling to wineries rather than drying is a significant development in districts that, in the past, have been restricted to the production of dried grapes or the marketing of fresh fruit. An innovation in grape harvesting, largely in response to the increasing difficulty in obtaining suitable harvest labour, particularly in the warm irrigated areas, has been the successful operation of mechanical harvesters.

The Department of Agriculture conducts research in connection with the selection of suitable vine material and prevention and control of pests and diseases.

Particulars of vine production for the five seasons 1970-71 to 1974-75 are shown in the following table :

VICTORIA—VINE FRUIT PRODUCTION

Season	Number of growers	Area		Production				
		Bearing	Non-bearing	Grapes gathered	Wine made	Dried		
						Raisins	Sultanas	Currants
hectare	hectare	tonnes	kilolitres	tonnes	tonnes	tonnes		
1970-71	2,487	18,558	2,052	218,452	30,078	3,894	37,342	3,083
1971-72	2,463	18,988	1,804	354,973	35,835	4,854	68,203	3,409
1972-73	2,485	20,036	1,582	227,805	34,966	3,838	36,576	2,323
1973-74	2,405	20,000	1,597	206,396	41,384	2,254	31,392	1,255
1974-75	2,338	20,541	1,806	282,263	54,282	3,887	43,375	1,707

**Further reference, 1975**

## Vegetables

### General

Victoria has 29 per cent of the area of vegetable crops in Australia. Most of Victoria's vegetables are grown in the Central Agricultural District; however, limited water supplies and urban expansion will limit increases in area, especially in the important Cranbourne and Koo-wee-rup regions. The State's principal vegetable crops are shown on page 468.

Over the last few years there has been a significant decline in the area of onions and peas. Peas for processing are grown over a wide area of the Western Agricultural District, from Geelong almost to the South Australian border. Potatoes and onions are the other main crops in the Western Agricultural District.

Potatoes are also grown in Central and South Gippsland, and green beans and sweet corn for processing are grown in East Gippsland. Tomatoes for processing, gherkins for pickling, and a range of market vegetable crops are also grown in various areas of Gippsland.

The Northern Agricultural District, which includes the Goulburn and mid-Murray Valleys and the Rochester and Bendigo regions, is the centre of the processing tomato industry. A number of warm season crops are grown in the area, including melons and capsicums. Onions and potatoes are also grown in the Murray Valley.

In the Mallee, along the Murray River, growers specialise in winter lettuce and carrots, autumn and spring beans, early tomatoes for market, and summer melons, pumpkins, and capsicums.

As a result of the difficulty in obtaining labour for vegetable production and harvesting, there has been a trend to mechanisation of harvesting and handling of produce. It is estimated that there was enough machinery in Victoria to harvest about 40 per cent of the processing tomato crop in 1974-75.

Aircraft are used extensively for spraying broad area crops such as tomatoes, beans, and corn. Hydro-cooling and other pre-cooling techniques are used extensively for perishable produce. Many growers have their own cool stores which enable them to supply a better product and add flexibility to their marketing operations. Irrigation has lifted the yield of many crops, especially potatoes and onions.

The new vegetable varieties which have been introduced during the last ten years have not only been disease resistant but have also facilitated the mechanisation of bean, tomato, cabbage, and brussels sprouts harvesting. Consumer demand has also led to some changes in varieties, and the light-skinned New Zealand onion is rapidly forcing older varieties from the market.

In recent years, increased quantities of produce are by-passing wholesale markets and are being sold to retailers and retail chains. The trend to chain-store marketing has led to a considerable increase in pre-packing for retail sales, especially such commodities as root crops, sweet corn, potatoes, and onions. As packaging is now the major component of production and marketing costs, the industry is seeking alternatives to cases and cartons. Bulk bins of a nominal capacity of 500 kilograms are widely used by supermarket chains and processors, and are finding their way into wholesale markets. Pallets with fold-down mesh sides are used to transport bulky vegetables such as cauliflowers. The recent introduction of 36 litre returnable, stackable, nestable containers was a major advance in produce marketing in Australia.

The main trend in the processing industry has been the takeover of a number of the smaller freezing companies and the interstate nature of operations. By operating plants in several States, processors have been able to optimise the use of harvesting equipment, particularly along the eastern coast of Australia. However, produce also moves across State borders for processing; for example, Queensland beans go to Victoria and Victorian beans to northern New South Wales, Riverina tomatoes to Melbourne, and Goulburn Valley tomatoes to the Murrumbidgee irrigation area of New South Wales. Probably the main development in canning has been the increased consumption of canned whole tomatoes and small potatoes. In the processing industry, the market for pickled gherkins and cucumbers has expanded, and there is a growing demand for pickled capsicums, cauliflower, and sauerkraut.

The large volume lines such as peas, beans, and tomatoes are grown on a broad area basis, but processors often contract with market gardeners for smaller quantities of particular vegetables such as cauliflower and celery.

Australian market gardeners have been under the pressure of housing development ever since settlement. During the last ten years, suburban expansion has displaced market gardens from areas close to Melbourne, such as Heatherton,

Mulgrave, and Doncaster, and many have been re-established in the Cranbourne area and the Yarra valley. While there is still a good deal of suitable land for growing vegetables near many of Victoria's cities, many factors such as high land values and rates, and the competition of the cities for water supplies, are limiting the further development of market gardening in the outer urban areas. Fortunately there is a good deal of suitable land in Victoria which has not yet been fully developed for vegetables. Improved transport and changes in marketing will mean that distance becomes less important in relation to farming in the outer urban areas.

The availability and the cost of petroleum products affect all aspects of vegetable production—fertilisers, agricultural chemicals, and packaging, in addition to fuel for cultivation, irrigation pumping, spraying, transportation, and even frost protection. In the long-term, labour could remain in relatively short supply; consequently, further mechanisation of operations is likely to continue. Already lines with high labour inputs are disappearing and bunched vegetables may become a rarity. The further development of new vegetable varieties suitable for machine harvesting will be most important.

#### VICTORIA—VEGETABLES FOR HUMAN CONSUMPTION

Main type	Area sown		Production		Estimated gross value	
	1973-74	1974-75	1973-74	1974-75	1973-74	1974-75
	hectares	hectares	tonnes	tonnes	\$'000	\$'000
Potatoes	12,474	13,010	254,023	282,547	35,191	28,868
Onions	758	685	12,727	17,547	1,226	1,761
Carrots	928	965	30,781	34,067	3,538	5,032
Parsnips	173	171	3,966	4,398	916	1,311
Beetroot	97	46	2,330	1,021	153	86
Tomatoes	1,874	2,384	45,566	137,115	4,751	5,276
French beans	1,296	1,502	5,004	7,392	804	853
Green peas—						
Sold in pod	380	220	979	608	356	250
Processing	6,348	5,544	(a)10,387	(a)10,063	987	604
Cabbages and						
Brussels sprouts	900	797	18,949	27,440	1,989	3,497
Cauliflowers	867	858	31,520	31,020	2,585	2,917
Lettuce	831	617	12,746	9,801	2,647	1,599
Pumpkins	891	910	10,694	11,274	786	1,002

(a) Shelled weight.

#### Potatoes

Victoria grows more than one third of the total production of potatoes in Australia. Although potatoes are usually sold as a fresh vegetable, the rapid development of the processing industry has added a new dimension to the outlet for this crop, some 30 per cent of the crop now being processed in various ways.

While the main crop is planted in spring and grows during the summer months, potato planting goes on in one district or another for at least ten months of the year, and harvest extends over the whole year. Early crops, which are planted in mid-year, are grown in areas where risk of frost is minimal, such as the Bellarine Peninsula and market garden areas. They are lifted as new potatoes from September to December. Mid-season crops from districts such as Koroit, Gembrook, Koo-wee-rup, and Thorpdale come on to the market during January to March. The main or late crop is grown in the Central Highlands (Ballarat to Woodend), Kinglake, and Beech Forest; harvest begins during April and continues until October in some years. These late crops are often treated with post-maturity weedicides to prevent growth of weeds that would interfere with harvesting operations.

More than two thirds of the total area planted to potatoes in Victoria is spray irrigated to supplement natural rainfall at critical stages during plant



growth and development. Irrigation is one of the main factors that has contributed to the improvement in yield of potatoes over the last ten years.

More rapid harvesting methods have created a renewed interest in the storage of potatoes on the farm. Modern techniques of holding potatoes in refrigerated storages under conditions of high humidity and controlled ventilation are well established, and are being widely used for seed potatoes and as raw material for processing. However, their adoption for table potatoes is inhibited by the comparatively high cost of an insulated storage and its associated air-conditioning equipment, together with the uncertainties of the potato market.

Four varieties make up the bulk of the potato crop in Victoria: Kennebec, Sebago, Exton, and Sequoia. With the exception of Exton, these varieties are of North American origin. Two locally bred varieties, Coliban and Tasman, have been released by the Department of Agriculture and seed became available to commercial growers in 1976. The Department of Agriculture assists growers to improve the quality and production of potatoes by research into potato agronomy and plant breeding at the Potato Research Station, Healesville, together with research in plant pathology at the Victorian Plant Research Institute, Burnley. A recent development is the production of nuclear seed stocks from pathogen-tested tip cuttings taken from selected plants. This material is propagated under controlled conditions for several generations to produce Foundation Seed, now the basis of the Seed Potato Certification Scheme.

#### VICTORIA—POTATO PRODUCTION

Season	Area	Production (a)	Average yield per hectare	Estimated gross value
	hectares	tonnes	tonnes	\$'000
1970-71	14,150	303,901	21.48	20,916
1971-72	13,986	306,708	(b)21.93	15,002
1972-73	13,120	286,909	21.87	16,478
1973-74	12,474	254,023	20.36	35,191
1974-75	13,010	282,547	21.72	28,868

(a) Includes seed potatoes as well as amounts held on farms for seed, stockfeed, etc., as follows: 27,332 tonnes in 1970-71; 37,384 tonnes in 1971-72; 28,098 tonnes in 1972-73; 31,981 tonnes in 1973-74; and 51,424 tonnes in 1974-75.

(b) Record average yield.

#### Onions

The principal onion growing areas are in the Central and Western Agricultural Districts. In the season 1974-75 these areas were responsible for 84 per cent of the total onion production in Victoria.

#### VICTORIA—ONION PRODUCTION

Season	Area	Production	Average yield per hectare	Estimated gross value
	hectares	tonnes	tonnes	\$'000
1970-71	1,049	17,178	16.38	1,366
1971-72	951	19,678	20.69	1,354
1972-73	922	13,608	14.76	1,336
1973-74	758	12,727	16.79	1,226
1974-75	685	17,547	25.62	1,761

Onion Marketing Board, 1974

#### 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 led in recent years 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 third term, provides for the annual sale, at a guaranteed minimum price, of 15,422,000 kilograms of leaf which meets defined quality standards. The operative bodies in the implementation of the Stabilisation Plan are the Australian Tobacco Board together with a Tobacco Leaf Marketing Board in each producing State.

Australian tobacco is mainly absorbed 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 set at 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 usually accounts for 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 many Victorian tobacco farms.

The Department of Agriculture assists 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 its substation at Gunbower, in conjunction with an intensive farm-to-farm tobacco advisory service in all producing districts. The Department of Agriculture has collaborated with the C.S.I.R.O. in developing varieties resistant to blue mould. Other current advances in tobacco production include the fungicidal control of petal drop rot, improved nursery practices to give more effective and economical control of blue mould in seedlings, determination of the best ways to handle crops which have been damaged by hail, and identification of the effects of soil and climatic variables on tobacco crop production.

#### VICTORIA—TOBACCO PRODUCTION

Season	Area	Production	Average yield per hectare	Estimated gross value
	hectares	tonnes (dry)	tonnes (dry)	\$'000
1970-71	4,241	6,902	1.63	16,087
1971-72	3,844	5,765	1.50	14,690
1972-73	4,068	5,769	1.42	13,918
1973-74	3,940	5,634	1.43	16,408
1974-75	3,926	6,086	1.55	18,119

Further reference, 1975

#### Hops

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

Because of the good quality and acceptability of Victorian hops on world markets, the area given over to hops in the State has increased in recent years. Hops require 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 in height 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 available for export. The high quality Victorian-bred variety *Pride of Ringwood* is being well received on world markets and is now virtually the only variety grown in Victoria.

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 is to be intensified and additional investigations on long-term fertiliser requirements, and control of weeds and insect pests, are to be introduced.

#### VICTORIA—HOPS PRODUCTION

Season	Area	Production	Average yield per hectare	Gross value
	hectares	tonnes	tonnes	\$'000
1970-71	363	629	1.73	1,313
1971-72	395	683	1.73	1,436
1972-73	453	662	1.46	1,419
1973-74	508	915	1.80	1,961
1974-75	478	831	1.74	1,740

#### Plant nurseries

Melbourne's well regarded parks and public gardens and many beautiful private gardens are a result of the foresight of the early planners and the nurserymen and settlers who recognised the suitability of the climate and soils for the establishment of an extremely wide range of plants. This led to the establishment of a flourishing plant nursery industry.

John Pascoe Fawcner was the first nurseryman and horticulturist of early Melbourne, growing fruit, vegetables, and gardens on his allotment, including 2 hectares of land for market gardening, and an orchard established at Pascoe

Vale. Following his example, several other nurserymen and seedsmen established themselves more than one hundred years ago.

With the rapid expansion of Melbourne and surrounding districts, many plant nurseries were established during the late nineteenth and early twentieth centuries, and these have made a valuable contribution towards the large and flourishing orchard and market gardening industries of Victoria, and in fostering the State's gardening organisations.

The location of plant nurseries involves consideration of the plant species to be grown and the economics of production and marketing. The physical features and environmental conditions of the sites must be considered, together with availability of water, power and other services, and the access to markets. The actual area covered by a plant nursery depends on the size and type of operation. Small retail outlets or backyard propagators may operate in less than 0.25 hectare, while the larger fruit tree nurserymen or bulb growers may have 40 to 50 hectares.

With the large number of new homes, home units, and office buildings, and a renewed awareness and interest by the public of their environmental needs, the horticulture and plant nursery industry has expanded over the last ten to fifteen years with the development of specialist native plant growers and plant hire firms, and with growing numbers of part-time backyard nurserymen. Many of the larger nurserymen have increased the efficiency of their operations by establishing glasshouses with full environmental control, as well as soil sterilisation equipment and soil mixing and container-filling machinery to enable improved precautions to be taken against plant diseases. In addition to fertilisers and pesticides, plant growth regulating substances, plastic sheeting, and foam and plastic containers are important adjuncts to the modern nursery business.

The Nurserymen and Seedsmen's Association of Victoria, formed in 1903, sets and maintains standards in the industry. Since 1924, the annual Garden Week exhibition has been held as a horticultural trade show with proceeds for scholarships for the advancement of horticulture and, more recently, to establish a fund as the Association's contribution to the Research Project for Diseases of Ornamental Plants of the Victorian Plant Research Institute.

A census of commercial Victorian nursery establishments covering the 1974-75 season resulted in the following information :

VICTORIA—NURSERIES (a), 1974-75

Item	Amount
Number of nurseries	373
Sales of nursery products (\$'000)—	
Seeds and bulbs	1,458
Seedlings	2,849
Cut flowers (including orchids)	3,758
Cultivated turf	167
Fruit trees and vines	642
Rose bushes	937
Other shrubs and trees	6,792
<b>Total nursery sales</b>	<b>16,603</b>

(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.

VALUE OF PRIMARY COMMODITIES PRODUCED

The value of primary production, excluding mining, as estimated in the following tables is based to a large extent on returns received annually from

individual producers throughout Victoria. A detailed account of the period covered for individual rural industries is given on page 433. Statistics for the non-rural industries refer to the year ended 30 June.

**Gross value of primary commodities**

Gross value is defined as the value placed on recorded production at the wholesale price realised in the principal market. In cases where primary products are absorbed locally, or where they become raw material for secondary industry, these points are presumed to be the principal markets. Care is taken to prevent, as far as possible, all overlapping or double counting. The primary value of dairy production, in accordance with the above definition, is the price paid at the factory for milk or cream sold by the farmer; the value added by the process of manufacturing into butter, etc., is included in manufacturing production value of production statistics.

**VICTORIA—GROSS VALUE OF PRIMARY COMMODITIES  
(EXCLUDING MINING)  
(\$'000)**

Industry	1970-71	1971-72	1972-73	1973-74	1974-75
Agriculture (a)	262,475	299,177	282,696	461,232	524,275
Pastoral	354,607	394,451	607,812	597,851	506,151
Dairying (b)	239,626	262,507	263,161	276,934	266,659
Poultry and bees	48,849	49,659	51,241	69,814	74,165
Trapping	1,749	2,406	3,225	5,634	6,051
Forestry	34,687	35,854	36,792	49,496	49,561
Fisheries	7,310	9,507	11,471	11,065	10,684
<b>Total gross value</b>	<b>949,303</b>	<b>1,053,561</b>	<b>1,256,398</b>	<b>1,472,026</b>	<b>1,437,546</b>

(a) Includes net payouts: 1970-71, \$130,278; 1971-72, \$455,939; 1972-73, \$186,297; 1973-74, \$455,009 and 1974-75, \$254,843 from the Apples and Pears Stabilization Fund.

(b) Includes subsidy: 1970-71, \$27,710,000; 1971-72, \$25,700,000; 1972-73, \$17,969,000; 1973-74, \$12,379,000; and 1974-75, \$6,075,000.

**Local value of primary commodities**

The gross value of production, less costs of marketing (freight, cartage, brokerage, commission, insurance, and containers) represents the gross production valued at the place of production, that is, local value, details of which are shown in the following table:

**VICTORIA—LOCAL VALUE OF PRIMARY PRODUCTION  
(EXCLUDING MINING)  
(\$'000)**

Produce	1970-71	1971-72	1972-73	1973-74	1974-75
<b>Agriculture—</b>					
Barley	13,753	13,444	10,393	21,933	29,709
Maize	88	107	84	173	138
Oats	11,077	9,677	8,263	10,860	11,201
Wheat	41,030	77,604	53,719	139,010	199,471
Onions	1,148	913	1,058	994	1,327
Potatoes	18,305	10,766	12,649	31,311	24,869
Other vegetables for human consumption	21,865	18,954	19,693	22,265	28,835
Hay and straw	36,205	39,874	51,564	76,896	50,148
Fruit	38,277	34,010	42,093	48,447	47,572
Vineyards	15,706	24,119	24,670	34,482	33,190
Other crops	27,552	23,638	21,724	26,551	26,788
<b>Total</b>	<b>225,006</b>	<b>253,106</b>	<b>245,910</b>	<b>412,922</b>	<b>453,248</b>

VICTORIA—LOCAL VALUE OF PRIMARY PRODUCTION  
(EXCLUDING MINING)  
(\$'000)

Produce	1970-71	1971-72	1972-73	1973-74	1974-75
<b>Pastoral—</b>					
Wool	108,215	122,043	235,638	213,199	156,052
Sheep slaughtered	50,794	68,256	97,298	95,670	50,508
Cattle slaughtered	166,353	171,723	227,813	228,004	102,105
Total	325,362	362,022	560,749	536,873	308,665
<b>Dairying—</b>					
Whole milk used for—					
Butter	104,476	120,428	121,434	129,252	148,438
Cheese	13,088	14,650	19,158	18,627	24,898
Condensing, concentrating, etc.	16,087	19,098	21,126	19,303	26,729
Human consumption and other purposes	40,253	43,199	42,673	44,806	49,372
Subsidy paid on wholemilk for butter and cheese	27,710	25,700	17,969	12,379	6,075
Pigs slaughtered	22,415	22,551	23,517	34,684	40,264
Total	224,029	245,627	245,877	259,051	295,776
<b>Poultry and bees—</b>					
Eggs	25,471	24,364	27,392	36,169	38,343
Poultry	14,068	15,333	14,946	23,722	24,315
Honey and beeswax	997	774	2,088	1,773	1,280
Total	40,536	40,471	44,426	61,664	63,938
<b>Trapping, etc.—</b>					
Rabbits and hares	1,196	1,889	2,473	3,556	4,446
Rabbit and hare skins, etc.	427	379	596	1,849	1,392
Total	1,623	2,268	3,069	5,405	5,838
<b>Forestry—</b>					
Sawmills	29,980	31,019	31,583	r43,904	42,575
Hewn timber	2,619	2,736	3,385	3,764	4,433
Firewood	1,600	1,579	1,387	875	1,631
Bark for tanning	1	1	1	..	..
Other	87	124	89	174	142
Total	34,287	35,459	36,445	r48,717	48,781
<b>Fisheries—</b>					
Fish	2,635	2,735	2,644	4,008	3,978
Rock lobster (a)	1,696	1,926	2,018	1,495	819
Scallops	901	2,502	4,461	1,715	1,642
Other	1,230	1,692	1,523	1,634	2,108
Total	6,462	8,855	10,646	8,852	8,547
Total local value	857,304	947,808	1,147,123	r1,333,484	1,184,793

(a) Includes freshwater crayfish.

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- 10.38 Wool production and utilisation
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