
AGRICULTURAL INDUSTRIES

This chapter is divided into the following major parts: Introduction; Sources of statistics and definitions of units; Structural statistics (provides data on the legal arrangements, size and industry class of the business organisations operating within the agricultural sector); Value of agricultural commodities produced and index of values at constant prices; Apparent consumption of foodstuffs and nutrients; Land tenure and utilisation; Crop statistics; Livestock statistics; Livestock products; Agricultural improvements, employment, regulation of agricultural industries, and the agricultural research activities of the Commonwealth Scientific and Industrial Research Organisation (CSIRO).

Introduction

The development of Australian agricultural industries has been determined by interacting factors such as profitable markets, the opening up of new land (including the development of transport facilities) and technical and scientific achievements. Subsistence farming, recurring gluts, low prices and losses to farmers were gradually overcome by the development of an export trade. Profitable overseas markets for merino wool and wheat, and the introduction of storage and refrigerated shipping for the dairying and meat industry, combined to make the agricultural sector Australia's main export earner. Until the late 1950s, agricultural products comprised more than 80 per cent of the value of Australia's exports. Since then, the proportion of Australia's exports from the agricultural sector has declined markedly.

However, this decline in importance has been due not to a decline in agricultural activity but rather to an increase in the quantity and values of the exports of the mining and manufacturing sectors. In fact, the agricultural sector experienced an increase in total output over that period. One interesting aspect of this increase in output is that it was accompanied by a large reduction in the size of the agricultural labour force, implying a large growth in productivity within the sector.

Sources of statistics and definitions of units

The major source of the statistics in this chapter is the Agricultural Census conducted at 31 March each year. A wide range of information is collected from agricultural establishments with agricultural activity covering the physical aspects of agriculture such as area and production of crops, fertilisers used, number of livestock disposed of, etc. In conjunction with the Census, certain supplementary collections are conducted in some States where this has proved expedient, e.g. where the harvesting of certain crops has not been completed by 31 March (apples, potatoes, etc.), special returns covering the crops concerned are collected after the completion of the harvest.

The ABS excludes from the Census those establishments which make only a small contribution to overall agricultural production. Since 1986–1987, the Census includes establishments with agricultural activity which had, or were expected to have, an estimated

value of agricultural operations of \$20,000 or more. Prior to this (1982–83 to 1985–86) the cut-off value was \$2,500.

While these alterations have resulted in some changes in the counts of numbers of establishments appearing in publications, the effect on the statistics of production of major commodities is small. Statistics of minor commodities normally associated with small scale operations may be affected to a greater extent.

Details of the method used in the calculation of the estimated value of agricultural operations are contained in the publication *Agricultural Industries: Structure of Operating Units, Australia* (7102.0).

Integrated Register Information System—IRIS

Details of agricultural units for 1986–87 have been derived from IRIS. Details of the structure of economic units engaged in agriculture, in hierarchical order, are:

- **Enterprise** (the second level of economic unit). The enterprise is that unit comprising all operations in Australia of a single operating legal entity. (The term 'single legal entity' means a sole trader, partnership, company, trust, cooperative or estate in the private sector, or a department, local government authority or statutory authority in the government sector). For the agricultural sector, a 'multi-State enterprise' is an enterprise which belongs to an enterprise group which undertakes agricultural activities in more than one State.
- **Establishment** (the smallest economic unit). The establishment covers all operations carried out by one enterprise at a single physical location.

Other statistical collections

The ABS conducts a number of other collections to obtain agricultural statistics. These include collections from wool brokers and dealers, livestock slaughterers and other organisations involved in the marketing and selling of agricultural commodities.

For financial statistics from the Agricultural Finance Survey, conducted for 1986–87, see *Agricultural Industries Financial Statistics, Australia, 1986–87, Preliminary* (7508.0).

Structural Statistics

The following tables provide information relating to the structure of operating units during 1987–88. Although the definitions of the operating units have been provided above, the following terminology is also used:

- **Industry**. As set out in the *Australian Standard Industrial Classification (ASIC)* (1201.0 and 1202.0). These publications provide details of the methodology used in determining the industry class of an economic unit.
- **Estimated Value of Agricultural Operations (EVAO)**. This is determined by valuing the physical crop and livestock information collected in the Agricultural Census.

A further explanation of this terminology and more detailed statistics are given in the publication *Agricultural Industries: Structure of Operating Units, Australia* (7102.0).

ESTABLISHMENTS WITH AGRICULTURAL ACTIVITY, INDUSTRY AND ESTIMATED VALUE OF AGRICULTURAL OPERATIONS
AUSTRALIA, 31 MARCH 1988

ASIC Code	Industry of establishment Description	Estimated value of agricultural operations (\$'000)											Total establishments
		Less than 20	20-29	30-39	40-49	50-59	60-74	75-99	100-149	150-199	200-499	500 or more	
0124	Poultry for meat	17	16	21	25	26	49	108	165	95	112	75	709
0125	Poultry for eggs	27	22	16	15	19	32	32	100	78	235	159	746
0134	Grapes	223	321	387	444	385	447	531	392	122	114	22	3,388
0135	Plantation fruit	170	187	189	172	134	142	180	229	114	117	36	1,670
0136	Orchard and other fruit	548	462	466	485	406	503	509	718	361	562	176	5,200
0143	Potatoes	28	39	56	81	86	113	160	249	173	351	71	1,407
0144	Vegetables (except potatoes)	316	301	274	223	212	214	293	413	274	602	244	3,366
0181	Cereal grains (incl. oilseeds n.e.c.)	416	477	471	434	455	672	1,050	1,419	902	1,670	305	8,271
0182	Sheep—cereal grains	181	515	820	1,099	1,113	1,854	3,153	4,948	3,073	4,859	596	22,121
0183	Meat cattle—cereal grains	179	200	279	248	200	232	336	417	226	340	57	2,793
0184	Sheep—meat cattle	244	516	749	732	646	855	1,386	1,318	724	1,100	218	8,182
0185	Sheep	758	1,270	1,782	1,816	1,688	2,230	3,085	3,639	2,179	3,114	432	22,242
0187	Meat cattle	2,423	3,023	2,435	1,832	1,555	2,258	3,501	3,351	1,755	1,088	350	19,857
0189	Milk cattle	197	51	87	121	157	2,056	3,520	3,151	1,028	648	40	15,319
0188	Pigs	84	97	126	141	108	101	234	338	205	345	18	1,357
0191	Sugar cane	41	121	220	424	578	849	1,059	1,096	496	461	25	5,393
0192	Peanuts	10	19	27	32	28	29	61	66	33	66	6	345
0193	Tobacco	1	5	4	13	16	42	89	218	72	66	3	529
0194	Cotton	2	32	2	4	5	10	14	32	36	220	302	627
0195	Nurseries	687	80	150	99	77	184	121	241	115	244	111	2,109
0196	Agriculture n.e.c.	626	453	427	318	241	260	236	233	116	167	31	3,108
	Total (ASIC code 01)	7,178	8,585	9,817	9,569	9,148	12,821	17,363	21,073	11,173	16,449	3,367	126,543
02	Services to agriculture	3	11	15	9	5	8	8	6	5	3	—	73
03	Forestry and logging	—	3	4	3	1	1	3	2	1	—	—	21
04	Fishing and hunting	—	1	1	2	1	1	1	1	—	—	—	8
	Total (ASIC Division A)	7,183	8,600	9,837	9,583	9,155	12,831	17,375	21,082	11,179	16,452	3,368	126,645
B	Mining	1	2	—	—	—	—	—	—	—	—	—	—
C	Manufacturing	12	17	19	13	11	11	12	11	2	9	13	137
D	Electricity, Gas and Water	10	20	11	11	5	6	7	7	5	2	—	2
E	Construction	34	15	9	8	8	15	15	12	5	11	5	84
F	Wholesale and Retail Trade	17	28	15	16	11	18	9	9	3	3	—	130
G	Transport and Storage	—	—	—	—	—	—	—	—	—	—	—	130
H	Communication	—	—	—	—	—	—	—	—	—	—	—	—
I	Finance, Property and Business Services	9	5	1	3	3	2	2	2	1	1	2	31
J	Public Administration and Defence	1	—	—	—	—	—	—	—	—	—	—	3
K	Community Services	7	5	12	3	9	8	17	18	19	31	7	136
L	Recreation, Personal and Other Services	8	4	5	2	1	3	2	5	—	1	—	31
	Total, all industries	7,282	8,696	9,909	9,641	9,203	12,888	17,440	21,148	11,223	16,512	3,396	127,338

NUMBER OF UNITS BY TYPE OF UNIT

Year/unit	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
31 March 1986—									
Agricultural establishments(a)	51,728	43,931	33,745	18,739	16,004	5,199	267	103	169,716
Establishments with agricultural activity(a)	52,042	44,317	33,936	18,971	16,258	5,283	269	104	171,180
31 March 1987—									
Agricultural establishments(a)	36,955	33,808	25,531	14,983	13,536	3,543	283	68	128,707
Establishments with agricultural activity(a)	37,131	33,987	25,676	15,084	13,692	3,615	285	68	129,538
31 March 1988—									
Agricultural establishments(a)	37,532	32,362	25,111	14,540	13,226	3,434	272	66	126,543
Establishments with agricultural activity(a)	37,698	32,532	25,254	14,647	13,367	3,499	274	67	127,338

(a) Statistics for the year ended 31 March 1986 are not directly comparable with statistics for subsequent periods due to change in census EVAO cut-off levels.

AGRICULTURAL ESTABLISHMENTS (a) INDUSTRY, 1987-88

Industry of establishment		NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Australia
ASIC Code	Description									
0124	Poultry for meat	371	123	96	59	47	13	—	—	709
0125	Poultry for eggs	265	155	146	63	93	19	4	1	746
0134	Grapes	644	1,580	50	998	110	4	2	—	3,388
0135	Plantation fruit	771	—	761	—	131	—	7	—	1,670
0136	Orchard and other fruit	1,609	964	827	1,173	417	204	5	1	5,200
0143	Potatoes	166	521	230	99	150	241	—	—	1,407
0144	Vegetables (except potatoes)	634	578	1,027	476	420	202	27	2	3,366
0181	Cereal grains (incl. oilseeds n.e.c)	2,008	1,999	2,017	1,580	645	9	13	—	8,271
0182	Sheep — cereal grains	7,724	4,023	289	4,837	5,224	24	—	—	22,121
0183	Meat cattle — cereal grains	1,062	185	1,457	60	23	2	4	—	2,793
0184	Sheep — meat cattle	3,439	2,374	672	717	588	376	—	16	8,182
0185	Sheep	8,071	6,244	1,457	2,343	3,252	851	—	28	22,246
0186	Meat cattle	4,676	3,761	6,464	344	940	481	176	15	16,857
0187	Milk cattle	2,594	8,371	2,158	1,032	553	806	4	1	15,519
0188	Pigs	608	289	570	271	153	65	1	—	1,957
0191	Sugar cane	438	—	4,955	—	—	—	—	—	5,393
0192	Peanuts	3	—	338	—	4	—	—	—	345
0193	Tobacco	22	181	326	—	—	—	—	—	529
0194	Cotton	356	—	271	—	—	—	—	—	627
0195	Nurseries	927	365	341	193	229	34	19	1	2,109
0196	Agriculture n.e.c	1,144	649	659	295	247	103	10	1	3,108
	Total (ASIC code 01)	37,532	32,362	25,111	14,540	13,226	3,434	272	66	126,543
02	Services to agriculture	5	18	18	9	21	2	—	—	73
03	Forestry and logging	5	1	7	—	1	7	—	—	21
04	Fishing and hunting	—	—	—	—	4	4	—	—	8
	Total (ASIC Division A)	37,542	32,381	25,136	14,549	13,252	3,447	272	66	126,645
B	Mining	3	2	1	1	2	—	—	—	9
C	Manufacturing	21	27	11	37	36	4	—	1	137
D	Electricity, Gas and Water	—	2	—	—	—	—	—	—	2
E	Construction	13	35	6	9	13	8	—	—	84
F	Wholesale and Retail Trade	48	22	20	11	11	17	1	—	130
G	Transport and Storage	28	36	15	17	20	14	—	—	130
H	Communication	—	—	—	—	—	—	—	—	—
I	Finance, Property and Business Services	6	5	7	8	3	1	1	—	31
J	Public Administration and Defence	2	—	—	1	—	—	—	—	3
K	Community Services	27	11	55	11	25	7	—	—	136
L	Recreation, Personal and Other Services	8	11	3	3	5	1	—	—	31
	Total, all industries	37,698	32,532	25,254	14,647	13,367	3,499	274	67	127,338

Value of Agricultural Commodities Produced and Index of Values at Constant Prices

Definitions

Gross value of commodities produced: the value placed on recorded production at the wholesale prices realised in the market place.

Marketing costs: include freight, cost of containers, commission and other charges incurred in marketing.

Local value of commodities produced: the value placed on commodities at the place of production as is ascertained by deducting marketing costs from the gross value.

Index of values at constant prices: the index of the gross value of commodities produced at constant prices, i.e. it is a measure of change in value after the direct effects of price changes have been eliminated.

VALUES OF AGRICULTURAL COMMODITIES, 1987-88

	<i>Gross value of agricultural commodities produced</i>	<i>Marketing costs</i>	<i>Local value of commodities produced</i>	<i>Index of values at constant prices of agricultural commodities produced (a) (Base year: 1984-85 = 1,000)</i>
	\$m	\$m	\$m	
Crops	7,812.0	1,102.5	6,709.5	862
Livestock slaughterings and other disposals	5,074.3	377.6	4,696.7	1,171
Livestock products	7,256.2	265.9	6,990.3	1,078
Total agriculture	20,151.8	1,745.9	18,405.9	991

(a) Weighted by averages unit values for the year 1979-80.

Publications

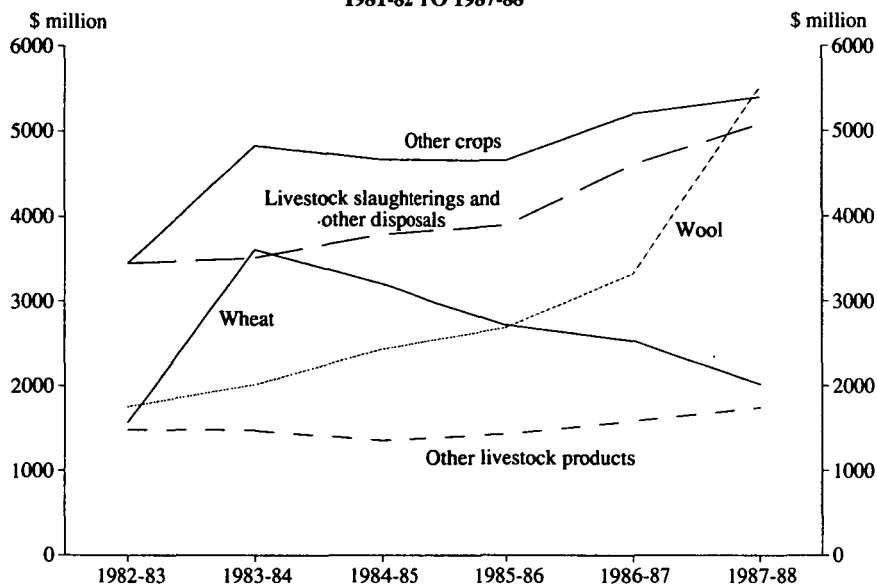
Two preliminary estimates of value of commodities produced are published: *Value of Principal Agricultural Commodities Produced, Australia, Preliminary (7501.0)* and *Value of Selected Agricultural Commodities Produced, Australia, Preliminary (7502.0)*. A final publication, *Value of Agricultural Commodities Produced, Australia (7503.0)*, contains Indexes of Values at Constant Prices.

Index of Agricultural Commodities Produced

The index is consistent in scope with those of previous years. The indexes are weighted by the average unit values for the year 1984-85 with a reference base of 1984-85=1,000.

For further details on how these and earlier series were calculated see *Year Book* No. 61, and *Value of Agricultural Commodities Produced, Australia (7503.0)*.

**GROSS VALUE OF SELECTED AGRICULTURAL COMMODITIES
1981-82 TO 1987-88**



**GROSS VALUE OF AGRICULTURAL COMMODITIES PRODUCED
(\$ million)**

	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88
Crops—						
Barley for grain	290.8	732.6	759.3	586.8	432.6	459.8
Oats for grain	116.1	203.8	129.6	138.3	164.8	195.0
Wheat for grain	1,566.2	3,605.6	3,202.9	2,719.4	2,530.0	2,015.7
Other cereal grains	260.4	408.7	400.8	346.3	322.4	402.3
Sugar cane cut for crushing	508.9	516.6	512.2	494.2	586.4	618.2
Fruit and nuts	498.0	552.5	670.9	678.6	837.2	886.0
Grapes	212.5	217.0	259.4	270.0	272.2	353.7
Vegetables	556.9	738.6	628.8	713.6	885.4	952.9
All other crops (a)	1,000.5	1,451.1	1,303.5	1,430.5	1,706.7	1,528.9
Total crops	5,010.3	8,426.5	7,867.4	7,377.7	7,737.7	7,412.5
Livestock slaughterings and other disposals (b)—						
Cattle and calves (c)	2,076.2	2,118.0	2,253.2	2,367.3	2,819.7	3,057.0
Sheep and lambs	548.0	585.0	576.1	531.6	721.2	803.9
Pigs	414.9	375.5	438.1	438.3	468.5	536.1
Poultry	413.1	430.2	512.6	559.1	601.7	671.2
Total livestock slaughterings and other disposals (e)	3,452.2	3,508.6	3,783.3	3,896.4	4,611.0	5,074.3
Livestock products—						
Wool	1,760.9	2,016.1	2,434.4	2,693.4	3,333.6	5,516.6
Milk	1,186.5	1,153.2	1,035.4	1,106.7	1,257.4	1,390.9
Eggs	275.3	295.2	291.2	297.7	291.6	304.4
Total livestock products (d)	3,245.8	3,489.8	3,792.8	4,125.3	4,915.6	7,256.2
Total value of agricultural commodities produced	11,708.3	15,424.9	15,443.5	15,406.0	17,272.5	20,151.8

(a) Includes pastures and grasses cut for hay and harvested for seed. Excludes crops for green feed or silage. (b) Includes net exports of livestock. (c) Includes dairy cattle slaughtered. (d) Includes honey and beeswax. (e) Includes goats.

**INDEX OF VALUES AT CONSTANT PRICES OF AGRICULTURAL COMMODITIES
PRODUCED (a)**

(Base year: 1984-85 = 1,000)

	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88
Crops—							
Barley for grain	621	349	880	1,000	876	645	625
Oats for grain	1,148	604	1,630	1,000	943	1,171	1,275
Wheat for grain	873	469	1,179	1,000	865	880	652
Other cereal grains	952	662	1,107	1,000	974	924	970
Sugar cane (b)	995	1,021	917	1,000	987	967	978
Fruit and nuts	887	913	872	1,000	1,007	1,099	1,153
Grapes	929	885	927	1,000	1,018	936	921
Vegetables	836	819	865	1,000	988	1,046	1,172
All other crops (c)	705	586	884	1,000	1,019	1,056	1,087
<i>Total</i>	837	604	1,028	1,000	933	933	862
Livestock slaughtering and other disposals—							
Cattle and calves (d)	1,201	1,178	1,026	1,000	1,057	1,138	1,202
Sheep and lambs	940	1,013	949	1,000	1,065	1,107	1,077
Pigs	875	917	973	1,000	1,041	1,086	1,140
Poultry	809	907	863	1,000	1,062	1,112	1,167
<i>Total (e)</i>	1,070	1,086	986	1,000	1,057	1,124	1,171
Livestock products—							
Wool	866	850	877	1,000	1,002	1,070	1,109
Milk	862	912	981	1,000	996	1,019	1,015
Eggs	1,050	1,089	1,060	1,000	1,010	1,022	1,051
<i>Total (f)</i>	879	885	920	1,000	1,000	1,052	1,078
Total agricultural commodities produced	905	791	991	1,000	980	1,009	991

(a) Indexes of values at constant prices (weighted by average unit values of the year 1979-80). (b) Sugar cane cut for crushing and planting. (c) Includes pasture and grasses. Excludes crops for green feed or silage. (d) Includes dairy cattle slaughtered. (e) Component series based on carcass weight. (f) Includes honey and beeswax.

Apparent Consumption of Foodstuffs and Nutrients

Estimates of consumption in Australia are compiled by deducting net exports from the sum of production and imports and allowing for recorded movement in stocks of the respective commodities. The term 'consumption' is used in a specialised sense, since the quantities actually measured are broadly the quantities available for consumption at a particular level of distribution, i.e. ex-market, ex-store or ex-factory depending on the method of marketing and/or processing. Because consumption of foodstuffs is measured, in general, at 'producer' level no allowance is made for wastage before they are consumed. The effect of ignoring wastage is ultimately to overstate consumption but it is believed that more efficient distribution and storage methods in recent years have cut down wastage. Furthermore, it is likely that many of the foodstuffs are being supplemented by householders' self-supplies over and above the broad estimate already made.

The estimates of consumption per capita have been obtained by using the mean resident population for the period.

More detailed information on the consumption of foodstuffs is contained in the publication *Apparent Consumption of Foodstuffs and Nutrients, Australia* (4306.0). For some commodities, more timely information is contained in the publication *Apparent Consumption of Selected Foodstuffs, Australia, Preliminary* (4315.0).

APPARENT PER CAPITA CONSUMPTION OF FOODSTUFFS
(Kg—unless otherwise indicated)

<i>Commodity</i>	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87
Meat and meat products—						
Meat (carcass equivalent weight)						
Beef	47.3	42.4	39.9	40.0	39.3	37.5
Veal	2.6	3.5	2.4	2.1	2.1	1.9
<i>Beef and veal</i>	49.8	45.9	42.3	42.1	41.4	39.4
Lamb	16.3	16.2	16.9	17.0	16.9	15.0
Mutton	3.5	4.5	5.2	6.6	7.1	7.4
Pigmeat (a)	15.1	15.3	16.4	16.4	17.0	16.8
<i>Total</i>	84.7	81.7	80.9	82.9	82.3	78.5
Offal and meat, n.e.i.	4.4	4.4	3.4	2.8	2.7	3.4
Total meat and meat products	89.1	86.1	84.3	85.0	85.0	82.0
Poultry—						
Poultry (dressed weight)	19.6	20.3	20.0	21.8	23.0	23.5
Seafood—						
Fresh and frozen (edible weight)—						
Fish—						
Australian	1.6	1.2	1.7	1.8	2.2	2.3
Imported	1.1	1.5	1.8	1.9	1.8	1.8
Crustacea and molluscs	1.0	1.1	0.8	0.9	0.7	0.8
Seafood otherwise prepared (product weight)—						
Australian	0.4	0.6	0.6	0.4	0.5	0.5
Imported						
Fish	1.9	1.5	2.0	1.9	1.8	1.7
Crustacea and molluscs	0.5	0.4	0.4	0.5	0.5	0.5
Total seafood	6.5	6.3	7.3	7.4	7.5	7.6
Milk and milk products—						
Market milk (fluid whole)(litres)	103.1	102.9	101.6	101.8	102.5	102.9
Condensed, concentrated and evaporated milk—						
Full cream sweetened	0.6	0.9	0.7	0.7	2.8	2.5
Full cream unsweetened	2.4	1.8	2.2	2.0		
Skim	1.2	0.8	0.9	1.2	0.9	1.0
Powdered milk—						
Full cream	0.9	0.8	0.7	0.7	0.6	0.9
Skim	2.8	2.7	2.3	2.3	2.3	2.7
Infants' and invalids' food	1.3	1.2	1.2	1.0	1.2	1.0
Cheese (natural equivalent weight)	7.0	7.4	7.7	8.1	8.0	8.1
Total (converted to milk solids, fat and non-fat)	23.0	22.7	22.5	22.7	22.6	24.1
Fruit and fruit products—						
Fresh fruit (incl. fruit for fruit juice)—						
Citrus	36.4	47.9	51.2	45.3	40.8	40.6
Other	37.8	39.6	38.1	41.4	42.1	45.3
Jams, conserves, etc	1.8	1.8	1.8	2.1	1.9	1.9
Dried fruit	2.3	2.5	2.4	3.0	2.9	2.3
Processed fruit	10.3	9.4	9.8	11.1	8.0	7.7
Total (fresh fruit equivalent)	97.4	110.6	113.3	114.6	106.9	106.4
Vegetables—						
White potatoes	57.6	52.2	62.6	59.9	57.7	60.6
Other root and bulb vegetables	18.7	16.9	17.4	19.3	18.9	18.9
Tomatoes	16.7	16.5	18.6	19.6	16.9	18.0
Leafy and green vegetables	20.8	21.4	21.9	22.5	22.8	21.8
Other vegetables	17.1	17.9	18.3	21.0	20.0	19.9
Total (fresh equivalent weight)	130.8	124.9	138.8	142.4	136.2	139.3
Grain products—						
Flour (b)	72.0	67.1	73.1	72.6	71.8	72.0
Breakfast foods—						
Oatmeal and rolled oats	0.9	1.2	1.3	1.3	1.5	1.6
Other (from grain)	7.1	7.6	7.9	8.2	n.a.	8.1
<i>Total breakfast foods</i>	8.0	8.7	9.2	9.6	n.a.	9.7
Table rice	2.9	3.0	3.3	3.7	3.7	3.7
Total grain products	82.9	78.8	85.6	85.8	n.a.	85.4
Bread	47.5	49.3	45.6	45.4	n.a.	n.a.
Eggs and egg products—						
Equivalent number of eggs (c)	222	141	145	143	140	138
Nuts (in shell)—						
Peanuts	1.5	2.1	1.8	1.4	1.6	2.1
Tree nuts	3.3	3.2	3.6	3.8	3.8	3.5

For footnotes see over.

APPARENT PER CAPITA CONSUMPTION OF FOODSTUFFS—continued
(Kg—unless otherwise indicated)

Commodity	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87
Oils and fats—						
Butter	4.3	4.0	3.9	3.9	3.8	3.5
Margarine						
Table margarine	6.8	6.8	6.9	6.6	6.9	6.8
Other margarine	2.7	2.8	2.7	2.3	2.1	2.1
Total margarine	9.5	9.6	9.6	9.0	9.0	8.9
Total (fat content) (d)	21.8	21.6	21.5	21.0	21.0	20.6
Sugar—						
As refined sugar	12.5	12.0	11.5	10.0	8.2	8.6
In manufactured foods	34.8	34.0	32.4	34.2	36.8	35.3
Total	47.2	46.0	43.9	44.2	45.0	43.9
Honey	0.9	0.8	0.9	0.7	0.8	0.9
Total (e)	51.5	49.6	49.0	49.1	49.9	48.9
Beverages—						
Tea	1.6	1.4	1.5	1.4	1.4	1.3
Coffee (f)	1.9	2.0	2.1	2.0	1.6	1.8
Aerated and carbonated waters (litres)	64.2	65.7	63.0	67.3	73.0	73.6
Beer (litres)	128.6	121.6	117.8	114.5	115.5	111.0
Wine (litres)	19.1	19.7	20.4	21.3	21.6	21.0
Spirits (litres alcohol)	1.2	1.2	1.1	1.2	1.3	1.2

(a) Includes bacon and ham. (b) Includes flour used for breadmaking. (c) Data from 1982-83 consist of commercial disposals only. (d) Includes an estimate for vegetable oils and other fats. (e) Includes sugar content of syrups and glucose. (f) Coffee and coffee products in terms of roasted coffee.

Nutrients

The nutrients table has been compiled by the Nutrition Section of the Commonwealth Department of Community Services and Health and is based on the estimates of the quantity of foodstuffs available for per capita consumption.

For further information on the level of nutrient intake see the publication *Apparent Consumption of Foodstuffs and Nutrients, Australia* (4306.0).

ESTIMATED SUPPLY OF NUTRIENTS AVAILABLE FOR CONSUMPTION (a)
(per capita per day)

(Source: Department of Community Services and Health)

Nutrient	Unit	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87
Protein							
Animal	g	65.0	64.1	62.9	64.3	64.7	63.2
Vegetable	g	33.2	32.2	34.7	34.4	34.1	34.4
Total	g	98.2	96.3	97.6	98.7	98.8	97.7
Fat (from all sources)	g	148.0	145.9	146.3	146.0	146.7	143.1
Carbohydrate	g	399.9	386.3	405.7	407.5	404.6	403.1
Calcium	mg	917	914	912	924	914	931
Iron	mg	15.0	14.9	15.1	15.3	15.2	14.9
Vitamin A activity	µg	1,510	1,496	1,446	1,400	1,367	1,436
Vitamin C (b)—							
Unadjusted	mg	105.0	114.0	122.0	119.0	112.0	114.0
Adjusted	mg	77.0	88.0	93.2	90.8	83.8	87.3
Thiamin (b)—							
Unadjusted	mg	1.8	1.8	1.9	1.9	1.9	1.9
Adjusted	mg	1.5	1.5	1.6	1.6	1.6	1.6
Riboflavin	mg	2.6	2.6	2.6	2.6	2.6	2.6
Niacin (b)—							
Unadjusted	mg	22.5	22.7	23.0	23.2	23.2	23.3
Adjusted	mg	38.9	38.7	39.3	39.7	39.7	39.7
Energy value	kJ	14,471	14,125	14,458	14,506	14,497	14,301

(a) Figures are based on conversion factors calculated from the revised and enlarged edition of S. Thomas and M. Corden *Metric Tables of Composition of Australian Foods*, Canberra, 1977. (b) Data show adjustments made for loss of nutrients in cooking and the extra niacin obtained from the metabolism of protein.

Land Tenures

Land tenure statistics mainly relate to land held under freehold tenure ('alienated or in process of alienation') or leasehold tenure ('leased or licensed') with all agricultural establishments falling within these categories. Descriptions of the land tenure systems of the States and the Territories, and conspectuses of land legislation in force were provided in *Year Book* No. 48 and *Year Book* No. 50.

Disposal of Crown lands

For a description of the provisions that exist in all mainland States for the disposal of Crown lands for public purposes, for unconditional purchase and occupation under lease or licence, see *Year Book* No. 61.

Closer settlement and war service settlement

Particulars of these are given in issues of the *Year Book* up to No. 22, and in *Year Book* Nos 48, 55 and 61.

Alienation and occupation of Crown lands

For data relating to land tenures in the States and Territories, see *Year Book* No. 66 and *Year Book* No. 67.

Land Utilisation in Australia

The total area under tenure differs from the total area of agricultural establishments (shown in the following table) by amounts which represent unused land or land held for non-agricultural purposes. In general, land in the more fertile regions tends to be mostly freehold, while the less productive land is held under Crown lease or licence.

AREA OF ESTABLISHMENTS WITH AGRICULTURAL ACTIVITY (million hectares)

<i>At 31 March</i>	<i>NSW</i>	<i>Vic.</i>	<i>Qld</i>	<i>SA</i>	<i>WA</i>	<i>Tas.</i>	<i>NT</i>	<i>Aust. (incl. ACT)</i>
1983	64.0	14.2	155.9	60.2	112.0	2.2	75.2	483.8
1984	64.0	14.3	158.1	62.1	114.3	2.2	73.7	488.6
1985	63.7	14.2	157.2	62.7	114.0	2.1	74.0	488.0
1986	63.3	14.2	158.1	60.7	113.8	2.1	72.9	485.2
1987	60.8	13.1	152.0	57.4	113.0	2.0	71.2	471.0
1988	61.5	13.1	152.4	60.0	113.5	2.0	69.6	472.0

LAND UTILISATION: AUSTRALIA (million hectares)

<i>Year</i>	<i>Area of</i>			<i>Total</i>		<i>Percentage of Australian land area (768,284,000 hectares)</i>
	<i>Crops (a)</i>	<i>Sown pastures and grasses</i>	<i>Balance (b)</i>	<i>Area of establishments</i>		
1982-83	19.4	25.6	438.8	483.8	63.0	
1983-84	22.0	26.1	440.5	488.6	63.6	
1984-85	21.1	27.1	439.8	488.0	63.5	
1985-86	20.9	27.5	436.8	485.2	63.2	
1986-87	20.0	27.3	424.0	471.0	61.3	
1987-88	18.4	28.6	426.0	472.0	61.4	

(a) Excludes pastures and grasses harvested for hay and seed which have been included in 'sown pastures and grasses'. (b) Used for grazing, lying idle, fallow, etc.

The total area of agricultural establishments in 1986-87 constituted 61.4 per cent of the Australian land area, the remainder being urban areas, State forests and mining leases, with an overwhelming proportion of unoccupied land (mainly desert). The balance data include large areas of arid or rugged land held under grazing licences but not always used for grazing. Balance data also include variable amounts of fallow land.

The crop area data represent up to 3.9 per cent of the area of agricultural establishments and emphasise the relative importance of the livestock industry in Australia.

Crops

For this section, statistics relating to crop areas and production have been obtained from the annual Agricultural Census. The Census returns are collected in all States and the two Territories at 31 March each year and relate mainly to crops sown in the previous twelve months.

Where harvests are not completed by March (e.g. potatoes), provision is made in some States for a supplementary collection after the harvest is completed. Additional statistics relating to value of agricultural commodities produced, manufactured production and overseas trade are also included. Agricultural Census data published in this section refer to the 'agricultural' year ended 31 March, while other data refer to the year ended 30 June; but for most purposes there will be little error involved in considering 'agricultural year' data as applying to the financial year.

The following table shows the area of crops in each of the States and Territories of Australia since 1870-71.

AREA OF CROPS (a)
(^{'000} hectares)

Year	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
1870-71	156	280	21	325	22	64	—	—	868
1880-81	245	627	46	846	26	57	—	—	1,846
1890-91	345	822	91	847	28	64	—	—	2,197
1900-01	990	1,260	185	959	81	91	—	—	3,567
1910-11	1,370	1,599	270	1,112	346	116	—	—	4,813
1920-21	1,807	1,817	316	1,308	730	120	—	1	6,099
1930-31	2,756	2,718	463	2,196	1,939	108	1	2	10,184
1940-41	2,580	1,808	702	1,722	1,630	103	—	2	8,546
1949-50	2,295	1,881	832	1,518	1,780	114	—	4	8,424
1954-55	2,183	1,904	1,049	1,711	2,069	122	—	2	9,040
1959-60	2,888	1,949	1,184	1,780	2,628	130	1	3	10,564
1964-65	4,182	2,621	1,605	2,414	3,037	163	2	4	14,028
1969-70	4,999	2,212	2,208	2,290	3,912	98	6	2	15,728
1971-72	4,186	1,925	2,017	2,278	3,751	67	7	1	14,231
1972-73	4,329	1,943	1,963	2,122	3,814	80	12	1	14,265
1973-74	4,628	1,981	1,786	2,451	4,133	74	6	1	15,060
1974-75	4,089	1,772	1,898	2,257	3,754	67	7	1	13,845
1975-76	4,285	1,851	2,010	2,116	4,208	60	8	1	14,539
1976-77	4,520	1,943	2,026	2,036	4,417	65	2	1	15,010
1977-78	4,984	2,163	2,107	2,564	4,910	70	1	1	16,800
1978-79	5,020	2,209	2,307	2,827	4,993	80	2	1	17,438
1979-80	5,243	2,243	2,334	2,771	5,281	79	2	1	17,954
1980-81	5,208	2,180	2,481	2,772	5,547	84	1	1	18,273
1981-82	5,744	2,184	2,765	2,865	5,963	90	2	1	19,613
1982-83	5,200	2,234	2,648	2,856	6,380	98	3	1	19,420
1983-84	6,566	2,655	2,998	3,108	6,526	101	5	1	21,961
1984-85	5,789	2,569	3,047	2,902	6,723	99	6	1	21,136
1985-86	5,990	2,528	3,231	3,039	5,970	88	7	1	20,853
1986-87	5,325	2,317	3,036	3,066	5,930	78	12	—	19,764
1987-88	4,908	2,159	2,870	2,990	5,334	84	13	1	18,359

(a) The classification of crops was revised in 1971-72 and adjustments made to statistics back to 1967-68. After 1966-67 lucerne for green feed, hay and seed, and pasture cut for hay and harvested for seed or green feed are excluded. NOTE: From 1970-71 to 1980-81 figures related to area 'used for' crops, i.e. an area used for more than one purpose during the year was counted only once. From 1981-82, an area double cropped has been counted separately each time used.

The wide range of climatic and soil conditions over the agricultural regions of Australia has resulted in a diversity of crops being grown throughout the country. Generally, cereal crops (excluding rice, maize and sorghum) are grown in all mainland States over wide areas, while other crops are confined to specific locations in a few States. However, scanty or erratic rainfall, limited potential for irrigation and unsuitable soils or topography have restricted intensive agriculture. Despite this, agricultural production has increased over time to meet increased demands both in Australia and from overseas.

The following table provides a summary of the area, production and gross value of the principal crops in Australia.

CROPS: AREA, PRODUCTION AND GROSS VALUE

	1985-86			1986-87			1987-88		
	Area (^{'000} ha)	Prod- uction (^{'000} tonnes)	Gross value (^{'000} \$m)	Area (^{'000} ha)	Prod- uction (^{'000} tonnes)	Gross value (^{'000} \$m)	Area (^{'000} ha)	Prod- uction (^{'000} tonnes)	Gross value (^{'000} \$m)
Cereals for grain—									
Barley	3,284	4,868	587	2,274	3,548	433	2,346	3,417	460
Grain sorghum	734	1,416	181	818	1,419	162	745	1,633	208
Maize	84	278	40	58	206	31	56	208	32
Oats	1,068	1,330	138	1,140	1,584	165	1,275	1,698	195
Rice	107	716	81	96	608	85	106	740	117
Wheat	11,736	16,167	2,719	11,135	16,119	2,530	9,005	12,287	2,016
Legumes for grain	894	854	163	1,244	1,315	294	1,615	1,342	330
Crops for hay—									
Oats	182	594	47	205	676	58	228	714	61
Wheat	59	165	13	67	186	15	76	200	17
Crops for green feed, silage—									
Barley	75			85			91		
Forage sorghum	117			117			212		
Oats	662	n.a.	n.a.	645	n.a.	n.a.	759	n.a.	n.a.
Wheat	29			71			60		
Sugar cane cut for crushing	304	24,402	494	300	24,742	586	387	24,832	618
Tobacco	5	11	56	5	12	65	5	13	73
Cotton	177	685	325	156	612	373	245	762	425
Peanuts (in shell)	29	43	38	34	48	42	32	37	33
Soy Beans	71	105	28	54	90	27	43	69	29
Rapeseed	74	87	24	65	76	18	58	66	18
Sunflower	277	215	53	193	137	34	200	216	66
Fruit (excl. grapes)	113	—	679	107	—	837	109	—	886
Fruit—									
Orchard	94	—	518	89	—	634	91	—	670
Oranges	n.a.	496	132	n.a.	504	126	n.a.	479	146
Apples	20	292	139	19	325	205	19	300	186
Pears	n.a.	143	64	n.a.	145	77	n.a.	102	78
Peaches	n.a.	61	29	n.a.	61	41	n.a.	66	48
Bananas	10	134	102	9	156	127	9	160	133
Pineapples	6	132	33	6	142	42	6	147	41
Grapes	64	907	270	57	783	272	57	799	354
Vegetables	111	—	714	111	—	885	117	—	953
Potatoes	36	965	206	37	1,015	267	40	1,082	270
Total, all crops (excluding pastures)	20,853	—	7,049	19,764	—	7,318	18,359	—	7,812

Cereal Grains

In Australia, cereals are conveniently divided into autumn–winter–spring growing ('winter' cereals) and spring–summer–autumn growing ('summer' cereals). Winter cereals such as wheat, oats, barley and rye are usually grown in rotation with some form of pasture such as grass, subterranean clover, medics or lucerne. In recent years, alternative winter crops such as rapeseed, field peas and lupins have been introduced to cereal rotation in areas where they had not previously been grown. Rice, maize, sorghum and the millets are summer cereals with the latter two being grown in association with winter cereals in some areas. In Northern Queensland and Western Australia there are two rice growing seasons—a dry season winter crop and a wet season summer crop.

Cereals for grain form a significant percentage of both the value of Australia's agricultural commodities and of the country's export earnings. The following table shows the significance of cereal grains in the last 6 years.

CEREAL GRAINS IN AUSTRALIA: A PERSPECTIVE

Year	Cereal grains (a)		Total agriculture gross value	Total Australian exports— all produce value f.o.b.	Gross value of cereal grains as a percentage of gross value of agriculture	Export value of cereal grains as a percentage of total Australian exports
	Gross value	Export value f.o.b.			per cent	per cent
	\$m	\$m	\$m	\$m		
1982–83	2,230.4	1,669.7	11,714	21,454	19.0	7.8
1983–84	4,950.6	2,564.9	15,425	24,013	32.1	10.6
1984–85	4,492.6	4,068.8	15,444	29,708	29.1	13.7
1985–86	3,790.8	3,812.6	15,406	32,795	24.6	11.6
1986–87	3,449.8	2,628.6	17,272	35,783	20.0	7.3
1987–88	3,072.8	2,089.6	20,151	39,691	15.2	5.3

(a) Principally wheat, barley, oats, grain sorghum, rice and maize, with panicum/millet, canary seed and rye being minor cereals.

Wheat

Wheat is grown in all States, and is Australia's most important crop in terms of production and exports. As 70 to 80 per cent of the wheat crop is exported, wheat marketing arrangements play an important role in the industry. The Australian Wheat Board (AWB) was constituted in September 1939, under National Security (Wheat Acquisition) Regulations, to purchase, sell or dispose of wheat and wheat products. At the end of World War II, the AWB continued to operate under extensions to these regulations, until 1948, when the Commonwealth and States agreed to national marketing arrangements. After a poll of growers had approved the plan the necessary complementary legislation was passed by the Commonwealth and the States. The *Wheat Industry Stabilization Act 1948* established the present AWB to acquire and market all wheat and to administer successive stabilisation plans. The *Wheat Marketing Act 1979* replaced the stabilisation plans with a guaranteed minimum price scheme, applicable to an unlimited quantity of wheat.

Wheat marketing and pricing arrangements 1984–85 to 1988–89

The basic elements of the new arrangements were negotiated between the Australian Wheatgrowers' Federation (now renamed the Grains Council of Australia) and Commonwealth and State Governments. The enactment of State legislation complementary to the Commonwealth legislation was necessary for the implementation of a national scheme.

Under these arrangements, which applied until 30 June 1989, the AWB was maintained as the statutory authority responsible for the marketing of wheat in Australia and overseas. It was also able to issue permits for the domestic sale of stockfeed wheat outside the pooling arrangements. The concept of a guaranteed minimum price is retained. The AWB has been given greater commercial freedom but is required to operate in accordance with an approved corporate plan and be accountable to growers as well as to parliament. Some of the main features of the 1984–85 to 1988–89 plan are outlined below.

Guaranteed Minimum Price

The Commonwealth Government underwrites wheat returns on a net basis through a Guaranteed Minimum Price (GMP) Scheme. The Australian Standard White (ASW) GMP is set at 95 per cent of the average of the estimated gross return per tonne for all wheat (ASW basis) from the subject season and the lowest two of the previous three seasons less the estimated pool costs per tonne for the subject season. Separate GMPs are established for categories of wheat, the quality of which is above or below ASW, based on the expected market value of the wheat in those categories relative to ASW.

Growers receive a split first advance payment. Upon delivery of the wheat, a grower is paid 90 per cent of the estimated GMP for the relevant category less contributions to research (wheat tax), dockages for non-approved varieties and allowances for storage, handling and transportation charges. When the final GMP has been determined (before 1 March during the subject season), the grower receives the final GMP, increased or decreased by an allowance for the quality of wheat (in addition to the deductions made at the time of delivery), less the interim advance payment already received. Initial allowances could be adjusted by the AWB at a later date to reflect actual costs and returns. If the net return per tonne exceeds the GMP, the excess is returned to growers by way of a final payment, made by instalments over a number of years. The government guarantees to meet any deficiency between the net pool return rate and the GMP.

These arrangements are market related but they provide the industry with support from the government that is designed to help it overcome any major short-run down-turn in producers' returns. Particulars of GMP rates may be found in *Crops and Pastures, Australia* (7321.0).

Financial arrangements

From 1984–85, the AWB, with the Minister's approval, was able to borrow overseas up to an amount equal to the aggregate size of expected foreign currency denominated sales in respect of a particular season, provided that amount did not exceed that season's net financing requirement.

Domestic pricing

The domestic price for human consumption wheat was determined each quarter by averaging the quoted export prices for the forward and past quarters and adding a margin to cover the additional costs of servicing the domestic market. Domestic prices for industrial and stockfeed wheats were quoted daily by the AWB in the light of its commercial judgment and were related to export prices. A Tasmanian freight levy applied to all wheat sales and was used exclusively to cover the cost of shipping wheat from the mainland to Tasmania each season.

Domestic marketing arrangements

The AWB controls the domestic marketing of wheat although domestic stockfeed wheat may be directly sold by growers to buyers under a permit issued by the AWB. The availability of these permits was governed by guidelines issued by the Federal Minister for Primary Industries and Energy and the relevant State Ministers. Wheat sold pursuant to a stockfeed purchase permit is subject to a deduction to cover wheat research tax, Tasmanian freight, the AWB's administration costs and an adjusted bulk handling authority charge. No pooling or GMP provisions or minimum or maximum prices apply in respect of such wheat.

The AWB could also authorise a grower to sell wheat on behalf of the AWB under grower-to-buyer direct delivery transactions. The grower and buyer negotiate quality and

freight allowances around the AWB's domestic ASW price applicable for the same end use. The proceeds of sale are incorporated in the AWB's pooling arrangements.

The grower receives payment from the AWB as if he had delivered ASW wheat, adjusted by the abovementioned allowances including a reduction in the relevant bulk handling authority's charge.

Wheat which is retained by a grower for his own use does not come under the control of the AWB. The AWB has power to import wheat for use on the domestic market.

Overseas marketing arrangements

Under the 1984 Act, the AWB maintains sole authority for the export of wheat but no longer controls the export of wheat products. The Act extended the powers of the Board in relation to overseas marketing to enable it to enter into tripartite barter arrangements and the sale and shipment of other grains in combination with wheat. The AWB undertakes market research and promotion both within and outside Australia.

Wheat classification

Unlike the other wheat exporting nations, Australia does not produce red grained wheats, nor does it have the traditional winter or spring wheats found in the northern hemisphere.

All Australian wheats are white grained, and all are planted during the Australian winter months of May, June and July. They grow during the spring months of August, September and October. The harvest commences in Queensland in September–October and gradually progresses southwards, culminating in Victoria and the southern part of Western Australia in January.

The various combinations of wheat varieties, soil fertility and seasonal conditions encountered throughout the Australian wheat belt enable a wide spectrum of recognised wheat types to be produced. These range from high protein hard grained wheats to low protein soft grained wheats.

Before wheat delivered by farmers can be received into the bulk handling system, the wheat must conform to strict receival standards. These standards are set by the AWB and relate to moisture content (12 per cent maximum), test weight (74 kilograms per hectolitre minimum), no insects, and a range of tolerances for unmillable material, weather damaged and sprouted kernels, foreign matter and foreign seeds.

In addition to the receival standards, a system of varietal control operates Australia-wide in which the AWB can impose a monetary penalty on wheat received according to the variety delivered and the region of production. The aim of this system is to ensure that varieties are grown in areas where the protein content that they are likely to achieve is in line with the processing characteristics of the wheat (grain hardness, milling quality, dough properties), and to highlight to growers the need to grow marketable varieties of wheat.

The system of classification of Australian wheats has evolved in response to changing market demands. The wheats are classified into two broad categories, namely the milling and non-milling classes, according to test weight, grain soundness and other physical factors. Further classification into grades is based on wheat variety, protein content and grain hardness.

Australian wheats of the following categories are suitable for milling purposes:

- Australian Prime Hard
- Australian Hard
- Australian Standard White (ASW)
- Australian Soft
- Australian Durum
- Australian General Purpose 1

Australian General Purpose 2 and Feed categories are non-milling wheats which have incurred weather damage or have some other defect.

There can exist within each category a number of individual classes, many of which have been developed to meet individual customer requirements. Particulars of Australian wheat standards may be found in *Crops and Pastures, Australia* (7321.0).

WHEAT: AREA, PRODUCTION AND RECEIVALS

Season	Area (a)		Production (a)		Australian Wheat Board receipts (b)
	For grain	All purposes	Grain	Gross value	
	'000 ha	'000 ha	'000 tonnes	\$m	'000 tonnes
1982-83	11,520	11,755	8,876	1,566.2	7,927
1983-84	12,931	13,025	22,016	3,605.6	21,059
1984-85	12,078	12,150	18,666	3,202.9	17,544
1985-86	11,736	11,823	16,167	2,719.4	15,085
1986-87	11,135	11,274	16,119	2,530.4	15,288
1987-88	9,005	9,141	12,287	2,015.7	10,740

(a) Area and production data relate to the year ending 31 March. (b) Due to amendments to the *Wheat Marketing Act 1979*, the AWB has changed from a December–November to an October–September crop year.

WHEAT FOR GRAIN: AREA AND PRODUCTION, BY STATE

Season	NSW	Vic.	Qld	SA	WA	Tas.	Aust.
AREA ('000 hectares)							
1982-83	3,162	1,327	767	1,398	4,865	1	11,520
1983-84	3,999	1,614	1,006	1,564	4,746	2	12,931
1984-85	3,603	1,523	921	1,378	4,652	2	12,078
1985-86	3,663	1,508	973	1,443	4,148	2	11,736
1986-87	3,099	1,364	795	1,616	4,260	2	11,135
1987-88	2,464	1,026	646	1,556	3,312	1	9,005
PRODUCTION ('000 tonnes)							
1982-83	1,499	394	754	692	5,534	1	8,876
1983-84	8,961	3,971	1,922	2,843	4,316	3	22,016
1984-85	5,805	2,666	1,579	2,031	6,580	4	18,666
1985-86	5,916	2,250	1,691	1,944	4,362	4	16,167
1986-87	4,855	2,795	833	2,255	6,377	5	16,119
1987-88	3,997	1,882	718	1,803	3,882	4	12,287

PRODUCTION AND DISPOSAL OF WHEAT ('000 tonnes)

	1983	1984	1985	1986	1987	1988
Year ended 31 March—						
Production	8,876	22,016	18,666	16,167	16,119	12,287
Balance held on farm for seed, feed and other uses	949	957	1,122	1,082	851	902
Year ended 30 September (a)—						
Wheat received	7,927	21,059	17,544	15,085	15,288	10,740
Carry-in	4,879	2,285	7,518	8,456	5,838	3,772
Total availability for export, domestic disposal and carryover	12,806	23,344	25,062	23,541	21,126	14,512
Exports of wheat, flour and wheat products	7,280	14,159	14,679	16,026	15,582	9,962
Domestic disposals	3,241	1,667	1,941	1,709	1,772	1,715
Total disposals	10,521	15,826	16,620	17,735	17,354	11,677

(a) Due to amendments to the *Wheat Marketing Act 1979*, the AWB has changed from a December–November to an October–September crop year.

Central Grain Research Laboratory

In 1976, the Australian Wheat Board established this laboratory in Sydney as an addition to the facilities of the Bread Research Institute of Australia. The main functions of the laboratory are to test and report on the Australian crop, to analyse and compare competitor wheats from other countries and to develop research programs to aid the marketing of wheat. Wheat pools

Details of wheat receivals by State of origin for the several Pools together with Pools payments and times of payment will be found in the latest issue of *Crops and Pastures, Australia* (7321.0) or in Australian Wheat Board Annual Reports..

International Wheat Agreement

A number of Agreements have operated since 1933 to provide a valuable framework for continuing international consultation and cooperation on world wheat matters, including the regular monitoring of the world wheat situation. On 1 July 1986, the International Wheat Agreement 1986 entered into force and will remain in force until 30 June 1991. It comprises two separate legal instruments, the Wheat Trade Convention and the Food Aid Convention, linked by a common preamble. The primary objective of the Wheat Trade Convention is to promote international cooperation in all aspects of trade in wheat and other grains. Under the Food Aid Convention, countries undertake to provide minimum annual amounts of food grain as aid. Contributions are made by both wheat importing and exporting countries in the form of grain (or grain products) for human consumption or cash for the purchase of grain.

WHEAT EXPORTS: A COMPARISON WITH OTHER EXPORT COMMODITIES (a)

Year	Wheat for grain: export		Total Australian exports— all produce: value f.o.b.	Export value of wheat for grain as a percentage of total Australian exports per cent
	Quantity '000 tonnes	Value f.o.b. \$m		
1982-83	8,022	1,343.1	21,454	6.1
1983-84	10,535	1,813.8	24,013	7.3
1984-85	15,704	2,866.9	29,708	9.8
1985-86	16,109	2,968.8	32,795	9.3
1986-87	14,789	2,168.3	35,783	6.1
1987-88	12,157	2,722.6	39,691	6.9

(a) These statistics exclude re-exports.

Australia acceded to the Wheat Trade Convention, 1986 in July 1986. Major changes from the previous Wheat Trade Convention, which operated from 1971, include expansion to cover coarse grains and amendments to reflect the fact that the Convention does not contain economic provisions. The Wheat Trade Convention through its plenary body, the International Wheat Council (IWC), provides a forum for exchange of information and discussion of members' concerns regarding trade in grains. In the context of the current round of GATT Multilateral Trade Negotiations, Australia has proposed that the IWC Secretariat undertake a study examining the effects of changes in national policies on world grains markets.

Australia made a formal application to accede to the Food Aid Convention, 1986 at the 53rd Session of the Food Aid Committee in December 1986 with a minimum annual contribution of 300,000 tonnes, compared with 400,000 tonnes under the previous Convention. The decision to reduce the level of Australia's commitment was made against

the background of the severe economic difficulties being experienced in Australia which, inter alia, have effectively reduced our capacity to provide development assistance, including food aid. Australia's application was accepted at the 54th Session of the Food Aid Convention in June 1987.

Coarse grains

In the late sixties and early seventies, restrictions on wheat deliveries and low returns in the sheep industry caused a resurgence of interest in coarse grain crops and the newer oilseed crops. The resultant higher level of plantings and production has been maintained, despite the lifting of wheat delivery quotas and a general improvement in market prospects for wheat, wool and meat.

Oats

Oats are traditionally a cereal of moist temperate regions. However, improved varieties and management practices have enabled oats to be grown over a wide range of soil and climatic conditions. They have a high feed value and produce a greater bulk of growth than other winter cereals; they need less cultivation and respond well to superphosphate and nitrogen. Oats have two main uses: as a grain crop, or as a fodder crop, (following sowing or fallow or rough sowing into stubble or clover pastures). Fodder crops can either be grazed and then harvested for grain after removal of livestock or else mown and baled or cut for chaff. Oats produced in New South Wales are marketed through a statutory board while the Victorian Oatgrowers' Pool and Marketing Company Ltd and private merchants market the bulk of oats produced in Victoria. In South Australia the Barley Marketing Act was amended in 1977 to give the Australian Barley Board powers over oat marketing in that State. Under the legislation amendments, the Board controls export sales and grain resold on the local market; however, direct sales between producers and consumers are outside the Board's supervision. In Western Australia, oats are marketed under a warehousing system operated by Co-operative Bulk Handling Ltd.

Oats are usually next in importance to wheat and barley among the grain crops. About three-quarters of the crop is used domestically as stockfeed or for human consumption.

OATS FOR GRAIN: AREA, PRODUCTION AND EXPORTS

Year	Area '000 ha	Production		Exports	
		Quantity '000 tonnes	Gross value \$m	Quantity '000 tonnes	Value f.o.b. \$m
1982-83	1,212	848	116.1	83	13.2
1983-84	1,772	2,296	203.8	289	40.9
1984-85	1,041	1,367	129.6	391	49.0
1985-86	1,068	1,330	138.3	185	25.1
1986-87	1,140	1,584	164.8	190	26.3
1987-88	1,275	1,698	195.0	215	31.2

Barley

This cereal contains two main groups of varieties, 2-row and 6-row. The former is generally, but not exclusively, preferred for malting purposes. Barley is grown principally as a grain crop although in some areas it is used as a fodder crop for grazing, with grain being subsequently harvested if conditions are suitable. It is often grown as a rotation crop with wheat, oats and pasture. When sown for fodder, sowing may take place either early or late in the season, as it has a short growing period. It may therefore provide grazing or fodder supplies when other sources are not available. Barley grain may be crushed to meal for stock or sold for malting.

Crops sown for malting purposes require a combination of light textured soil of moderate fertility, reliable rainfall, and mild weather during ripening. The main barley-growing areas in Australia are situated in South Australia, but considerable quantities are also grown in

New South Wales, Western Australia, Victoria and Queensland. In December 1980, a joint Commonwealth-industry research scheme for the barley industry commenced operation. The scheme is financed by a levy on barley production and a Commonwealth contribution not exceeding the total of the levy.

Barley is marketed by statutory marketing authorities in each of the mainland States. The Australian Barley Board controls marketing in both South Australia and Victoria, while separate authorities operate in the three other States.

BARLEY FOR GRAIN: AREA, PRODUCTION AND EXPORTS

Year	Production					Exports	
	Area	2-row	6-row	Total		Quantity	Value f.o.b.
				Quantity	Gross value		
'000 ha	'000 tonnes—			\$m	'000 tonnes	\$m	
1982-83	2,452	1,785	153	1,939	287.6	834	131.4
1983-84	3,109	4,585	305	4,890	732.6	3,121	499.4
1984-85	3,518	5,194	361	5,554	759.3	5,183	750.0
1985-86	3,284	4,635	233	4,868	586.8	4,168	536.6
1986-87	2,274	3,397	151	3,548	432.6	2,191	254.1
1987-88	2,346	3,283	134	3,417	460.0	1,146	126.2

Grain sorghum

The sorghums are summer growing crops which are used in three ways: grain sorghum for grain; sweet or fodder sorghum, sudan grass and, more recently, columbus grass for silage, green feed and grazing; and broom millet for brooms and brushware.

Grain sorghum has been grown extensively only in the last two decades. Rapid increases in production have resulted in a substantial increase in exports over this period. The grain is used primarily as stockfeed and is an important source for supplementing other coarse grains for this purpose.

The climatic conditions of Queensland and northern New South Wales are particularly suited to the growing of sorghum. In Queensland, grain sorghum production is concentrated in the Darling Downs, Fitzroy and Wide Bay-Burnett Divisions. In New South Wales, the northern and north-western slopes and plains are the main areas.

In Queensland, a degree of orderly marketing is ensured by the operation of the Central Queensland Grain Sorghum Marketing Board (a statutory authority in a defined area in central Queensland). A State statutory marketing board handles sorghum grain in New South Wales.

GRAIN SORGHUM: AREA, PRODUCTION AND EXPORTS

Year	Production			Exports	
	Area	Quantity	Gross value	Quantity	Value f.o.b.
'000 ha	'000 tonnes	\$m	'000 tonnes	\$m	
1982-83	907	958	124.4	445	53.9
1983-84	730	1,885	246.3	772	110.7
1984-85	723	1,369	196.9	1,594	242.1
1985-86	734	1,415	180.8	1,234	177.6
1986-87	818	1,419	161.5	818	90.6
1987-88	745	1,633	208.0	415	48.3

Maize

Like sorghum, maize is a summer cereal demanding specific soil and climatic conditions. Maize for grain is almost entirely confined to the south-east regions and Atherton Tablelands of Queensland; and the north coast, northern slopes and tablelands and the Murrumbidgee Irrigation Area in New South Wales. Small amounts are grown in all States, except South Australia, for green feed and silage, particularly in association with the dairy industry.

A statutory board controls the marketing of maize in the Atherton Tablelands area of Queensland. A large proportion of the crop is sold directly to food processors.

MAIZE: AREA, PRODUCTION AND EXPORTS

Year	Area '000 ha	Production		Exports	
		Quantity '000 tonnes	Gross value \$m	Quantity '000 tonnes	Value f.o.b. \$m
1982-83	64	139	23.3	18	2.4
1983-84	68	238	35.6	19	2.8
1984-85	103	291	46.1	140	24.9
1985-86	84	278	40.4	81	13.2
1986-87	56	206	31.1	46	7.0
1987-88	56	208	32.0	12	1.9

Rice

In Australia, rice was first grown commercially in 1924-25 in the Murrumbidgee Irrigation Area, one of three irrigation areas in southern New South Wales where rice is now produced. Today, about 97 per cent of Australia's rice is grown in New South Wales. The remainder is grown in the Burdekin River basin and at Mareeba in Northern Queensland.

Rice is a summer growing crop in New South Wales. The combination of irrigation water and the relatively cloudless days characteristic of summers in temperate regions of the world is the main contributing factor to the very high yields per hectare often achieved by New South Wales growers. In Queensland, a winter and a summer crop are grown.

State statutory marketing boards are responsible for the marketing of the New South Wales and Queensland crops.

RICE: AREA, PRODUCTION AND EXPORTS

Year	Area '000 ha	Production		Exports	
		Quantity (a) '000 tonnes	Gross value \$m	Quantity '000 tonnes	Value f.o.b. \$m
1982-83	85	548	88.4	405	120.3
1983-84	119	632	88.9	246	91.9
1984-85	122	866	123.1	341	121.7
1985-86	107	716	80.5	178	77.0
1986-87	96	608	85.1	186	73.6
1987-88	106	740	117.4	115	52.3

(a) In terms of paddy (or rough) rice.

Oilseeds

Specialised oilseeds

The oilseeds industry is a relatively young industry by Australian agricultural standards. Production has increased rapidly in recent years following changes in relative profitability and agronomic advances. The expected profitability of oilseeds relative to crops such as wheat and coarse grains will continue to influence future production levels in the industry. This profitability will be related to domestic and international markets for protein meals and vegetable fats and oils.

The specialist oilseed crops grown in Australia are sunflower, soybeans, rapeseed, safflower and linseed. Sunflower and soybeans are summer grown while the others are winter crops. In Australia, oilseeds are crushed for their oil, which is used for both edible and industrial purposes and protein meals for livestock feeds.

Oilseed crops are grown in all States but the largest producing regions are the grain growing areas of the eastern States.

For area, production and gross value of several oilseed crops, *see* Crops: area, production and gross value in the Crops section of this chapter.

Sunflower

When crushed, sunflower seed yields a high quality dual purpose oil used primarily to manufacture margarine, salad and cooking oils.

Queensland produces about two-thirds of the Australian crop with the Darling Downs and Central Highlands being the major regions. New South Wales is the next largest producer with the north-west of the State dominating production. Smaller amounts are produced in all other States except Tasmania.

Soybeans

The major uses of soybean oil are in salad and cooking oils and margarine. Small amounts are used in the production of paints, detergents and plastics. Soybeans also yield a high protein feed for livestock with a small proportion used to manufacture adhesives and synthetic fibres and meats.

Queensland and New South Wales produce virtually all of Australia's soybean crop. The main producing areas are the irrigation districts of the Darling Downs and northern New South Wales. Lesser areas include the Burnett and Lockyer regions of Queensland, while production of raingrown soybeans is expanding on the North Coast of New South Wales.

In irrigated areas, soybeans have increasingly been used as a rotational crop for cotton.

Rapeseed

The main use of rapeseed oil has been in salad and cooking oils and in margarine with a small amount being used for industrial purposes.

The major production areas are the tablelands and western slopes of New South Wales followed by the south-east of South Australia and the Western Districts of Victoria. Smaller levels of production occur in the South Coast region of Western Australia.

Following significant increases in the 1960s and 1970s, rapeseed production declined rapidly due to problems of blackleg disease and erucic acid content. Production has recovered in recent years with the development of varieties to overcome these problems and in response to the crop rotation benefits of rapeseed.

Safflower

The oil from safflower is used in the production of cooking oil, margarine, soaps, paints, varnishes, enamels and textiles. In recent years, New South Wales and Queensland together have produced around 90 per cent of Australian output. In Queensland, most production

occurs in the Central Highlands with smaller amounts coming from the Dawson–Callide Valley and the Darling Downs. New South Wales production is centred on the Central West.

Wide fluctuations in safflower production since the mid 1960s have been due to variable seasonal conditions affecting yields and the profitability of other crops which has influenced plantings.

Linseed

The oil from crushed linseed is used in the manufacture of paints, varnishes, technical inks and linoleum.

The main producing areas are the wheat belt of New South Wales, the Darling Downs in Queensland, the Western Districts of Victoria and, to a lesser extent, the south-eastern districts of Victoria. Linseed production has been generally declining in recent years.

Other oilseeds

Peanuts and cottonseed are summer crops grown primarily for human consumption and fibre purposes respectively. The rapid expansion of the cotton industry in recent years has resulted in cottonseed becoming the major oilseed in Australia. Cottonseed oil is used mainly in the manufacture of compound cooking fats and margarine. The least important source of vegetable oils in Australia is peanuts as it is only the low quality kernels which are crushed for oil. Crushings may vary between 3,000 and 7,000 tonnes per annum depending on the quality of the crop. Peanut oil is a high quality oil which is used in the manufacture of margarine and in compound cooking fats and is also used as a cooking and salad oil.

Peanuts

The major peanut growing areas are around Kingaroy in south-east Queensland and the Atherton Tablelands in North Queensland, with smaller pockets of production around Tweed Heads in New South Wales and around Douglas in the Northern Territory.

About 80 per cent of peanuts grown in Australia are of Virginia variety, the remainder being of Spanish types.

Local demand for peanuts and peanut products is comparatively static with a limited potential for growth corresponding to population growth. The local growing industry normally supplies most of the domestic demand for edible peanuts in its major outlets: peanut butter, packaged trade and confectionery. Any surplus is sold on export markets. Exports vary according to the size of the crop.

PEANUTS: AREA, PRODUCTION AND GROSS VALUE

<i>Year</i>	<i>Area</i>	<i>Production</i>	<i>Gross value</i>
	'000 hectares	'000 tonnes	\$ million
1982–83	36	23	17.8
1983–84	32	47	40.2
1984–85	30	42	36.6
1985–86	29	43	38.1
1986–87	34	48	42.0
1987–88	32	37	33.0

Cotton

Cotton is grown primarily for its fibre (lint). When the cotton is matured, seed cotton is taken to a gin where it is separated (ginned) into lint, seed and thrash. Lint is used for yarn while seed is further processed at an oil mill. There the short fibres (linters) remaining on the seed after ginning are removed. They are too short to make into cloth but are used for wadding, upholstery and paper. The seeds are then separated into kernels and hulls. Hulls are used for stock feed and as fertiliser, while kernels are crushed to extract oil. The remaining cake is ground into meal which is protein roughage used as stock feed.

Over three-quarters of Australia's total production of cotton lint is grown in New South Wales, principally in the Namoi, Macquarie, Gwydir and McIntyre Valleys and the Bourke area. Irrigation water for these areas is provided from the Keepit, Burrendong, Copeton and Glenlyon Dams and the Darling River. The rest is grown in Queensland, in the Emerald, Biloela, St George, and Darling Downs areas. Most of these areas are also irrigated. Australian production has for some time satisfied most of the requirements of local mills for short and medium staple cotton. Since the mid 1970s there has been very strong investment growth in the cotton industry and the resultant surge in plantings has resulted in large amounts of cotton becoming available for export.

COTTON: AREA, PRODUCTION AND EXPORTS

Year	Area '000 ha	Seed cotton (a)		Cotton- seed (b) '000 tonnes	Lint (c) '000 tonnes	Raw cotton export	
		Quantity '000 tonnes	Gross value \$m			Quantity '000 tonnes	Value f.o.b. \$m
1982-83	96	286	167.5	164	101	129	197.6
1983-84	137	401	268.8	230	141	82	147.9
1984-85	183	679	330.2	410	248	140	259.6
1985-86	177	685	324.9	366	259	241	378.4
1986-87	156	612	372.5	418	214	251	344.7
1987-88	245	762	425.1	435	281	177	353.0

(a) Before ginning. (b) Estimated by the Australian Bureau of Agricultural and Resource Economics. (c) Provided by the Raw Cotton Marketing Advisory Committee.

Sugar

Sugar cane is grown commercially in Australia along the east coast over a distance of some 2,100 kilometres in a number of discontinuous areas from Maclean in northern New South Wales to Mossman in Queensland. The geographical spread contributes to the overall reliability of the sugar cane crop and to Australia's record as a reliable sugar supplier.

Approximately 95 per cent of production occurs in Queensland, with some 75 per cent of the crop grown north of the Tropic of Capricorn in areas where rainfall is reliable and the warm, moist and sunny conditions are ideal for the growing of sugar cane. Farm sizes range between 20 and 70 hectares.

Australian cane farmers are regarded as amongst the most efficient in the world and employ a high degree of mechanisation in ploughing, planting, harvesting, and transportation activities. The Australian industry was the first in the world to introduce mechanical cultivation and harvesting techniques and by 1964 the entire industry had converted to bulk handling.

The cane crop is generally planted in April-May and harvested from June to December the following year. The major proportion of each year's crop is from ratoons while in

New South Wales most crops are allowed to grow for two seasons due to the slower growing conditions.

The organisation of the Australian sugar industry is complex. The Queensland Government controls the quantity of raw sugar produced through a system of mill peaks which is translated into cane quotas for growers. In addition the Queensland Government contracts with CSR Limited and Millaquin Sugar Company Pty Limited for the refining, marketing and distribution of home consumption needs, arranges through CSR Limited the export marketing of raw sugar, and regulates the division of industry proceeds between growers and millers.

There are 33 raw sugar mills located throughout the growing regions: 30 are located in Queensland and the remaining three in New South Wales. Fifteen of the mills are cooperatively owned by canegrowers and the remaining eighteen by proprietary companies. Refineries are located in each mainland capital city and at Bundaberg. The six bulk sugar export terminals located in Queensland are at present capable of storing 2.9 million tonnes. While raw sugar is the main product from mills, important by-products are bagasse (fibre), molasses, ash and filter mud.

In recent years sugar cane production has been around 24 million tonnes yielding between 2.8 and 3.3 million tonnes of sugar. Area, production and yield levels for sugar cane from 1982-83 to 1987-88 are provided in the following table.

SUGAR CANE: AREA, PRODUCTION AND YIELD

Year	New South Wales					Queensland				
	Sugar cane cut for crushing			Raw sugar (a)		Sugar cane cut for crushing			Raw sugar (a)	
	Area harvested	Production	Yield	Quantity	Yield	Area harvested	Production	Yield	Quantity	Yield
	'000 ha	'000 tonnes	t/ha	'000 tonnes	t/ha	'000 ha	'000 tonnes	t/ha	'000 tonnes	t/ha
1982-83	16	1,702	106.5	176	11.0	303	23,115	76.4	3,324	11.0
1983-84	15	1,468	96.7	159	10.5	292	22,723	77.8	3,012	10.3
1984-85	15	1,540	103.6	199	13.4	298	23,910	80.3	3,349	11.2
1985-86	15	1,398	91.1	170	11.1	288	23,004	79.8	3,209	11.1
1986-87	24	1,276	93.2	n.y.a.	n.y.a.	287	23,466	81.8	n.y.a.	n.y.a.
1987-88	27	1,632	60.4	n.y.a.	n.y.a.	360	23,200	64.4	n.y.a.	n.y.a.

(a) In terms of 94 net titre.

The domestic market is reserved entirely for sugar produced in Australia. This is achieved by an embargo on the import of sugar. The maximum price of refined sugar for sale to wholesalers and manufacturers is fixed each six months under a formula contained in the Commonwealth-Queensland Sugar Agreement.

Domestic sales account for about 760,000 tonnes annually or approximately 20 per cent of the total industry sales. Granulated sugars account for about 75 per cent of the total domestic sales with liquid sugars (15 per cent), castor sugar (5 per cent), and raw sugar taking up the bulk of the remainder. About two-thirds of the sales of refined sugar products go to processed food and drink manufacturers.

The Australian sugar industry exports about 75 per cent of its annual raw sugar production and is one of the world's largest sugar exporters. The disposal pattern of Australia's sugar production is shown in the following table.

SUGAR: AREA, PRODUCTION, EXPORTS AND CONSUMPTION

Year	Area harvested '000 ha	Production			Exports		Apparent consumption in Australia (a)	
		Sugar cane		Raw sugar	Raw and refined sugar		Total '000 tonnes	Per head kg
		Quantity mil. tonnes	Gross value \$m	Quantity mil. tonnes	Quantity mil. tonnes	Value f.o.b. \$m		
1982-83	319	25	508.9	4	3	557.7	703	46.0
1983-84	307	24	516.6	3	2	621.3	680	43.9
1984-85	313	25	512.2	4	3	572.2	692	44.2
1985-86	380	24	494.2	3	3	613.2	714	45.0
1986-87	379	25	586.4	3	4	632.5	707	43.9
1987-88	387	25	618.2	4	5	682.0	n.y.a.	n.y.a.

(a) Total quantity of sugar available for consumption in Australia comprises refined sugar and refined sugar contained in manufactured foods.

Australia has regularly participated in arrangements to regulate the international sugar market and was a signatory to the 1984 International Sugar Agreement (ISA). The Agreement is an administrative pact only, and unlike previous Agreements contains no economic provisions. This means that member countries are not constrained in their sugar exports.

Vegetables

Vegetables for human consumption

The area sown to vegetables reached a peak of over 200,000 hectares in 1945, but has remained static at around 109,000 hectares since 1975-76. However, yields from most vegetable crops have increased due to variety breeding for increased yields, greater use of irrigation and better control of disease and insect pests.

Because of the wide climatic range in Australia, supplies for main city markets are drawn from widely different areas, depending on the times of maturity of the various crops. Historically, market gardens were located near urban centres and, while many small scale growers still produce crops close to city markets, urban expansion, rising urban land values, improvements in transport and irrigation, and developments in freezing, canning and drying have extended the industry far from the cities. Transport costs are reduced by the location of processing establishments in producing areas, although city markets still absorb the bulk of fresh and processed produce.

For further information on vegetables see *Year Book* No. 70.

VEGETABLES FOR HUMAN CONSUMPTION: AREA AND PRODUCTION

Year	French and runner beans	Cabbages	Carrots	Cauli flowers	Onions	Green peas	Potatoes	Tomatoes	Total vegetables
AREA ('000 hectares)									
1982-83	6.7	2.5	3.8	3.3	4.2	14.8	(a)37.4	8.7	110.3
1983-84	6.7	2.5	4.3	3.4	3.8	12.2	37.9	9.1	109.9
1984-85	6.3	2.4	4.6	3.6	4.4	11.4	38.4	9.3	111.0
1985-86	5.9	2.3	4.3	3.6	4.5	11.2	36.1	9.5	110.7
1986-87	5.9	2.9	4.6	3.7	4.3	11.7	36.7	8.6	111.3
1987-88	6.0	2.8	1.2	4.6	5.0	11.2	39.8	8.9	116.7

VEGETABLES FOR HUMAN CONSUMPTION: AREA AND PRODUCTION—continued

Year	French and runner beans	Cabb- ages	Carrots	Cauli- flowers	Onions	Green peas		Pot- atoes	Tom- atoes
						Process- ing (shelled weight)	Sold in pod (pod weight)		
PRODUCTION ('000 tonnes)									
1982-83	33.5	67.2	105.0	76.5	129.0	46.0	1.9	858.5	224.1
1983-84	32.3	72.3	124.3	84.4	115.9	44.0	2.1	1,019.8	258.3
1984-85	31.1	69.5	130.6	101.1	151.7	41.8	2.1	992.1	270.5
1985-86	31.3	69.1	127.6	103.8	159.7	39.7	1.5	964.9	252.6
1986-87	29.4	82.9	146.0	91.6	164.7	33.4	1.2	1,015.2	266.0
1987-88	32.7	80.1	144.0	112.2	181.7	43.0	1.2	1,081.5	282.6

(a) Incomplete, information on this commodity was not separately collected in some States.

For further information on vegetables see the following publications: *Crops and Pastures, Australia* (7321.0), (ceased 1986-87) *Summary of Crops, Australia* (7330.0) (first issue 1987-88). *Apparent Consumption of Foodstuffs and Nutrients, Australia* (4306.0) *Value of Agricultural Commodities Produced, Australia* (7503.0), and *Year Book No. 70*.

Fruit (Excluding Grapes)

A wide variety of fruit is grown in Australia ranging from pineapples, mangoes and papaws in the tropics to pome, stone and berry fruits in the temperate regions.

In recent years there has been rapid expansion in the cultivation of many relatively new fruit crops in Australia and there is considerable scope for continued growth in the future.

Avocado is perhaps the most commonly known of these crops and production has expanded considerably during the past decade to a current gross value of over \$10 million. Avocado production is mainly in Queensland and New South Wales with minor quantities produced in Western Australia, South Australia and Victoria.

Kiwifruit is a relatively new temperate fruit crop to Australia. Production has been expanding rapidly mainly in Victoria and New South Wales and further expansion is expected. Of the berry fruits, strawberries are widely grown, with largest production in Victoria and Queensland. Interest in the production of blueberries in Australia has developed only recently and plantings of blueberries have increased rapidly mainly in Victoria and New South Wales. Other berries (currants and raspberries) are grown predominantly in Tasmania and production has been reasonably constant over the past five years.

Tropical fruit such as mangoes, papaws, passionfruit, custard apples and guavas, are grown mainly in Queensland. Smaller quantities of tropical fruit are produced in the north coast region of New South Wales, Western Australia and more recently the Northern Territory. The largest expansion has been of mango production which has more than doubled since 1979. Given the large number of non-bearing mango trees, production is expected to continue to increase dramatically. There is also considerable interest in many other exotic tropical and subtropical fruits. Production of lychees and persimmons has recently commenced and some plantings of rambutan, sapote and longans have been made, mainly in Queensland and the north coast region of New South Wales.

SELECTED FRUIT STATISTICS

Year	Orchard fruit: number of trees ('000)				Tropical and other fruits: area (ha)			Total area of fruit (ha)
	Apples	Oranges	Pears	Peaches	Bananas	Pineapples	Other fruit	
1982-83	6,098	6,219	1,556	1,642	9,040	6,010	1,774	104,325
1983-84	6,066	6,397	1,584	1,646	9,282	6,011	2,085	107,534
1984-85	6,147	6,657	1,548	1,696	9,205	6,268	2,272	109,095
1985-86	6,397	6,777	1,592	1,793	9,640	6,325	2,432	112,655
1986-87	6,350	6,897	1,552	1,797	9,391	3,762	1,245	107,492
1987-88	6,555	6,873	1,779	1,867	9,195	6,269	2,024	166,100

Year	Apples	Apricots	Bananas	Cherries	Oranges	Peaches	Pears	Pine- apples	Plums and prunes
	PRODUCTION ('000 tonnes)								
1982-83	300.8	26.9	140.5	4.2	410.0	63.0	119.2	111.3	20.6
1983-84	267.0	23.6	146.4	3.5	391.8	48.3	122.1	115.1	20.0
1984-85	352.0	24.5	144.8	3.8	445.0	59.8	138.5	124.5	20.6
1985-86	292.1	29.6	134.4	3.9	496.2	61.4	142.9	131.6	21.7
1986-87	325.0	27.0	157.7	4.0	504.0	61.1	145.0	142.3	22.0
1987-88	300.0	28.0	160.1	5.0	479.0	66.0	162.0	146.5	18.0

GROSS VALUE OF PRODUCTION (\$ million)									
1982-83	132.4	18.3	70.1	7.9	101.0	21.3	41.9	25.4	16.9
1983-84	134.1	17.6	86.8	8.7	105.3	25.4	45.9	26.2	17.5
1984-85	178.3	19.7	93.2	10.8	131.9	28.3	50.7	33.5	19.8
1985-86	139.0	24.5	101.7	9.5	132.5	29.3	63.7	32.6	23.5
1986-87	204.5	25.5	126.7	11.9	126.1	40.9	76.8	42.0	25.2
1987-88	185.8	31.7	132.6	16.2	146.4	48.1	77.7	41.4	22.9

FRUIT: VALUE OF PRODUCTION AND EXPORTS
(\$ million)

Year	Gross value			
	Orchard fruit	Tropical, berry and other		Exports (a) value f.o.b.
		Total		
1982-83	396	113	509	135
1983-84	418	135	552	117
1984-85	522	149	671	152
1985-86	518	161	679	196
1986-87	634	203	837	242
1987-88	670	216	886	256

(a) Fruit and nuts, excluding grapes (fresh and dried); includes fresh, dried and preserved and fruit preparations.

For further data on fruits and fruit products see the publications *Fruit, Australia* (7322.0) (ceased 1986-87), *Summary of Crops, Australia* (7330.0) (first issue 1987-88), *Production Bulletin No. 3: Food, Drink and Tobacco, Australia* (8359.0), *Apparent Consumption of Foodstuffs and Nutrients, Australia* (4306.0) and *Value of Agricultural Commodities Produced, Australia* (7503.0)

Grapes

Grapes are a temperate crop which require warm to hot summer conditions for ripening and predominantly winter rainfall. Freedom from late spring frosts is essential. They are grown for wine-making, drying and, to a lesser extent, for table use. Some of the better known wine producing areas are the Barossa, Clare, Riverland, Southern Districts and Coonawarra (SA); North-Eastern Victoria and Great Western (Vic.); Hunter and Riverina (NSW); Sunraysia (NSW and Vic.); Swan Valley and Margaret River (WA).

Nearly all the dried fruit is produced along the River Murray and its tributaries in Victoria and New South Wales with small localised areas in other States.

VITICULTURAL STATISTICS: AREA, PRODUCTION AND VALUE

Year	Area		Productions: grapes used for—			
	Bearing	Total	Winemaking	Drying	Total (a)	
					Quantity	Gross value
'000 ha	'000 ha	'000 tonnes fresh weight	'000 tonnes fresh weight	'000 tonnes fresh weight	\$m	
1982-83	62	67	431	310	768	212.5
1983-84	60	65	495	320	841	217.0
1984-85	60	64	559	297	890	259.4
1985-86	60	64	510	359	907	270.0
1986-87	54	57	477	262	783	272.2
1987-88	54	57	460	293	799	353.7

(a) Includes grapes used for table and other purposes.

Multipurpose grapes are used predominantly for winemaking and drying, the latter process being particularly susceptible to adverse seasonal conditions. A serious over supply of dried vine fruit existed on world markets in 1983 and 1984, however the situation has improved since 1985 as a consequence of reduced production from northern hemisphere suppliers in late 1984. Australian exporters have made significant sales on international markets. The Australian Dried Fruits Corporation is the body responsible for the organisation of the export trade in dried vine fruits. The Corporation also administers the statutory Dried Vine Fruits Equalisation Scheme and the Dried Sultana Production Underwriting Scheme. Both these schemes were restructured by the government in 1985 following an inquiry into the dried vine fruits industry by the Industries Assistance Commission. The Government's objective was to make the industry more responsive to market signals. Until 1983, imports of dried vine fruit had been largely insignificant. However, since that time significant imports have occurred each year, the major sources being Greece and the United States. The Australian industry has demonstrated injury from subsidised imports from Greece and countervailing measures have been implemented.

Varietal statistics: 1988 season

VITICULTURE: AREA AND PRODUCTION BY VARIETY, 1988 SEASON (a)

	Area of vines at harvest			Grubbings (actual and/or intended)	Production			
	Bearing	Not yet bearing	All vines		Grapes used for—			
					Wine- making	Drying	Other	Total
—hectares—				—tonnes (fresh weight)—				
Red grapes—								
Cabernet								
Sauvignon	3,352	270	3,622	12	24,971	—	—	24,971
Currant (incl. Carina)	1,302	87	1,387	43	174	15,383	13	15,570
Grenache	2,246	9	2,255	58	29,427	—	109	29,536
Mataro	666	—	666	11	7,728	—	28	7,756
Pinot Noir	525	261	785	1	3,957	—	—	3,957
Shiraz	4,819	86	4,904	79	48,069	—	15	48,083
Other red grapes	2,854	507	3,365	106	10,744	36	11,450	22,232
Total red grapes	15,764	1,220	16,984	310	125,070	15,419	11,615	152,105
White grapes—								
Chardonnay	2,344	634	2,978	12	20,637	—	2	20,638
Doradillo	1,022	4	1,025	64	21,396	—	25	21,421
Muscat Blanc	493	16	509	19	5,618	—	44	5,662
Muscat Gordo								
Blanco	3,887	154	4,041	103	63,650	6,875	623	71,147
Palomino and Pedro Ximenes	1,372	14	1,385	83	21,924	—	6	21,930
Rhine Riesling	3,658	45	3,703	51	30,591	—	—	30,591
Semillon	2,447	126	2,573	19	37,004	—	—	37,004
Sultana	15,733	475	16,209	221	53,327	265,603	24,330	343,260
Waltham Cross	1,170	18	1,188	59	5,361	4,613	4,474	14,449
Other white grapes	5,718	463	6,182	158	75,570	102	4,782	80,454
Total white grapes	37,844	1,949	39,793	789	335,078	277,193	34,286	646,558
Total grapes	53,608	3,169	56,777	1,099	460,148	292,609	45,902	798,659

(a) Varietal data not collected in Northern Territory and the Australian Capital Territory.

DRIED VINE FRUIT: PRODUCTION, EXPORTS AND CONSUMPTION
(dried weight)

Year	Production				Exports			Consumption of dried vine fruit	
	Raisins	Sultanas	Currants	Total	Raisins/ sultanas	Currants	Total		kg
							Quantity	Value f.o.b.	
'000 tonnes	'000 tonnes	'000 tonnes	'000 tonnes	'000 tonnes	'000 tonnes	'000 tonnes	'000 tonnes	\$m	
1982-83	3.9	64.9	4.7	73.4	57.1	2.4	59.5	59.7	1.9
1983-84	1.4	69.0	4.6	75.0	51.6	0.9	52.5	54.1	1.7
1984-85	2.1	60.1	5.7	67.8	61.5	1.0	62.4	58.0	2.3
1985-86	5.2	72.9	6.3	84.4	48.4	2.9	51.3	71.3	2.3
1986-87	1.9	58.8	5.2	65.9	54.5	2.3	56.8	96.5	1.9
1987-88	2.3	55.4	2.8	60.6	43.0	0.7	43.7	80.5	n.a.

Wine industry

Australia produces a wide range of wine and brandy products. Over the past twenty years there has been a distinct trend towards greater production and consumption of unfortified or table wines. In the twelve months ending June 1987 sales of table wine accounted for nearly 78 per cent of all sales of Australian wine. The large growth in table wine sales has been principally due to the successful marketing of wine in 'casks' (usually fibreboard, box-shaped, 4 litre containers equipped with dispensing faucets).

While imports of wine are relatively insignificant (7.8 million litres in 1987-88), exports are becoming increasingly important and now account for 9.8 per cent of production. Legislation reconstructing the Australian Wine and Brandy Corporation as the body responsible for the control of the export trade in wine, brandy and grape spirit products was enacted in June 1986. The Corporation has the power to regulate exports as well as organise promotion and publicity functions in export markets and in Australia.

PRODUCTION, CONSUMPTION AND EXPORT OF WINES

Year	Pro- duction	Exports		Consump- tion in Australia per capita
		Quantity	Value f.o.b.	
		mil. litres	\$m	
1982-83	340	8.0	13.4	19.7
1983-84	396	9.0	16.8	20.4
1984-85	451	8.8	17.4	21.3
1985-86	389	10.9	21.3	21.6
1986-87	372	21.2	44.6	21.0
1987-88	403	39.4	98.7	20.9

For further details on viticulture, dried vine fruit, wine, etc. see the following publications: *Fruit, Australia* (7322.0) (ceased 1986-87), *Summary of Crops, Australia* (733.0) (first issue 1987-88), *Sales and Stocks of Australian Wine and Brandy* (8504.0) and *Viticulture, Australia* (7310.0).

Fodder crops

As well as crops specifically for grain, considerable areas of Australia are devoted to fodder crops. These crops are utilised either for grazing (as green feed), or conserved as hay, ensilage, etc.

This development of fodder conservation as a means of supplementing pasture and natural sources of stockfeed is the result of the seasonal and comparatively unreliable nature of rainfall in Australian agricultural areas.

FODDER CROPS: AREA AND PRODUCTION

Year	Hay (a)			Green feed or silage (b)	
	Area	Production		Area	Silage made
		Quantity	Gross value		
	'000 ha	'000 tonnes	\$m	'000 ha	'000 tonnes
1982-83	408	907	100.6	1,292	301
1983-84	377	1,269	99.5	896	698
1984-85	258	848	60.3	876	502
1985-86	252	773	64.5	1,005	620
1986-87	306	942	72.9	1,191	679
1987-88	344	1,003	78.0	1,313	878

(a) Principally oaten and wheaten hay. (b) Principally from oats, barley, wheat and forage sorghum.

Lupins

Lupins are grown primarily as a grain crop, but grazing of standing crops and stubble is also an important use. Because of their high protein content, lupins are becoming increasingly important in livestock feed and for human consumption, particularly in some of the Asian countries.

There has been a significant expansion of lupin production in recent years, particularly in Western Australia which is the major producer and exporter of lupins. Smaller quantities are also grown in New South Wales, Victoria and South Australia mainly for domestic use.

FARMSTOCKS OF CEREAL GRAINS, HAY AND SILAGE (^{'000} tonnes)

At 31 March	Cereal grains				
	Barley	Oats	Wheat	Hay	Silage
1983	506	711	970	2,983	333
1984	627	1,705	1,021	6,789	642
1985	684	1,479	910	5,872	697
1986	872	1,403	1,185	5,555	851
1987	729	1,406	1,045	5,783	817
1988	693	1,366	962	4,970	757

Tobacco

Tobacco is a summer-growing annual which requires a temperate to tropical climate, adequate soil moisture and a frost-free period of approximately five months. In Australia, all tobacco is grown under irrigation. Because of specialised requirements, production is limited to areas with suitable soils and climate. The main centres of production are the Mareeba-Dimbulah districts of north Queensland and Myrtleford in north-eastern Victoria. Other areas where tobacco is grown include Bundaberg, Beerwah and Texas (Queensland) and Yetman and Coraki (New South Wales). All tobacco grown in Australia is of the flue-cured type except for small quantities of burley tobacco produced mainly in Victoria.

TOBACCO: AREA, PRODUCTION AND OVERSEAS TRADE

Year	Area '000 ha	Production (dried leaf) '000 tonnes	Exports (value f.o.b.)		Imports (value)	
			Unmanu- factured	Manu- factured	Unmanu- factured	Manu- factured
			\$'000	\$'000	\$'000	\$'000
1981-82	6.6	13.3	2,080	8,551	46,268	23,187
1982-83	6.7	13.4	4,835	9,667	52,916	30,420
1983-84	6.5	14.4	2,434	12,172	58,939	31,425
1984-85	5.4	12.5	110	14,545	59,789	27,692
1985-86	4.7	10.7	158	15,021	64,495	33,197
1986-87	5.1	12.2	149	17,157	82,523	33,617
1987-88	5.0	13.0	251	12,424	75,520	40,620

Marketing

In 1965 the Commonwealth and State Governments agreed to a stabilisation plan which provided for an annual Australian tobacco leaf marketing quota of flue-cured tobacco and a guaranteed minimum average reserve price. The plan is administered by the Australian Tobacco Board, constituted under the *Tobacco Marketing Act 1965*, and is composed of representatives of the Commonwealth Government, tobacco-growing States, growers and manufacturers.

Following a review by the Industries Assistance Commission of the tobacco industry in 1982, the Government announced a new 5-year stabilisation scheme which began in 1984. The new scheme is designed to rationalise marketing arrangements in the industry. The scheme provides that the annual tobacco leaf quotas are adjusted in line with consumption, that manufacturers' stocks are reduced to a level equivalent to 13 months' consumption by 1988, and that prices be adjusted so as to significantly reduce the gap between Australian and world prices by 1990.

Livestock

Since 1861, annual enumerations of livestock have been made, based with few exceptions on actual collections made through the agency of the State police or by post. Particulars concerning the numbers of each of the principal kinds of livestock in Australia at ten-yearly intervals from 1861 to 1971, and then from 1981 on by single years, are given in the following table.

LIVESTOCK, AUSTRALIA
(^{'000})

<i>Year</i>	<i>Cattle</i>	<i>Sheep</i>	<i>Pigs</i>	<i>Year</i>	<i>Cattle</i>	<i>Sheep</i>	<i>Pigs</i>
1861	3,958	20,135	351	1961	17,332	152,579	1,615
1871	4,276	41,594	543	1971	24,373	177,792	2,590
1881	7,527	62,184	816	1981	25,168	134,407	2,430
1891	10,300	97,881	891	1982	24,553	137,976	2,373
1901	8,640	70,603	950	1983	22,478	133,237	2,490
1911	11,745	98,066	1,026	1984	22,161	139,242	2,527
1921	13,500	81,796	674	1985	22,738	149,747	2,512
1931	11,721	110,568	1,072	1986	23,436	155,561	2,553
1941	13,256	122,694	1,797	1987	21,915	149,157	2,611
1951	15,229	115,596	1,134	1988	21,851	152,443	2,706

While livestock numbers (particularly sheep) have increased substantially since 1861, marked fluctuations have taken place during the period, mainly on account of widespread droughts which have from time to time left their impressions on the pastoral history of Australia.

Australia has suffered ten major widespread droughts since the keeping of rainfall records began:

- 1864-1866** All States were affected except Tasmania.
- 1880-1886** Southern and eastern mainland States were affected.
- 1888** All States were hit except Western Australia.
- 1895-1903** This drought, one of the worst on record, halved Australia's sheep population (originally 100 million) and cut cattle numbers (12 million) by 40 per cent.
- 1911-1916** Wheat crops were affected in most States, sheep numbers declined by 19 million and cattle by 2 million.
- 1918-1920** During this period, parts of Western Australia were the only areas completely free from drought.
- 1939-1945** This prolonged drought affected crops and/or pastoral areas in all States. Sheep numbers fell from 125 million in 1942 to 96 million in 1945.
- 1965-1967** This drought, in its impact on Queensland, New South Wales and Victoria, ranked with the 1902 drought as one of the most severe on record. It resulted in a 40 per cent drop in the wheat harvest, a loss of 20 million sheep, and a decrease in farm income of \$300-500 million. There was a

chain reaction to other industries, with heavy losses being suffered by manufacturers of farm machinery and the New South Wales Railways. Effects of the drought were worsened by water rationing in irrigation areas.

1972 Widespread drought occurred throughout Australia.

Much of eastern Australia experienced one of the worst droughts on record in 1982 and early 1983. Widespread and soaking rains during the autumn months of 1983 greatly alleviated the situation and most areas received further good rains during 1983-84. However, 1985 saw the return of light and variable rainfall conditions. In July 1985, much of New South Wales and western Queensland had again been drought declared and regional areas of concern were notified in western Victoria, parts of South Australia and Western Australia, and much of the Northern Territory. Good rains during August 1985 relieved much of this problem.

For further details of droughts in Australia see the special article at the end of Chapter 16 in *Year Book* No. 71.

The years in which the numbers of livestock attained their peaks are as follows: cattle, 1976 (33,434,000); sheep, 1970 (180,080,000); and pigs, 1973 (3,259,000).

Cattle

Cattle-raising is carried out in all States, the main object in certain districts being the production of stock suitable for slaughtering purposes and in others the raising of dairy herds. While dairy cattle are restricted mainly to southern and to coastal districts, beef cattle are more widely distributed. Cattle numbers in Australia increased slowly during the 1960's and 1970s, despite seasonal changes and heavy slaughterings, to a peak of 33.4 million in 1976. There was a continuous decline, aggravated by drought conditions, to 22.2 million in 1984. Improved seasonal conditions and higher export prices in 1984 encouraged producers to commence rebuilding herds and numbers increased to 23.4 million in 1986.

Beef cattle production is often combined with cropping, dairying and sheep. In the north (north of the 26th parallel), cattle properties and herd size are very large, pastures are generally unimproved, fodder crops are rare and beef is usually the only product. The industry is more intensive in the south because of the more favourable environment including more improved pasture.

For further details on cattle, see *Livestock and Livestock Products, Australia* (7221.0).

CATTLE NUMBERS, BY AGE, SEX, PURPOSE
(*000)

Classification	31 March—					
	1983	1984	1985	1986	1987	1988
Milk cattle—						
Bulls used or intended for service	47	46	45	43	37	36
Cows, heifers and heifer calves	2,642	2,693	2,697	2,655	2,561	2,507
House cows and heifers	69	66	63	61	41	38
Total	2,757	2,805	2,806	2,759	2,639	2,581
Meat cattle—						
Bulls used or intended for service	499	498	524	554	513	528
Cows and heifers (1 year and over)	9,929	9,964	10,274	10,626	9,795	9,818
Calves under 1 year	4,644	4,455	4,897	5,010	4,738	4,716
Other cattle (1 year and over)	4,649	4,438	4,282	4,487	4,230	4,207
Total	19,721	19,356	19,978	20,678	19,276	19,270
Total, all cattle	22,478	22,161	22,784	23,436	21,915	21,851

CATTLE NUMBERS
(**'000**)

<i>31 March</i>	<i>NSW</i>	<i>Vic.</i>	<i>Qld</i>	<i>SA</i>	<i>WA</i>	<i>Tas.</i>	<i>NT</i>	<i>Aust. (incl. ACT)</i>
1983	5,018	3,408	9,349	828	1,754	562	1,548	22,478
1984	5,036	3,487	9,154	813	1,730	542	1,390	22,161
1985	5,226	3,576	9,413	846	1,673	554	1,484	22,784
1986	5,409	3,720	9,662	914	1,690	570	1,458	23,436
1987	4,868	3,478	9,012	912	1,659	535	1,439	21,915
1988	4,962	3,474	8,825	947	1,705	542	1,385	21,851

Sheep

With the exception of a short period in the early 1860s, when the flocks in Victoria outnumbered those of New South Wales, the latter State has occupied the premier position in sheep raising. Western Australia is the second largest sheep raising State, followed by Victoria. Sheep numbers reached a peak of 180.0 million in Australia in 1970. They then declined rapidly up to March 1973 as producers turned off large numbers for slaughter and moved from wool-growing towards grain and beef production. By 1975, the numbers had again increased to 151.7 million, but in March 1978 the numbers had fallen to 131.4 million, the lowest since 1955. Improved seasonal conditions during 1978 and 1979 enabled producers to begin rebuilding their flocks. By March 1980, numbers had risen to 136.0 million. Subsequently, high levels of drought-induced slaughter led to a decline in numbers to 134.4 million by March 1981. Numbers rose to 138.0 million in March 1982 with improved seasonal conditions and the attractiveness of sheep enterprises relative to cattle contributing to the growth in numbers. Subsequently, drought conditions saw the flock reduce to 133.2 million in March 1983. The increase in flock numbers to 139.2 million in March 1984 reflects flock rebuilding by producers in response to favourable seasonal conditions beginning in the autumn of 1983, improved lambing rates, and a favourable outlook for wool and live sheep enterprises. This trend continued and, in March 1989, flock numbers reached 152.4 million.

SHEEP NUMBERS
(**millions**)

<i>31 March</i>	<i>NSW</i>	<i>Vic.</i>	<i>Qld</i>	<i>SA</i>	<i>WA</i>	<i>Tas.</i>	<i>Aust. (incl. NT, ACT)</i>
1983	48.1	22.7	12.2	15.4	30.2	4.5	133.2
1984	51.0	24.6	13.0	16.4	29.5	4.6	139.2
1985	55.5	26.5	14.0	17.3	31.6	4.8	149.7
1986	58.0	26.9	14.3	17.9	33.2	5.1	155.6
1987	52.2	26.6	14.6	17.2	33.5	5.0	149.2
1988	54.9	27.0	14.4	17.4	34.0	4.7	152.4

SHEEP, BY AGE AND SEX
(**millions**)

<i>31 March</i>	<i>Sheep: 1 year and over</i>				<i>Lambs and hoggets (under 1 year)</i>	<i>Total, sheep and lambs</i>
	<i>Rams</i>	<i>Breeding ewes</i>	<i>Other ewes</i>	<i>Wethers</i>		
1983	1.7	65.6	5.5	28.8	31.6	133.2
1984	1.7	70.3	4.9	30.5	31.8	139.2
1985	1.8	71.0	5.4	33.3	38.3	149.7
1986	1.8	72.1	6.6	38.7	36.3	155.6
1987	1.7	72.1	4.2	37.5	33.6	149.2
1988	1.7	71.6	4.3	39.1	35.7	152.4

The combined value of wool and sheep slaughtered during 1987-88 is estimated at 31.4 per cent of the gross value of agricultural commodities. This proportion varies with wool and meat prices and seasonal conditions. Australia has about 14 per cent of the world's woolled sheep but produces around 29 per cent of the world's greasy wool output. In addition, in the year ended 30 June 1988 the sheep industry produced 586,000 tonnes of mutton and lamb. Exports of live sheep for slaughter during the same period totalled 6.9 million head, with Kuwait and Saudi Arabia accounting for 66 per cent of the total.

LAMBING

<i>Year ended</i> 31 March	<i>Season</i>	<i>Number of breeding ewes at start of season</i>	<i>Mating intentions at start of season</i>	<i>Actual matings</i>	<i>Ratio of actual matings to intended matings</i>	<i>Lambs marked</i>	<i>Ratio of lambs marked to actual matings</i>	<i>Ratio of lambs marked to breeding ewes</i>
		million	million	million	%	million	%	%
1983	1982-83	68.5	64.6	60.9	94	45.4	74	66
1984	1983-84	65.6	58.9	58.5	99	44.5	76	68
1985	1984-85	70.3	65.9	63.5	96	51.9	82	74
1986	1985-86	71.0	65.3	62.8	96	49.8	79	70
1987	1986-87	68.0	64.3	60.8	95	47.3	78	69
1988	1987-88	72.1	65.5	60.9	93	49.2	81	68

Pigs

Over the past 30 years there have been significant changes to the structure of the Australian pig industry. Initially, pigs were raised as part of a dairying operation where there were abundant supplies of liquid skim milk. Today, however, with introduction of factory separation of milk and cream, coupled with the low grain prices of the 1960s, pig raising has become more and more associated with grain production.

In addition there has been a major move away from the so called extensive method of pig raising to the intensive conditions that apply today. This has meant an increase in the capital investment in the industry and a greater degree of specialisation in pig raising. The average pig production unit today would be based on approximately 300 sows with feeds being almost exclusively grain based. While the number of sows in Australia has remained fairly constant the number of pig farmers has decreased.

**PIGS NUMBERS
(’000)**

<i>31 March</i>	<i>NSW</i>	<i>Vic.</i>	<i>Qld</i>	<i>SA</i>	<i>WA</i>	<i>Tas.</i>	<i>Aust. (incl. NT, ACT)</i>
1983	794	387	551	405	300	51	2,490
1984	799	404	556	417	300	48	2,527
1985	814	410	563	402	274	47	2,512
1986	798	432	585	414	278	45	2,553
1987	830	432	579	422	295	46	2,611
1988	853	437	617	441	307	48	2,706

Poultry

The commercial poultry industry comprising hatcheryworkers, egg producers and broiler growers is highly specialised, although a proportion of production comes from 'backyard' egg producers, roughly estimated at from 20 to 25 per cent of the total. There are also separate research schemes funded jointly by industry and government for the egg and meat chicken industries but close liaison exists. Both sectors are good examples of specialised, large scale, capital-intensive production.

POULTRY NUMBERS (a)
(**'000**)

31 March	Chickens			Other poultry			Total all poultry
	Hens and pullets for egg production	Meat strain chickens (broilers)	Total chickens (b)	Ducks	Turkeys	Other poultry	
1983	15,532	30,296	48,389	294	467	243	49,393
1984	14,075	31,318	47,529	370	535	239	48,673
1985	13,497	33,761	50,109	219	653	293	51,273
1986	13,752	35,619	51,807	288	580	378	53,053
1987	13,506	39,187	55,579	350	1,249	430	57,608
1988	13,463	47,988	64,201	663	1,585	365	66,813

(a) Data are for numbers of poultry on agricultural establishments as reported in the annual Agricultural Census. (b) Includes breeding stock and data not available for separate publication.

For further details on pigs and poultry see publication *Livestock and Livestock Products, Australia* (7221.0).

Meat Production, Slaughterings and Other Disposals

The ABS collects details of slaughterings and meat production from abattoirs, commercial poultry and other slaughtering establishments and includes estimates of animals slaughtered on farms and by country butchers. The data relate only to slaughterings for human consumption and do not include animals condemned or those killed for boiling down.

PRODUCTION OF MEAT BY TYPE (a)
(**'000 tonnes**)

Year	Carcass weight					Dressed weight (b)(c)		
	Beef	Veal	Mutton	Lamb	Pig meat	Total meat	Chickens	Total all poultry (d)
1982-83	1,482	61	250	280	239	2,313	283	314
1983-84	1,303	42	169	296	253	2,064	272	298
1984-85	1,271	39	215	301	260	2,086	315	345
1985-86	1,344	41	258	320	269	2,232	334	367
1986-87	1,469	39	285	297	282	2,373	345	384
1987-88	1,537	39	295	294	297	2,462	(e)362	396

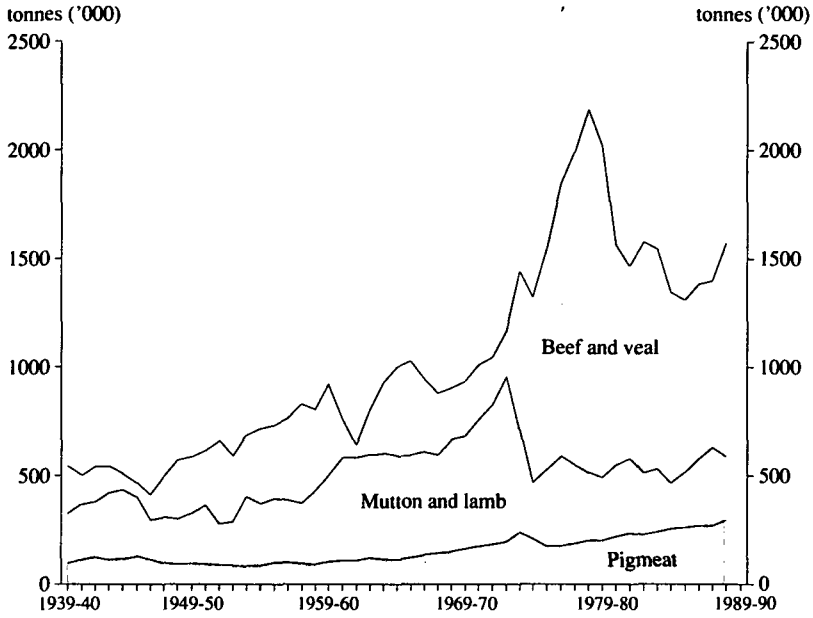
(a) Excludes offal. (b) Excludes the Northern Territory and the Australian Capital Territory. (c) Dressed weight of whole birds, pieces and giblets. (d) Includes other fowls, turkeys, ducks and drakes. (e) Excludes Tasmania.

NUMBERS OF LIVESTOCK AND POULTRY SLAUGHTERED FOR HUMAN CONSUMPTION
(**million head**)

Year	Cattle	Calves	Sheep	Lambs	Pigs	Chickens (a)	Other fowls (b) and turkeys	Ducks and drakes
1981-82	7.2	1.5	11.9	16.3	4.1	205.9	10.0	2.0
1982-83	7.4	1.7	13.1	16.9	4.2	226.2	10.9	1.9
1983-84	6.0	1.3	8.4	17.1	4.4	216.2	10.2	1.7
1984-85	5.8	1.2	10.5	17.5	4.5	244.2	10.7	2.1
1985-86	6.2	1.2	12.9	19.1	4.5	258.3	11.8	2.3
1986-87	6.7	1.2	14.5	17.7	4.7	269.3	11.2	2.1
1987-88	6.9	1.2	15.0	17.2	4.9	(c)274.0	10.4	2.1

(a) Comprises broilers, fryers and roasters. (b) Comprises hens, roosters, etc. (c) Excludes Tasmania.

**PRODUCTION OF MEAT, AUSTRALIA
1939-40 to 1987-88**



Mutton and lamb

Production of sheepmeats in Australia is closely associated with the wool industry. Sheep grazing often occurs on mixed farms in conjunction with beef and/or grain enterprises and in some areas producers specialise in lamb production. The supply of sheepmeat depends greatly on seasonal conditions, decisions to build up or reduce flock numbers, expectations of wool prices, live sheep exports and the pattern of domestic consumption of meat.

There was a movement out of sheep raising in Australia early in the 1970s, principally as a result of low wool prices, and many producers diversified into cattle and grains. Flock numbers declined from a peak of 180.0 million in 1970 to a low of 131.0 million by 1978. After 1978, wool and sheepmeat prices improved and the trade in live sheep for slaughter overseas continued to expand. As a result, the national flock size increased slightly to 136.0 million by March 1980. Since March 1980, flock numbers have fluctuated as a result of climatic and market conditions peaking at 138.0 million in March 1982, before dropping to 133.2 million in March 1983. Total Australian sheep flock in March 1988 was 152 million head.

Sheepmeat production declined rapidly from the high levels of the early 1970s, which were associated with flock reduction, to annual levels of between 400,000 and 600,000 tonnes from 1973-74. Lamb production declined from a peak of 316,000 tonnes in 1985-86 to 293,000 in 1987-88, while mutton production has varied between 230,000 and 300,000 tonnes in recent years until 1983-84, when it declined to 169,000 tonnes. Production increased to 293,000 tonnes in 1987-88.

A high proportion of lamb is consumed in Australia with per capita consumption remaining steady at about 14-16 kilograms per year. A high proportion of mutton produced is exported. Australia is the world's largest exporter of mutton, with Japan and the Middle East being the main markets.

Beef and veal

The cattle industry is very dependent on international trade in beef and is subject to great fluctuations. Over half of Australia's beef and veal production is exported, with the United States and Japan the main outlets.

Beef and veal production in Australia rose markedly in the 1970s, reaching peak levels of over 2.0 million tonnes in 1977-78 and 1978-79, but declining to 1.3 million tonnes in 1984-85. The increase in production followed the rapid expansion of the beef herd that had occurred during the late 1960s and early 1970s mainly in response to relatively profitable beef prices and increased demand from overseas markets.

In the mid 1970s, poor economic conditions and heavy domestic supplies of beef in major importing countries led them to impose severe restrictions on their imports. With reduced international demand and heavy supplies in Australia, saleyard prices fell greatly and remained low for about four years. The depressed conditions were accompanied by a severe reduction in the national herd.

Improved seasonal conditions during 1983, accompanied by strengthening overseas demand, resulted in a move towards herd rebuilding. However, the high level of drought-induced slaughterings during 1982 had reduced the breeding herd base implying very slow herd expansion until 1986. Higher slaughtering in 1987-88 was due to record beef prices in the US and a larger than expected number of tenders in Japan. Current projections by the Australian Meat and Livestock Corporation (AMLC) indicate that cattle numbers will slowly increase over the next few years. While slaughtering and production will fall slightly in the short term during the rebuilding process, numbers should expand to 25.5 million by 1992 implying a production increase of over 100,000 tonnes on 1987-88.

Of historical significance to the beef industry in 1988 was the opening of the Japanese and Korean beef markets which will provide substantial opportunities to increase beef exports in the coming years.

Pigmeat

Significant changes have taken place in the pig producing industry in recent years. Capital investment and corporate takeovers have seen the emergence of a few large companies producing 30 per cent of all pigs sold in Australia. These moves on top of the trend to more intensive and efficient production techniques have seen pigmeat production rise steadily since 1982 to reach 285,000 tonnes in 1987-88. In addition, there has been an increase in the slaughter weights of pigs reflecting the demands of the fresh pork trade. It is believed that about 60 per cent of production is processed into bacon, hams and smallgoods, with the rest sold as fresh pork. Less than 2 per cent of the industry's output is exported. The increasing production of pigmeat therefore reflects a steady increase in per capita domestic consumption over the past three years.

In recent years a small but useful market for the meat of feral pigs has been established in Europe.

Prices paid for pigs at auction have varied quite markedly in recent years. Profitability in the industry may be eroded in the coming year due to higher feed grain prices (see Australian Bureau of Agricultural and Resource Economics forecast, *Quarterly Review of the Rural Economy* Volume 10 Number 2).

Poultry meat

The poultry meat industry developed rapidly in the 1970s with both output and consumption rising steeply, although in recent years production has exceeded demand and excess production capacity in the industry continues. Genetic and technical improvements and the organisation of the industry into large-scale enterprises have raised efficiency and helped to reduce production costs relative to other meats. The price competitiveness of chicken meat compared with other meats, especially beef, continues to improve, consolidating the position of poultry meat as the second most important meat after beef in Australian diets.

EXPORTS OR FRESH, CHILLED OR FROZEN MEAT(a)
'000 tonnes

	<i>Beef(b)(c)</i>		<i>Veal(b)</i>		<i>Mutton(b)</i>		<i>Lamb</i>		<i>Pork</i>
	<i>Bone-in</i>	<i>Bone-out</i>	<i>Bone-in</i>	<i>Bone-out</i>	<i>Bone-in</i>	<i>Bone-out</i>	<i>Bone-in</i>	<i>Bone-out</i>	
1983-84	28.7	419.4	1.2	2.3	26.5	32.1	30.2	1.5	2.0
1984-85	10.5	395.8	1.6	3.6	21.6	38.1	26.3	1.4	3.2
1985-86	4.8	466.3	2.2	3.7	38.0	51.8	47.8	2.1	2.8
1986-87	4.6	555.3	2.1	3.5	49.9	57.9	53.7	1.5	3.9
1987-88	11.2	624.0	1.2	5.0	47.3	61.2	48.9	2.5	8.2

(a) Excludes offal. (b) Factors can be applied to beef, veal, mutton and lamb bone-out figures to derive bone-in carcass weight which, when added to bone-in figures, shows total exports in carcass weight. The factor for beef and veal is 1.5 and that for mutton and lamb 2.0 (Source: Australian Meat and Livestock Corporation). (c) Includes buffalo meat.

GROSS VALUE OF LIVESTOCK SLAUGHTERINGS AND OTHER DISPOSALS (a)
(\$ million)

<i>Year</i>	<i>Cattle and calves</i>	<i>Sheep and lambs</i>	<i>Pigs</i>	<i>Poultry</i>	<i>Total</i>
1982-83	2,076.2	548.0	414.9	412.7	3,451.8
1983-84	2,118.0	585.0	375.5	430.2	3,508.6
1984-85	2,253.2	576.1	438.1	512.6	(b)3,783.3
1985-86	2,367.3	531.6	438.3	559.1	3,896.4
1986-87	2,819.7	721.2	468.5	601.7	4,611.0
1987-88	3,057.0	803.9	536.1	671.2	(b)5,074.3

(a) Includes adjustment for net exports of live animals. (b) Includes goats.

Consumption

The methodology for calculating meat consumption has been revised for the years 1975-76 to 1983-84 and is now shown purely in carcass weight equivalent terms. Canned meat as such is not available. Carcass weight is defined as ex abattoir (i.e. bone-in). Owing to diverse cutting practices by butchers and the difficulty in clearly defining 'retail weight of meat' it is considered impractical to derive a factor for the purpose of expressing estimated meat consumption in terms of retail weight. (Estimates of retail weight as a percentage of carcass weight range from 70 per cent for beef, 80 to 85 per cent for lamb and 80 per cent for pork.)

APPARENT CONSUMPTION OF MEAT AND MEAT PRODUCTS AS HUMAN FOOD

<i>Year</i>	<i>Beef and veal</i>	<i>Mutton</i>	<i>Lamb</i>	<i>Pigmeat (a)</i>	<i>Offal</i>	<i>Total meat</i>	<i>Poultry meat</i>
TOTAL ('000 tonnes)							
1982-83	701	68	247	233	67	1,316	311
1983-84	654	81	261	254	53	1,303	309
1984-85	660	104	267	256	44	1,331	341
1985-86	656	113	268	269	43	1,349	365
1986-87	635	118	241	270	55	1,319	378
1987-88	660	104	267	256	44	1,331	341
PER CAPITA PER YEAR (kg)							
1982-83	45.9	4.5	16.2	15.3	4.4	86.1	20.3
1983-84	42.3	5.2	16.9	16.4	3.4	84.3	20.0
1984-85	42.1	6.6	17.0	16.4	2.8	85.0	21.8
1985-86	41.4	7.1	16.9	17.0	2.7	85.0	23.0
1986-87	39.4	7.4	15.0	16.8	3.4	82.0	23.5
1987-88	42.1	6.6	17.0	16.4	2.8	85.0	21.8

(a) Includes pigmeat products such as bacon and ham.

NOTE: Beef, veal, mutton, lamb, pigmeat and offal are expressed in terms of carcass weight, and poultry meat in dressed weight.

For further details on meat production and slaughtering *see* the following publications: *Livestock and Livestock Products, Australia* (7221.0), *Value of Agricultural Commodities Produced, Australia* (7503.0) and *Apparent Consumption of Foodstuffs and Nutrients, Australia* (4306.0).

Australia Meat and Livestock Corporation—AMLC

Legislation was enacted to establish the AMLC from 1 December 1977. The Corporation, which regulates and promotes the export of both meat and livestock and the promotion of domestic consumption, replaced the Australian Meat Board.

In mid 1984 the Australian Government introduced measures to restructure the administration of the Australian livestock and meat industry. Legislation enacted at the time, or foreshadowed, had three primary components:

- a restructured AMLC;
- establishment of the Australian Meat & Livestock Industry Policy Council (AMLIPC);
- the foreshadowed replacement of the Australian Meat Research Committee (AMRC) with an incorporated body called the Australian Meat and Livestock Research and Development Corporation (AMLRDC).

The AMLC has the power to trade in meat and livestock in a manner which accords with adopted policy and with normal commercial practice. Its power is also extended to engaging in sole trading or to permitting restricted trading by a specified holder or holders of meat or livestock licences. The exercise of this sole or restricted trading power is limited to circumstances where: a monopoly buying power is, in the AMLC's opinion, distorting normal market forces; such action is necessary or desirable to ensure that producers receive a fair return for the meat or livestock exported to that market; the exercise of sole trading powers would be beneficial for the further development of that market; the exercise of sole trading powers would be in the best commercial interests of the industry.

In order to foster consultation, the AMLC may, for the purposes of considering any matter relating to the performance of its functions, make arrangements for consulting persons and bodies representative of different sectors of the industry.

The AMLC's main functions are to:

- improve the production of meat and livestock in Australia;
- encourage and promote the consumption and sale of Australian meat, and the sale of Australian livestock, both in Australia and overseas;
- encourage, assist, promote and control the export of meat and livestock from Australia.

Exporters of meat and livestock are licensed by the AMLC and have to comply with its requirements in relation to export trading. The AMLC assists exporters in overseas market development and conducts meat promotion activities in Australia and abroad. It has authority also, to perform a wide range of other functions aimed at improving the production of meat and livestock for the general benefit of the meat and livestock industry.

Two bodies have been established within AMLC to undertake major programs for the meat and livestock industry. These are the Authority for Uniform Specification of Meat and Livestock (AUSMEAT), which is developing and implementing a meat and livestock description language, and Computer Aided Livestock Marketing (CALM) which is conducting livestock sales by computer.

Australian Meat and Livestock Industry Policy Council—AMLIPC

The legislation referred to above established a new statutory body, the AMLIPC, to relieve the AMLC of responsibility for the examination of all broad industry policy issues. It is intended that AMLIPC:

- facilitate the participation of industry in the development and formulation of industry policies;
- provide a forum of consensus, building between different sectoral interests within the industry;
- provide opportunities, through AMLIPC Working Groups, for all interested parties to work together on the factual examination of industry problems, and to present practical proposals to government for their solution.

Wool

The Australian Sheep Flock contains nearly 12 per cent of the world's sheep and produces over 30 per cent of the total annual production of wool. This is largely due to the more than 80 per cent of Australian sheep which are pure Merino and raised primarily for their heavy fleeces of fine quality wool.

Wool production

Wool as shorn from the sheep ('greasy wool') contains an appreciable amount of grease, dirt, vegetable matter and other extraneous material other than the clean wool fibre. The exact quantities of these impurities in the fleece vary between countries, differing climatic and pastoral conditions, with seasonal fluctuations and with the breed and condition of the sheep. It is, however, the clean wool fibre that is ultimately consumed by the textile industry and the term 'clean yield' is used to express the net wool fibre content present in greasy wool.

Since the 1946-47 season, the average clean yield of Australian wool has been assessed annually. In the early years, the average clean yield was assessed on the basis of a small number of tests and subjective appraisal. However, in recent years the Australian Wool Corporation has calculated the clip average yield on the basis of laboratory tests of yield applied to nearly all wool offered for sale at auction in Australia. It was 64.31 per cent in 1985-86.

Wool scoured and carbonised in Australia before export, however, has a somewhat lower clean yield than the whole clip, less so now than in past years. Much of scoured wool is now drawn from high yielding fleece types. The quantity of scoured and carbonised wool exported during 1985-86 was about 16 per cent of total raw wool exports in greasy terms. For the clean yield of Australian scoured wools exported, a standard factor of 93 per cent has been adopted.

SHEARING, WOOL PRODUCTION AND VALUE

Year	Sheep and lambs shorn	Average fleece weight	Wool production			
			Shorn wool	Other wool (a)	Total wool	
					Quantity	Gross value (b)
million	kg	'000 tonnes	'000 tonnes	'000 tonnes	\$m	
1982-83	149.1	4.30	641.5	60.2	701.7	1,761
1983-84	152.6	4.40	671.2	56.4	727.6	2,016
1984-85	168.2	4.48	752.7	61.6	814.3	2,434
1985-86	173.8	4.39	762.1	67.9	830.0	2,693
1986-87	179.8	4.53	813.7	73.2	886.9	3,338
1987-88	186.1	4.53	842.7	71.3	914.1	5,517

(a) Comprises dead and fellmongered wool, and wool exported on skins. (b) Gross value is based, for shorn wool, upon the average price realised for greasy wool sold at auction and, for skin wools, on prices recorded by fellmongers and skin exporters.

The wool market

The primary raw wool market in Australia is at public auctions where brokers, acting on behalf of woolgrowers, receive wool into store, and arrange sampling for measurement of the main, variable physical characteristics. The wool is then offered for sale at a rostered auction. Some 80 per cent or more of the clip is normally marketed this way, the remainder being sold privately at transaction prices agreed between the grower and a buyer.

The Australian Wool Corporation, on behalf of all growers, operates a minimum price support scheme at public auction sales.

Wool receivals

TAXABLE WOOL RECEIVALS

Year	Receivals		Dealers as per cent of total receivals	Shorn wool production (b)	
	Brokers (NCWSB)	Dealers (a)			
	—'000 tonnes—		per cent	'000 tonnes	
1982-83	509.6	141.2	650.8	21.7	641.5
1983-84	535.5	152.9	688.4	22.2	671.2
1984-85	588.3	164.0	752.2	21.8	752.7
1985-86	599.2	167.6	766.8	21.9	762.1
1986-87	627.5	187.5	815.0	23.0	696.2
1987-88	657.6	185.5	843.1	22.0	842.7

(a) includes brokers who are not members of the National Council of Wool Selling Brokers of Australia (NCWSB).
(b) Obtained from the annual Agricultural Census.

Under the terms of the Wool Tax Acts, all growers pay a tax on the gross value of shorn wool sales, to provide financial backing for wool promotion, research and the operation of a statutory Reserve Price Scheme. The ABS collects details of the total amounts of taxable wool received by wool selling brokers and dealers each year. These figures exclude wool received by brokers on which tax had already been paid by other dealers (private buyers) or brokers.

Wool marketing arrangements

The Australian Wool Corporation is a Commonwealth statutory authority, established at the request of the nation's woolgrowers to undertake a number of functions on their behalf, principally to stimulate the demand for Australian wool. Most important among these functions are the Reserve Price Scheme in the raw wool market, and comprehensive global wool promotion programs, and a broad programme of Research and Development.

The Reserve Price Scheme was introduced to the market in 1970 and seeks to provide a measure of wool price stability, in Australian dollar terms, to the benefit of the industry.

A Minimum Price for each wool type is established at the commencement of each wool selling season (financial year). Any wool which fails to attract bids equal to or higher than this minimum is purchased by the Corporation at that price and held until demand improves. As well, when the market is trading above these minimum price levels, the Corporation may intervene in the market with the aim of providing market stability. This may be needed, for instance, when there is exchange rate uncertainty or when the market enters a cycle of volatile price change. Finance for the operation of the Reserve Price Scheme is provided by growers, through a compulsory Wool Tax.

The Australian Wool Corporation has a number of other responsibilities which include: supervision of the industry's comprehensive research programs; establishing, monitoring and when necessary enforcing industry agreed clip preparation standards; shearer training; and encouraging efficiency within the sphere of wool handling and transport. It also operates extensive commercial storage facilities on the industry's behalf.

Wool testing

The Australian Wool Testing Authority came into existence in 1957 but its role became more prominent with the introduction, in 1971, of wool valuation techniques relying on objective specification of wool's main physical characteristics. From the first sales of wool in this manner in the early 1970s, this technique has achieved universal acceptance and now 99 per cent of all wool sold at auction is accompanied by certified measurements for yield, (i.e. the amount and type of clean wool fibre), average fibre diameter and the percentage and type of vegetable fault.

During 1986–87, commercial testing commenced for the additional characteristics of staple length and strength. In 1988–89 almost 20 per cent of all combing wool sold at auction was accompanied by these measurements and this figure is expected to approach 50 per cent of the offering in 1989–90.

At the direction of the Commonwealth Government, the Authority, which had operated as a division of the Corporation, was transferred to the private sector effective from the beginning of July 1982. The new company is known as AWTA Ltd.

Wool promotion

Since 99 per cent of the Australian wool clip is exported, the other major arm of wool marketing is the demand stimulating activities carried out in manufacturing and consumer markets around the world. These programs, which commenced in 1937, were significantly scaled up in the 1960s in response to the challenge posed by synthetic fibres. In more recent times these programs have again been increased in an effort to ensure wool's future as a preferred textile fibre in the world's major consumer markets. Growers have financed wool promotion since its inception, and for 1987–88 this was at the rate of 3.5 per cent of gross wool sales revenue, totalling \$190.1 million. This was boosted by a Commonwealth Government contribution of \$25 million, which meant a total \$215.1 million was available for wool promotion during the year. The majority of these funds are remitted to the International Wool Secretariat which operates actively in more than 50 countries around the world.

Wool research

Australian woolgrowers have financed industry research programs since 1937. In recent times this was coordinated through the Wool Research Trust Fund to which both the woolgrowers and the Commonwealth Government contributed. The Fund was administered by the Commonwealth Department of Primary Industries and Energy.

From 1 July 1986, the task of determining industry research priorities and allocating funds was transferred to a new body, the Wool Research & Development Council which was constituted as a committee of the Australian Wool Corporation.

Major recipients of wool industry research funds include the Commonwealth Scientific and Industrial Research Organization (CSIRO)—especially in the fields of wool textiles and wool production; Bureau of Agricultural and Resource Economics; universities and States departments of agriculture/primary industry.

Wool income

Fluctuations in wool prices have a marked effect on agricultural and national income. In 1945–46 the gross value of wool production was \$117.2 million, representing 17.4 per cent of the gross value of all agricultural commodities produced, while in 1955–51, when prices reached a peak during the Korean War, wool was valued at \$1,303.8 million, or 55.6 per cent of total agricultural industries. More recent figures for the contribution of wool income to total agricultural production and national exports reflect the growth in other commodities over the intervening years, rather than a decline in the fortunes of the wool industry.

WOOL INCOME
(per cent)

<i>Year</i>	<i>Value of wool as a per cent of total agriculture</i>	<i>Value of wool exports as a per cent of total Australian exports</i>
1982-83	15.0	8.5
1983-84	13.1	8.7
1984-85	15.8	8.7
1985-86	17.5	7.3
1986-87	19.3	10.9
1987-88	27.4	12.7

The gradual strengthening of wool prices since the mid 1970s has seen wool's contribution to total national export revenue increase steadily. This trend has accelerated in the years since 1983-84 when export income from wool has climbed from just over \$2 billion to reach \$6 billion during 1987-88. This means that wool is again Australia's largest earner of export revenue, as it has been for most of the 200 years of European settlement in Australia.

Stocks

Stocks shown below of raw and semi-processed wool were held by wool processors, scourers, fellmongers, brokers, dealers and the Australian Wool Corporation. They exclude wool on skins since this wool is not recorded as production until fellmongered in Australia or exported on skins.

WOOL STOCKS
(*000 tonnes)

<i>At 30 June</i>	<i>Stocks of—</i>					
	<i>Raw wool</i>		<i>Semi-processed wool</i>		<i>Total wool</i>	
	<i>Greasy</i>	<i>Clean</i>	<i>Greasy</i>	<i>Clean</i>	<i>Greasy</i>	<i>Clean</i>
1983	305.4	189.5	8.2	5.1	313.6	194.6
1984	368.4	232.1	9.6	6.1	378.0	238.2
1985	332.8	212.5	9.1	5.9	341.9	218.3
1986	299.0	190.9	8.5	5.5	307.5	196.3
1987	191.2	119.4	7.2	4.6	198.4	124.0
1988	147.8	94.8	5.9	3.8	153.7	98.6

Wool processing

During the 1970s there was a trend to increased early stage processing of Australian wool before export. The last 2 years has seen a further wave of investment in this area, with some expansion of existing facilities and some new plants being built. There is now sufficient capacity in Australia to process over 20 per cent of the Australian wool clip prior to export.

The main scope for expanded domestic processing remains with worsted types for export in scoured or combed top form. Japanese processors initiated the export of scoured worsted types from Australia, and Japan became Australia's major market for scoured wool in 1973-74. In more recent times China has emerged as a major destination for Australian wool, much of which is part processed prior to export.

Before 1975 the wool processing industry was largely centralised in cities close to major ports. Since then, however, much of the expansion has been in decentralised, inland locations. The most recent investment in this sector has again been adjacent to major ports, especially Melbourne.

Wool consumption

Two series of calculations on Australian wool consumption are shown below:

- Consumption of raw wool, which measures consumption in terms of scoured wool used by mills;
- Consumption of processed wool, which is calculated from the usage of woollen and worsted yarn.

Raw wool comprises greasy, slipe, scoured and carbonised wool. This series has been included for purposes of comparison with other countries.

CONSUMPTION OF RAW AND PROCESSED WOOL (*000 tonnes)

Year	Consumption of raw wool		Consumption of processed wool				Total	
			Worsted yarn used (a)		Woollen yarn used (b)			
	Greasy	Clean	Greasy	Clean	Greasy	Clean	Greasy	Clean
1982-83	54.7	32.7	9.8	5.8	13.1	8.2	24.1	14.5
1983-84	54.4	32.4	9.8	5.7	14.4	8.9	25.5	15.2
1984-85	59.3	35.4	10.7	6.3	17.0	10.6	28.9	17.4
1985-86	62.5	37.3	10.5	6.1	18.3	11.4	29.9	18.1
1986-87	62.9	37.6	11.4	6.7	17.1	10.7	29.8	17.9
1987-88	64.9	38.9	8.6	5.1	17.6	11.0	29.4	17.8

(a) Wool content of yarns containing a mixture of wool and other fibres. (b) Comprises pure and mixed woollen yarn.

The second series is considered to be a more satisfactory measure of Australian wool consumption, principally because allowance is made for significant quantities of wool tops exported. However, both series relate to consumption of wool by the wool textile industry, and should not be used as measures of consumption of wool at retail level. It has not been possible to estimate wool consumption at retail level because of the impracticability of obtaining reliable data concerning the wool content of the multiplicity of woollen and worsted piece-goods.

Exports of wool

From its earliest days the Australian wool industry has been export oriented, and today approximately 99 per cent of total annual production of wool is exported.

Apart from wool in its natural 'greasy' state, and in part processed forms (i.e. scoured, carbonised, top and noil) a significant quantity of wool is also exported on sheep skins.

EXPORTS OF WOOL

Year	Selected exports ('000 tonnes: greasy basis)			Total exports	
	Greasy and slipe	Scoured and carbonised	Exported on skins	Greasy basis	Value
				(a)	f.o.b.
				'000 tonnes	\$m
1982-83	487.7	82.0	54.2	653.6	1,881
1983-84	497.7	95.7	50.7	669.8	2,049
1984-85	554.9	108.5	55.4	746.8	2,548
1985-86	607.9	130.4	61.2	830.5	3,098
1986-87	677.2	150.6	65.8	923.6	3,888
1987-88	663.6	n.y.a.	n.y.a.	n.y.a.	5,219

(a) Includes processed wool.

For further details on sheep shorn, wool production and overseas trade see the following publications: *Livestock and Livestock Products, Australia* (7221.0), *Sheep Numbers, Shearing and Wool Production Forecast, Australia* (7211.0), *Shearing and Wool Production Forecast, Australia, Preliminary* (7210.0), *Livestock Products, Australia* (7215.0), *Foreign Trade, Australia* (5409.0, 5410.0), *Production Bulletin No. 4, Australia* (8360.0) and *Value of Agricultural Commodities Produced, Australia* (7503.0).

Dairying

Dairying in Australia has experienced quite significant changes in recent decades. In response to changed demand patterns and consumer preference, both in Australia and overseas, there have been dramatic changes in cow numbers, farm productivity, product mix, export levels and major export destinations.

Although dairying occurs in all States, Victoria, Tasmania and New South Wales combined account for 80 per cent of total milk production. In recent years there has been structural adjustment in some States to match production with domestic market demand particularly liquid milk demand. With the exception of some inland irrigation areas, e.g. the Goulburn-Murray Valley and the M.I.A., most dairying is centred along the coastal belt. Some feed lot dairies have been established in Australia.

Production

Wholemilk production has been around 6,000 million litres in more recent years with Victoria representing approximately 60 per cent. Although total production has stabilised, this has been associated with a fall in both cow numbers and the number of registered dairy farms. In 1989 there were some 15,981 registered dairy farms with 1,663,000 cows in production. This compares with 1982 figures showing some 20,300 farms and 1,812,000 cows.

The factors behind the yield gains of about 4 per cent per annum since 1982 include improved feeding programs (pasture and supplementary), genetic/breeding gains and generally enhanced farm management practices. Economy of operation gains have been possible as average farm and herd size has increased. This has enabled more economic application of new technology. Over the last decade, the rate of average yield increase has been amongst the highest in the world.

Domestic market

The consumption of dairy products in Australia has undergone change in recent years in both the volume and composition of dairy product consumption. These changes generally reflect changes within the Australian population as Australia becomes more culturally diverse. Other factors influencing dairy food consumption include changed consumer preference, e.g. more diet/health conscious, and changed relative prices (butter with respect to margarine). Liquid milk sales account for around 27 per cent of total milk production and compete heavily against other non-alcoholic beverages, e.g. fruit juices. Changes in manufactured dairy produce consumption have been more dramatic than for liquid milk. Recent product developments such as spreadable butter and butter/vegetable oil blends have been commercialised with reasonable success.

Since 1960 annual per capita cheese consumption has risen by an average of 7.9 per cent with current levels at around 9.2 kilograms. The area of greatest growth has been in the specialty type cheeses while per capita consumption of traditional cheddar type cheeses has stabilised at around 5 kilograms per annum. The cheeses to have experienced quite large increases include Camembert, Mozzarella and Parmesan.

Since the mid 1980s, Australian manufacturers' share of the non-cheddar market has been increasing, from 64 per cent in 1983-84 to nearly 80 per cent in 1988-89. This reflects the increasing range and quality of Australian specialty cheeses.

MILK CATTLE NUMBERS
(^{'000})

*Cows and heifers used or intended for
production of milk or cream for sale*

<i>31 March</i>	<i>Bulls used or intended for service</i>	<i>Cows (in milk and dry)</i>	<i>Heifers</i>		<i>House cows and heifers (a)</i>
			<i>1 year and over</i>	<i>Under 1 year</i>	
1983	47	1,792	460	390	69
1984	46	1,809	483	401	66
1985	45	1,809	475	413	63
1986	43	1,770	488	397	61
1987	37	1,716	464	381	41
1988	36	1,676	455	375	38

(a) One year and over, kept for the establishment's own milk supply.

International marketing

Although international trade in dairy products is heavily restricted, Australia exports around a quarter of its annual milk production as manufactured dairy products. During 1988–89, the total value of dairy products exported was \$650 million (f.o.b.) with cheese and milk powders the main products sold. Australia's export sales are concentrated in end user markets in Asia and the Middle East, with Japan being our largest single customer.

Because international prices are affected by the export subsidies used by countries such as the EEC, world price minima for dairy products are established under the General Agreement on Tariffs and Trade (GATT). GATT minimum prices for all major dairy products were increased in September 1989 in response to the continued improvement in the international trading environment during the year.

Government assistance

The world dairy market is heavily distorted by the production and trade policies of major dairy producing countries. In light of this the Australian Government allows the Australian industry to fund and operate a market support scheme. This scheme was introduced on 1 July 1986, after much industry consultation. It replaced an equalisation scheme which aimed to protect the industry from unexpected and share falls in world market prices. Central to the former scheme was that returns on export markets were pooled and manufacturers received an equalised return.

Under the current scheme no equalising of returns occurs. The general thrust of the new arrangements is to further expose the industry to market forces, both locally and overseas. An integral part of the current arrangements is the operation of the Market Support Fund.

The Market Support fund is financed via an all milk levy which is determined by government following recommendation of the Australian Dairy Corporation. The all milk levy for 1988–89 was set at 45 cents per kilogram milkfat; current legislation prevents the levy exceeding 45 cents per kilogram milkfat. These funds are used to support export returns, by 18.5 per cent of estimated average export prices in 1988–89.

Assistance to industry is also offered via the Rural Adjustment Scheme which provides financial assistance for such things as farm build-up, farm-improvement and household support. Government funding of dairy research is provided on a dollar for dollar matching basis with industry funded contributions. Producers at present pay a 1.3 cent per kilogram milkfat levy for research and a 4.65 cent per kilogram milkfat levy for promotion.

The allocation of research funds is administered through the Dairy Research Council. Dairy Research Council supported research covers three broad areas — farm, manufacturing and economics and marketing. Examples of more specific research include cheese making technology, pasture renovation, animal nutrition and economic modelling.

PRODUCTION, UTILISATION AND GROSS VALUE OF WHOLE MILK

Year	<i>Whole milk intake by factories (a)</i>			
	<i>Market milk sales by factories</i>	<i>Milk used in the manufacture of dairy products</i>	<i>Total intake</i>	<i>Gross value</i>
	—million litres—			\$m
1982-83	1,573	3,951	5,524	1,186.5
1983-84	1,572	4,351	5,923	1,153.2
1984-85	1,593	4,445	6,038	1,035.4
1985-86	1,625	4,412	6,037	1,106.7
1986-87	1,685	4,491	6,176	1,257.4
1987-88	1,667	4,462	6,129	1,390.9

(a) These milk intake figures have been collected (from milk factories) by the Australian Dairy Corporation and replace statistics of whole milk production and utilisation previously compiled by the ABS.

Industry outlook

Under the current dairy marketing arrangements, the returns achieved by Australian manufacturers on all sales are largely determined by prevailing international prices. In turn, these prices are heavily influenced by the production and trade policies of the EEC and the USA. During the past two years, improved production controls and the disposal of old stockpiles through discount sales have greatly improved the balance between world supply and demand for dairy products. As a result, international prices have firmed considerably. Farm gate returns for manufacturing milk have also increased in line with the improvement in end product prices, thereby, greatly improving industry confidence overall.

With international supply and demand balances expected to remain fairly tight over the next year, prices should stabilise around their current higher levels.

However, despite this improvement in both farm gate and manufacturer returns, the industry faces a number of challenges in the year ahead. Under the Closer Economic Relations Treaty (CER), New Zealand dairy products will have unrestricted access to the Australian domestic market from July 1990. This will increase the competition between local and imported products in the expanding industrial and food-service sectors of the domestic market. Moves to further deregulate domestic trade in liquid milk and an increased consumer preference for reduced fat dairy products will also provide significant challenges for local producers.

On the international scene there is considerable potential for Australia to improve its access to the more lucrative Northern Hemisphere markets as a result of the current round of Multilateral Trade Negotiations (MTN) being held as part of the GATT Uruguay Round. However, in the shorter term, there will only be limited changes to our pattern and level of export trade.

PRODUCTION AND TRADE OF BUTTER AND CHEESE

Year	Butter			Cheese			Imports '000 tonnes
	Factory production '000 tonnes	Exports (a)		Factory pro- duction (c) '000 tonnes	Exports (b)		
		Quantity '000 tonnes	Value f.o.b. \$m		Quantity '000 tonnes	Value f.o.b. \$m	
1982-83	88.3	15.5	41.1	158.2	54.5	134.6	19.7
1983-84	111.3	27.4	50.3	161.1	54.6	141.1	22.3
1984-85	114.0	40.7	69.2	159.6	67.6	163.7	22.3
1985-86	105.0	42.9	71.6	170.1	66.1	165.5	20.3
1986-87	103.9	27.3	52.9	177.5	62.2	164.3	17.7
1987-88	94.2	35.3	67.1	176.3	71.8	186.8	18.6

(a) Excludes ghee and butter concentrates. (b) Includes processed cheese exports. (c) Factory production is shown only for non-processed cheese.

APPARENT CONSUMPTION OF MILK, BUTTER, CHEESE AND MARGARINE

Year	Apparent consumption Total			Apparent consumption Per capita per year			Margarine	
	Market milk	Butter	Cheese	Market milk	Butter	Cheese	Table	Other
	ML	'000 tonnes	'000 tonnes	Litres	kg	kg	kg	kg
1982-83	1,572	61	113	102.9	4.0	7.4	6.8	2.8
1983-84	1,572	60	118	101.6	3.9	7.7	6.9	2.7
1984-85	1,594	62	126	101.8	3.9	8.1	6.6	2.3
1985-86	1,625	60	125	102.5	3.8	8.0	6.9	2.1
1986-87	1,655	56	130	102.6	3.5	8.1	6.8	2.1
1987-88	1,594	61	118	101.8	3.9	8.1	6.6	2.3

For further details on the dairying industry see the publications, *Livestock and Livestock Products, Australia* (7221.0), and *Production Bulletin No. 3: Food, Drink and Tobacco, Australia* (8359.0).

Beekeeping

The beekeeping industry consists of approximately 300-400 full-time apiarists, who produce approximately 70 per cent of Australian honey, and a large number of part-time apiarists who produce the rest. Some of these apiarists move as far afield as from Victoria to Queensland in an endeavour to obtain a continuous supply of nectar for honey from suitable flora. While honey production remains the predominant sector of the industry, production of breeding stock and provision of pollination services is significant.

Exports of honey are regulated by the Australian Honey Board which also promotes honey consumption.

Statistics up to and including 1985-86 in the following table relate to apiarists with forty or more hives. In 1986-87 the Census scope was revised to include establishments undertaking agricultural activity having an estimated value of agricultural operations (EVAO) of \$20,000 or more. The previous scope value cut-off was \$2,500 EVAO.

BEEKEEPING STATISTICS

Year	Number of apiarists	Number of beehives		Honey produced			Beeswax produced	
		Productive	Total	Quantity '000 tonnes	Average production per produc- tive hive kg	Gross value \$'000	Quantity tonnes	Gross value \$'000
		'000	'000					
1982-83	2,182	390	540	22.5	57.7	16,605	424	1,613
1983-84	2,148	393	529	25.0	63.6	19,220	467	1,622
1984-85	2,222	413	553	28.0	67.7	21,257	528	2,077
1985-86	2,250	427	560	26.9	63.0	25,387	490	2,035
1986-87	760	293	364	19.2	65.6	33,038	334	1,988
1987-88	770	285	366	23.0	80.8	32,500	428	1,900

Honey levy

The *Honey Levy Acts (Nos 1 & 2) 1962* impose a levy on domestic sales of honey. The rate of levy is set by regulation up to a maximum of 2.70c per kg fixed by the legislation.

The *Honey Export Charge Act 1973*, imposes a charge on exports of honey. The legislation provides for a maximum charge of 1.5c per kg.

For further information, see the publication *Livestock and Livestock Products, Australia* (7221.0).

Eggs and Egg Products

Commercial egg production in Australian States (including NT but excluding ACT) in 1987-88 was about 184.0 million dozen. The decrease in recent years is expected to continue as all States endeavour to reach their goal of maintaining quota hen numbers at such levels as will result in production being very close to domestic needs with very little left over for export. Such action has been taken as the net return on exports of shell eggs and egg products has been well below the cost of production in past years.

EGGS AND EGG CONSUMPTION
(million dozen)

Year	Recorded commercial production	Exports (a)	Apparent consumption in Australia as human food(b)	
			Total	Per capita (number of eggs)
1985-86	183.1	7.6	177.4	134
1986-87	184.5	4.7	184.5	138
1987-88	184.0	4.7	184.0	135

(a) Includes shell egg and egg products in shell egg equivalent. (b) Data from 1982-83 consists of commercial disposals only.

Agricultural Improvements**Irrigation on agricultural establishments**

Irrigation is one of the factors by which agriculture is developed. The variability in stream flow and annual rainfall means that successful irrigation of crops and pastures is dependent on storage. Ground water supplies are also used in areas where the quantity is adequate

and the quality is suitable. The area of land irrigated (approximately 1.8 million hectares in 1986–87) forms 9.2 per cent of the total area under crops.

Chapter 16, Water Resources, contains additional details of water conservation and irrigation with international, national and interstate aspects.

Irrigation statistics are collected every three years in the Agricultural Census and represent area actually irrigated.

AREA IRRIGATED BY SOURCE OF WATER USED, YEAR ENDED 31 MARCH 1987(a)
(Hectares)

	<i>NSW</i>	<i>Vic.</i>	<i>Qld</i>	<i>S.A.</i>	<i>W.A.</i>	<i>Tas.</i>	<i>Australia (b)</i>
Surface water—							
From State irrigation schemes	403,852	423,414	69,255	13,103	12,091	2,449	924,164
From other schemes (including private group schemes)							
Direct from rivers, creeks, lakes, etc.	350,963	62,300	50,770	21,555	1,777	13,314	501,713
From farm dams	16,848	34,564	31,792	3,692	4,498	20,797	112,194
Total	367,811	96,864	82,562	25,247	6,275	34,111	613,907
<i>Total surface water</i>	<i>771,663</i>	<i>520,278</i>	<i>151,817</i>	<i>38,350</i>	<i>18,366</i>	<i>36,560</i>	<i>1,538,071</i>
Underground water supply (e.g. bore, spear, well)	57,722	26,027	122,997	52,238	5,473	1,476	266,507
Town or country reticulated water supply	732	4,096	546	1,177	130	128	6,942
Unspecified(c)	24,951	—	—	—	—	—	24,951
Total all water sources	855,068	550,402	275,360	91,765	23,969	38,165	1,836,472

(a) Data for irrigation collected every 3 years. (b) Also includes figures for the ACT & NT. (c) ABS imputed data to balance area irrigated and source of water questions due to incomplete reporting in the Agricultural Census.

Fertilisers

Most Australian soils are deficient in phosphorus. Because of this and the significant but less widespread deficiency of sulphur in many soils, phosphatic fertilisers, particularly single superphosphate, account for the bulk of fertiliser usage. Nitrogen deficiency is also general in Australian soils and the use of nitrogenous fertilisers is increasing. Potassium deficiency however is confined mainly to soils in the higher rainfall areas which are intensively cropped or used for irrigated pastures.

The pattern of fertiliser usage in Australia has changed dramatically in recent years. Prior to 1973–74 the usual consumption ratio of elemental N:P:K has been 2:6:1, but by 1983 the ratio had changed to almost 3:3:1. This variation has resulted from a combination of reduced consumption of phosphatic fertilisers with an increased consumption of nitrogenous fertilisers.

The domestic industry has sufficient manufacturing capacity to meet normal local demand for phosphatic fertilisers but not nitrogenous fertilisers. Australia is dependent on imports of potassic fertilisers, rock phosphate and sulphur. Imports of compounded high analysis fertilisers and specialised fertilisers were insignificant until 1982–83. Since then, however, imports have been rising strongly, largely as a result of oversupply and lower prices on the world market.

ARTIFICIAL FERTILISERS: AREA AND USAGE

Year	Area fertilised	Super-phosphate used	Nitrogenous fertilisers used	Other fertilisers used
	'000 ha	'000 tonnes	'000 tonnes	'000 tonnes
1982-83	n.a.	2,562	429	633
1983-84	n.a.	2,481	414	721
1984-85	26,407	2,374	421	885
1985-86	25,089	2,160	408	869
1986-87	24,473	2,079	401	850
1987-88	26,651	2,454	431	953

Since the Second World War there has been a great expansion of the area of sown pasture accompanied by an increased use of fertilisers. New pasture varieties (including tropical species) have been developed, and nutrient or trace elements deficiencies in soils identified.

The main artificial fertiliser used in Australia is superphosphate, over half of which is used on pastures, mainly in areas with moderate to good rainfall. Large quantities are also used on cereal crops.

SUPERPHOSPHATE USAGE

Year	Selected crops and pastures					Total
	Sown and native pastures	Lucerne	Wheat	Other cereals	Sugar cane	
AREA FERTILISED ('000 hectares)						
1982-83	10,711	n.a.	9,299	n.a.	300	n.a.
1983-84	10,175	n.a.	9,672	n.a.	292	n.a.
1984-85	10,686	133	9,694	4,588	297	26,407
1985-86	10,674	n.a.	8,813	n.a.	288	25,089
1986-87	10,399	n.a.	8,525	n.a.	289	24,064
1987-88	13,231	n.a.	7,307	n.a.	297	26,651
SUPERPHOSPHATE USED ('000 tonnes)						
1982-83	1,289	n.a.	777	n.a.	27	2,562
1983-84	1,229	n.a.	720	n.a.	23	2,481
1984-85	1,227	24	618	352	18	2,374
1985-86	1,211	n.a.	499	n.a.	16	2,160
1986-87	1,130	n.a.	437	n.a.	16	1,981
1987-88	1,565	n.a.	367	n.a.	19	2,454

Agricultural machinery on agricultural establishments

Statistics on the type of agricultural machinery on agricultural establishments were published in early issues of the *Year Book*. Additional information was published in the publication *Agricultural Land Use, Improvements and Labour, Australia, 1980-81* (7103.0). Details of the sales of new tractors for agricultural purposes are given in the quarterly publication *Sales and Stocks of New Tractors, Australia* (8507.0).

Employment in Agriculture

Employment on agricultural establishments

Prior to 1976, data on employment collected at the annual Agricultural Census differentiated between permanent full-time employees and temporary employees. Full-time workers excluded casual or seasonal workers and other persons working only part-time. Casual or seasonal workers were shown as temporary employees.

In the past it has been difficult to maintain comparability of employment on agricultural establishments from year to year because of the changing number of lessees and share farmers and because of the tendency of many farmers to include part-time family helpers as full-time workers in their returns. Since World War II there has been a decline in the percentage of people living in rural areas due, in part, to a rising standard of living accompanying the introduction of new techniques and increasing use of capital equipment, fuel, fertilisers, and pesticides. As a result, a smaller agricultural labour force is now producing a larger output of farm products.

EMPLOYED PERSONS IN AGRICULTURE AND SERVICES TO AGRICULTURE
(*000)

<i>Month of August</i>	<i>Males</i>	<i>Married females</i>	<i>All females</i>	<i>Persons</i>
1983	290.2	80.2	94.1	384.2
1984	279.3	80.0	93.8	373.1
1985	287.4	89.5	107.1	394.5
1986	278.4	94.0	112.1	390.6
1987	300.4	98.8	116.7	417.1
1988	284.0	104.7	118.7	402.7

Regulation of Australian Agricultural Industries

Year Book No. 61, pages 837-57, contains a summary of the means by which agricultural industries are assisted and regulated. It is not intended as a comprehensive statement of all the consultative and legislative assistance and control measures that exist, but rather as a description of the way in which these processes affect the crops, livestock and livestock products referred to earlier in this chapter.

Agricultural Research by CSIRO

Agricultural research conducted by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) is directed primarily to aspects of agricultural production and processing that are of widespread significance and require mid-term to long-term research. It is aimed at establishing principles, practices and technologies that will improve the efficiency and long-term viability of Australian agriculture and its capacity to respond to changing needs. It is vertically integrated, covering all aspects from production through to post-harvest handling, storage and processing, and includes studies designed to integrate new plant varieties, animal breeds and production technologies into sound production systems.

CSIRO's research is appropriate for attacking problems or developing opportunities that transcend State boundaries; are complex and require concentration of disciplinary effort for their solution; and may need sustained long-term effort before they yield practical results. Its agricultural research complements that of State government departments and universities, and the Organisation attaches considerable importance to collaborative research with them.

CSIRO's agricultural research covers the following research areas: plant improvement; plant physiology and biochemistry; soils and plant nutrition; crop and pasture pests and diseases; livestock production; livestock health; agricultural systems; wool textiles and marketing; food handling, processing and storage; and agricultural and veterinary chemicals. There is also research directly relevant to the agricultural industries carried out within the research area of environmental protection and rehabilitation.

Most of CSIRO's agricultural research is performed within the Institute of Animal Production and Processing and the Institute of Plant Production and Processing. The Institute of Animal Production and Processing carries out scientific and technological research aimed at improving the efficiency of livestock production and processing and the quality and safety of human foods. The Institute's activities include research on control of indigenous and exotic animal diseases; nutrition, reproduction, genetics and management of livestock; methods of processing, handling and storing meat, dairy foods, and fruit and vegetables; and wool textiles and marketing. This research is performed by the following constituent units of the Institute—the Divisions of Animal Health; Animal Production; Tropical Animal Production; Food Processing; Wool Technology; and the Australian Animal Health Laboratory.

Research in the Institute of Plant Production and processing is directed to improving the profitability and stability of industries based on field crops, pastures, horticulture and forests, and to providing knowledge for the use and management of Australia's soils, plants and insects. Specific objectives are: to increase understanding of basic plant biological processes and their interactions with insects and soils; to increase the variety and quality of plant-based products to meet market needs; to develop more efficient production systems; to develop technologies to provide new opportunities for Australian industries; and to improve the community's understanding of Australia's plants, insects and soils. This research is performed in the following constituent Divisions of the Institute: Entomology; Forestry and Forest Products; Horticulture; Plant Industry; Tropical Crops and Pastures; and Soils.

The Institute of Industrial Technologies is also engaged in research of direct benefit to the agricultural industries through research on the design and synthesis of potential agricultural chemicals performed by the Division of Chemicals and Polymers.

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