

## LIVESTOCK

### INTRODUCTION

This topic maps and describes the geographic distribution of pasture-dependent livestock and some broad measures of their productivity. The four main livestock industries—wool, sheep meat, beef and dairy production—generate about half the total value of Australian agricultural production. Livestock are economically important virtually everywhere within the area used for agriculture. Even in the extensively cropped wheat belts they provide nearly half the total farm income. Only in some small areas of intensive cropping are they unimportant or absent.

The role of livestock in Australian farming and their relationship with cropping are described in the final topic, 'Farms', of this volume. Pigs and poultry, which are not dependent on pasture but are mostly grain-fed, are also covered in the final topic.

### GRAZING DENSITY

The pastures described in the preceding topic were grazed by about 150 million sheep and 33 million cattle in 1976.

Cattle, because they are larger, need more food than sheep so numbers of each must be converted to a common standard to make a nation-wide comparison of intensity of pasture use. To compile the 'Grazing Density' map, a sheep-equivalent *livestock unit* was adopted based on ratios at present used by the Bureau of Agricultural Economics for similar purposes of standardisation. In this system a sheep equals one livestock unit, a beef beast equals 8 units and a dairy beast equals 12 units.

Different ratios have been applied in the past and other ratios may be more appropriate to some local conditions. For instance, a ratio of 10 sheep to one beef beast was applied in the map 'Distribution of Stock' (1954) in the First Series of this Atlas and 5 sheep to one beef beast is applied by some State authorities in the more arid areas.

The broad pattern of grazing density closely reflects average effective rainfall, ranging from very low densities on the fringes of the unused deserts and in the monsoonal north through a progression of higher densities coastward towards the south and east, culminating in the highest densities on the temperate and relatively well watered coastlands of Victoria and northern Tasmania.

This general pattern is disrupted by differences in soils and terrain. The Mitchell grasslands support higher densities than surrounding country with poorer soils in northern Australia, as do the flood plains of the Channel Country in south-western Queensland. In higher rainfall areas of the south and east, relatively low densities occur in areas of rugged terrain and, on the border of South Australia and Victoria, in relict sand-dune country.

Sharp breaks in density occur on the drier edges of the wheat belts, notably in Western Australia and western South Australia, where improved pasture on wheat-sheep farms is much more productive than the adjacent poor native pasture.

The most densely grazed pasture (more than 8 livestock units per hectare) covers only about 3% of Australia's grazed land. However, although small in area, it supports about a quarter of all livestock including nearly all dairy cattle. Most of this land is under

perennial sown pasture and is almost exclusively confined to the wetter coastal lowlands and adjacent uplands of the south and east together with irrigated pastures further inland.

The second highest class (2–8 units per hectare) covers about 10% of the grazed land but supports about 40% of the nation's livestock. This land is largely confined to the more temperate humid and sub-humid regions of the south and east with fragments extending north in Queensland along the coast and in the Central Highlands. It is predominantly sown pasture, much of which is based on subterranean clover or, in Queensland, is sown perennial grasses such as panic and Guinea grass.

These two most densely grazed pasture classes, in combination, mark the areas over which the inherently poor native pastures have been successfully replaced by more productive ones. Whilst still only covering about 13% of the total grazed area, they support about two-thirds of the livestock.

On the drier fringes of the wheat belts, where subterranean clover pastures are less easily maintained (notably in Western Australia and South Australia), grazing densities are in the middle class (1–2 units per hectare). This class also includes, towards the bottom of its range, the Mitchell grasslands, the Channel Country flood plains and some of the better saltbush country in the Riverina of southern inland New South Wales. This middle class covers 16% of the grazed land and supports about 20% of the livestock.

The next class (1/2–1 unit per hectare) covers 20% of the grazed land but supports only about 9% of the livestock. It is associated with a variety of poor native pastures, notably acacia shrub–short grass in semi-arid New South Wales and Queensland, the drier areas of southern xerophytic mid grass, inferior Mitchell grass and some saltbush.

The most sparsely grazed country (less than 1/2 unit per hectare) covers the largest area of any class (41% of the grazed land) but supports only about 5% of the livestock. It occurs mostly in the arid zone and in areas of poorer soils in the semi-arid zone, where it is associated with spinifex (hummock grass), saltbush and acacia shrubland. There are also large areas of monsoon tall grass, higher rainfall spinifex and *Aristida* pastures in the north, and saltbush and uncleared mallee in the south.

### CATTLE

The 'Cattle' map shows the very wide distribution of cattle from the monsoonal north to the desert fringes inland and the moist temperate areas in the south. The only large area of grazed land virtually devoid of cattle occurs in the southern semi-arid region of Western Australia, where only sheep are grazed. The spatial variations in density reflect the carrying capacity of the pastures and the local importance of cattle relative to sheep, shown in the 'Livestock Type Ratios' map overleaf.

#### Beef Cattle

Throughout the history of European farming in Australia, cattle numbers expressed as livestock units have been less than or about equal to sheep. Because wool was historically more profitable than beef, cattle were restricted to land unsuitable for sheep or unprotected by dingo fences. This led in many places to sharp differentiations between cattle and sheep grazing land.

Up to the 1950s little beef was exported, unlike wool. Major changes then occurred when a 15-year meat export agreement with the U.K. improved market

prospects and, more importantly, exports to the U.S.A. grew substantially in the late 1950s.

The American demand for lean hamburger beef revitalised development in the northern beef areas, which were well suited to supply this new market. After 1961 the Commonwealth Government's beef roads program greatly improved the condition of key northern roads, previously a major handicap to development. Pasture improvement began in a small way, with Townsville stylo sowings in suitable areas of the wetter monsoonal north, and improvements in animal breeding and management advanced more rapidly. Despite these changes, cattle grazing in the north and centre remains much more extensive in terms of land and labour than in the south.

In the late 1960s and early 1970s beef prices rose steadily while wool prices were low and fluctuating. Accordingly beef cattle numbers increased dramatically to almost 30 million in 1976 (Table 2) and sheep declined (see Figure 16, page 11). Much of the increase in beef cattle occurred in what had been predominantly sheep country, notably in Queensland and northern New South Wales, where many marginally viable sheep farms changed to beef. Further south a large number of wheat-sheep and high-rainfall sheep farms were diversified to include small beef herds made possible by increases in improved pasture. This raised the carrying capacity and therefore enabled graziers to introduce cattle without necessarily decreasing their sheep flocks.

Table 2. Beef Cattle Numbers, 1966, 1976 and 1980

State	1966 '000	1976 '000	1980 '000
Queensland . . . . .	5 829	10 844	9 957
New South Wales & A.C.T. . . . .	2 983	8 529	5 625
Victoria . . . . .	1 458	3 996	2 725
Tasmania . . . . .	239	691	493
South Australia . . . . .	429	1 683	910
Western Australia . . . . .	1 042	2 487	1 938
Northern Territory . . . . .	1 007	1 602	1 730
<b>AUSTRALIA . . . . .</b>	<b>12 987</b>	<b>29 833</b>	<b>23 378</b>

Sources: Australian Bureau of Statistics—*Rural Industries 1969–70*, Bulletin No. 8; *Livestock Statistics, Australia: 31 March 1978*; *Livestock: Australia: 31 March 1980*.

Thus in New South Wales between 1966 and 1976 cattle increased from 3 million to over 8 million (Table 2); 85% of this increase occurred in the high-rainfall sheep country and the wheat belt, where sown pasture development has been greatest, while sheep in these areas decreased by only 16%. Even on the western plains, which in 1966 were grazed almost exclusively by sheep, beef cattle increased to make up a quarter of the livestock units by 1976 despite an increase in sheep over the same period.

The increase in beef cattle in sheep country has resulted in more widespread and uniform distribution of cattle. Even the recent decline in cattle, due to lower beef prices since 1974, has not altered this new situation.

Historically cattle derived from British breeds (*Bos taurus*) have formed the bulk of the national beef herd. Today this is still the case in the south, where Herefords (including Poll Herefords) and Shorthorns are still the most numerous group. In the tropical north, however, much beef breeding in recent years has been based on Zebu stock (*Bos indicus*), which are better suited to the environment than British breeds so that in Queensland, for example, more than half the beef cattle are now pure or crossbred tropical breeds.

In 1975–76 about 8 million cattle and calves were sold for slaughter (Table 3). The variation of beef productivity is shown on the 'Cattle' map by the turn-off ratio, the percentage of animals turned off for slaughter during the census year to the number remaining on farms at the census date. The ratio also generally indicates the length of time animals need to graze before they reach slaughter weight: it is low where cattle gain weight slowly on poor tropical and arid pastures and high where cattle fatten quickly on high-quality pastures in more humid and temperate areas. It is highest where 'store' cattle are brought in from other areas for fattening.

Table 3. Cattle Turn-off, 1975–76

State	For Slaughter '000	For Fattening '000	Total '000
Queensland . . . . .	1 841	734	2 575
New South Wales & A.C.T. . . . .	2 406	651	3 058
Victoria . . . . .	1 797	902	2 698
Tasmania . . . . .	249	95	344
South Australia . . . . .	708	105	813
Western Australia . . . . .	635	129	764
Northern Territory . . . . .	106	43	149
<b>AUSTRALIA . . . . .</b>	<b>7 742</b>	<b>2 658</b>	<b>10 400</b>

Source: Australian Bureau of Statistics, unpublished statistics for year ended 31 March 1976.

PHOTOGRAPH ABOVE: A merino ram—the foundation of Australia's fine-wool production.

All photographs in this topic by Australian Information Service.



Figure 12. Mustering beef cattle in the dry season on Mitchell grassland, Barkly Tableland, Northern Territory.



Figure 13. Beef cattle grazing sown Guinea grass pasture, eastern Queensland.

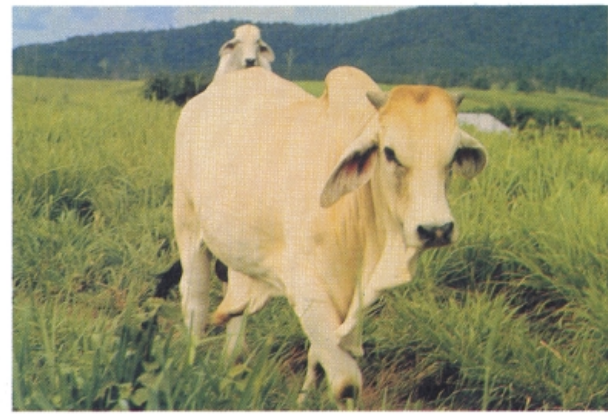


Figure 14. Zebu cattle in north-eastern Queensland.

Thus turn-off ratios are highest in the wetter parts of the wheat belts and in coastal areas close to major urban markets. Lot-feeding beef cattle on grain, which has the highest possible rates of turn-off, is rare in Australia, in contrast with the U.S.A. Turn-off ratios are lowest in the large areas of extensive and exclusive beef grazing of the north, where they are generally less than 10%. However, they are marginally higher in areas of better pasture such

as the Mitchell grasslands and in the Channel Country of Queensland.

Despite the widespread distribution of beef cattle and the vast areas of exclusive beef grazing in the north, almost half the cattle sold for slaughter come from the south-east (southern New South Wales, Victoria, south-eastern South Australia and Tasmania). Tasmania, for example, produced more than twice as much beef in

1975-76 as the Northern Territory.

In addition to those turned off for slaughter, about 2.7 million cattle in 1975-76 were sold for fattening elsewhere. The trade in cattle before they reach slaughter weight varies greatly from year to year depending on local pasture conditions and current and anticipated changes in beef prices.

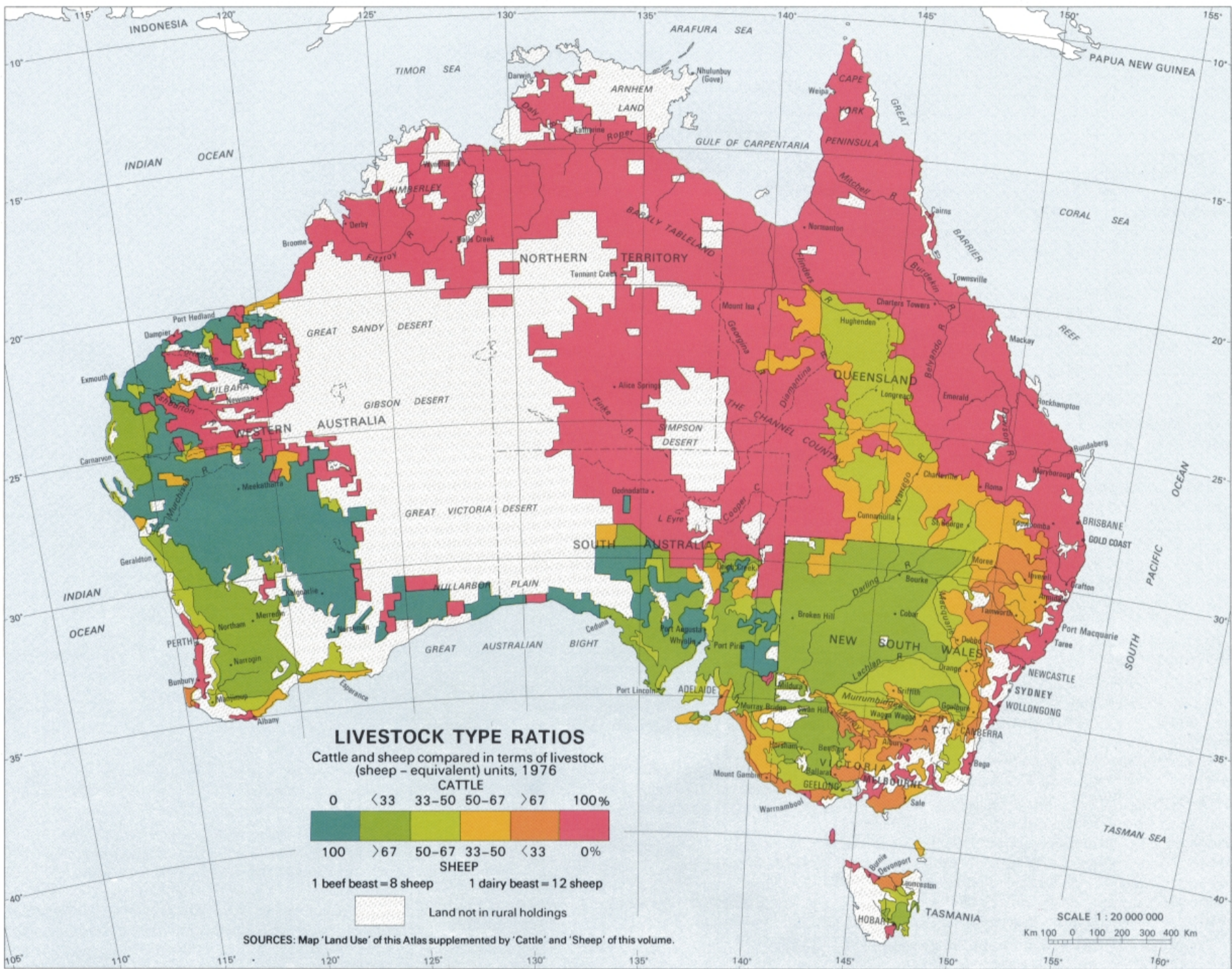


Table 4. Dairy Cattle Numbers and Milk Production, 1966, 1976 and 1980

State	Numbers ('000)			Milk (million litres)		
	1966	1976	1980	1965-66	1975-76	1979-80
Queensland	937	503	375	1 005	683	520
New South Wales & A.C.T.	1 100	632	486	1 372	983	875
Victoria	1 867	1 872	1 527	3 414	3 518	3 151
Tasmania	244	218	156	400	435	315
South Australia	245	209	157	447	397	329
Western Australia	204	168	128	281	232	222
Northern Territory	1	1	..	..	..	..
<b>AUSTRALIA</b>	<b>4 598</b>	<b>3 602</b>	<b>2 830</b>	<b>6 919</b>	<b>6 248</b>	<b>5 412</b>

Note: Dairy cattle numbers at 31 March, milk production for years ended 30 June.

Sources: Australian Bureau of Statistics—Rural Industries 1969-70, Bulletin No. 8; Livestock Statistics, Australia: 31 March 1978; Livestock: Australia: 31 March 1980; Dairying and Dairy Products: Australia: 1978-79; and Livestock Products, Australia: May 1981.

### Dairy Cattle

Only a very small proportion of Australia is climatically suitable for dairying, which ideally requires a constant supply of good pasture. In 1976 the 3.6 million dairy cattle were concentrated in the more humid coastal areas (mostly in the temperate south), in some uplands and valleys near the coast, and on some inland irrigation areas where water is sufficiently cheap and abundant for the maintenance of perennial pastures. More than half the dairy cattle are now in Victoria (see Table 4), in three major concentrations: West Gippsland, the more coastal areas of the Western District, and the north-central irrigation areas (see the 'Cattle' map).

The main dairy breeds are Jersey, Friesian and Ayrshire. Red Poll and Dairy Shorthorn cattle are widely used as dual-purpose breeds for milk and meat. Other dairy breeds are Guernsey and Illawarra Shorthorn and recently, in more tropical areas, the Australian Milking Zebu (a Sahiwal/Jersey cross).



Figure 15. Dairy cows grazing perennial sown pasture, Gippsland, south-eastern Victoria.

Dairy areas contracted and dairy cattle numbers declined as increasing production costs and overseas competition forced marginally productive areas and less efficient farms in more productive areas out of the industry.

This process began as early as the 1930s and 1940s in Queensland and northern New South Wales and has accelerated over the last two decades. As a result dairy cattle are now heavily concentrated around the larger coastal cities, where they are locally needed to supply fresh milk, and, in larger numbers, on areas of good perennial pasture in the more suitable humid temperate climates of Victoria and Tasmania where high milk yields are possible.

By 1980, 62% of the national dairy herd was in Victoria and Tasmania compared with only 30% in 1939. Over the same period the percentage of the national herd declined dramatically in Queensland (31% to 13%) and New South Wales (31% to 16%) and remained static in South Australia and Western Australia.

The continuing decline in numbers has been to some extent offset by increases in average milk production per cow, which rose from about 1800 litres in 1957 to nearly 3000 litres in 1980. This has been due to improvements in breeding and management and to more sown pasture and irrigation. On dairy farms between 1963-64 and 1973-74 improved pasture doubled to reach an average of 60% of pasture area nationally but ranged from almost 100% in

Tasmania and Victoria to only about 20% in Queensland and northern New South Wales. Accordingly stocking rates on dairy farms in Victoria and Tasmania are almost double those in Queensland and milk yields are about 50% greater. The national average stocking rate is about one dairy beast per hectare.

**SHEEP**

In the past, because sheep have generally been more profitable than cattle, they have tended to occupy the better grazing land wherever the climate and pastures are suitable. The Australian wool industry—for many years the mainstay of the national economy and still an important part of it—has been based on the merino breed since the early days of European settlement. This breed, of Spanish origin, produces a high yield of fine wool and is ideally suited to the dry conditions of much of Australia. Today pure-bred merinos make up three-quarters of the national flock.

At the peak of pastoral expansion in the late 19th century sheep were tried in all climatic regions, even the tropical north. It was soon discovered that sheep did not thrive in the north, although sheep grazing persisted until recently in the west Kimberley area of Western Australia. Less than 3% of sheep now graze north of the Tropic, on the Mitchell grass plains of Queensland and the better country in the northern Pilbara (W.A.). In the south sheep are widespread but are virtually absent from the coastlands of New South Wales and Queensland, where the climate and pastures are unsuitable for a variety of reasons mostly related to high summer humidity. Inland, sheep give way to beef cattle on the desert margins where the area of land required to run a profitable flock becomes too large to manage or water adequately. Specially constructed fences enclose sheep country in southern Western Australia, South Australia and Queensland and run along the State boundary of western New South Wales, protecting sheep from attack by dingoes (wild native dogs) living in uncontrolled areas beyond.

Sheep numbers reached a peak of 180 million in 1970 but declined to 136 million in 1980 (see Table 5 overleaf and Figure 16). The decline began during the beef boom of the early 1970s but has since continued, although at a lower rate.

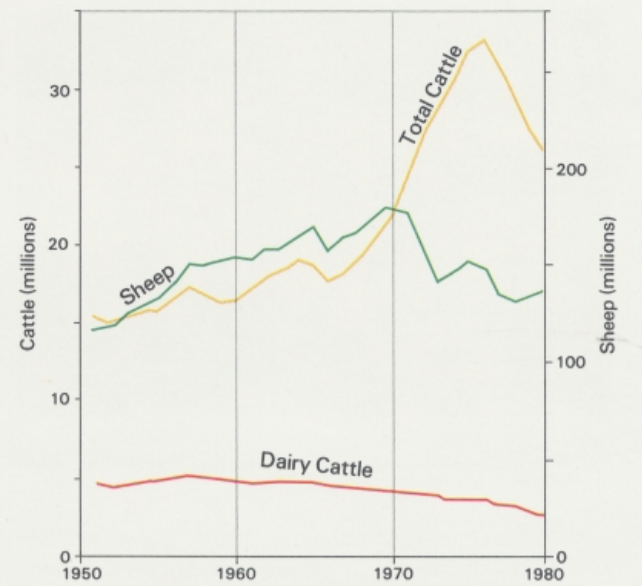


Figure 16. Cattle and Sheep Numbers, Australia 1951-80. Based on totals at 31 March from various publications of the Australian Bureau of Statistics, with some estimation of dairy cattle numbers up to 1963.

Within the sheep grazing country three broad zones are recognised by the Bureau of Agricultural Economics: the High Rainfall Zone, the Wheat-Sheep Zone and the Pastoral Zone. Almost half the national sheep flock is in the Wheat-Sheep Zone, which is broadly coincident with the wheat belts shown in Figure 1. Here the sheep are mostly grazed on sown pasture, grown in rotation with cereal crops, at an average stocking rate of about two sheep per hectare. Although pure-bred merinos make up about 80% of the zonal flock, about a third of all lambs are sired by British-breed rams for sale as fat lambs. However, there is a marked variation between States in this zone. In Western Australia and South Australia more than 95% of the sheep are pure-bred merinos and less than 15% of the lambs are sired by British breeds while, in this zone in Victoria, only about 65% are pure-bred merinos and 65% of lambs are sired by British breeds. This is reflected in the 'Sheep Turn-off for Slaughter' map, which shows high turn-off rates in the Victorian Wheat-Sheep Zone.

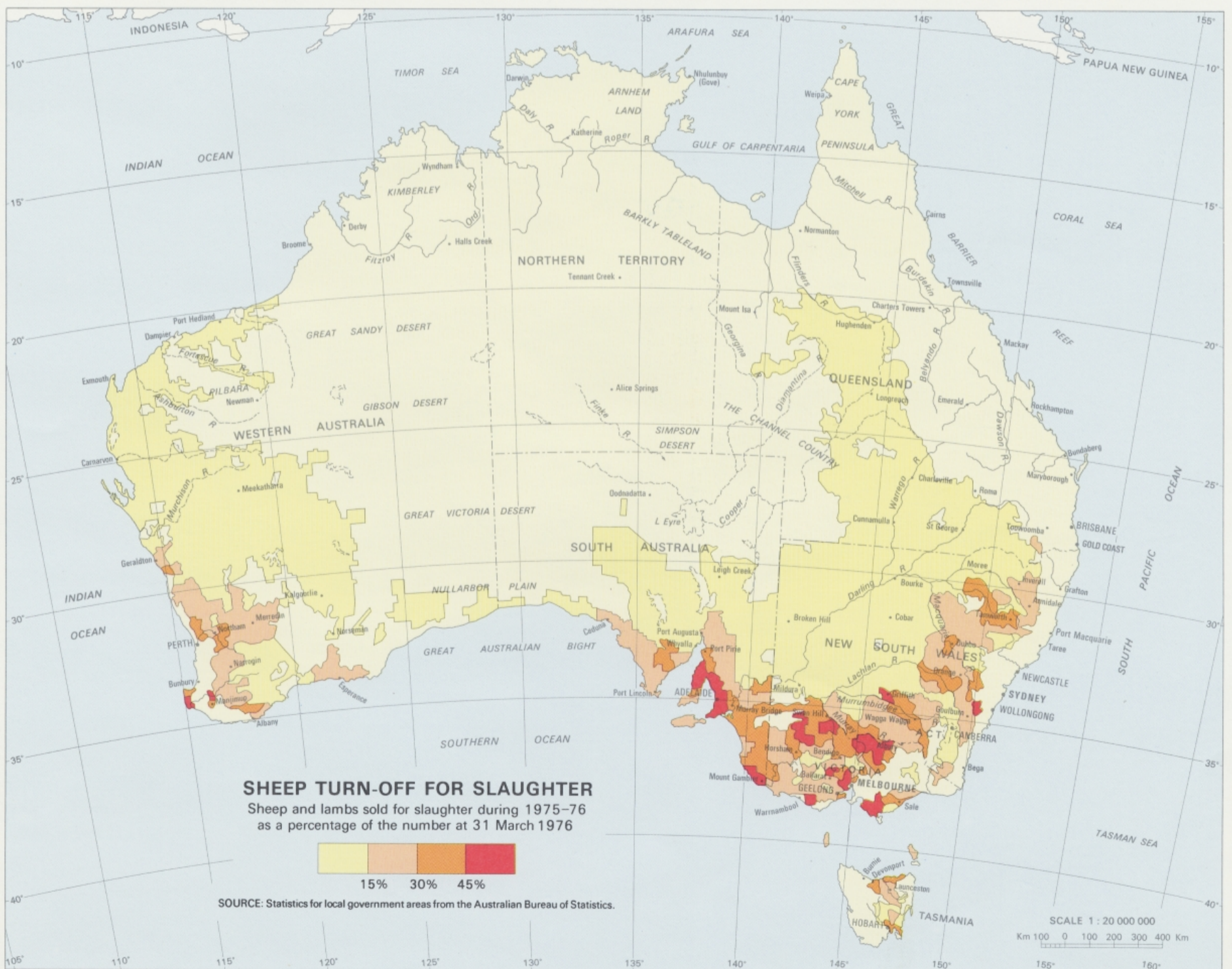




Figure 17. Sheep grazing sown pasture in the Wheat-Sheep Zone, central New South Wales.

Wool yield per adult sheep tends to be highest in those areas where the merino is the predominant breed since it produces a heavier fleece than British breeds. However, the percentage of sheep and lambs turned off for slaughter is greatest where the merino percentage is least, since British breeds produce a type of lamb preferred by the domestic market. Thus there is an inverse relationship between wool yield and turn-off for slaughter, which can be seen by comparing the wool-yield component of the 'Sheep' map with the 'Sheep Turn-off for Slaughter' map.

The High Rainfall Zone lies along the wetter edge of the wheat belts and has generally better pasture, predominantly sown perennial grass and clover, which make up 80% of all pasture grazed by sheep in this zone. It contains about one-third of the national sheep flock at an average stocking rate of about four sheep per hectare. Pure-bred merinos make up about 60% of the flock, the lowest proportion of all three zones, since there is a strong emphasis on the production of fat lambs from British breeds. Although much fine merino wool is produced in this zone from high-yielding animals, the average yield is depressed by the higher proportion of lower yielding British breeds.

The Pastoral Zone, lying on the drier side of the wheat belts, is the largest of all three zones but provides grazing for only one-fifth of the national flock. With little or no sown pasture, it is grazed almost exclusively by merinos

at an average stocking rate of about one sheep to 5 ha. Despite the extensive nature of the grazing, dictated by low rainfall and correspondingly poor productivity of the native pastures, fleece weights are comparable with those of merinos grazed in wetter areas. They are particularly heavy in South Australia, where a locally developed strain of larger bodied merinos produces a longer and slightly thicker fleece. However, where pastures have severe seasonal deficiencies, as during the winter dry season in the north, even merino fleece weights can be



Figure 18. Rounding up ewes and fat lambs in high-rainfall sheep country.

Table 5. Sheep Numbers and Wool Production, 1966, 1976 and 1980

State	Numbers ('000)			Wool ('000 tonnes)		
	1966	1976	1980	1965-66	1975-76	1979-80
Queensland . . . . .	18 384	13 599	12 163	87	66	59
New South Wales & A.C.T. . . . .	61 654	53 348	48 698	264	241	233
Victoria . . . . .	30 968	25 395	24 400	166	138	147
Tasmania . . . . .	4 127	4 249	4 245	19	28	20
South Australia . . . . .	17 993	17 279	16 046	105	106	96
Western Australia . . . . .	24 426	34 771	30 431	112	184	158
Northern Territory . . . . .	9	1	1	..	..	..
<b>AUSTRALIA . . . . .</b>	<b>157 563</b>	<b>148 643</b>	<b>135 985</b>	<b>754</b>	<b>754</b>	<b>713</b>

Note: Sheep numbers at 31 March, wool production for years ended 30 June. Total wool production in 1979-80 was composed of 84% shorn from sheep, 6% shorn from lambs and 10% unshorn wool on skins.

Sources: Australian Bureau of Statistics—Rural Industries 1969-70, Bulletin No. 8; Livestock Statistics, Australia: 31 March 1978; Livestock: Australia: 31 March 1980; Wool, Australia: 1979-80.

affected. Thus wool yields per sheep are low in the northern Pilbara and central-western Queensland.

Table 6 shows the distribution, by States, of sheep and lambs sold for slaughter. Most lamb (about 80%) is eaten in Australia but about 80% of mutton is exported. The export of live sheep (mostly merinos) to the Middle East is a new and growing trade to satisfy local preference for fresh, lean meat slaughtered in accordance with Islamic custom. From small numbers in the 1960s, this trade has grown to almost 6 million sheep in 1980, supplied mainly by Western Australia and South Australia.

Table 6. Sheep and Lambs turned off for Slaughter, 1975-76

State	Sheep '000	Lambs '000
Queensland . . . . .	619	138
New South Wales & A.C.T. . . . .	4 063	5 549
Victoria . . . . .	3 074	3 464
Tasmania . . . . .	359	519
South Australia . . . . .	3 088	2 224
Western Australia . . . . .	4 239	1 677
Northern Territory . . . . .	..	..
<b>AUSTRALIA . . . . .</b>	<b>15 442</b>	<b>13 571</b>

Source: Australian Bureau of Statistics, unpublished statistics for year ended 31 March 1976.

## MAPS FOLLOWING

Grazing Density

Cattle

Sheep