

Agriculture in the Southern Highlands of New South Wales (NSW)

Ian Bowie, March 2022

In this paper I will focus on ‘commercial agriculture’ as distinct from both ‘less-than-commercial’ agriculture and ‘domestic agriculture’ because the latter respond differently to resource limitations. I will also talk of agricultural rather than food production because while food raw materials account for around eighty per cent of the farm-gate value of agricultural commodities produced in NSW, many (such as livestock and milk) require factory processing before they become foods.

I will use the threshold VACP (estimated value of agricultural commodities produced) of \$40,000 per annum for ‘commercial agriculture’ because this was the minimum VACP used for reporting data from the 2016 (2015/6) agricultural census of the ABS¹. It should be noted that different thresholds were used in earlier which makes for significant difficulties in describing and understanding agriculture in a region that has been undergoing conversion of land from commercial agriculture to other uses for more than fifty years².

I will focus also on the Southern Highlands Statistical Area (SA3) of the ABS (‘the Highlands’) and the almost identical Wingecarribee Shire (‘the Shire’; see Figure One) and earlier similar statistical areas partly as a convenience for fetching data but to distinguish this region clearly from neighbouring parts of the Southern Tablelands, Wollondilly and Illawarra Coast that are sometimes lumped together with the Southern Highlands.

The Southern Highlands is at the southern end of a Greater Sydney region that includes the Central Coast, and the LGAs (local government areas) of the County of Cumberland which is the locus of the Sydney urban area. The greater region (which has an area of 12,368 km², 1,236,770 hectares, ha) lies within 100 kilometres of Sydney’s CBD. It embraces most of Sydney’s commuting zone and is dominated by the 5¼ million residents who live in the Sydney urban area.

In 2016 (2015/6) agricultural establishments with a VACP (value of agricultural commodities produced) of \$40,000 or more accounted for 6.5% of the VACP in NSW, from only 17 per cent of the area of the larger region. Within that region, the Highlands with 19 per cent of its 2689 km² in agriculture accounted for less than 0.4% of the State’s VACP (or less than half of what came from a similar area in the highly urbanised County of Cumberland).

The region is thus far from being significant for its agriculture. Indeed, since the 1970s it has consistently reported one of the smallest total VACP of any of around a hundred LGAs outside the County of Cumberland. It is useful to consider why this should be.

Agriculture in the Southern Highlands

Historically, agricultural activity has been geographically more widespread in the Highlands than it is today. After John Oxley brought 500 cattle to his station there in 1816³ cattle numbers rose to over 15,000 in 1859, after which both cattle and sheep numbers grew steadily as land grants were taken up initially for rough grazing but later to be cleared of native vegetation for sown or seeded pastures and a little cropping.

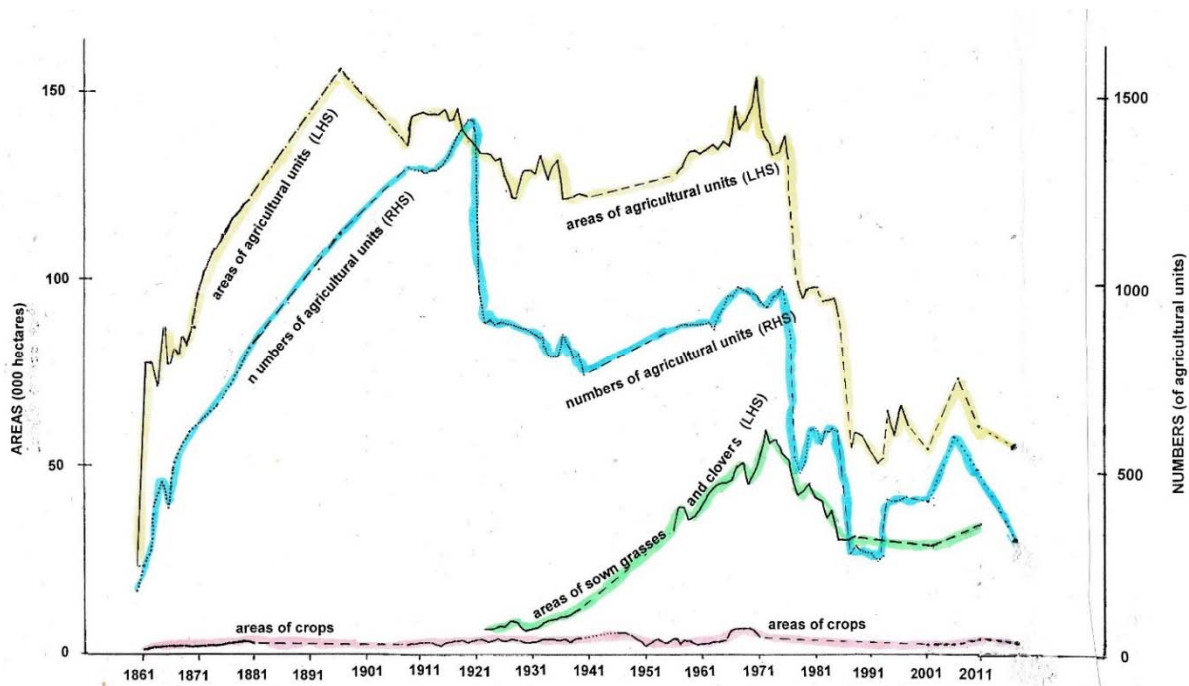


FIGURE ONE: Wingecarribee Shire (Southern Highlands) in its geographical context

Source: Readers Digest Association (1994), Atlas of Australia [from AUSLIG, 1:250,000]

By the 1890s around 60 per cent of the then Berrima Police District was reported as being in ‘rural holdings’ [Figure Two]. A similar percentage has been reported more recently as cleared of native vegetation⁴. After land around Burrawang was opened-up for closer settlement (with about 120 km² taken up during 1861-5) bush clearing accelerated and livestock numbers rose [Figure Three], particularly of dairy cattle but also of sheep and meat cattle in the outer parts of the region.

Much of the subsequent history of agriculture in the Highlands to the 1970s parallels the history of broadacre agriculture elsewhere in New South Wales, with fluctuations due to changing farm gate prices, government interventions, seasonal weather and competition for capital and labour⁵,



Data is for the Police Districts that approximated to the Wingecarribee in 1859/60 to 1880/1, 1896/7, 1907/8 to 1921/2, 1924/5, 1925/6, and 1929/30 to 1939/40 (except for crops); otherwise, data is for the local government areas that approximated to the Wingecarribee, whose total areas were 2872 km² in 1907-57 and 2688.8 km² since then. Data was enumerated for 'holdings' of 1 acre or more to 1972/3, 1 ha or more in 1973/4 and 1974/5, 10 ha or more in 1975/6 and grossing \$1500 or more in 1976/7; since then data have been enumerated for 'establishments' grossing \$1500 or more in 1977/8 to 1980/1, \$2500 or more 1981/2 to 1984/5, \$20,000 or more 1985/6 to 1990/1, \$22,500 in 1991/2 and 1992/3 and \$5000 or more in later years until 2015/6 when it was \$40,000 and over

FIGURE TWO: Southern Highlands, areas/numbers of rural holdings/agricultural establishments and areas of crops, 1859/60 to 2015/6

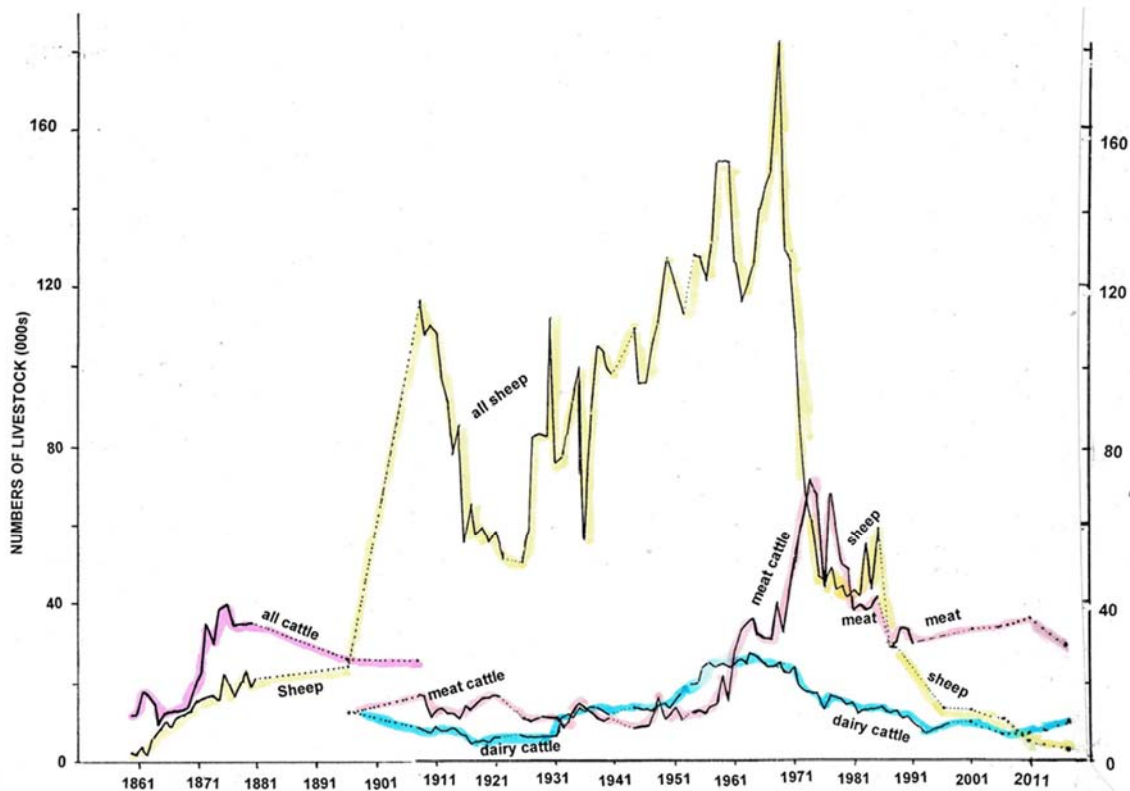
Sources: Statistical Registers of New South Wales and Australian Bureau of Statistics (various)

but locally also some resumptions of land by the Crown in the 1920s and 1930s for water catchment protection and other reserves and demand for land for non-agricultural purposes as the regional became more accessible by car from Sydney from the 1950s.

After World War I, agriculture grew to historical peaks, in the 1960s in numbers of dairy cattle and areas of crops such as potatoes, in the 1970s in numbers of meat cattle and sheep for wool and areas of improved pastures, and in 1968/9 to an all-time peak in the total area in rural holdings of 1561.2 km². By then, dairy farming was the predominant agricultural activity and there were milk cattle on most rural holdings⁶ and perhaps 300 dairy farms⁷.

However, by the 1990s numbers of reported rural holdings had fallen sharply, sheep numbers on these had plummeted, cattle numbers had halved and cropping for potatoes and other vegetables had declined. As the number of milk suppliers halved⁸, the last local dairy factories closed in Robertson in 1989 and in Moss Vale in the early 1990s, and an abattoir that had opened in Moss Vale in 1963 was also closed in 1994.

This apparent decline in agriculture is often attributed to a spate of subdivisions to create hobby farms and rural residential allotments in response to demand particularly from Sydney as the region became more accessible by car from the 1950s. This spate peaked in the early 1980s when



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FIGURE THREE: Southern Highlands, numbers of sheep and cattle, 1859/60 to 2015/6

Sources: Statistical Registers of New South Wales and Australian Bureau of Statistics (various)

the number of rural allotments may have nearly doubled over five years⁹, but this was more a consequence than a cause of the apparent decline

Much of the earlier growth in sheep and dairy cattle numbers had followed especially the Ottawa Agreement of 1932 under which Britain gave preference to agricultural products from its Empire. Later, governments came to support prices for wool and to give generous subsidies and bounties to the dairy industry which insulated many small farmers in Australia from the impacts of a cost-price squeeze that already had been ongoing for decades.

However, governments began withdrawing protections in the 1970s with adverse impacts on graziers and dairy farmers in the region because many rural holdings became commercially unviable as full-time farms because they were too small to support large enough flocks of sheep or herds of dairy cattle. For a while, meat cattle appeared to offer an alternative but generally meat cattle require larger holdings than for dairy cattle to be viable.

With insufficient capital and other resources to enable enlargement of holdings, diversification, or enhanced productivity, many small landholders simply sold or subdivided their land (see Figure Four), although some dairy-farmers who were able to install refrigeration and increase their

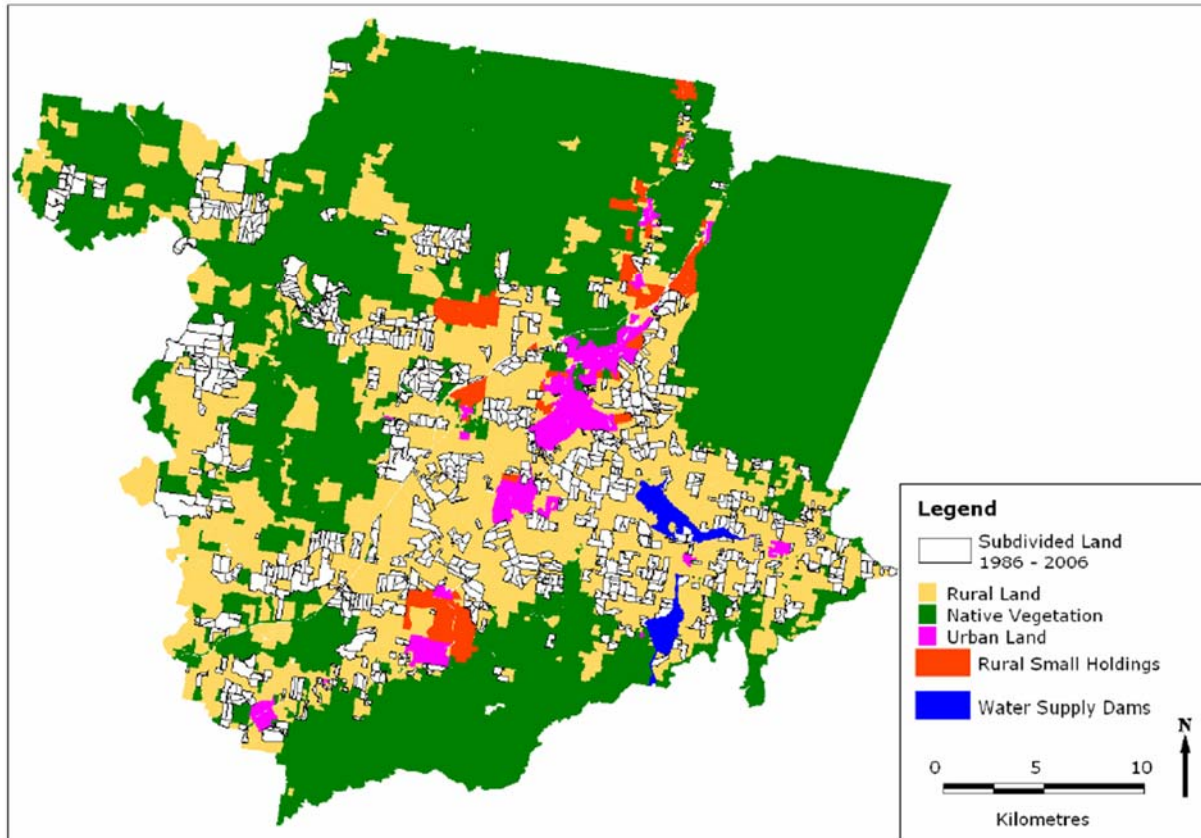


FIGURE FOUR: Wingecarribee Shire, rural holdings subdivided between 1986 and 2006

Source: Edge Land Planning (2007: 20)

quotas to supply milk factories (which became collection depots later) in Bowral and Moss Vale were able to benefit from prices for town milk which were higher than for manufacturing milk.

The apparent loss of farmland due to subdivision has been amplified by the progressive elimination from its agricultural censuses by the ABS of rural holdings that were of little economic consequence, but which had been included in earlier data collections by the former CBCS and other agencies, as noted earlier. These holdings have included substantial areas of marginal land since resumed by the Crown¹⁰.

Notwithstanding the elimination of less-than-commercial holdings from agricultural censuses and the possibility that some agricultural businesses choose not to participate in these censuses, areas of commercial agricultural holdings as well as numbers of milk and meat cattle on them in 2016¹¹ appear to have stabilized since the 1980s, while sheep numbers and areas cropped have continued generally to decline.

A comparison of areas reported in 2016 (51,176 ha) and numbers of establishments reported for that year (212) with those shown in Figures Two and Three for earlier years, particularly 1986-1992 and then 1993-2011, suggests that some hundreds of less-than-commercial holdings covering perhaps 20,000 hectares with some intensive crops and some thousands of meat cattle were not reported from the 2016 agricultural census.

Notwithstanding this and despite droughts, the total VACP reported for the region has increased steadily (despite weather events) since the 1970s (Figure Five) and, contrary to what might be expected, the total attributable to milk/milk products and livestock off dairy farms rose until 2016 -- to more than a third of total VACP. Livestock and livestock products overall accounted for more than eighty per cent of the VACP in the region in 2016 (Figure Six).

A 2006 study of rural holdings in the Shire¹² indicated that perhaps 95 per cent of the Shire's agricultural area was occupied then by broadacre milk and meat cattle on a combined total of 1014 commercial holdings and other farms such as hobby farms (see Figure Seven). The agricultural census of 2006 reported 597 holdings of which 34 carried milk cattle and 446 carried meat cattle

However, in 2016 the agricultural census reported barely a handful of dairy farms supplying milk through bulk collections¹³ and around a dozen other establishments selling or processing their

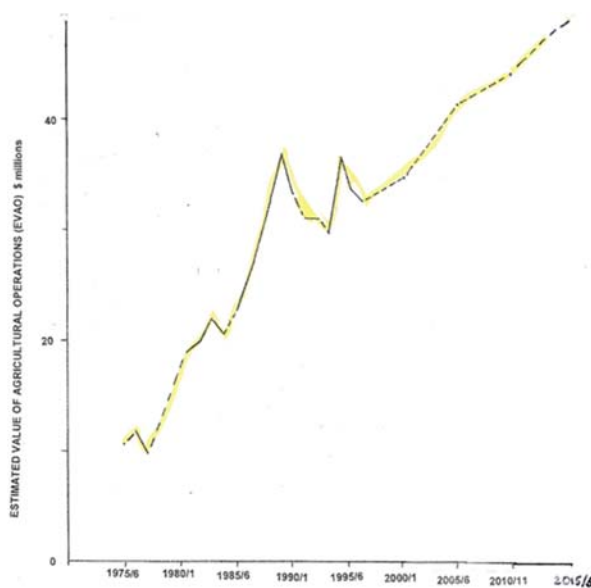


FIGURE FIVE: Wingecarribee/Southern Highlands, EVAO/ VAVP 1975/6 to 2015/6 (\$ millions).

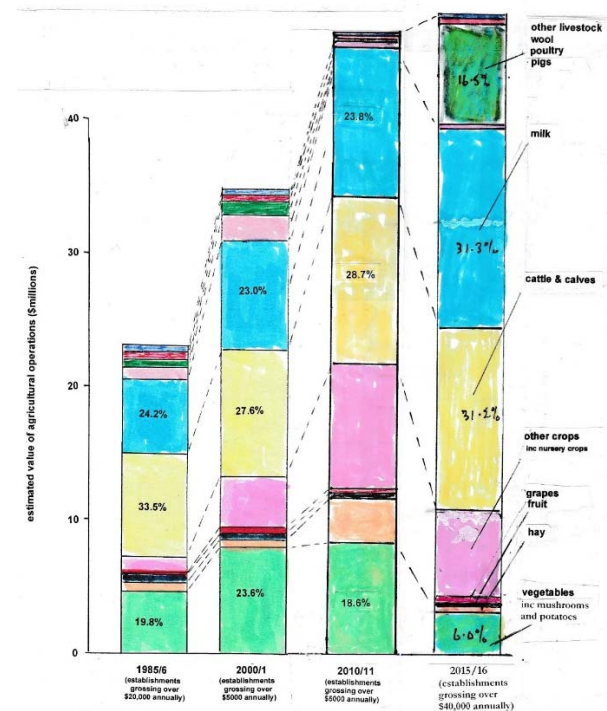
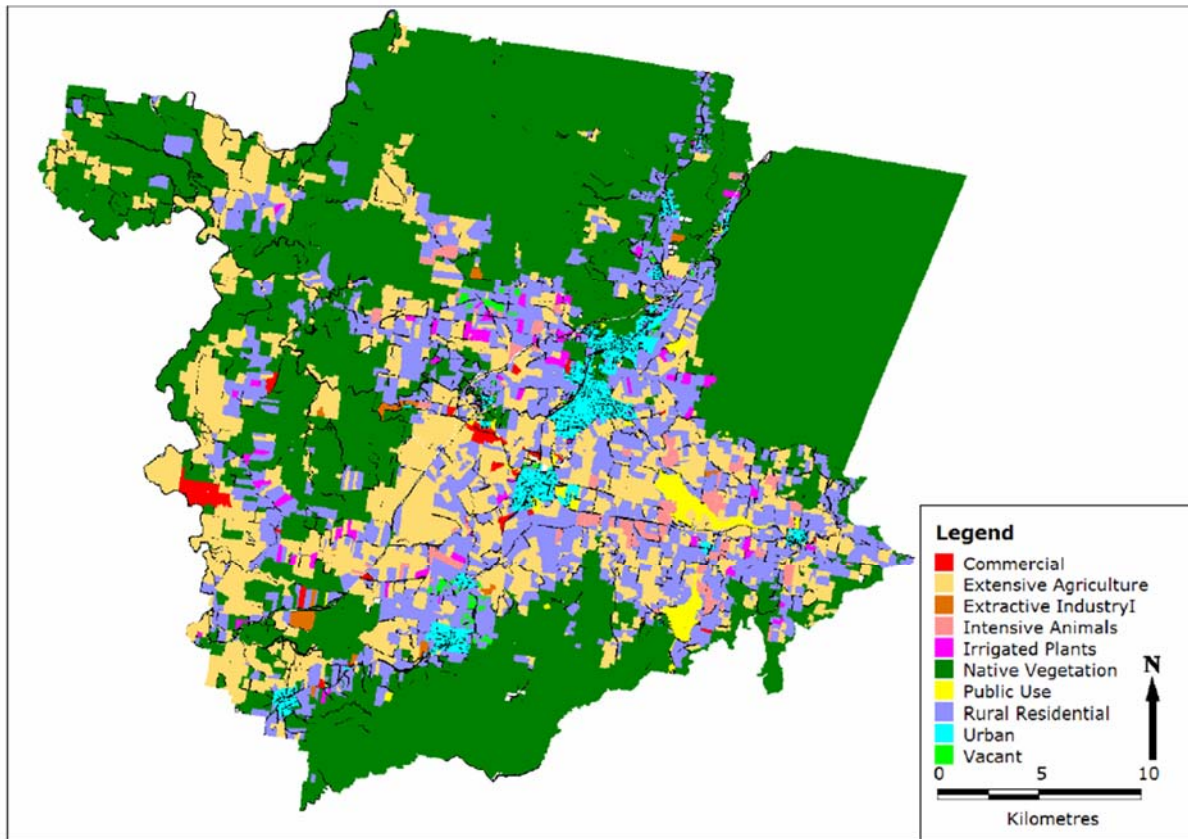


FIGURE SIX: Wingecarribee/Southern Highlands, EVAO/VACP by industry 1985/6, 2000/1, 2010/1 and 2015/6

Data is for agricultural holdings which were 10 ha or more in 1975/6 or grossed \$1500 or more in 1976/7; since then they have been for agricultural 'establishments' which grossed \$1500 or more in 1977/8-1980/1, \$2500 or more in 1981/2-1984/5, \$20,000 or more in 1985/6-1990/1, \$22,500 in 1991/2-1992/3, and \$5000 or more until 2015/6 when it was \$40,000 or more. Data from 2000/1 is for Value of Agricultural Commodities Produced (VACP) (previously it was for Estimated Values of Agricultural Operations, EVAO)

Sources: agricultural commodities data for Wingecarribee Shire/Southern Highlands SA3 from ABS agricultural censuses



Note: ‘extensive animals’ here refers to broadacre grazing of cattle, sheep and other livestock

FIGURE SEVEN: Wingecarribee Shire, principal land uses, 2006

Source: Edge Land Planning (2007:18)

own milk, all confined to the eastern corner of the Highlands. Most (two thirds) of commercial holdings in 2016 carried meat cattle, in the centre and east of the region

Intensive livestock and intensive cropping occur more randomly, typically on smaller holdings than for meat cattle and dairy farms. In 2016, a few holdings ran pigs or poultry and more than 80 holdings supported crops, although apart from a dozen vineyards large enough to be included in the agricultural census handfuls only grew respectively nursery crops, potatoes and other vegetables, mushrooms, fruit, and hay, each generating VACP disproportionate to their total areas.

More than half of the VACP from commercial holdings now comes from the eastern corner of the region, in or adjacent to the Robertson-Fitzroy statistical area SA2 (see Figure Eight), where commercial holdings are somewhat larger in area than elsewhere in the centre and east.

In 2016 commercial agriculture accounted for 19 percent of the area of the region, smaller farms perhaps 8 per cent and rural residential holdings and retreats on former farmland perhaps another 8 per cent. By contrast, 59 percent is in (water catchment reserves in the northeast corner, national parks, and state forests where much was once cleared of native bush for extensive grazing of sheep and cattle but has reverted since to secondary growth.¹⁴

statistical area SA2	no of holdings	total area (ha)	mean area (ha)	total VACP (\$ 000s)	mean VACP (\$000s)
Hilltop/Colo Vale	10	249	25	8419	829
Mittagong	10	883	90	3345	339
Bowral	14	1312	94	1445	103
Moss Vale/Berrima	39	4316	109	4860	123
Robertson/Fitzroy Falls	74	12155	165	21784	295
Other Southern Highlands	85	35260	541	8948	137
TOTAL	212	51176	241	48805	230

Notes: a commercial agricultural holding is one which had a VACP of \$40,000 or more in 2015/6
 numbers are estimates based on responses to the 2015/6 agricultural census
 VACP (Value of agricultural commodities produced) is before deduction of off-farm costs

FIGURE EIGHT: Southern Highlands SA3, commercial agricultural holdings 2015/6 by SA2

source: ABS Agricultural Commodities–Australia, States and Territories and ASGS regions–2015-16; <https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/7121.02015-16?OpenDocument>

Agriculture, once the dominant economic activity in the region, now contributes little directly to its wider economy. In 2016, all agriculture accounted for 3.6 percent (612) of people employed in the Shire and only 1.9 percent of the Shire’s Gross Regional Product¹⁵. Few rural businesses have significant turnovers or employment according to the ABS Business Register and the 2016 population census suggests that few agricultural enterprises in the Shire (commercial or otherwise) employ anyone other than their owners/operators with many of these having off-farm income, which suggests that a high percentage of rural holdings are hobby farms.

As well, agriculture contributes little indirectly, with few employed locally in agricultural support services or any form of secondary processing. While large numbers of livestock (not all of which come from the region) are sold at a Regional Livestock Exchange near Moss Vale most livestock from the region are killed in an abattoir in Picton and most milk collected is now processed in factories in Sydney¹⁶.

So, even though it is on the doorstep of the largest market in NSW for agricultural produce, the Highlands region is back to being a minor agricultural producer. The region may produce more milk, potatoes, mushrooms and perhaps cattle for slaughter than equivalent to what it consumes, but Sydney’s Cumberland plain alone produces as much or more of all these¹⁷ and a range of other agricultural produce that is barely represented in the region.

Why should this be so? What of the future?

Answers to these questions lie as much in economics as in biophysical conditions influencing plant growth. Climates and weather set conditions on moisture availability and growing temperatures, soils and terrain set conditions on nutrient availability and potential for cultivation, but it is the ways in which scale of production is constrained by the patterns of holding sizes, and externalities such as prices and access to labour and capital, that effectively limit agricultural potentials in the region.

Climates and weather

Climates and weather in the Southern Highlands are not unlike those in parts of southern France. Here, processions of cyclonic and anticyclonic air masses bring maritime air from the southwest and (more especially in summer) occasional incursions of continental air from the northwest and of maritime air from the east causing considerable variation in growing temperatures and moisture availability from place to place, season to season and year to year¹⁸.

Although storm events are more likely from westerlies, rain comes more from easterlies especially closer to the coast (where the Illawarra Escarpment has an orographic influence) which has more and more reliable rainfalls than in the west of the region. With tendencies also toward rainfalls in summer when evaporation is highest, the eastern half of the shire is less subject to moisture deficits than the western half especially near the edges of the region.

Most of the region is a plateau averaging an elevation of around 650 metres above sea level, which means that temperatures are 'normally' around 4°C cooler than at sea level nearby. However, during daytimes and in drier seasons temperatures may be more extreme with maxima closer to those of the coast; while at night and when it is wetter than normal temperatures tend to be more moderate. Temperatures in the west exhibit greater extremes than in the east.

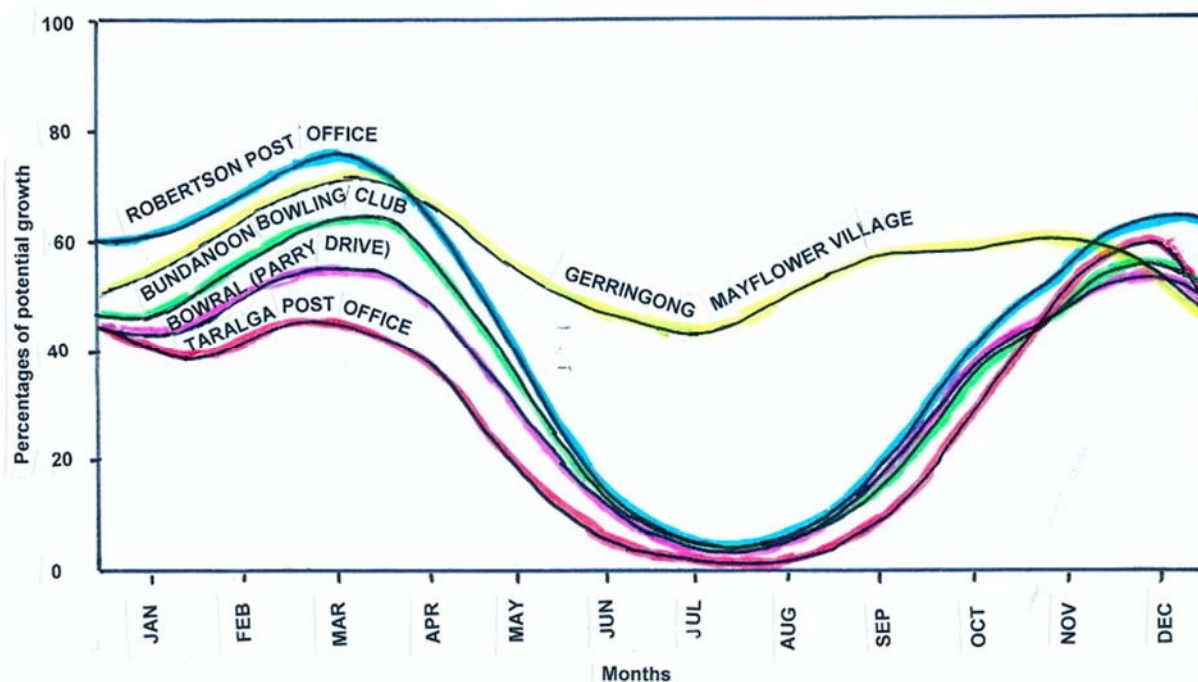
For agriculture, cool winter temperatures with frosts suppress plant growth especially in the west, as do soil moisture deficits in summer and autumn when evaporation is highest. Thus, the potential growth of temperate grasses based on climatic data ranges from nearly 60 per cent of a theoretical maximum at a coastal location to 45 per cent in the east of the Wingecarribee and to 30 percent at a location just to the west (Figure Nine).

Taking this modelling of 'normal' years as a guide, the impact of cool winter temperatures and summer moisture deficits on growing seasons restricts the range of both pasture and crop species suited to the region. This impacts directly on potential carrying capacities, and it is likely that many available plant and seed varieties are not ideal for the region. Suppression of potential plant growth may be magnified locally by aspect, or elevation, or exposure.

However, there is considerable and unpredictable variation from year to year in seasonal weather conditions when wind patterns depart from the 'normal'. A recent succession of years in which seasonal rainfalls have been drier than normal had profound consequences for soil moisture and for runoff and ground water when these dry periods developed into droughts (defined as periods in which rainfalls are amongst the lowest ten percent on record).

A concern with this succession of warmer and drier-than 'normal' years, which restricts the range of suitable crop species and varieties, is that these may become more normal as human-induced climate change progresses, with what are now drought years becoming merely dry ones¹⁹. As well, seasonal weather including occasional wet years is expected to become less predictable with greater variation from year to year, and more extreme weather 'events' may be expected.

Generally, it is not practicable to more than alleviate possible adverse impacts of unpredictable weather. For example, the shire has two water storages (Wingecarribee and Fitzroy Falls, both of



Note: Taralga lies west of the Southern Highlands, Bowral is at its centre, Bundanoon is in its south, Robertson in its east, and Gerringong lies outside the region on the coast to the east

FIGURE NINE: Southern Highlands, Potential growth of temperate grass species at five meteorological stations

Drawn from modelling by the National Agricultural Monitoring System (Bureau of Rural Sciences, Australian Department of Agriculture Fisheries and Forestry) using the GROWEST model of the Fenner School of Environment and Society at the Australian National University. [similar models of growing seasons may be generated on <https://weatherspark.com/>]

which are operated by Sydney Water, and which are shown as public use areas in Figure Seven) which are more than adequate for town water supply in the region but are too small²⁰ to offer the prospect of much more than stock water and supplementary irrigation in dry years. The same is true of the limited potential water from underground aquifers.

Soils and terrain

Soils and terrain further limit locally what agriculture is possible²¹. In essence the surface of the Wingecarribee plateau comprises a large shallow drainage basin with mainly low and undulating terrain surrounded by a somewhat higher hilly rim which is deeply dissected, and which falls away often precipitously to lower elevations outside the region especially towards its northern, eastern, and southern edges.

This terrain is the product of a long geological history in which rock material described as ‘sandstones’ were deposited, uplifted, eroded and weathered. In the centre and east of the region these sandstones are overlain by deeply weathered rock materials known collectively as ‘shales’ on top of which are remnants of geologically more ‘recent’ (23 to 56 million years old) but also very weathered basalt flows near Moss Vale and around Robertson.

The soils of today, other than those actively subject to mass wasting and erosion and some alluvial soils in valleys towards the more elevated rim of the plateau, are largely the product of weathering of eroded parent materials, with leaching of nutrients and eluviation of colloids, particularly in the moister east and centre where pH in soil reactions and nutrient statuses generally are lower than might be expected from their parent materials.

In part, lower pH may reflect the take-up of nutrients by vegetation in pre-European vegetation but, despite use of fertilisers and soil conditioners for introduced grasses and crops (see Figure Two), two centuries of deforestation, burning, grazing, browsing, cultivation and the like have exacerbated nutrient losses which continue in soils affected by accelerated soil creep and removal of humic matter, especially finer-textured soils.

The sandy podsolised soils that have developed on the 'sandstones' that dominate the shire are mostly skeletal in consequence of erosion and are low in nutrient status. In many parts of the shire these soils are on challenging terrain and even where they are of moderate depth and on gentler terrain, they tend to be unstructured and coarsely textured – hence, free draining and poorly aerated – and strongly acid in soil reaction (pH 5.0 to 5.5).

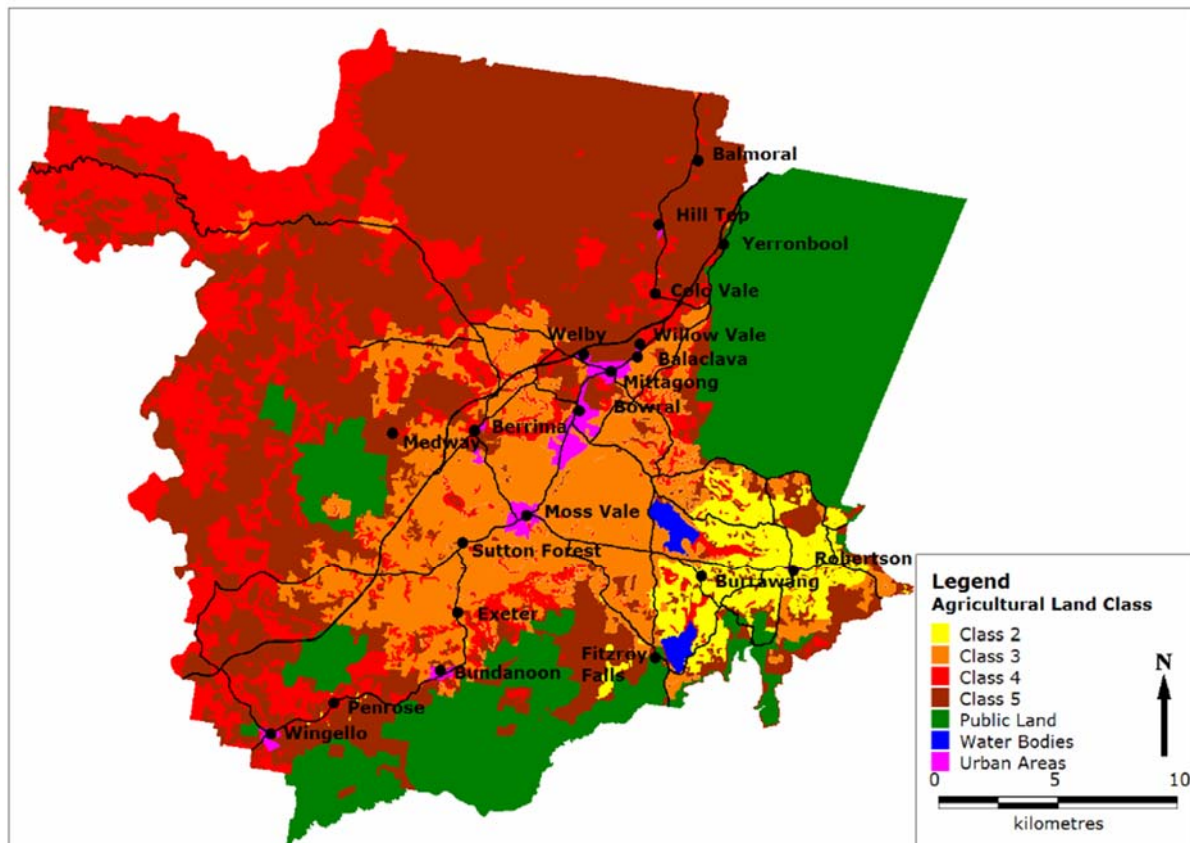
The soils developed on shales and basalts are less obviously influenced by erosion and deposition, but they are subject to soil creep especially in the more undulating east. This downhill transfer of small particles is accentuated by the effects of cyclical shrink-and-swell which happens with changing moisture regimes in the more reactive clay soils. These soils are more finely textured, with greater capacities to hold air and water, but they are often clayey and poorly drained.

The clayey but also podsolised soils that have developed on the 'shales' in about a quarter of the shire are mainly on the undulating surface of the Wingecarribee plateau and have been less subject to the processes of erosion and deposition. They can be moderately deep when they are transferral but are subject to imperfect drainage and tend to be of low nutrient status with slightly acidic (soil reactions of pH 5.5-6.0).

The also-clayey red soils that have developed on alkaline basalts are deeper than soils elsewhere but depletion by forest vegetation and weathering under higher rainfalls have led to chemical fertility that is lower than might be expected (with soil reactions of pH 6.0 to 7.0). Often these soils are on sloping land, which helps to offset inherently imperfect drainage but may limit potential for tillage.

Areas of 'good' soils across the shire are thus small and fragmented. 1970s soil capability mapping by the then Soil Conservation Service showed the shire as having no Class 1 soils at all and only about 35 km² of soils capable of regular (but not continuous) cropping because of chemical or physical limitations or slopes too steep, an area about the size of that used for vegetable production alone on the Cumberland plain.

In somewhat less detail, more recent mapping of suitability for agriculture by the Department of Agriculture suggests that only about 190 km² or 7 per cent of the shire is considered to be 'prime agricultural land' (ie Classes 1 to 3 in Figure Ten), land that is suitable for improved pastures and might be capable of cultivation with improved structure and nutrient status. Elsewhere, soils and terrain impose very real limits on broadacre agriculture in the region!



Note: class 1 land: suitable for continuous cultivation [there is none in the Shire]
 class 2 land: suitable for regular cultivation for crops but not to continuous cultivation
 class 3 land: suitable for pasture improvement, with cultivation in rotation with pasture
 class 4 land: suitable for grazing on native pastures or pastures improved using minimum tillage
 class 5 land: unsuitable for agriculture or at best suited only to light grazing

FIGURE TEN: Wingecarribee Shire, Agricultural land suitability (NSW Department of Agriculture)

Source: Edge Land Planning (2007:45)

Holding structure and rural services

The mean (average) holding sizes shown in Figure Seven are small relative to those of broadacre and intensive agricultural holdings elsewhere east of the Great Divide in New South Wales²². However, averages don't tell the full story which is of many smaller and a few larger holdings. The predominance of smaller holdings in this region significantly inhibits agricultural responses to the region's environmental challenges.

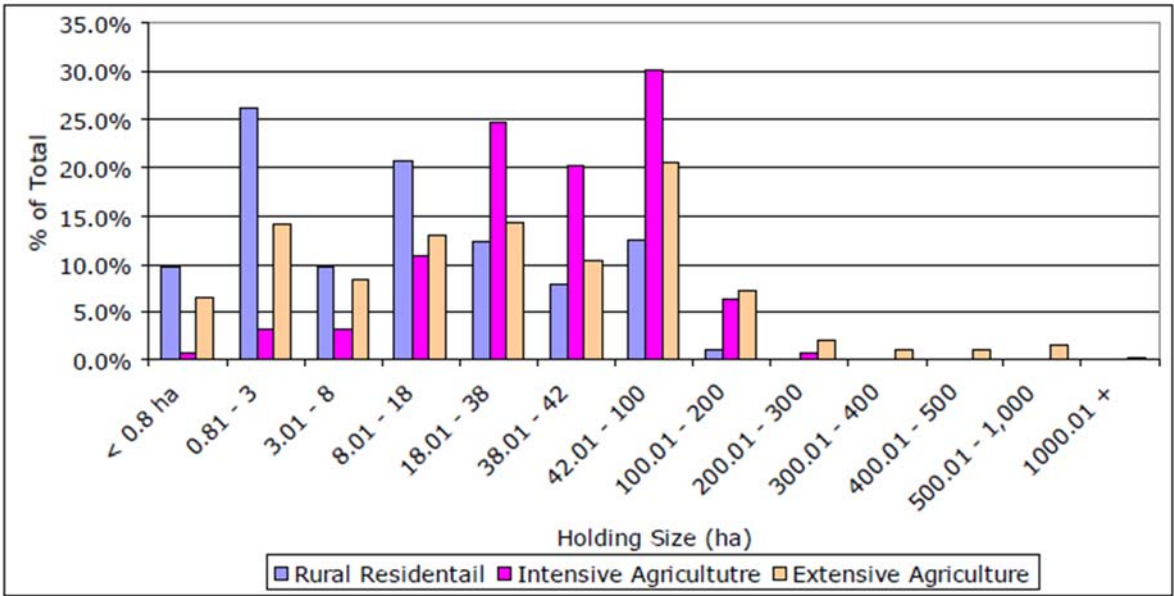
This predominance was clear from the last comprehensive census of rural holdings (1974) and was largely a result of nineteenth century grants for closer settlement. As an example, maps of Yarrawa parish show the original grants of land south of Robertson from 1861 to have been typically around 60 hectares; the subsequent history of fragmentation and consolidation has been somewhat obscured by the changing thresholds for reporting in more recent agricultural censuses²³.

Today, cost-price squeezes have rendered most rural holdings quite simply too small to be commercially viable for full-time broadacre livestock grazing in the region. For example, it seems that a dairy establishment with 200 cows plus other stock supplying town milk can no longer be commercially viable as a full-time business²⁴ even in the east, where carrying capacities of two milking cows plus calves per hectare of improved pasture might be achieved.

A milking herd of 200 cows or its meat cattle equivalent would require at least 100 hectares of prime agricultural land to be commercially viable, but the analysis of 2006 data noted above suggested that there may then have been no more than 70 rural holdings of 100 hectares or larger on Classes 2 and 3 land in the Shire (which is confined to its east and centre)²⁵. There are larger holdings elsewhere (as implied by Figure Eleven), but they are on land with lower carrying capacities.

Perhaps existing holdings of 100 hectares in the east and centre might be capable of supporting commercially viable fulltime broadacre milk or meat enterprises with significant capital investment but that would be at the risk of overcapitalising. The alternatives for landholders would appear to be either moving out of broadacre farming, or moving to part-time operations, or exiting agriculture.

In principle it might be possible for agricultural businesses to enlarge existing holdings, or to intensify operation such as into feedlot grazing, or to move to higher-yielding operations such as breeding and selling of stud stock, niche milk and meat and other animal products, running herds of alternative livestock such as of deer and alpacas or cropping alternative plants. It is unlikely that many current farmers would be prepared to take the capital risks that might be involved.



Note: the percentages are separately of rural residential (2149), intensive agriculture (121) and extensive agriculture (893) holdings respectively, and not of the total of these (3154).

FIGURE ELEVEN: Wingecarribee Shire, percentages of rural holdings by size class, 2006.

Source: Edge Land Planning (2007:15 and 22)

The greatest of these risks currently lies in rural land prices (including for leaseholds) that have escalated in the face of demand for rural land for urban and rural residential purposes from buyers who have resources that quite simply are beyond those available to operators of broadacre cropping or grazing enterprises²⁶, to the point where it is hard to see how broadacre agriculture in the region can now produce a satisfactory net return on investment.

Land prices, and holding structure also limit potential in a region adjacent to Sydney markets for more intensive farming also even if expertise was available. Despite cases locally of factory farming (chickens and mushrooms) and of intensive cropping with irrigation and climate control (nursery produce and vegetables) and of contract growing they are not numerous. Intensive livestock and cropping enterprises which are less-than-commercial in scale seem more likely.

If the VACP threshold of \$40,000 a year for commercial agriculture is applied, a substantial part of the agricultural land uses shown in Figure Six was probably in holdings of less-than-commercial scale then. Some of these may have been working farms but many were likely to have been part-time operations including most hobby farms and other 'lifestyle' uses of rural land, all likely to have become less than full-time since 2006.

The incidence today of part-time agriculture is hinted at in data reported from both the Business Register of the ABS and population censuses. The latter showed in 2016 that most of the 659 people whose principal place of work was in rural industries (almost all were in agriculture) worked in unincorporated businesses. It seems unlikely that many rural businesses would be large enough to warrant incorporation.

The Register for the same year recorded 549 businesses that were 'active' in rural industries²⁷, a number that has not changed much in several decades. 454 of these employed no-one other than their operator, and 283 (barely half) had turnovers of \$50,000 or more, including around twenty businesses with \$1 million or more (not necessarily in agriculture) which accounted for half of total rural turnover of rural industries which was in the order of \$100 million.

That number of rural businesses with turnovers of \$50,000 or more (283) is not much larger than that of holdings reported from the agricultural census as having VACP of \$40,000 or more (212) in the same year, while the number of businesses with smaller turnovers (266) may hint at the extent of hobby farming for tax losses (the Australian Tax Office reported that 128 of 634 individuals engaged in primary production in the Shire as claiming net losses in 2016²⁸).

Part-time farming in the region may be a necessary adaption to the prevalence of small holdings but it does not support the development or existence of many of the specialised services needed by some types of farming, including advisory and other services, contract workers and equipment and specialised market facilities. Nor does it encourage entrepreneurship or the development of communal knowledge within the region.

When a region does not have or loses a critical mass of services, enterprises will wither. For example, dairy factories and abattoirs closed as supplies of milk and of livestock respectively fell in the past; in turn many remaining graziers were forced to abandon dairy farming and livestock grazing for lack of local markets, often selling their holdings to hobby farmers and developers for rural residential land uses and rural retreats.

None of this is to discount the possibilities for innovation and commercialisation of new crops or livestock in the region. Indeed, the development of grape growing in the region on a dozen commercial vineyards and perhaps fifty smaller holdings²⁹ variously contract-growing grapes, selling grapes and having their grapes processed by a few wineries shows that innovation and

commercialisation are possible. However, the Southern Highlands is not and is not likely to become a major grape growing region.

More generally small holdings, high rural land prices and part-time farming discourage investment locally in the 'centre functions' needed to achieve and maintain the critical masses needed for most agricultural development.

Comment and Conclusion

Commercial agriculture in the Southern Highlands is distinguished by its diversity and its small scale. There is a great deal of less-than-commercial agricultural activity as well. Against a background of biophysical limitations and competition for rural land, and notwithstanding the success of a few entrepreneurs, commercial agriculture is struggling to survive.

No land uses are set forever but it is unlikely that biophysical limitations can be much altered here, while unravelling today's rural holding structure could not be done quickly or easily. Both would require significant changes including to prices received by farmers and to demand notably from Sydney for land for hobby farms and other 'lifestyle' rural land uses.

Land use planning through regulation such as imposition of forty-hectare minima on new lots created by subdivision has not done much to bolster commercial agriculture or protect prime agricultural land over the past forty years, but it is difficult to see how market forces might change the economic constraints under which agriculture operates here any more effectively.

Perhaps existing landholders might find new and more profitable ways of using their land? Perhaps increasing transport costs would make proximity to Sydney markets more attractive? Perhaps the hobby farmers and rural residents of today could become the land use entrepreneurs of tomorrow? Perhaps the future in this region lies beyond commercial agriculture?

Today, however, it is hard to conclude anything other than that the immediate future for commercial agriculture (as distinct from domestic agriculture which isn't constrained in the same way as commercial agriculture by soils and climates or by needs for infrastructure and problems of accessing capital) in the region is bleak.

Endnotes and References

¹ So many 'censuses' of agriculture have been taken over the years variously by colonial police and other agencies, the Registrar General of NSW, the CBCS (Commonwealth Bureau of Census and Statistics) and ABS (Australian Bureau of Statistics) and I will refer to them all simply as 'agricultural censuses'. I will similarly describe the various censuses of population and housing as 'population censuses'. A minimum threshold VACP of \$40,000 was used for reporting results from the 2016/6 agricultural census, will be used again for reporting the 2020/21 agricultural census in 2022 and is currently used for reporting the results of annual surveys. This threshold excludes many holdings that are essentially hobby farms and other part-time holdings. It is an estimate based on farm production data reported in censuses and surveys and differs from turnover data which are based on actual receipts. It is no indication of return on investment or any other measure of commercial viability.

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- ² The last comprehensive reporting of data for rural holdings was in CBCS (1976), *Classification of rural holdings by size and type of activity, 1973-74*. The ABS has used various thresholds in sometimes annual and sometimes five-yearly agricultural censuses since then, including what might have been regarded then as thresholds for commercial agriculture for its 1986 to 1992 agricultural censuses and much less rigorous thresholds for its 2006 and 2011 censuses.
- ³ James Jervis (1986:14-25). *A History of the Berrima District 1798-1973*, Library of Australian History in association with Wingecarribee Shire Council, Moss Vale.
- ⁴ K F Wells (1984). *Loss of Forests and Woodlands in Australia*. CSIRO, Canberra, Institute of Biological Resources Technical Memorandum 84/4.
- ⁵ See, for example, D N Jeans, (1972), *An Historical Geography of New South Wales to 1901*, Reed Education, Sydney, and many articles in the *Review of Marketing of Agricultural Economics*.
- ⁶ See E Dayal (1980). *Agricultural adjustments in the Illawarra Region*. Wollongong Studies in Geography, No 4. <https://ro.uow.edu.au/wollgeo/4> (accessed 10 February 2022).
- ⁷ 'What the price of milk will cost the dairy industry'. *Southern Highlands News*, 27 September 2018.
- ⁸ See Dayal (1980).
- ⁹ Wingecarribee Shire Council (2002). *Wingecarribee our future, strategic plan*. The Council, Moss Vale.
- ¹⁰ 'Cattle property and former recreation area now National Park', *The Land*, 4 February 2019.
- ¹¹ ABS (2017). *Agricultural Commodities—Australia, States and Territories and ASGS regions—2015-16*
- ¹² Edge Land Planning (2007:15). *Wingecarribee Shire Agricultural Lands Study*, Wingecarribee Shire Council, Moss Vale. www.wsc.nsw.gov.au/files/4364/File/Agricultural_Lands_Study_Draft.pdf (accessed 20 June 2013).
- ¹³ 'Avoca's Hayes family set to move to greener pastures'. *Southern Highlands News*, 25 July 2019
- ¹⁴ Estimates draw on data in Australian Bureau of Statistics *Regional Statistics* and Wingecarribee Shire Council *State of Environment Reports*. See also Edge Land Planning (2007:17).
- ¹⁵ Gross Regional Product was \$2,605 million in 2015/6. <https://economy.id.com.au/wingecarribee/gross-product> (accessed 10 February 2022).
- ¹⁶ P D Morton (2018). 'Highlands History: Local dairies dominate industry', *Southern Highlands News*, 25 October.
- ¹⁷ NSW Department of Primary Industry (2020), *Agriculture Industry Snapshot for Planning Greater Sydney Region* https://www.dpi.nsw.gov.au/data/assets/pdf_file/0011/1260488/Greater-Sydney-Snapshot.pdf (accessed 10 February 2022), and *Agriculture Industry Snapshot for Planning South East and Tablelands Region* https://www.dpi.nsw.gov.au/data/assets/pdf_file/0010/1260496/South-East-Tabllands-Snapshot.pdf (accessed 10 February 2022), and Department of primary Industries (2017), *VACP data for the sub-regions within the Sydney Basin*, https://www.dpi.nsw.gov.au/data/assets/excel_doc/0004/848452/gvp-data-sa4-regions-2015-2016.xlsx (accessed 10 February 2022).
- ¹⁸ Weather and climates are described in more detail in Ian Bowie (2006:18-23), *Wingecarribee Our Home: a geographical interpretation of the Southern Highlands of New South Wales*, U3A Southern Highlands Inc, Bowral, <https://library.wsc.nsw.gov.au/uploads/94/wingecarribee-our-home.pdf> (accessed 10 February 2022).
- ¹⁹ CSIRO (2022). *Climate analogue*. 07 <https://www.climatechangeinaustralia.gov.au/en/projections-tools/climate-analogues/analogues-explorer/> (accessed 10 February 2022).
- ²⁰ Water NSW and formerly the Sydney Catchment Authority report inflows, evaporation, outflow and storage data for water storages in its Shoalhaven system, including the Wingecarribee and Fitzroy Falls reservoirs on annual and more frequent bases.
- ²¹ Petrology and soils are described in more detail in Bowie (2006:6-17).

²² See for examples, Australian Bureau of Agricultural and Resource Economics and Sciences, ABARES (2020), *Financial performance of dairy farms, 2017–18 to 2019–20* Australian Department of Agriculture and Water Resources 2020

https://daff.ent.sirsidynix.net.au/client/en_AU/search/asset/1030841/0 (accessed 10 February 2022) and ABARES (2017), *Australian vegetable-growing farms An economic survey, 2014–15 and 2015–16* Australian Department of Agriculture and Water Resources

<https://www.horticulture.com.au/globalassets/hort-innovation/resource-assets/vg13068-australian-vegetable-growing-economic-survey-2014-15-to-2015-16.pdf> (accessed 10 February 2022).

²³ I J S Bowie (1993). 'Land lost from agriculture: a dubious basis for rural policy'. *Urban Policy and Research*, 11:217-29.

²⁴ 'Avoca's Hayes family set to move to greener pastures', *Southern Highlands News*, 25 July 2019; 'Celebrating a century of early mornings', *Southern Highlands News*, 12 June 2012.

²⁵ Edge Land Panning (2007:85)

²⁶ Recent examples are cited in 'Mike Cannon-Brookes eyes Hume Coal's Mereworth', *Australian Financial Review*, 28 September 2021 and 'Southern Highlands dairy farm sells for \$8.45m above reserve' *Australian Financial Review*, 7 November 2021.

²⁷ ABS (2018), 8165.0 - *Counts of Australian Businesses, including Entries and Exits, Jun 2012 to Jun 2016*

<https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8165.0Jun%202012%20to%20Jun%202016?OpenDocument> (accessed 10 February 2022).

²⁸ Australian Taxation Office (2018), *Selected items, by taxable status, state/territory, postcode and taxable income range, 2015–16 income year*. <https://data.gov.au/data/dataset/d170213c-4391-4d10-ac24-b0c11768da3f/resource/8c86b6d5-0485-4387-b12b-ad26a9da2033/download/taxstats2016individual06taxablestatusstateterritorypostcodetaxableincome.xlsx> (accessed 10 February 2022).

²⁹ Destination Southern Highlands (2022). *Wine Trail*, <https://www.visitsouthernhighlands.com.au/trip-ideas/wine-trail/> (accessed 10 February 2022).