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# Fulham solar farm agricultural value assessment

Final report

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## **Table of Contents**

1	Introduction				
	1.1	PROPOSED DEVELOPMENT	1		
	1.2	PURPOSE	1		
	1.3	SCOPE	2		
2	Deve	elopment guidelines and policy	3		
	2.1	SOLAR ENERGY FACILITIES DESIGN AND DEVELOPMENT GUIDELINES	3		
	2.2	LOCAL PLANNING POLICY	3		
	2.3	OTHER RENEWABLE ENERGY FACILITIES WITHIN THE REGION	4		
3	Site and context analysis				
	3.1	SITE DETAILS	6		
	3.2	LAND USE	6		
	3.3	SITE FEATURES	7		
	3.4	SURROUNDING AREA	13		
4	Analysis				
	4.1	INTRODUCTION	15		
	4.2	AGRICULTURAL CAPABILITY	15		
	4.3	PRODUCTION LEVELS	16		
	4.4	RELATIVE VALUE – REGION AND STATE	16		
	4.5	IMPACT ON SURROUNDING LAND	17		
	4.6	ABILITY TO REVERT TO AGRICULTURAL PRODUCTION	17		
5	Con	clusion	18		
Appendix 1: ABS production data					

## 1 Introduction

## 1.1 PROPOSED DEVELOPMENT

A solar energy facility is proposed to be installed on Lot 2 LP204862 at Fulham in East Gippsland, as shown in Figure 1-1. The site is approximately 160 ha and is bordered by McLarens Road to the South and Hopkins Road to the east. The site sits within the Wellington Shire.



Figure 1-1: Location of proposed solar energy facility

The proposed development consists of approximately 160,000 photovoltaic modules and associated equipment. At full development the site is expected to be capable of producing 65 – 70 MW of electricity.

## 1.2 PURPOSE

The purpose of this agricultural assessment is to determine the agricultural uses and value of the site, with regards to the *Solar Energy Facilities Design and Development Guidelines* (DELWP, 2019). This report will contribute to the planning application documentation, for the proposed development of the site as a solar energy facility.

The DELWP guidelines reference the importance of a site's land and economic attributes in determining strategically important agricultural land in Victoria. The DELWP guidelines also make specific reference to solar energy facilities that are located in irrigation districts.

## 1.3 SCOPE

Our scope is limited to aspects of the proposed development relating to the agricultural value of the site. Therefore, this assessment includes:

- Site features relevant to agricultural production, such as existing infrastructure, soil types, climate and water availability
- Surrounding land uses
- Production levels
- Relative agricultural value to the region and state.

The findings of the assessment are outlined in Section 5.

## 2 **Development guidelines and policy**

## 2.1 SOLAR ENERGY FACILITIES DESIGN AND DEVELOPMENT GUIDELINES

The guidelines which inform our assessment are the *Solar Energy Facilities Design and Development Guidelines* published by DELWP in August 2019 (subsequently referred to as the DELWP design and development guideline).

As solar energy facilities are often located on, or close to, agricultural land, the DELWP guidelines provide specific planning strategies for the protection of agricultural land. The key measures noted in the DELWP guidelines are:

- Protecting strategically important agricultural and primary production land from incompatible land use
- Protecting productive agricultural land that is of strategic significance to a local area or in a regional context
- Avoiding the loss of productive agricultural land without considering the impact of the loss on the agricultural sector and its consequential effect on other sectors.

The DELWP design and development guidelines also state that *"Renewable energy generation can and does coexist with agricultural production, which contributes to the rural economy and supports farm incomes by diversifying property owners' revenue streams".* In addition to other site considerations for solar energy facilities, the DELWP design and development guidelines propose that site selection should also consider:

- The impact on the loss of the site if it has high-quality soils, particularly soils that are niche to a type of crop or other agricultural activity
- The potential loss of reliable, accessible water (such as irrigated areas) and its impact at a local or regional scale
- The impact of fragmentation and a change of land use to non-agriculture activity on local and regional productivity and output
- The impact of a change of land use on recent and/or current efforts to modernise and reform agricultural activity in the area
- Whether the land has specifically been set aside or defined for agricultural use and development in a planning scheme or other strategic document
- Whether the change in land use is to the detriment of a government's previous or existing investment and support for the site or the area
- Whether the proposed solar energy facility can co-locate with other agricultural activity, to help diversify farm' income without reducing productivity.

## 2.2 LOCAL PLANNING POLICY

### STRATEGY

Agriculture has a large presence in Wellington Shire. The sector generates a total output close to \$80 million and 'agriculture, forestry and fishing' is the largest employer (by sector). The Shire's Economic Development Strategy (2016-2022) identifies agriculture – particularly dairy farming and intensive agriculture – as a local competitive strength and as a sector with significant growth potential<sup>1</sup>. The Shire does not have a specific strategy for agricultural development and investment in the region.

 $<sup>\</sup>label{eq:linear} $$ the s://assets-global.website-files.com/5d3aa33f5216e339f691d9ee/5d4d1062574a782c67d6a7ea\_Economic-Development-Strategy.pdf. $$ the set of the$ 

#### PLANNING

Protecting the shire's strategic agricultural land is a priority in the planning scheme as identified in Section 14.01-1S<sup>2</sup>. In particular the scheme notes that in considering a proposal to use, subdivide or develop agricultural land, the following should be considered:

- Desirability and impacts of removing the land from primary production, given its agricultural productivity
- Impacts on the continuation of primary production on adjacent land, with particular regard to land values and the viability of infrastructure for such production
- Compatibility between the proposed or likely development and the existing use of the surrounding land
- The potential impacts of land use and development on the spread of plant and animal pests from areas of known infestation into agricultural areas
- Land capability.

The Wellington Planning Scheme also supports renewable energy. Section 19.01-2S specifically details the objectives and strategies for the provision of renewable energy in the Wellington Shire, stating the strategies are to:

- Facilitate renewable energy development in appropriate locations
- Protect energy infrastructure against competing and incompatible uses
- Develop appropriate infrastructure to meet community demand for energy services. Set aside suitable land for future energy infrastructure
- Consider the economic and environmental benefits to the broader community of renewable energy generation while also considering the need to minimise the effects of a proposal on the local community and environment
- Recognise that economically viable wind energy facilities are dependent on locations with consistently strong winds over the year.

## 2.3 OTHER RENEWABLE ENERGY FACILITIES WITHIN THE REGION

There are a number of large-scale renewable energy projects in the Gippsland region which are currently seeking planning approvals or have already been approved. The Latrobe Valley Authority prepared a key strategy that is guiding investment in the region – 'Latrobe Valley New Energy Jobs and Investment Prospectus.' This is in response to the move away from coal-fired electricity generation, which has historically been a leading source of employment, economic development and infrastructure investment in the Gippsland region. Instead, the region has positioned itself for future development in agriculture, renewable energy and advanced technologies.

This document highlights that the area has 'significant advantages in renewable energy generation, with commercial renewable resource potential for utility-scale clean energy generators. This includes onshore and offshore wind, solar and bio-energy, and emerging technologies such as hydrogen, geothermal and solar thermal capability.' The prospectus also notes that 'there is significant electricity network capacity available for utility-scale renewable energy projects. The volume of surplus capacity will ensure that congestion constraints are maintained at a minimum into the future. Existing transmission lines between the Latrobe Valley and Melbourne can connect up to 1.6 GW of renewable energy generation without major shared network augmentation.'

Solar developers are actively considering locating solar farm projects in the Latrobe Valley due to the unique combination of land availability, transmission network capacity and a skilled workforce. Current major projects include Australia's first proposal for offshore wind energy production. Victorian-based *Star of the South* has been working with the Victorian and Commonwealth governments to progress the proposal for up to 250 wind turbines which would deliver around 8,000 GW of electricity per year.

The Latrobe City Council is also currently assessing planning applications for a number of renewable energy facilities including:

- Delburn Wind Farm: 33 wind turbines are proposed around the Hazelwood Power Station
- Frasers Solar Farm: 75 MW solar farm on a 110 ha site near Toongabbie.

Solis RE (the proponent of the Fulham solar energy facility) has plans to develop a number of solar energy facilities in the Gippsland region, including both photovoltaics and battery storage. They have previously submitted a planning application for a 44 MW solar energy facility on a 94 ha site at Perry Bridge.

## 3 Site and context analysis

## 3.1 SITE DETAILS

The site is approximately 160 ha and located within a Farming Zone (FZ). There are no overlays affecting the site. There are a number of overlays in the vicinity of, and adjacent to, the site. These include a:

- Design and Development Overlay (DDO)
- Environmental Significance Overlay (ESO)
- Floodway Overlay (FO)
- Land subject to inundation overlay (LSIO)
- Public acquisition overlay (PAO).

The site is in a designated bushfire prone area. Special bushfire construction requirements apply and planning provisions may apply.

## 3.2 LAND USE

The site is currently operated as a beef grazing enterprise on a mix of annual and perennial pasture, as shown in Figure 3-1.



Figure 3-1: The property is currently being used to graze angus cattle (August 2020)

The quality of the pasture is moderate to poor, with significant areas where pasture weeds are dominant (Figure 3-2). The poor quality of the pasture limits the productivity of the site.

There are three areas where there are significant gorse infestations. Gorse is a declared noxious weed under the Catchment and Land Protection Act 1994 (CaLP Act) and is classified as 'regionally controlled' in this area (the West Gippsland Catchment Management Authority region). The CaLP Act states that land owners have the responsibility to take all reasonable steps to prevent the growth and spread of regionally controlled weeds on their land.



Figure 3-2: Pasture with weeds – gorse and capeweed (August 2020) – Image 1



Figure 3-3: Pasture with weeds – gorse and capeweed (August 2020) – Image 2

There is no evidence of any cropping activity on the property. Adjacent properties have perennial pastures and no sign of any cropping activity.

## 3.3 SITE FEATURES

### INFRASTRUCTURE

There is limited infrastructure on the site. There are yards that are in good functional condition (Figure 3-3) adjacent to an abandoned house and shed. Boundary fences across the site are in reasonable condition and are stock-proof. Internal fences are present but generally in poor condition.



Figure 3-4: Existing yards, cattle crush and race - Image 1, August 2020



Figure 3-5: Existing yards, cattle crush and race – Image 2, August 2020

There is evidence of a reticulated stock watering system on the property, that is not in working order. There are two windmills but neither of them are currently functioning (i.e. pumping water to troughs), and a series of stock water troughs. Stock water is currently provided via six small dams (Figure 3-8). This would limit the stock carrying capacity on the site, especially during dry periods.



Figure 3-6: A windmill (disconnected), August 2020



Figure 3-7: One of the stock water troughs, August 2020



Figure 3-8: Largest of the stock water dams, August 2020

### SOIL

The site sits within the 'Briagolong' soil/landscape unit of soil and landform survey conducted by Sargeant and Imhof in 2000<sup>3</sup> as shown in Figure 3-5. The landform for this unit is described as level to very gently undulating plain with dominant soil types of yellow and brown sodosols as classified by the Second Edition of the Australian Soil Classification (2016).

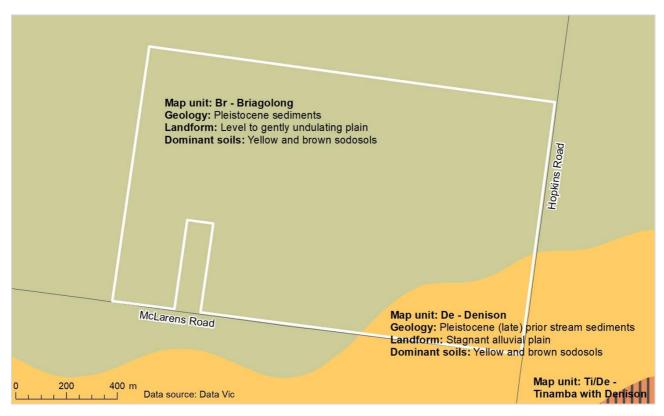


Figure 3-9: Soil map of site for proposed solar energy facility

These soils are characterised by a strong contrast in textures between the topsoil and subsoil. The surface horizons tend to be sandy and strongly acidic, with subsoils that are sodic and strongly dispersive. They tend to have low inherent fertility and low water storage capacity. The sodic and dispersive nature of the subsoils can lead to potential water logging in the sandy topsoils after periods of heavy rain. These characteristics make these soils unsuitable for cropping and will limit their agricultural potential<sup>4</sup>.

In one of the gorse infestations there were indications of rabbits, which is unsurprising given that gorse provides harbour and the sandy surface soils on the site are suited to rabbit warren development. The infestation is currently small.

#### TOPOGRAPHY

The topography at the site is relatively flat with a gentle slope towards the east. The contours of the site are shown in Figure 3-6. The high point of the site is located near the centre of the site with the western half slightly higher than the east.

<sup>&</sup>lt;sup>3</sup> Sargeant, I and Imhof, M. Major Agricultural Soils of the Maffra Region (2000) Department of Natural Resources and Environment.

<sup>&</sup>lt;sup>4</sup> http://vro.agriculture.vic.gov.au/dpi/vro/wgregn.nsf/pages/wg\_soil\_maffra\_briagolong.

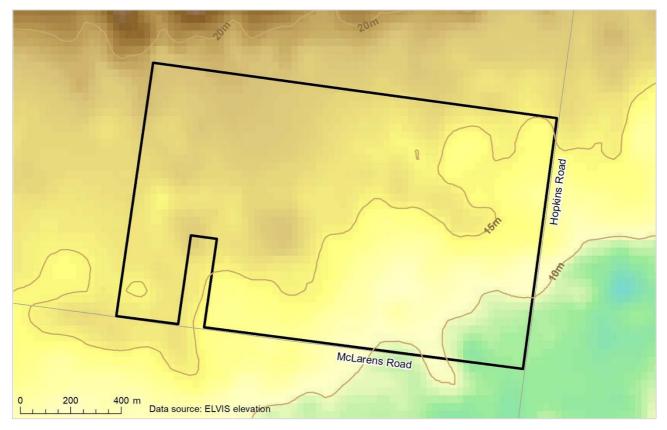


Figure 3-10: Contour map of site of proposed solar energy facility

#### CLIMATE

Data from the Bureau of Meteorology, East Sale (number 085072) was used to gather climate statistics, as shown in Table 3-1.

#### Table 3-1: Climate data

PARAMETER	VALUE		
Rainfall	Mean = 589.6		
Temperature	Mean maximum = 19.7 Mean minimum = 8.2		

The average rainfall is sufficient for dryland agriculture, such as winter season cereal crops, but is too low for high value enterprises like dairy, summer cropping or horticulture, unless there is access to additional water sources for irrigation.

#### SURFACE WATER

There are no significant natural watercourses on the property. The only obvious watercourse is in the south east corner of the property where it appears an old creek line has been made into a channel (Figure 3-7).



Figure 3-11: Watercourse in the south east corner that appears to have been made into a channel

#### GROUNDWATER

There is currently no groundwater being used on the site, previously it appears windmills were sourcing groundwater for watering stock.

### **IRRIGATION CONNECTIONS**

The DELWP design and development guidelines provide direction in respect to solar energy facilities in irrigated districts. The Victorian Planning Provisions (VPPs) *Clause 14.02-3S Protection of Declared Irrigation Districts* sets out objectives and strategies to manage and protect irrigated areas.

The site is not within a Victorian Irrigation District and has no connection to modernised irrigation infrastructure. Therefore:

- The area is not serviced by irrigation infrastructure and therefore does not have irrigation capability
- That the requirements of the DELWP guidelines with regards to irrigation infrastructure designate the site as not strategically significant agricultural land.

#### VEGETATION

The original vegetation of this area would have been grassy open woodland (red gum). This vegetation has now been almost completely cleared and the site is predominantly a mix of annual and perennial (exotic) pasture species. There is one small stand of eucalypt trees (in very poor condition) in the south west quarter of the property (Figure 3-8) and, as already noted, three areas with gorse infestations.



Figure 3-12: Small area of eucalypt with gorse

## 3.4 SURROUNDING AREA

### LAND USES

Properties adjacent to the site used for agriculture are mixed farming operations with predominately dryland livestock grazing. Land located nearby is also used for the:

- Gippsland Equestrian Centre
- Fulham Correctional Centre
- TAFE Gippsland Fulham Campus
- West Sale Airport.

There will be no implications on the agricultural activities of the neighbouring properties if the site was to be developed as a solar facility. The development of the site as a solar farm will in effect create a buffer between the Fulham Correctional Centre (which abuts the northern boundary) and other agricultural properties to the south.

### LOT SIZE

The size of the proposed site is consistent with other properties (lots) in the immediate vicinity. As shown in Figure 3-9 the majority of lots in the area are sized between 40 and 100 ha. The development of this site as a 160 ha solar farm will not result in fragmentation of the land in this area and is commensurate in size with neighbouring properties.



Figure 3-13: Size of lots in the immediate vicinity of the proposed site

### SOILS

Based on the information provided on the Victorian Resources Online website, soils in the surrounding area are consistent with that seen on site, that is, yellow and brown sodosols<sup>5</sup>.

<sup>&</sup>lt;sup>5</sup> Second Edition of the Australian Soil Classification (2016).

## 4 Analysis

## 4.1 INTRODUCTION

To understand the relative agronomic importance of the site in a local, regional and state context, an investigation of the agricultural capability of this farm was completed. The DELWP Guidelines reference the importance of a sites land and economic attributes in determining strategically important agricultural land. The DELWP Guidelines also make specific reference to solar energy facilities that are located in irrigation districts, as this property is not located within an irrigation district this is not an issue for this site.

## 4.2 AGRICULTURAL CAPABILITY

#### SOILS

Soil classification is useful in understanding the range of plants that could thrive at any given site. Although topsoils can be improved or modified to some extent, the soil is considered to be a critical inherent characteristic of the site. Therefore, the agricultural capability of the site is predominantly determined by soil type and group classification. The soil types at the site are shown in Figure 3-9.

As discussed in Section 3.2, the soil at this site is considered poor in an agricultural sense and agricultural productivity will be limited. They are not considered to be high quality soils or as, outlined in the DELWP design and development guideline, niche to a type of crop or other agricultural activity. The sodic subsoil can limit root growth and combined with the low water storage capacity of the topsoil represent a serious limitation to cropping. Low intensity operations such as grazing will generally represent the best use of soils of this nature.

### CLIMATE AND RAINFALL

Rainfall is another inherent site characteristic that is used to inform the agricultural capability of a site. The average rainfall at the site of 590 mm/annum is sufficient for dryland agriculture, such as winter season cereal crops and pasture production but is insufficient for high value enterprises like dairy, summer cropping or horticulture unless there is access to additional water sources for irrigation purposes.

#### DRAINAGE

Drainage and flooding do not have a major influence over the site's agricultural productivity.

#### CONCLUSION

Based on the soil characteristics and annual rainfall, this site is best suited to low value agricultural enterprises such as livestock grazing or cereal cropping.

## 4.3 **PRODUCTION LEVELS**

The productive value of the site has been assessed based on the agricultural capability of the site (Section 4.2) and the current (and most suited) agriculture enterprise.

The site is currently used for low intensity grazing of cattle (Black Angus) for beef production. Pastures are moderate to low quality with a mix of annual and perennial pasture. Pasture quality is lowered by the presence of pasture weeds and gorse.

To quantify agricultural output, data has been drawn from the Livestock Farm Monitor Project, Victoria 2015-16<sup>6</sup>, using the average figures for production in Gippsland. The 2015/16 year has been used so that a direct comparison can be made to the most recent ABS information that is available at a Local Government Area (LGA) level, to determine the relative significance of the site's production at regional level.

The agricultural output has been assessed based on the full 160 ha of the site however in reality the full site would not be grazed if used for a livestock enterprise (due to areas of remnant vegetation, building infrastructure and dams).

A summary of the agricultural value is provided in Table 4-1.

#### Table 4-1: Beef production potential

PARAMETER	VALUE
Stocking rate	15.7 DSE/ha
Average beef weight	407 kg lwt
Average beef price	\$2.57 per kg lwt
Beef produced	289 kg lwt/ha
Total unit income	\$742.73/ha
Total area	160 ha
Total income	\$118,837

Note: DSE = dry sheep equivalents; lwt = live weight

The agricultural output from the farm operation has been assessed at \$118,837 per annum. A typical farm needs to generate about \$250-500k gross income in order to have sufficient net income for one employee or one family farm. Therefore, this property is considered to have sufficient economic return to represent about 24% to 48% of a viable one family farm.

## 4.4 RELATIVE VALUE – REGION AND STATE

To put the value of the site into a regional perspective, the value of production calculated in Section 4.3 can be compared to that of the local region. ABS data for 2015/16, shown in Appendix 3, shows the total agricultural value for the Wellington Shire at \$79,840,146. Therefore, the production from this property represents approximately 0.15% of the shire's total agricultural production. At a state level, the economic output from this property represents 0.0009% of the state's agricultural value of output (\$13,079,964,644<sup>7</sup>). In conclusion, the potential economic output from the site is considered to be insignificant at both a regional and a state level.

<sup>&</sup>lt;sup>6</sup> Economic Development, Jobs, Transport and Resources, Livestock Farm Monitor Project – Victoria 2015-16 -

http://agriculture.vic.gov.au/\_\_data/assets/pdf\_file/0017/326312/Livestock-Farm-Monitor-Report-2015-16.pdf.

<sup>&</sup>lt;sup>7</sup> ABS Catalogue no.7503.0 – Victoria's total agriculture value 2015/16 – 13,079,964,644.

## 4.5 IMPACT ON SURROUNDING LAND

The proposed site is located within a Farming Zone with no overlays affecting the site. The site, and the properties immediately surrounding the site, are being used as mixed farming operations, primarily beef and sheep grazing. The property has not been modernised or reformed through government investment (such as support for development of irrigation infrastructure) and there are no horticultural enterprises in the immediate vicinity of the site.

The relative size of the site to be developed (as shown in Figure 3-9) is consistent with other properties (lots) in the immediate vicinity and will not result in fragmentation of the land. The development of the site for solar energy will in effect also provide a buffer to the Fulham Correctional Centre which abuts the northern boundary of the site.

There will be no implications on the agricultural activities of the neighbouring properties if the site was to be developed as a solar facility.

## 4.6 ABILITY TO REVERT TO AGRICULTURAL PRODUCTION

It is considered that once the solar facility has passed its useful life, it is relatively easy for the site to revert back to agricultural production. Once the solar infrastructure is removed, the property would be in a similar position to where it is today.

## 5 Conclusion

Based on the agricultural assessment of the site, it is concluded that:

- The predominant soil types are best suited to low value agriculture enterprises due to their inherent characteristics. They are not considered as being *high quality soils or soils that are niche to a type of crop or other agricultural activity* as outlined in the DELWP design and development guideline
- The agricultural output from the farm operation has been assessed as \$118,837 per annum. A typical
  farm needs to generate approximately \$250-500k gross income per annum in order to have sufficient
  net income for one employee or one family farm. Therefore, this property is considered to have
  sufficient economic return to represent about 24% to 48% of a viable one family farm
- The potential economic output from the site is considered to be insignificant at a regional and state level as it is 0.15% of the Wellington Shire's agricultural production and 0.0009% of the state's agricultural value of output
- There will be no loss of irrigated area within the district as the site is not part of an irrigation district and does not have significant irrigation infrastructure
- There will be no impacts on the agricultural activities of the neighbouring properties if the site was to be developed as a solar facility and the size of the site is commensurate with neighbouring properties
- Development of the site aligns with the considerations listed in the Wellington Planning Scheme regarding changes to use of agricultural land, and it is not detrimental to previous or existing government investment in the area
- It is considered that once the solar facility has passed its useful life, the site can be returned to agricultural production. Once the solar infrastructure is removed the property would be in a similar position to where it is today.

## **Appendix 1: ABS production data**

Agricultural Production Data

75030DO005\_201516 Value of Agricultural Commodities Produced, Australia 2015-16

Released at 11:30 am (Canberra time) 31 October 2017

Value of Agricultural Commodities Produced Australia, States and Territories and ASGS regions 2015-16

SA2	Wellington	
Level 1	Level 4	Sum of Gross value (\$)
Broadacre crops	All other crops n.e.c.	11,219
	Barley for grain	1,686,809
	Canola	3,375,389
	Lupins	91,655
	Maize for grain	323,202
	Oats for grain	1,552,575
	Sorghum for grain	204,040
	Triticale for grain	659
	Wheat for grain	8,490,450
Fruit and nuts	Cherries	3,688
	Nectarines	30,903
	Peaches	36,051
Нау	Cereal cut for hay	1,352,586
	Lucerne cut for hay	1,795,742
	Other crops cut for hay	73,152
	Other pasture cut for hay	173,415
Livestock Products	Eggs	59,609
	Milk	436,553
	Wool	21,577,839
Livestock slaughtered	Cattle and calves	20,940,307
and other disposals	Goats	47,594
	Pigs	913,528
	Poultry	54,321
	Sheep and lambs	15,914,322
Vegetables for human	All other vegetables n.e.c.	258,337
consumption	Broccoli	2,644
	Cabbages	83,477
	Carrots	147,282
	Cauliflowers	155,599
	Melons	9,131
	Onions	7,158
	Pumpkins	30,911
Grand Total		79,840,146

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