

## Vegetable growing in the Central West

### Stephen Wade

District Horticulturist (Vegetables)

Intensive Industries Development, Bathurst

### Introduction

The Central West region of New South Wales (see Figure 1) lies to the west of the Blue Mountains and extends from Lithgow to Condobolin. Bathurst and Orange are the largest cities in the region. The Sydney to Broken Hill railway line crosses the area, connecting the centres of Lithgow, Bathurst, Blayney and Orange. The Mid-Western, Mitchell and Newell Highways link these centres with the towns of Cowra, Forbes, Parkes and West Wyalong.

### At a glance

- Vegetable growing in the Central West is worth \$19 million a year.
- Around 45,059 tonnes of vegetables are grown on 2205 hectares by 75 growers.
- Vegetables are produced in the Central Tablelands and the Lachlan Valley.
- Cabbages, cauliflowers, lettuce, potatoes and sweet corn are the main vegetable crops.
- The future of the region's vegetable industry depends on its access to irrigation water.



Figure 1. The Central West region of New South Wales (2002)

Source: Australian Bureau of Statistics



Vegetable growing in the Central West is worth \$19 million a year. Around 45,059 tonnes of vegetables are grown on 2205 hectares by 75 growers. Cabbages, cauliflowers, lettuce, potatoes and sweet corn are the main vegetable crops. Beetroot, broccoli, peas, pumpkins and watermelons are also important. The region grows 6% of the New South Wales vegetable crop (Australian Bureau of Statistics, 2002).

The two main vegetable growing areas in the Central West are the Central Tablelands and the Lachlan Valley. The Central Tablelands contains the vegetable growing districts of Oberon, Bathurst, Blayney and Orange. The Lachlan Valley includes the Lachlan and Belubula River valleys and the towns of Cowra, Canowindra, Forbes and Condobolin.

## The Central Tablelands

### Land

The Central Tablelands are the highland areas located above 600 metres in the Central West. The main vegetable growing districts in the Central Tablelands are the Bathurst Plains, the Oberon Plateau and the Orange Plateau.

The Bathurst Plains are situated around the city of Bathurst. The Macquarie River flows across the area, where it has deposited a flood plain of black, clay loam soils. Most vegetable production occurs on the flood plain, using water from the Macquarie River for irrigation.

The Oberon Plateau and the Orange Plateau overlook the Bathurst Plains. Oberon, Blayney and Orange are the main centres on the plateaus. Vegetable production is concentrated on the red, clay loam soils scattered across these districts. Farm bores and dams supply the irrigation water required for vegetable growing on the plateaus.

### Climate

The Central Tablelands has a temperate climate with warm summers and cold winters. Temperatures at Bathurst range from 13°C to 28°C in January and from 1°C to 11°C in July (see [Table 1](#)). The tablelands have a short growing season with a frost-free period of 5 months at Orange and 3 months at Bathurst and Oberon. Bathurst can receive two to three snowfalls a year, with more falls occurring in the higher tablelands.

The annual rainfall ranges from 942 millimetres (mm) at Orange to 631 mm at Bathurst. Annual evaporation is 1468 mm at Orange and 1341 mm at Bathurst. While the rainfall is spread evenly over the year, the evaporation exceeds rainfall during the spring, summer and autumn months. Irrigation is required over this period to successfully grow vegetables on the Central Tablelands.

## The Lachlan Valley

### Land

In the Lachlan Valley vegetables are grown along the Belubula and the Lachlan Rivers from Cowra to Condobolin. Most production occurs on the black, silty loam soils on the river flood plains or the red, sandy loam soils on the adjacent river terraces. Irrigation water for the vegetable crops is pumped from the local rivers and on-farm bores.

### Climate

The Lachlan Valley has a temperate climate with hot summers and cool winters. Temperatures at Cowra range from 16°C to 31°C in January and from 4°C to 13°C in July (see [Table 2](#)). The area has a medium growing season with a frost-free period of 6 months at Cowra, Condobolin and Forbes and 5 months at Canowindra.

**Table 1. The Bathurst climate (Bathurst Agricultural Station 1908–2004)**

Season:	Spring			Summer			Autumn			Winter		
Month:	S	O	N	D	J	F	M	A	M	J	J	A
Maximum temp. (°C) <sup>1</sup>	16	20	23	26	28	27	25	20	16	12	11	13
Minimum temp. (°C) <sup>1</sup>	3	6	9	12	13	13	11	7	4	2	1	1
Frosts (days) <sup>2</sup>	7	2	0.1	0	0	0	0.1	2	8	12	16	13
Rainfall (mm) <sup>3</sup>	46	61	58	62	68	57	50	43	43	44	49	50
Evaporation (mm) <sup>3</sup>	81	124	156	205	211	165	140	87	50	33	34	56

1. Maximum and minimum mean temperatures in degrees Celsius.
2. Frost days with temperatures less than or equal to 0°C.
3. Mean rainfall and evaporation in millimetres.

Source: Bureau of Meteorology

**Table 2. The Cowra climate (Cowra Research Centre 1943–2004)**

Season:	Spring			Summer			Autumn			Winter		
Month:	S	O	N	D	J	F	M	A	M	J	J	A
Maximum temp. (°C) <sup>1</sup>	18	22	25	29	31	30	27	22	18	14	13	15
Minimum temp. (°C) <sup>1</sup>	7	9	12	15	16	17	14	10	7	5	4	5
Frosts (days) <sup>2</sup>	0.4	0.1	0	0	0	0	0	0	0.3	2	4	2
Rainfall (mm) <sup>3</sup>	52	63	55	56	66	53	48	44	52	44	52	54
Evaporation (mm) <sup>3</sup>	75	118	159	217	223	174	146	87	50	30	34	50
1.	Maximum and minimum mean temperatures in degrees Celsius.											
2.	Frost days with temperatures less than or equal to 0°C.											
3.	Mean rainfall and evaporation in millimetres.											

Source: Bureau of Meteorology

The annual rainfall ranges from 638 mm at Cowra to 465 mm at Condobolin. Annual evaporation is 1362 mm at Cowra and 1965 mm at Condobolin. Although the rainfall is spread evenly over the year, the evaporation exceeds the rainfall during spring, summer and autumn. Irrigation is needed over this period to reliably grow vegetables in the Lachlan Valley.

## Vegetable growing in the Central West

Vegetables are produced in the Central West using conventional and organic farming methods. A wide variety of vegetable crops are grown including asparagus, beans, beetroot, broccoli, Brussels sprouts, cabbages, cauliflowers, cucumbers, lettuce, peas, potatoes, pumpkins, rockmelons, silver beet, sweet corn, tomatoes, turnips, watermelons and zucchinis.

These vegetables are either sown as seed or planted as transplants, with the asparagus, broccoli, Brussels sprouts, cabbage, cauliflower, lettuce, melon and tomato crops usually being transplanted. During the growing season, the crops are watered by drip irrigation, sprinklers, travelling guns, centre pivots or linear move irrigators.

Most of the crops are picked by hand, with only the beetroot, cucumbers (gherkins), potatoes and sweet corn being mechanically harvested. The vegetables are then sold at the metropolitan produce markets or supplied to local and interstate food processors.

Cabbages, cauliflowers, lettuce, potatoes and sweet corn are the main vegetables grown in the Central West (see [Table 3](#)). The region produces 57% of the cauliflowers, 39% of the sweet corn and 24% of the cabbages grown in New South Wales (Australian Bureau of Statistics, 2002).

## Cabbages

Cabbages (*Brassica oleracea* L. var. *capitata* L.) are grown in the Bathurst, Canowindra, Cowra and Oberon districts. Green Coronet is the main fresh variety and Warrior is the main processing variety. In the Bathurst and Oberon districts, the cabbage crops are planted from September to March and harvested from January to August. In the Cowra and Canowindra districts, the cabbages are planted from January to March and picked from April to August (see [Table 4](#)). Cabbage yields average 41 tonnes per hectare in the Central West.

## Cauliflowers

Cauliflowers (*Brassica oleracea* L. var. *botrytis* L.) are produced in the Bathurst, Canowindra and Cowra districts. The main cauliflower varieties are Freemont, Summer Love and Forte. In the Bathurst district the cauliflower crops are planted from September to February and harvested from December to August. In the Canowindra and Cowra districts, the cauliflowers are planted from January to April and picked from April to August. Cauliflower yields average 24 tonnes per hectare.

## Lettuce

Lettuce (*Lactuca sativa* L. var. *capitata* L.) is grown in the Bathurst, Canowindra and Cowra districts. Assassin, Magnum and Target are the main lettuce varieties. In the Bathurst district the lettuce crops are sown from August to February and harvested from November to May. In the Canowindra and Cowra districts, the early lettuce crops are planted from July to September and picked from September to December. The late crops are planted from January to March and harvested from March to June. Lettuce yields average 30 tonnes per hectare.

## Potatoes

Potatoes (*Solanum tuberosum* L.) are produced in the Bathurst, Blayney, Canowindra, Cowra, Oberon and Orange districts. Fresh, crisping and certified seed potato crops are grown. Coliban and Sebago are the main fresh and certified seed varieties, while Atlantic is the main crisping variety. The potato crops are sown from October to December and dug from March to June. Potato yields average 38 tonnes per hectare. The crisping crops are processed by The Smith's Snack Food Co. factory at Brisbane in Queensland.

## Sweet corn

Sweet corn (*Zea mays* L. ssp. *mays*) is grown in the Bathurst, Cowra and Forbes districts. Goldensweet is the main fresh variety and Heritage, Magnum and Punch are the main processing varieties. In the Bathurst district the sweet corn crops are sown in November and December and harvested in March and April. In the Cowra and Forbes districts, the sweet corn is sown from October to January and harvested

from January to April. Sweet corn yields average 15 tonnes per hectare. Most of the sweet crop is processed into canned and frozen products at the Simplot Australia factory in Bathurst.

## Other vegetable crops

The Central West is a major producer of beetroot, broccoli, peas, pumpkins and watermelons. It produces 56% of the beetroot, 26% of the broccoli and 27% of the peas grown in New South Wales (Australian Bureau of Statistics, 2002).

### Beetroot

Beetroot (*Beta vulgaris* L. Crassa group) is grown in the Cowra district. Detroit Dark Red is the main variety. The beetroot crops are sown in January and February and harvested from May to July. Beetroot yields average 60 tonnes per hectare in the Central West. The beetroot is processed at the Windsor Farm Foods plant in Cowra and the SPC Ardmona factory at Shepparton in Victoria.

**Table 3. Vegetable production in the Central West (2002)**

Vegetable	Value (\$)	Production (tonnes)	Area (hectares)	Growers
Asparagus	380,876	184	41	4
Beans	329,936	137	34	2
Beetroot	213,101	1,227	29	2
Broccoli	589,358	300	148	5
Brussels sprouts	361,337	213	11	3
Cabbages	2,153,550	4,186	105	10
Cauliflowers	3,796,207	7,039	260	14
Lettuce	1,066,290	1,067	96	5
Peas	443,520	517	107	12
Potatoes	2,474,605	5,501	207	15
Pumpkins	740,553	1,917	138	20
Rockmelons	327,329	354	35	2
Sweet corn	4,980,590	20,899	871	15
Tomatoes	628,929	467	11	2
Watermelons	454,767	960	101	8
Other vegetables	118,397	91	11	6
<b>Total</b>	<b>19,059,345</b>	<b>45,059</b>	<b>2,205</b>	<b>75</b>

Source: Australian Bureau of Statistics

## Broccoli

Broccoli (*Brassica oleracea* L. var. *italica* Plenck.) is produced in the Bathurst, Canowindra and Oberon districts. The main broccoli varieties are Greenbelt and Marathon. In the Bathurst and Oberon districts, the broccoli crops are planted from September to March and harvested from November to May. In the Canowindra district, broccoli is planted in July and August and picked in September and October. Broccoli yields average 6 tonnes per hectare.

## Peas

Peas (*Pisium sativum* L. spp. *sativum*) are grown in the Blayney, Canowindra, Cowra, Oberon and Orange districts. Bounty is the main pea variety. The pea crops are sown from September to January and picked from December to April. Pea yields average 5 tonnes per hectare.

## Pumpkins

Pumpkins (*Cucurbita maxima* Duch.) and grammas (*Cucurbita moschata* Duch. ex Poir) are produced in the Bathurst, Canowindra, Cowra and Forbes districts. Jarrahdale is the main pumpkin variety and Butternut is the main gramma variety. The pumpkin and gramma crops are sown from October to December and picked from February to May. Pumpkin yields average 25 tonnes per hectare.

## Watermelons

Watermelons (*Citrullus lanatus* (Thunb.) Matsum and Nakai) are grown in the Canowindra, Condobolin, Cowra and Forbes districts. Red Tiger is the main seeded variety and Red Back is the main seedless variety. The watermelon crops are planted from October to December and harvested from January to May. Watermelon yields average 30 tonnes per hectare.

**Table 4. Vegetable growing seasons in the Central West**

Season:	Spring			Summer			Autumn			Winter		
Month:	S	O	N	D	J	F	M	A	M	J	J	A
<b>Beetroot</b>					•	•				■	■	■
<b>Broccoli</b>	•	•	•	•	•	•	•				•	•
<b>Cabbages</b>	•	•	•	•	•	•	•					
<b>Cauliflowers</b>	•	•	•	•	•	•	•	•				
<b>Lettuce</b>	•	•	•	•	•	•	•				•	•
<b>Peas</b>	•	•	•	•	•							
<b>Potatoes</b>		•	•	•								
<b>Pumpkins</b>		•	•	•								
<b>Sweet corn</b>		•	•	•	•							
<b>Watermelons</b>		•	•	•								
<b>Key:</b>												
<b>Planting period</b>	•	•	•									
<b>Harvest period</b>	■	■	■									

## The future of vegetable growing

The vegetable industry developed in the Central West because local growers could profitably produce vegetables. They grew crops with average to above average yields, had diversified markets for their produce and lower transport costs to many of these markets. The region's vegetable enterprises benefited from having:

- a favourable climate for growing many vegetables;
- the presence of local vegetable processors in the region;
- access to the large Sydney market; and
- reliable supplies of irrigation water.

### Climate

The Central Tablelands is one of the few places in Australia where cool season vegetables, such as broccoli, cabbages and cauliflowers, can be grown through the middle of summer without prematurely going to seed. The tablelands' growers can harvest these crops when such crops are unavailable in many other vegetable growing areas.

The Lachlan Valley has a suitable climate for growing warm season vegetables such as pumpkins, sweet corn and watermelons. Although watermelons will tolerate very hot weather, they prefer warm conditions with 25°C to 32°C days and 18°C to 22°C nights. At Cowra the daily maximum temperatures exceed 35°C for only 15 days a year, providing a favourable climate for growing high quality watermelons.

### Processing

Asparagus, beetroot, broccoli, cabbages, cucumbers (gherkins), lettuce, potatoes and sweet corn are also grown under contract for processing. Most of these vegetables are processed at the Simplot Australia factory in Bathurst, the Windsor Farm Foods plant at Cowra, the SPC Ardmona factory at Shepparton in Victoria and The Smith's Snack Food Co. plant at Brisbane in Queensland.

The Simplot Australia factory at Bathurst is the largest processor of sweet corn in Australia. It manufactures canned and frozen sweet corn products, which are sold under the Edgell and Birds Eye brands. The Chiko roll, an Australian culinary icon, is also produced by the company in Bathurst, using locally grown cabbages as one of its ingredients.

The Windsor Farm Foods factory at Cowra is the only asparagus and mushroom processor in Australia. It produces canned asparagus, beetroot, green bean, mushroom, potato and tomato products under the Windsor Farm brand.

### Markets

The Central West is located close to the city of Sydney, which is the largest metropolitan market for vegetables in Australia. Bathurst and Cowra are 223 and 334 kilometres by road from Sydney. Both centres are within half a day's travel of the Sydney and Canberra markets and within a day's journey of the Brisbane, Melbourne and Adelaide produce markets.

### Irrigation

The future of the vegetable industry in the Central West depends on its access to irrigation water. Irrigation is required during the spring, summer and autumn months to reliably grow vegetable crops. The main irrigation dams in the region have a storage capacity of 1,286,600 megalitres (see [Table 5](#)). Only a small amount of this water is used for vegetable growing.

As most production already occurs under drip or sprinkler irrigation, only minor gains can be achieved through improved irrigation efficiency. Access to underground water is also limited. However, if the vegetable industry is to continue developing it will require further supplies of irrigation water. The transfer price for irrigation water is therefore expected to determine the future development of vegetable growing in the Central West region of New South Wales.

**Table 5. Main irrigation water storages in the Central West (2004)**

Upper Macquarie River Catchment	Storage capacity (megalitres)
Ben Chifley Dam	30,800
Lachlan River Slopes Catchment	
Carcoar Dam	35,800
Wyangala Dam	1,220,000
<b>Total</b>	<b>1,286,600</b>

Source: State Water

## **Further information**

For more information on vegetable growing consult your nearest NSW Department of Primary Industries District Horticulturist (Vegetables).

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