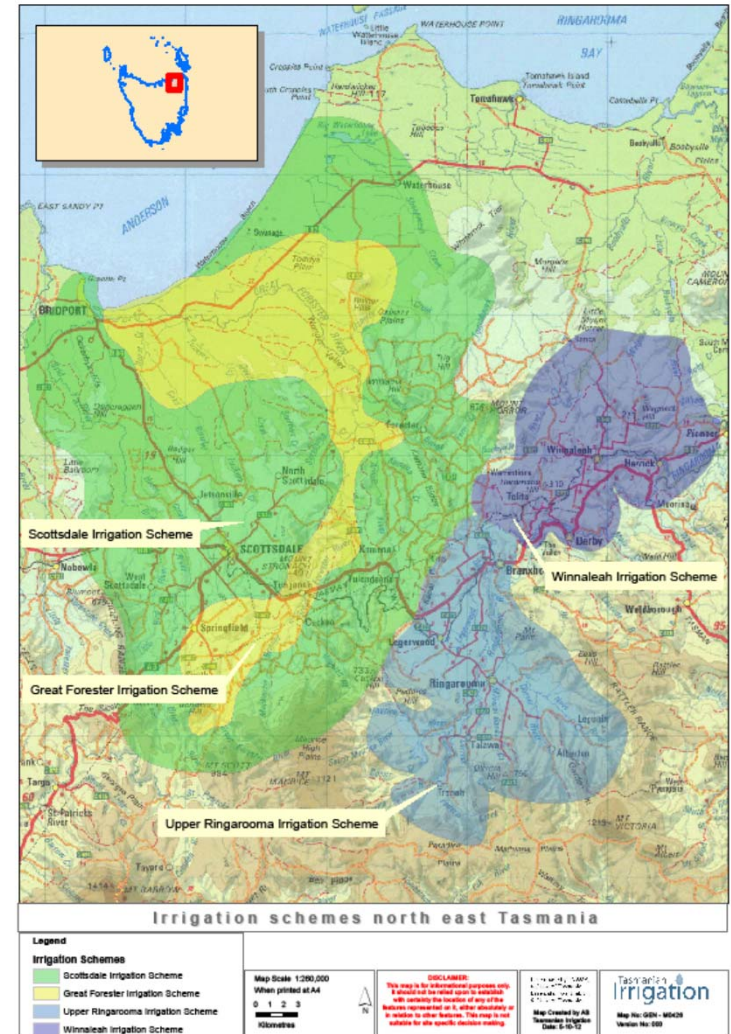


Climate, soils and the advantages of North East Tasmania for irrigated agriculture



October 2012



NE Tasmania in Summary- Ideal Temperate Production Region

- Highly suited to livestock production for both meat and dairy as well as and vegetable production both fresh and processed
- Highly fertile, free draining soil types that are manageable for a range of enterprises
- Range of agricultural expertise and support
- Skilled resource base



Climate – Temperate Production

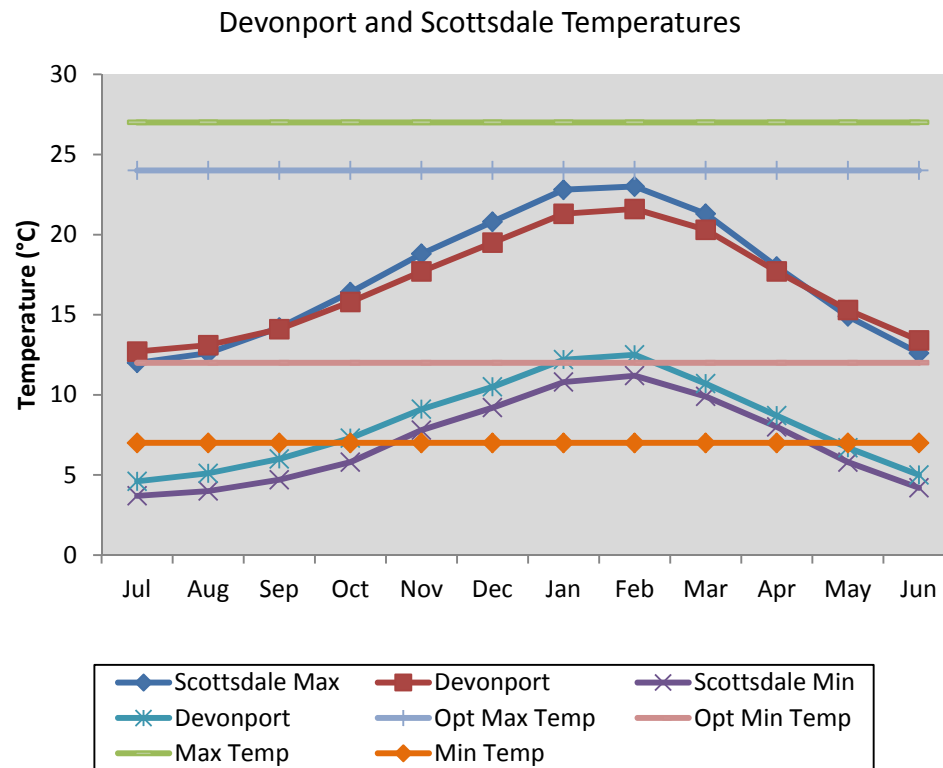


Figure 1 Devonport and Scottsdale Mean Maximum and Minimum Temperatures.

Maximum and Minimum temperatures are the accepted levels that most temperate crops experience stress, optimum minimum and maximum temperatures are the accepted levels for temperate crop production. Temperate crops are those that are endemic to and grow in regions outside of tropical latitudes— UC Davis.

•Bureau of Meteorology (BOM) station Devonport Airport data collected 1966-2012

•BOM station Scottsdale data collected 1958-2012

- Regions climate very similar to the cropping region of NW Tasmania
- Temperatures are well suited to temperate crops during the Spring, Summer and Autumn months
- Altitude is the main variable affecting climate variance in the region

Rainfall of the NE region

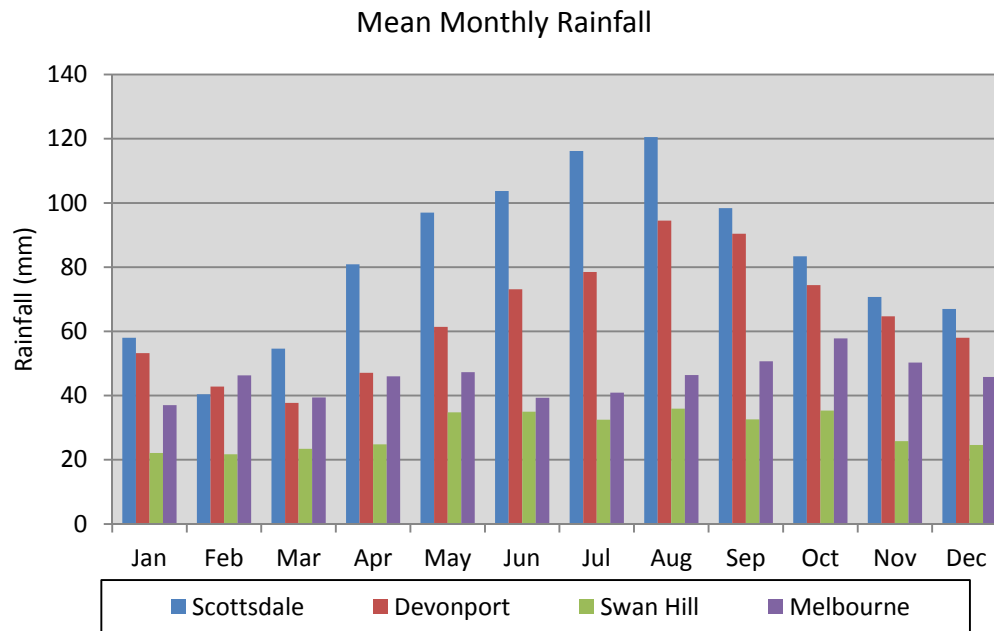


Figure 2 Mean Monthly Rainfall of the NE Region

- BOM station Devonport Airport data collected 1966-2012
- BOM station Melbourne data collected 1913-1980
- BOM station Swan Hill data collected 1884-1996
- BOM station Scottsdale data collected 1958-2012

•Note whilst Swan Hill and Melbourne data sets reference are from stations now closed, they represent a longer time period than the current stations and therefore a more concise indication of long term mean monthly rainfall.

- Whilst temperatures are well suited to temperate crops, the rainfall is high compared to other cropping regions in Tasmania and mainland Australia
- Summer months are similar to the NW coast of Tasmania and both are higher than mainland production areas
- Winter months are significantly higher than most agricultural regions and therefore limit production of many perennial crops unless on well drained soils.

Variability of the NE region

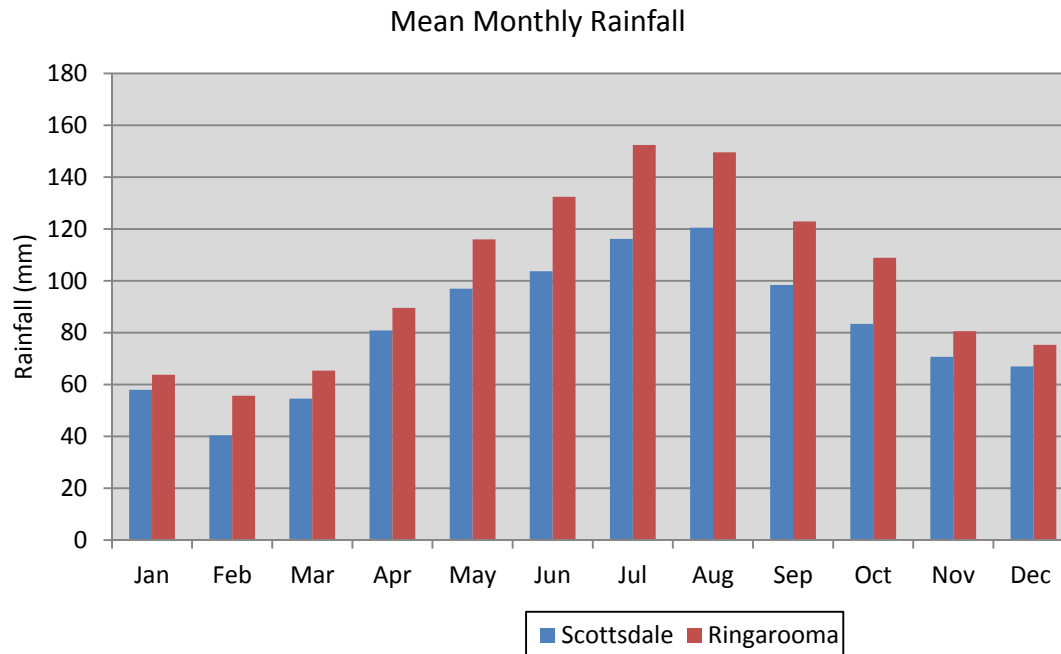


Figure 2 Mean Monthly Rainfall of the NE Region

- BOM station Ringarooma data collected 1884-1996
- BOM station Scottsdale data collected 1958-2012

- Some variability does occur in the region for example Ringarooma is around 28km from Scottsdale in a South East direction yet averages annually around 222mm greater rainfall.
- This is due to a combination of elevation and proximity from the coast– Scottsdale is at a height of approximately 200 m whilst Ringarooma is at a height of 300 m and further inland

Moderate Impact Rainfall Events

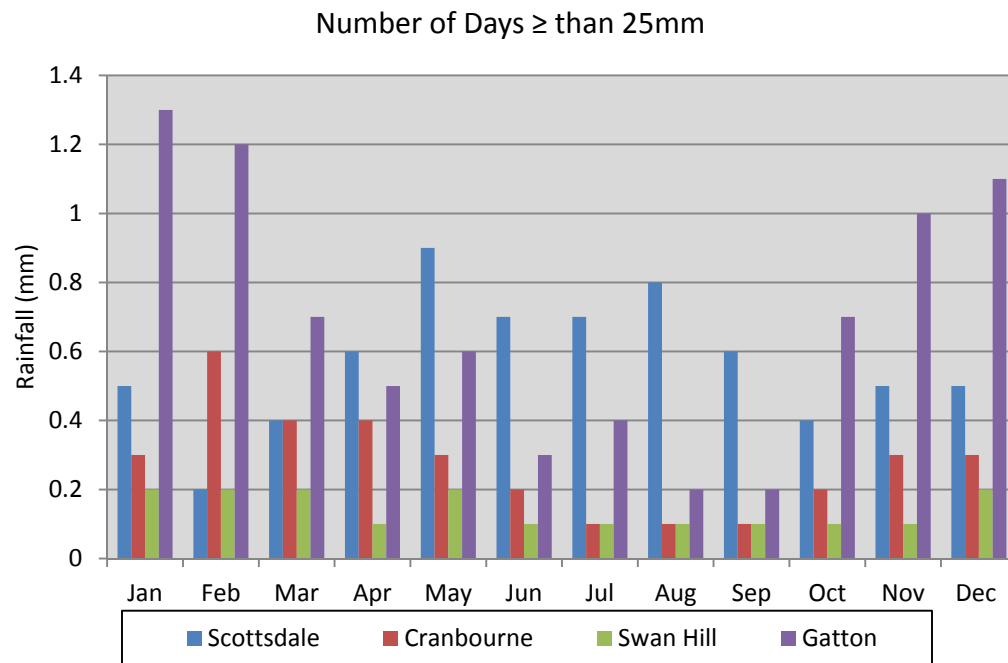


Figure 3 Number of Days of Rainfall Greater than 25mm for Scottsdale, Cranbourne, Swan Hill and Gatton.

- BOM station Scottsdale data collected 1958-2012
- BOM station Cranbourne botanical gardens data collected 1990-2012
- BOM station Swan Hill data collected 1996 - 2012
- BOM station Gatton Research Station data collected 1968-2012

- Frequency or impact of rainfall events can be gauged by the number of days where rainfall is greater than 25 mm
- Whilst the number of days greater than 25 mm are higher than mainland production areas, they are not significantly greater during the summer production period
- The winter period is where rainfall events have more impact.

Lack of Heat Events

- NE Tasmania is moderated by the Bass Strait and does not experience the severity or frequency of high temperature events that cause agricultural losses on mainland Australia, particularly in vegetables.

Mean Days over 30°C

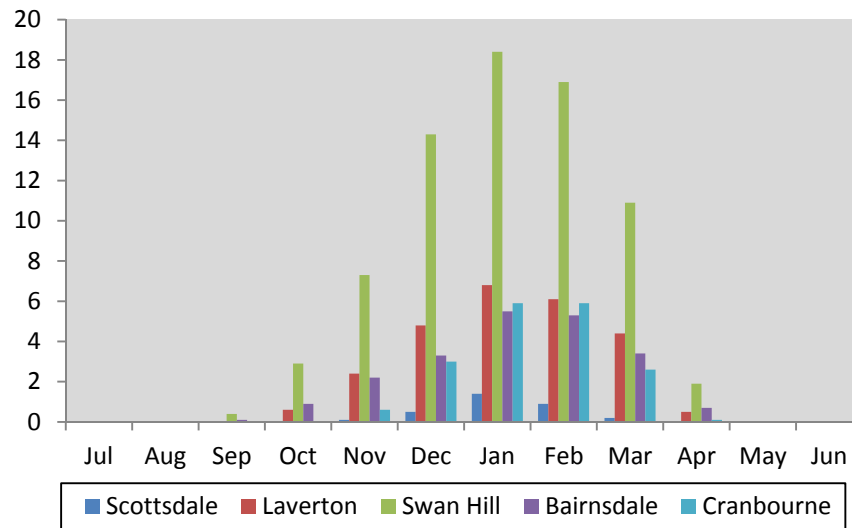


Figure 6 Mean Number of days over 30°C for Scottsdale, Swan Hill, Bairnsdale and Cranbourne

- BOM station Scottsdale data collected 1958-2012
- BOM station Swan Hill data collected 1996-2012
- BOM station Bairnsdale data collect 1942-2012
- BOM station Cranbourne botanical gardens data collected 1990-2012

Mean Days over 35°C

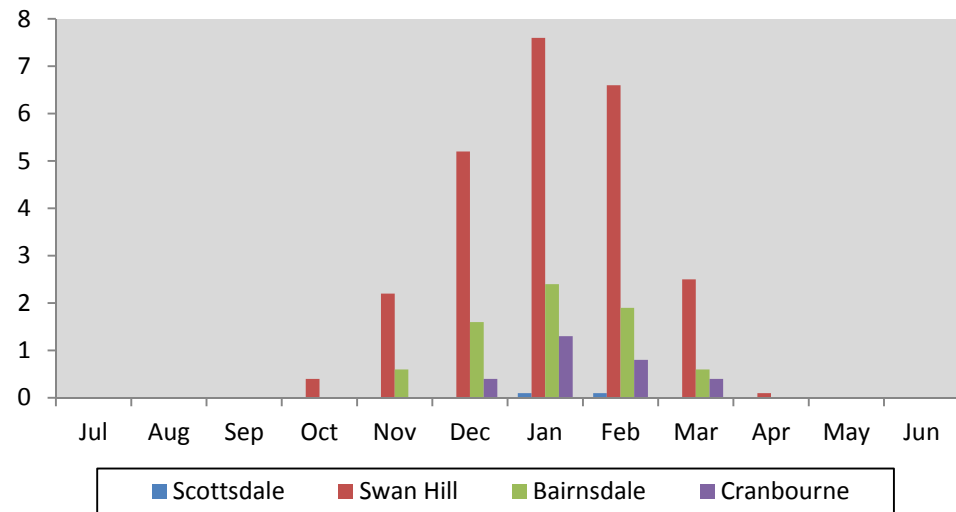


Figure 7 Mean Number of days over 35°C for Scottsdale, Swan Hill, Bairnsdale and Cranbourne

- BOM station Scottsdale data collected 1958-2012
- BOM station Swan Hill data collected 1996-2012
- BOM station Bairnsdale data collect 1942-2012
- BOM station Cranbourne botanical gardens data collected 1990-2012

Frost Frequency

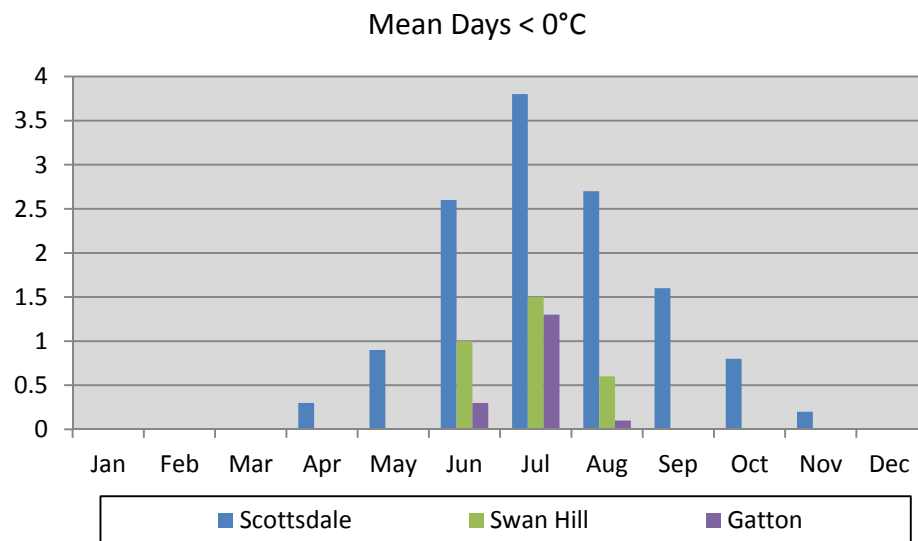


Figure 8 Mean Number of Days per month where temperature is less than 0° at Scottsdale, Cranbourne, Swan Hill and Bairnsdale

- BOM station Scottsdale data was collected 1958-2012
- BOM station Swan Hill data collected 1996-2012
- BOM station Bairnsdale data collect 1942-2012
- BOM station Cranbourne botanical gardens data collected 1990-2012

- Potential for frosts is moderately high in the region and a major environmental reason for low suitability for tree fruit or vines which are susceptible to frost at flowering
- Vegetable flowering crops such as peas and beans can be grown provided they are sown at the correct time such that flowering occurs after the periods of frost potential
- Moderate to high frost frequency over winter can be advantageous in lowering pest populations for many crops.
- Low temperatures over winter are critical for chilling in berryfruit – the region meets most varietal requirements

Humidity in the Region

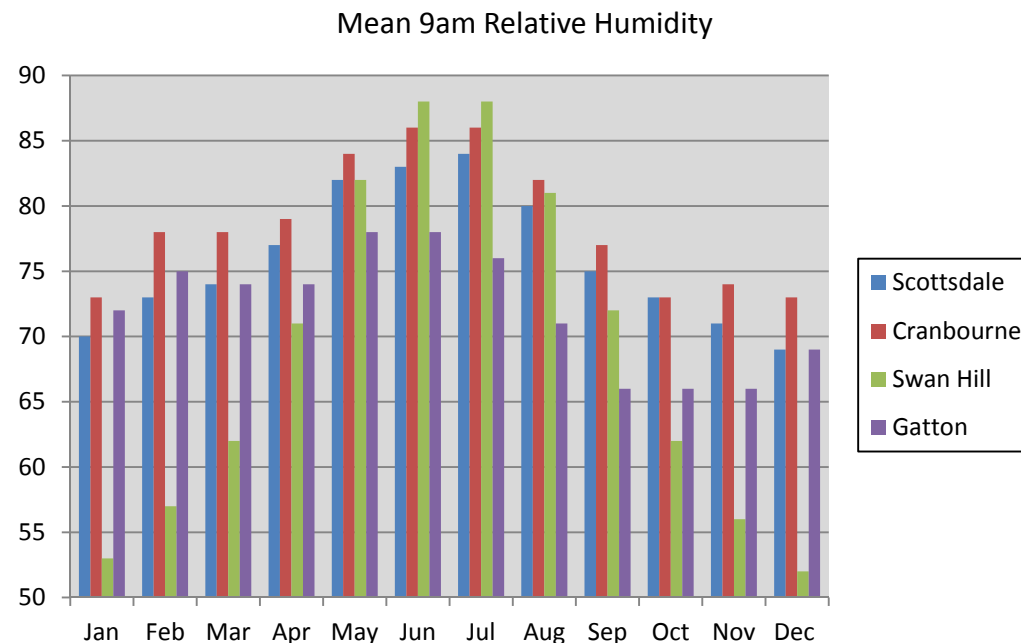


Figure 10 Mean Monthly 9am Relative Humidity at Scottsdale, Cranbourne, Swan Hill and Gatton

- BOM station Scottsdale data collected 1958-2012
- BOM station Cranbourne data collected 1990-2012
- BOM station Swan Hill data collected 1996-2012
- BOM station Gatton Research Station data collected 1968-2012

- High and/or prolonged periods of relative humidity increase the potential for fungal disease outbreaks and severity
- NE Tasmania has similar relative humidity during the summer growing season as many other vegetable areas of Australia
- The humidity remains potentially too high for many tree fruit crops, thereby increasing the likelihood of fungal diseases
- Conversely these conditions aid in pasture production for livestock as evapotranspiration rates will remain low

Summer Sunshine Hours

- Despite the low latitude NE Tasmania still has similar sunshine hours in summer to much of SE Australia thereby providing excellent summer production from temperate crops

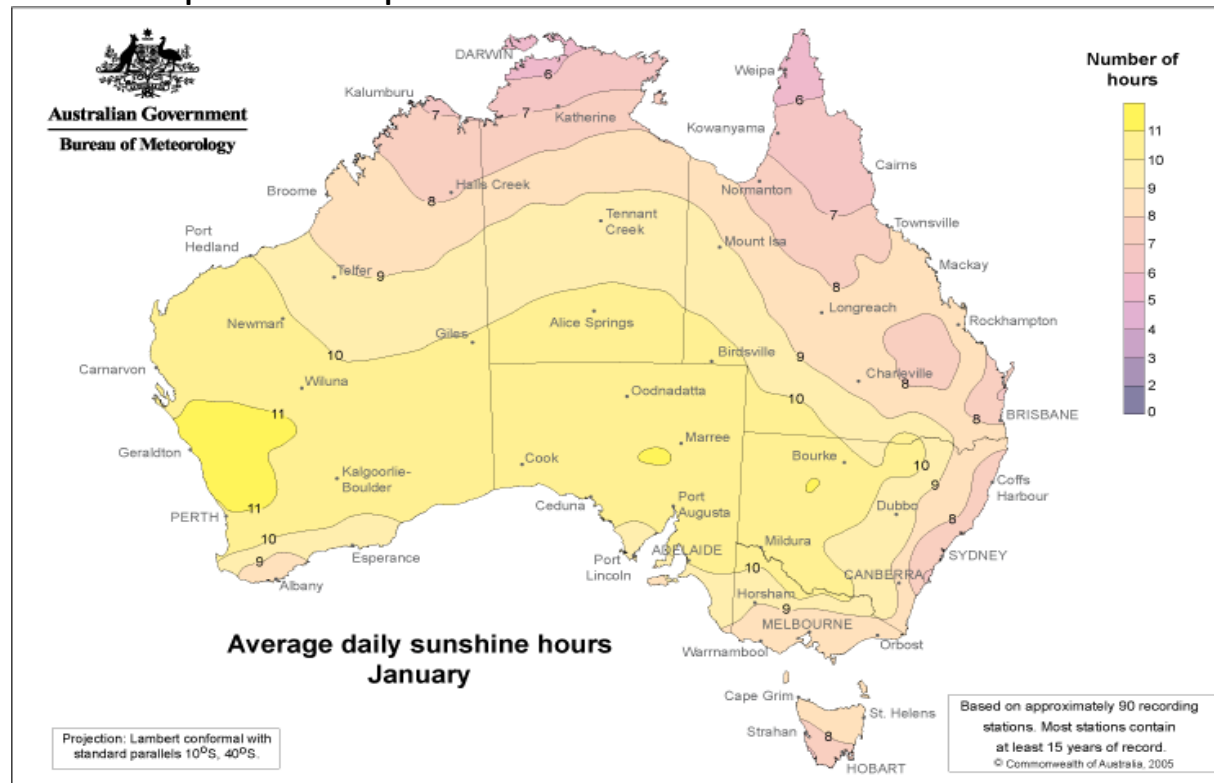


Figure 12 Average daily sunshine hours in January (Summer) across Australia - BOM

Current Agricultural Production in Region

- Livestock
 - Fat lamb and beef production
 - Grass and fodder production in the region is excellent for live weight gain
 - Around 75% of Tasmanian livestock is processed in the State to produce branded value-added products for local and export markets. The remaining livestock are exported live primarily to mainland destinations for finishing or direct processing. Beef dominates the industry with around 75% of total farm gate value (DPIPWE The Tasmanian Red Meat Industry May 2009).
 - Dairy
 - The sector has ebbed and flowed over the last few years but as a region it is well suited for dairy
 - Investment in milk processing in Tasmania has increased significantly in recent years and demand for milk is forecast to commensurately increase.
 - The NE region has an inherent advantage in dairying because of its low-cost milk production based primarily on reliable rain fed and irrigated pasture.
 - The region is less prone to drought than dairy areas in mainland Australia.
 - Over time this advantage is likely to increase because Tasmania's temperate maritime climate is expected to be less affected by climate change than mainland dairy areas.



Current Agricultural Production in Region

- Annual Crops
 - Processing vegetables
 - Potatoes are the dominant crop, peas, onions, carrots, beans and broccoli have been contracted in the past
 - Potatoes have been contracted previously to Simplot and McCains but currently only Simplot
 - Alkaloid poppies
 - all 3 poppy companies currently contracting growers in the NE
 - Fresh market vegetables
 - Potatoes, carrots, onions, cabbage, cauliflower, beets and other speciality lines
 - Broad acre crops
 - The predominant crops are cereals – barley, wheat and oats for feed
 - Essential Oils, flowers and bulbs
 - Parsley for oil is currently grown in the Winnaleah District. Lavender and Boronia have been grown for both flowers and oil. Small areas of flower and bulb production have been successful in the region eg. Iris NB: some of the individual crops in this grouping are also perennial in nature



Current Agricultural Production in Region

- Perennial Crops
 - Pyrethrum
 - All crops are contracted to Botanical Resources Australia (BRA), whilst the company plans to increase production there is limited expansion of the cropping area within this region planned at present. This will potentially increase once additional irrigation becomes available.
 - Hops
 - Once a large industry in the region, this has now contracted to small areas for boutique brewery market. Hops are predominantly restricted to areas of river flats as they require excellent drainage and flat topography to allow for trellising of the vines
 - Berry fruit
 - Small areas of Blueberry production as tourist outlets and pick your own



Potential New Opportunities

- Niche fresh vegetable varieties
- Expansion of berryfruit eg. Raspberry and Strawberry
- Herbs – fresh, culinary, medicinal and essential oils
- Boutique hop varieties
- Niche crops such as ginseng, wasabi and buckwheat have been trialled in the past but require market development
- Industrial Hemp for seed oil production



Combination of environmental factors

- Temperate crops require a combination of long days and low night temperatures eg: many temperate essential oil crops will produce the highest quality oil given low night temperatures and long sunshine hours, these conditions are limited to very few production regions in Australia
- The NE region has ideal conditions to produce high quality temperate products
- Opportunities for crops that have long growtimes and require field desiccation are potentially limited by the environment
- Conditions are ideal for producing grass and therefore livestock potential either as meat or dairy is very significant



Soils of the North East (NE)



Geology – quite complex general trend is:

- Hills mostly capped by basalt
- Some areas of granite (mainly in North and East of irrigation area)
- Slopes of sandstone/mudstone (mainly to the West of irrigation area)
- Valley floor of in-fill alluvial deposits (ie. mixture)
- Hills are generally stony and shallow near tops
- Slopes mainly either:
 - basalt derived slope deposits (red/brown soils in well drained positions)
 - granite slopes with gravelly topsoil and/or rock outcrop
 - texture-contrast soils from sandstone/mudstone or granite (generally lower slope positions)

Typical Soil Characteristics

Red and Brown soils on basalt

- The predominant agricultural soil type in the region
- Highly suited to agriculture (if fertility is maintained).
- Stoniness generally increases on higher ground. Stony nature can impede implement work.
- Need to maintain surface cover to minimise erosion.
- Structural decline can occur when wet.



Typical Soil Characteristics

Granite derived soils

- Frequently gravelly or sandy topsoils with outcropping rock.
- Often highly fragile soils and are prone to erosion especially on slopes.
- Need to maintain surface cover to minimise erosion.
- Soils with lower gravel content can handle more intensive agriculture as long as erosion control measures are undertaken.
- Minimal cultivation and direct drilling is the key to long-term productivity.



Typical Soil Characteristics

Texture-contrast soils

- Fragile soils - can quickly be degraded if overworked.
- Structure is often minimal - maintained only by the presence of roots and organic matter (pasture phase important).
- Well suited to long term pastures with only minimal cropping.
- Minimal cultivation and direct drilling is needed for long-term productivity.
- Can often have impeded drainage especially in low lying positions.

For further information

Macquarie Franklin specialises in economic studies and business and resource management including feasibility studies, irrigation and water development, land capability and mapping, natural resource management, training and extension, and technical agricultural consulting.

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