Pasture Recovery for North Coast Beef Producers

The past 12 months have been a trying time for beef producers to say the least and variability across the region is considerable. While some say it's the lowest rainfall, feed and water levels they have seen on their farms, others say they have seen it worse, overall the optimism within the industry is refreshing.

We are regularly hearing across the district 'if only the seasons go back to normal from September and October things will be fine because it will rain the feed will grow.' This mindset raises a few questions. What is normal rainfall? Is September or October a time that pasture conditions will begin to improve? When should I make decisions about pasture recovery and likely feed supply for the herd?

Impact of temperature and moisture on the growth of tropical pasture species

The majority of sub-tropical pasture species prefer high temperatures with maximum growth achieved when day temperatures are around 30°C and night temperatures are around 25°C. Growth is much slower when temperatures are below 18°C in the day and 13°C at night. With virtually no growth below 8°C.

The temperature will remain a growth-limiting factor until temperatures are above 18°C in the day and 13°C at night even if soil moisture becomes non-limiting. Warm days with cold nights below 13°C will still slow pasture growth.

Tropical pastures require adequate soil moisture. They grow best in soils with at least 150-200mm of Plant Available Water Capacity (PAWC). PAWC is the soil's total water-holding capacity, or the 'bucket'. It is the difference between the upper limit where the ground can hold no more water and the lower limit where the plant cannot absorb any remaining water. PAWC depends on soil texture and is independent of seasonal conditions. It is vital to understand PAWC as it will affect how the pasture responds to stored moisture and rainfall.

For example, if a soil has a large PAWC such as clay or clay loam soils, then pasture will likely perform well for longer after significant rain. On the other hand, if the PAWC is low, such as in sandy soils, pasture will need more frequent rain because the ground can't store as much moisture.

The amount of rainfall and frequency of follow-up rain required to achieve adequate soil moisture for pasture growth will depend on the soil texture and current soil moisture level.

What is 'normal' season rainfall wise?

Annual rainfall records for Casino sourced from the Bureau of Meteorology historical records for both the now closed Casino Airport station, for 1858 to 2012 (Chart 1), and the current Casino Airport station for 1995-2018 (Chart 2). Suggests that normal rainfall is variable.

There are, however, trends of wetter years and drier years. For example, the 1970s was a period of high rainfall, whereas the early 2000s were a period of lower rain. Anyone's idea of normal is more likely to reflect the periods and associated experiences on the farm. In reality, 'normal' rainfall is variable rainfall.

For More Information Contact:

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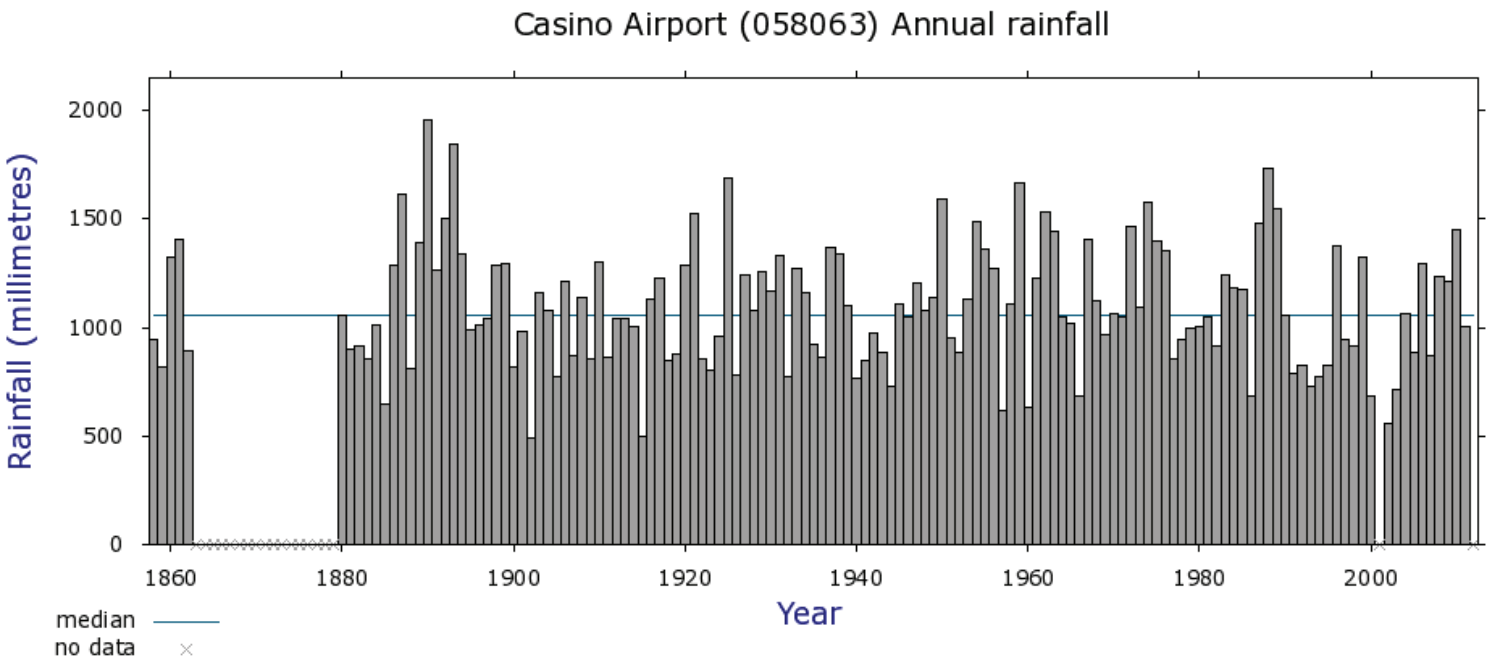

Chart 1: Annual rainfall for Casino Airport (058063) now closed from 1858 to 2012.

Climate Data Online, Bureau of Meteorology
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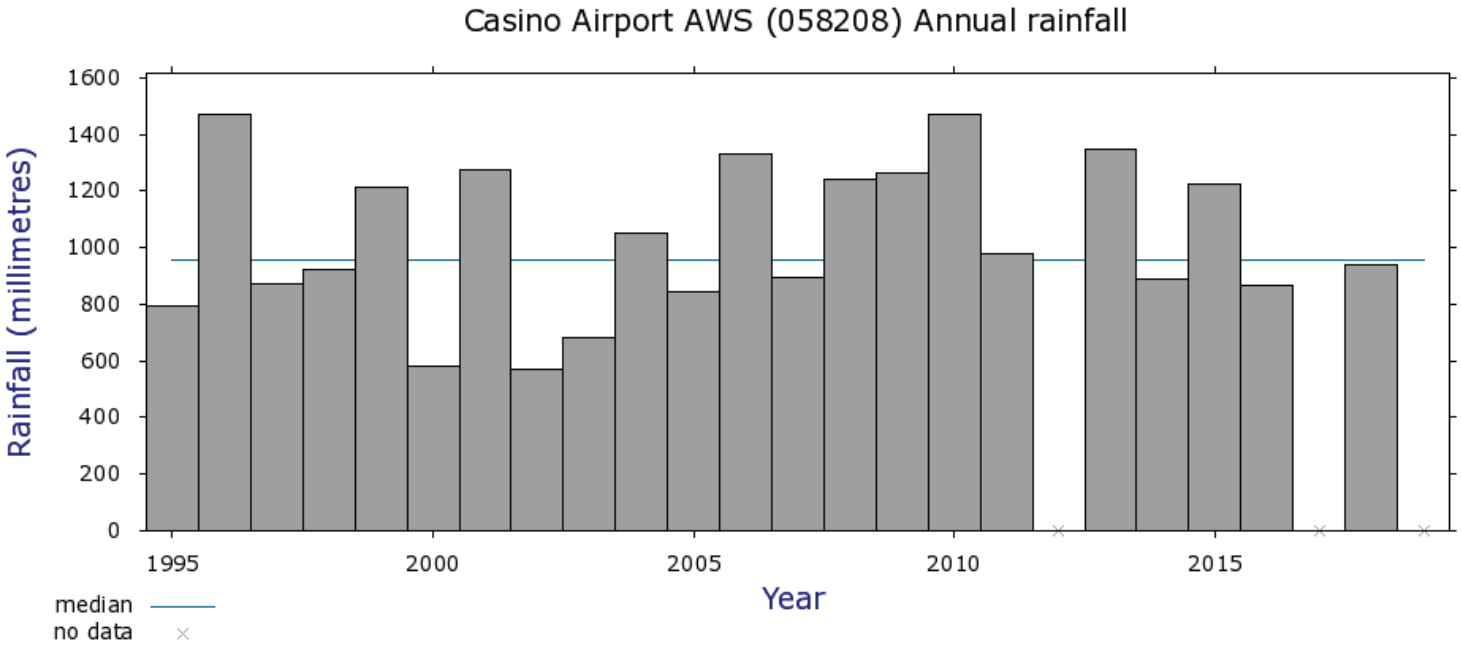

Chart 2: Annual rainfall for Casino Airport AWS (058208) from 1995 to present.

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Using historical weather data to help provide an indication of when pasture recovery is likely

Information presented in the table below has been sourced from the bureau of meteorology records for Casino Airport NSW station number 058063 now closed, for 1858 to 2012, and Casino Airport NSW station number 058208 for 1995-2018.

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
***1908 -2012 Mean Min Temp (°C)**	18.9	18.8	17.3	14.1	10.6	8.0	6.7	7.3	10.2	13.2	15.9	17.8
1858 -2012 Median rainfall (mm)	111.2	129.5	117.6	74.0	57.3	41.4	31.4	28.8	29.8	55.7	76.9	101.3
1995- 2018 Mean Min Temp (°C)	19.0	18.9	17.7	14.2	10.6	8.4	6.5	7.0	10.4	13.5	16.0	17.8
1995-2018 Median rainfall (mm)	109.8	148.6	123.6	69.2	47.0	58.6	19.8	24.6	24.9	59.0	102.8	108.4

***Temperature records only available from 1908.**

Considering Temperature

Tropical pasture growth response will be slow when minimum temperatures are below 13°C. Temperature is likely to remain a pasture growth-limiting factor until October, regardless of soil moisture levels or any rain. Pasture may begin to turn green, but minimum temperatures will still restrict growth.

Considering Rain

The median rainfall for September and October combined is 84.5mm. Median is determined by ranking rainfall from largest to smallest, and then identifying the middle. Meaning that 55 years out of the 111 recorded has had rain for September and October exceeded 84.5mm the other 55 years haven't.

When thinking about your circumstances consider; rainfall to date, available soil moisture and soil texture. Will 84mm (median rain for September and October) commence pasture recovery?

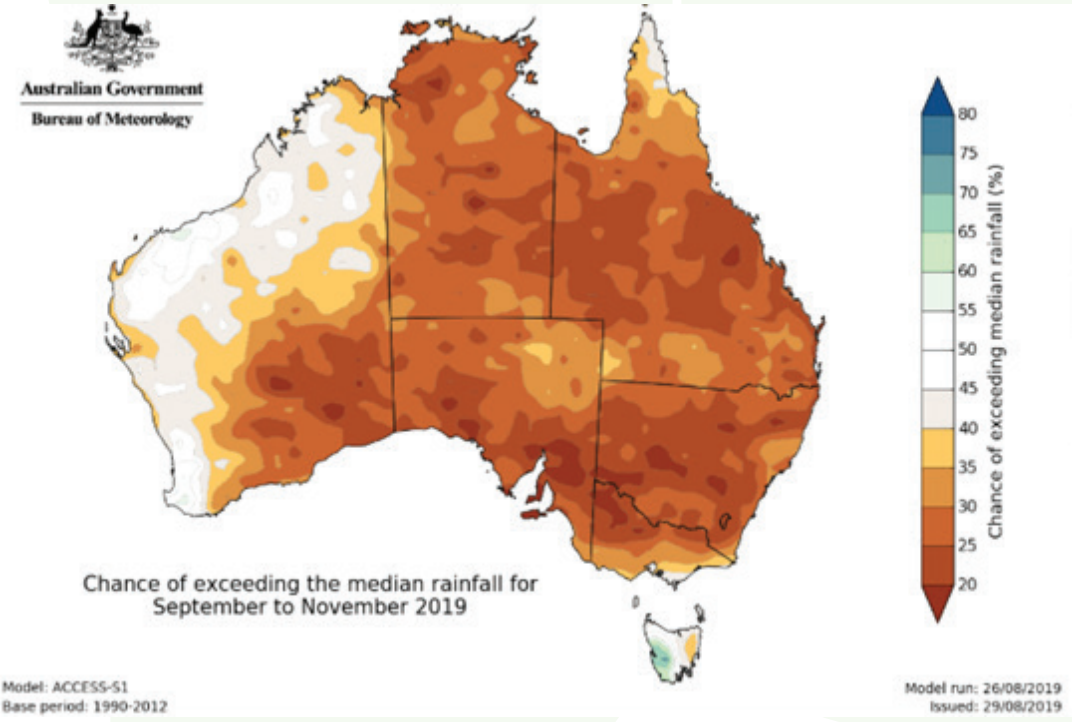
Across our soil types it will help tropical pastures turn green, but probably not likely to achieve sufficient pasture growth without adequate follow up rain and suitable minimum temperatures.

Can we expect to get adequate rain?

The bureau of meteorology on the 29th August 2019 provided the below forecast. This forecast shows there is only a 30 to 35% chance of exceeding the median rainfall, which from records is about 180mm between September and November for Casino

What does this mean for pasture recovery and making decisions about feed supply for the herd?

When the rainfall and temperature conditions overlay our pasture growth curve, their influence on pasture recovery in both quality and quantity is evident. It highlights some critical decision-making times about current and future feed supply for the herd.



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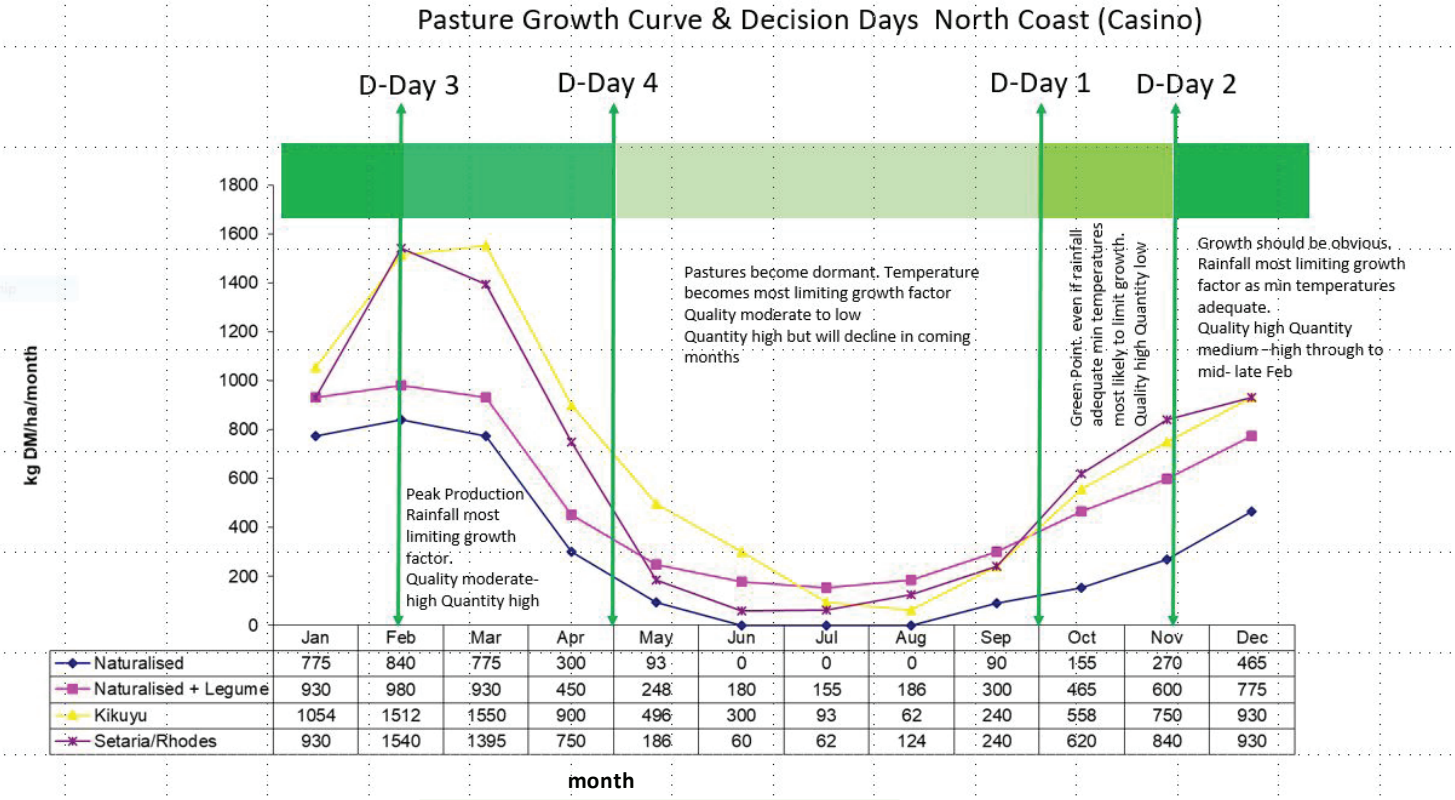

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Naturalised	775	840	775	300	93	0	0	0	90	155	270	465
Naturalised + Legume	930	980	930	450	248	180	155	186	300	465	600	775
Kikuyu	1054	1512	1550	900	496	300	93	62	240	558	750	930
Setaria/Rhodes	930	1540	1395	750	186	60	62	124	240	620	840	930

Let's keep optimistic but consider the historical data with pasture growth.

Decision Day 1 – End of September
In September to October pastures are likely to begin to turn green after rainfall, this is called the "green point". For some cold-tolerant species such as Setaria green point may be reached slightly earlier. As pastures turn green the quality is likely to be good, but quantity and ongoing growth response will be limited by minimum temperatures. In dry years with low soil moisture reserves even if some rain does fall, the combination of low soil moisture and low minimum temperatures may limit pasture growth beyond turning green. The chance of a false break (pasture turns green but fails to grown and can even die without adequate follow up rainfall) is high during this time.

If pastures are not showing signs of turning green and regaining some biomass, their yield over the growing season will be reduced, resulting in reduced feed availability. Pastures are also at their most vulnerable at this point. Letting cattle chew new green shoots hard will set back recovery and can affect yield over the growing season. Cattle "chasing the green" is often experienced during this time, and cow condition can fall rapidly as they spend hours walking paddocks trying to obtain enough quantity to meet intake requirements.

Decision Day 2 – Mid to end November
The rapid growth phase (main recovery) is likely to occur during November to January based on historical rainfall and temperature recordings. This will depend on adequate rain to initiate the green point during September and October. During this time quality is likely to be high but quantity still lower depending on when the break occurred and the rest period after grazing.

If pastures are still not showing signs of rapid growth, yield over the growing season and feed availability will be significantly reduced and much lower than the graph presents.

Decision Day 3 Mid February
The time that tropical pastures should be at highest production based on historical rainfall and temperature records as both are usually non-limiting. During this period quality can decline, but quantity should be high. If adequate rainfall has failed and pastures are struggling, or if pastures are less advanced than expected, decisions about available feed and stock numbers need to be made here. This is due to the growing window closing due to declining temperatures in the coming months.

Decision Day 4 - end of April
From now on temperature will become the main limiting pasture growth factor followed by rainfall. Quality will be declining as pastures set seed in response to decreasing temperatures and day length regardless of soil moisture. In terms of quantity what is available now is likely to be the most available feed until October or November. Decisions about stock numbers, supplementary feed supplies and winter forage planting options need to be made now to avoid a feed shortage sometime between the end of June and the next seasons break.

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How do I assess my pastures to determine what might come back?

Pinch clumps of dry grass, twist and pull –see if they pull out. If they're alive, the survival roots will keep them anchored. If they come out easily then they are dead. Pasture recovery will need to rely on the soil seed bank.

Most of our perennial species are deep-rooted and capable of survival, but root systems die due to continued hard defoliation, temperature extremes and moisture stress.

Categorise the paddocks into:

Category 1: Majority of grasses do not pull out. These pastures will be the quickest to respond as they are still alive but most likely dormant.

Category 2: Only a few plants alive. These pastures can still respond, but slower regrowth is likely, and density can be an issue. Continued hard grazing and insufficient rest period will increase pasture loss.

Category 3: Majority of the grass dead or nothing left. These paddocks are reliant on the soil seed bank. There is high weed potential, consider using them as a sacrifice paddock if entirely hand-feeding sparing other paddocks with pastures still alive. Re-growth from seed isn't likely to occur until moisture levels can support germination and continued growth. Importantly soil temperatures need to be >14°C preferably higher than 18°C for most tropical pasture species. These paddocks may need to be replanted to ensure a good sward of productive species establishes.

Measure out one square meter. Fill a bucket with 25L of water and tip it over the one square meter area twice a week and observe what plants respond or germinate. 1L of water tipped over one square meter is equivalent to 1mm of rainfall. 25L twice a week is the equivalent of 50mm rain. Remember that tropical pastures will be slow to respond if minimum temperatures are below 13°C. You can use more or less water but try not to apply an excessive amount as this will give a false indication of what will return. Too little water and it will appear that pastures won't respond.

Summary

Every beef producer's situation is different; from the land and soils they manage, available feed, recorded rainfall to date, cattle condition, financial position, attitude to risk and what drives the decision making process on-farm, e.g. fact (evidence something may or may not occur) or faith (belief that something may or may not happen).

Regardless, the riskiest approach in a dry season is failing to take the time to set decision days, not only around pasture growth and feed availability but also water, stock condition and most importantly, finances.

The decision days mentioned here relating to pasture growth can also be a good time to recheck the other critical areas of the business. After all pasture growth and feed availability ultimately impacts all the key aspects of a beef grazing business.