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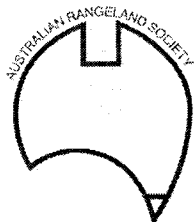
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UNDERSTANDING CLIMATE VARIABILITY IS BUT ONE ELEMENT OF 'GETTING THE STOCKING RATE RIGHT'

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ABSTRACT

The use of climate variability information is only one element among many that pastoralists use to 'get the stocking rate right'. In recent years, there has been a large increase in the amount and complexity of climate related information available to pastoralists. The challenge is to select the most appropriate climate information and integrate it into other elements of the decision making process. In the Southern Rangelands of Western Australia (WA) a simple process is being used to manage climate variability, which relies heavily on the observation and developing experience of station managers, often in a group setting. This process includes assessment of both livestock and vegetation and conducting economic analyses. It has been our experience that by integrating climate information into a full package of pastoral management, its outcomes are greatly enhanced, as opposed to it being presented and used in isolation.

KNOWING YOUR CLIMATE

The chance of receiving an average winter break in the WA Southern Rangelands is extremely low. Figure 1 illustrates that the chance of receiving an average winter break in the Meekatharra region of the Southern Rangelands is approximately 20%; not exactly the odds someone would be prepared to make a major financial decision on unless it was accompanied with other complementary information about the enterprise. In addition to the probability of the amount of rain received during this period, the spatial variation on which it falls on a single pastoral station can also vary considerably. Anecdotes of the north end of a station receiving twice to three times the rainfall what the south end receives over the years are common in the region and demonstrate the variability of the region's climate.

Climatically the region is defined as a desert and hence the concept of an 'average' year is for most practical purposes of no real value as it does not provide an accurate reflection of the major peaks and troughs of seasonal rainfall. In addition to the high variation in the annual rainfall, the degree to which it is effective, in terms of generating a vegetative 'pulse' from the pasture community is influenced by the timing and intensity at which it falls.

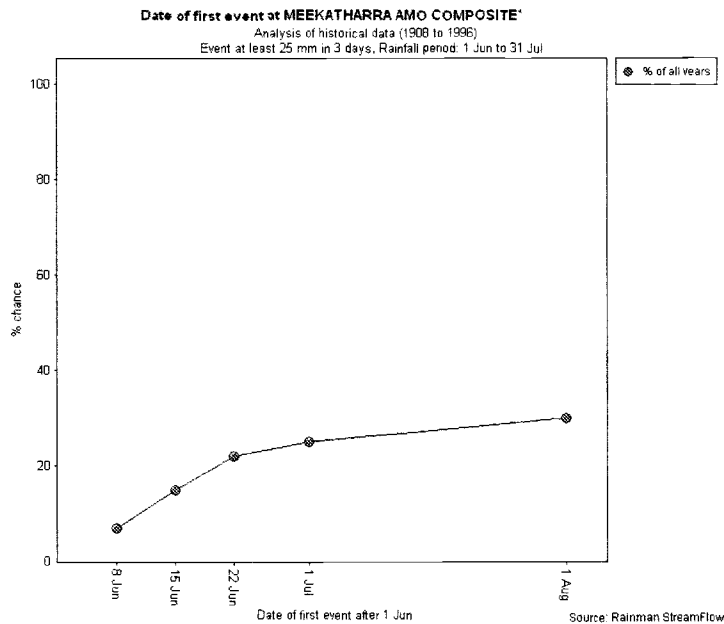


Figure 1: Chance of receiving 25 mm over 3 days in the winter growing season in Meekatharra

Figure 2 illustrates the high variability in annual rainfall between 1908-2006 in Meekatharra. The region is prone to a ‘feast and famine’ climatic pattern which involves extended periods of above average or below average annual rainfall. Though this climatic pattern is recognised, our understanding of the climate systems which drive this pattern remains limited. Hence the capacity of forecasting models to predict future events is restricted. The consequences of limited forecasting capability with poor lead times for pastoral production systems means that other information is necessary in order to accurately match stocking rate to carrying capacity, based on seasonal variation. Stocking rate is defined as the total feed demand required by livestock per unit area. Carrying capacity is defined as the total feed available per unit area able to be consumed at one point in time, without having an adverse impact on rangeland condition.

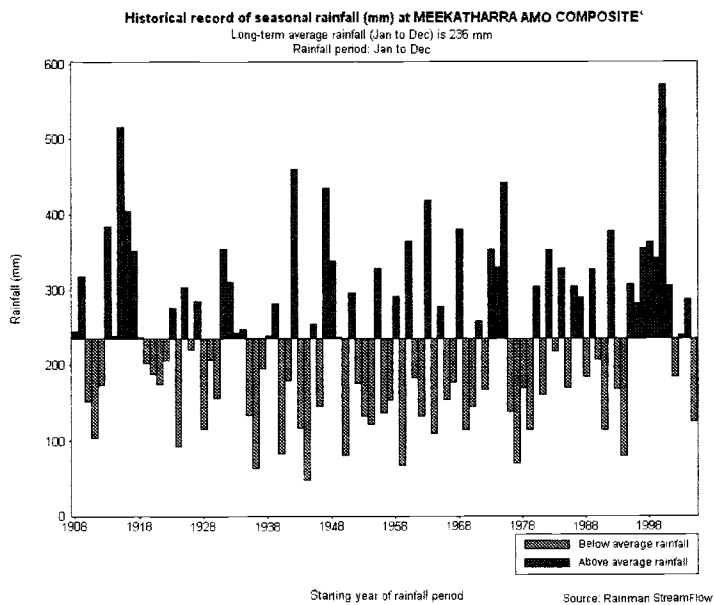


Figure 2: Annual rainfall variation in Meekatharra between 1908-2005

The key messages that we have delivered to pastoralists in terms of understanding climatic variation in the region have involved: defining their growing season, demonstrating the marginal probabilities of receiving an average or above average growing season, highlighting the inevitability of major drought episodes, the importance of aligning their production system with seasonal variability and using actual calendar dates as decision points at which they will take appropriate action concerning their stocking rates (i.e. critical and key dates).

MANAGING YOUR CLIMATE VARIABILITY

Increasing economic pressures and a reduction in carrying capacity due to ambitious stocking rates in the past has caused many producers in the WA Southern Rangelands to place greater scrutiny on the way in which they match stocking rate to carrying capacity. This approach has two primary objectives: 1) improve productivity by capitalising on good runs of seasons; and 2) improve efficiency and decrease losses by responding decisively to poor seasons. These objectives in conjunction with market forces like low wool prices have caused some producers to move away from self-replacing, Merino wool enterprises to those which are compatible with extensive restocking and de-stocking. Regardless of the enterprise, in order to ensure that the stocking rate is matched to carrying capacity pastoralists must have ready access to good climate information in conjunction with other critical production and pasture information.

As a part of the Gascoyne Murchison Strategy, a major exploratory study was conducted in order to determine whether there were any reliable indicators which could be used for seasonal forecasting with useful lead times (Stone *et al.* 2005). The study essentially found that there were currently no reliable indicators. Hence, compared to the amount of work and funding that is involved in seasonal forecasting for rangeland regions in other states, WA would appear to be the ‘poor cousin’. However, it has been our experience that this ‘impoverishment’ of reliable forecasting models may not necessarily be a disadvantage in relation to the way producers in the region respond to climatic information. It is our observation that the lack of reliable forecasting actually empowers producers because they are unable to rely on a forecaster and are more inclined to make their own climatic risk assessments based on historical records. This also fosters greater accountability because pastoralists are not able to blame the forecaster for “getting it wrong” and the responsibility of managing climate variability rests more with them.

Although the seasonal variation in the Southern Rangelands can be extreme, apart from areas which have been completely denuded and are now essentially annual pastures, well-managed pastoral stations are buffered through the existence of palatable perennial shrubs and grasses. This ‘perennial haystack’ allows pastoral production systems to maintain reasonable levels of livestock productivity and if managed well reduces the need to conduct a rapid de-stock or restock strictly based on the immediate season.

Key and critical dates are used by producers to manage climate variability in the Southern Rangelands. A key date is defined as the date from which the predominant growing season commences. A critical date is defined as the date from which you do not expect to receive any more effective rainfall. These dates have been useful in managing climate variability because it provides structure to the decision process and introduces an element of accountability to the manager if they have not begun to enact a decision by the specific calendar date. Figure 3 provides an example of key and critical dates for a station in the Murchison, WA. These dates

are used as a basis from which a producer makes the judgement that the existing feed in the paddock is all that is going to be available until the start of next year's growing season. A suitable stocking rate is calculated based on the available feed and any adjustments are made to present numbers at shearing/mustering time.

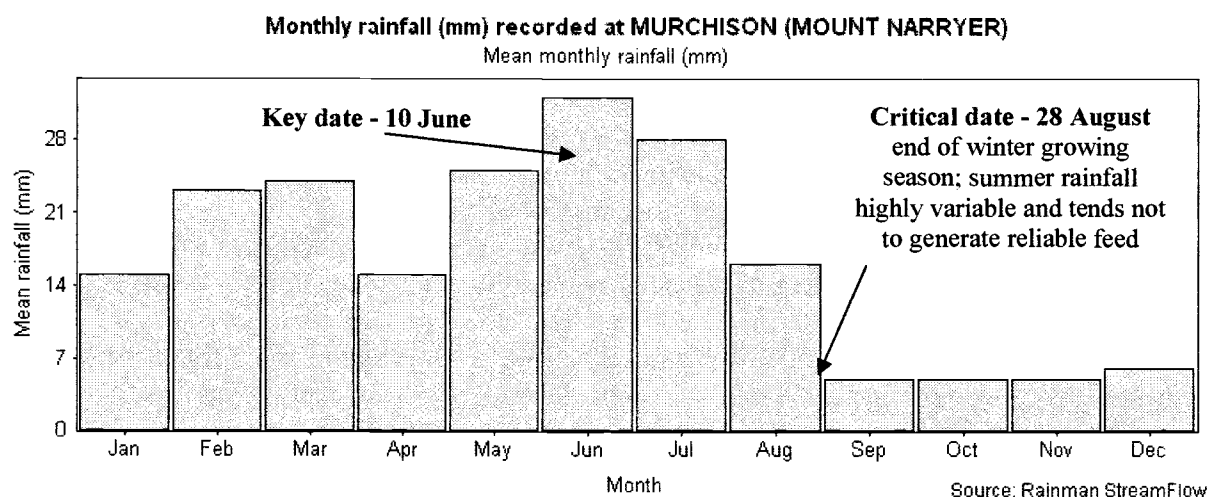


Figure 3: Key and critical dates of Mount Narryer Station, Murchison WA

Aside from having a realistic expectation of seasonal rainfall and understanding the highly variable nature of the climate, a critical aspect of 'getting the stocking rate right' is establishing a process which provides feedback on the system as a whole. This process should include assessment of both livestock and vegetation as well as economic analyses on various stocking rate options. The process currently being used by a growing number of producers in the region includes regular body condition scoring and/or weighing, assessments of feed-on-offer and completing gross margin analysis (the process is fully explained in Alchin and Sheehan 2006, in this proceedings).

CONCLUSION

One of the main outcomes we have observed in those pastoralists who have participated in the approach to integrating an understanding of climate variability with their production system has been a reduced tendency to procrastinate and delay decisions based on the infamous 'hope for rain' attitude. Pastoralists have found that by observing long term seasonal trends, possessing a realistic perception of the probability of a growing season, knowing the calendar dates when a decision has to be made and integrating this information with other economic, livestock and pasture information they are better equipped to match stocking rate to carrying capacity based on seasonal variation.

ACKNOWLEDGEMENTS

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