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# PROCESSES FOR USING CLIMATE-RISK-MANAGEMENT INFORMATION IN RANGELAND ENTERPRISES

*Colin J. Paull*

QCCA, Department of Primary Industries and Fisheries, 80 Meiers Road, Indooroopilly Qld 4068

## INTRODUCTION

Graziers in Queensland (Qld) currently have a range of decision-support information available to them on current and forecasted seasonal conditions. This includes spatial mapping information down to locality scale (e.g. Aussie GRASS products), and outputs from a range of tools (e.g. DroughtPlan, Rainman and StreamFlow) at property, paddock or point level. Such information can be valuable in making profitable business decisions. Recent surveys in the rangelands of Qld were concerned with users of SOI Hotlines (Paull and Peacock 2003), benchmarking under the national Aussie GRASS Project, evaluating monthly reports on seasonal conditions, and seasonal-climate-forecast (SCF) knowledge and use in western Qld (Park *et al.* 2004). These provided feedback on the SCF information needs of managers, the usefulness of current products, types of decisions in which they were used, preferred presentation formats and delivery methods. This paper reports on findings from a survey conducted in June 2003 – February 2004, pertaining to decision-making processes, including tools and processes used, example management decisions, benefits, and problems encountered. Such a study is a necessary step towards the widespread use of SCFs in integrated business-risk management within rangeland industries.

## AIMS AND METHODS

The aims were: to better understand how climate-forecast information was being used by graziers; to assess the value/benefits of using SCF information; to identify problems in using the information; and to identify new areas for developing climate applications. These were achieved by: reviewing feedback from recent surveys; developing a questionnaire, and mailing 133 copies in order to document a range of 'mini' case studies from a purposive sample; assessing the value of SCF information in decision-making; and conducting six more-detailed case studies of selected producers in Central Qld.

## RESULTS

Participants returned 36 completed questionnaires (27% return) from Southern Qld (n=13), Central Qld (14), Northern Qld (3), Western Qld (3), NSW (1), and address not given (2). Findings included:

- 67% of respondents said SCFs were not accurate enough. They (n=19) wanted the 'forecasted' climate scenario to occur 50-100% of the time (median 80%, and mean 83%). Several respondents mentioned conflicting forecasts from different sources.
- Respondents were more responsive to a decrease in the probabilities of an important annual climatic event than an increase. They would change normal management decisions when the probabilities were 50% above (n=19), or 40% below (n=13), the all-years probabilities. Some respondents indicated that they were more cautious/sensitive when drought was forecasted (and would tolerate poorer forecast accuracy), compared with a forecast of above-average conditions.
- 11% of respondents had no problems in using SCF information; 28% said the information was difficult to interpret/use; 14% said information was not detailed enough; 11% said the information was not available when needed; and 11% did not use SCF information.
- In the example decisions that were documented, there was a high correlation between the perceived accuracy of the SCF and the degree of influence of the SCF on the decision. 67% (n=10) said their perception of forecast accuracy was 'fairly accurate' or 'very accurate', while 53% (n=8) said the SCF was 'fairly influential' or 'very influential' on their decision.

- While 33% of respondents said SCF information had been 'quite valuable' to 'very valuable' to them, 67% said it had been of 'little value' or 'some value'.
- The median profit from example decisions (n=5) was \$25,000 – the range was \$5000 to \$600,000.

## DISCUSSION AND CONCLUSIONS

Requirements for facilitating use of SCF products in business-risk management are: a SCF system of worthwhile accuracy; timely provision of the customised information needed by clients; up-to-date relevant technical information including threshold values; and client's ability to access and understand the information, and willingness to use it. The feedback highlighted the following issues:

**Forecast Accuracy.** Perceived inaccuracies of forecasts, confounded by climate-change trends, were undermining confidence in using SCF information. Many respondents expected extremely high accuracy in a SCF system, possibly because of a lack of understanding of probabilities. A few indicated reluctance to use probabilities in decision-making. Comments made were: use the most accurate, reputable forecast supplemented by other relevant information; recognise the trade-off between lead-time and accuracy.

**Communication.** There was often a communication gap between producers of SCFs and graziers; issuing SCFs involves 'duty of care'. Comments included: avoid contradictory signals; use simple unambiguous language in interpretive comments; tailor forecast outputs to the decision-making process; include threshold values; only quote forecasts that have skill; quote rules-of-thumb where precision is difficult.

**Interpreting Forecasts.** Many graziers made decisions using 'headline' forecasts, often with inadequate understanding of how the forecast system worked and how to interpret the outputs. Sometimes SCF information was used in major business decisions.

**Benefits.** Client perceptions of the benefits of using SCFs are important. Quantitatively estimating the profit from using a SCF was difficult (Paull 2002). Financial outcomes from example decisions in this and previous studies varied between worthwhile profit and significant loss (climate-risk management often had a short-term cost). Some graziers recognised non-economic benefits.

**Increasing Adoption.** Graziers require customised SCF information, often with a longer lead-time. Sharing information helps to market climate-related products; this can be achieved by marketing products to agribusiness and extension specialists. The knowledge and skills of graziers (in climate-risk management), and SCF products/services, can be improved by responding to client feedback.

**Managerial Behaviour.** Management decisions have sometimes been counterproductive to increasing adoption of climate-risk-management practices – usually in response to political priorities, competitive pressures or shortage of resources (e.g., maintaining an outdated forecast system, exaggerating benefits; and allocating inadequate resources to communication and providing training).

Possible future activities to address the above issues are: develop more accurate SCF systems with longer lead-times; develop and customise specific regional products, in collaboration with leading graziers; make products readily available in an easily-understood format; and provide further training in understanding probabilities, and strategic use of information/integrated use of tools.

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