

Climate change risk management matrix approach

Introduction

Risk is defined in the context of the presentation by David Cobon as the product of the likelihood of something occurring (from rare to almost certain) and the consequence (from minor to catastrophic) if that event does occur. Vulnerability is defined in the context of the presentation by David Cobon as the product of the potential impact from (ranging from low to extreme) and adaptive capacity to (ranging from low to high) climate variability. Management of the risks associated with climate change is necessary to identify vulnerabilities and act accordingly. This may require adaptation and mitigation strategies to minimise the impact should those risks eventuate.

Risk Management Approach

Despite the lack of accurate future climate details and understanding of some biological processes, adaptation needs to occur now because past emissions of greenhouse gases have already committed Australia to further warming (Solomon et al. 2007), and these emissions are continuing to increase (Raupach et al. 2007). Risk assessment allows informed decisions to be made even where knowledge is limited (Cobon et al., 2009).

Completing a risk assessment via an established matrix can help identify the climate change impacts of most importance (impact risk) and the areas of greatest vulnerability (e.g. high potential impact with a low capacity to adapt). Risk is the product of consequence and likelihood (Jones 2001).

In formulating this assessment for the grazing industry, the risk assessment undertaken produced a risk matrix by the following steps:

Step 1 - Establishing the risk assessment boundaries - the specific area to be researched and the risk level of key variables affecting climate change. For instance, elevated CO₂ where there is very high confidence of this occurring.

Step 2 - The impact and adaptation matrices give modest increases in a pasture but a minor decrease in wool per head owing to decreased pasture nutrition.

Step 3 - Risk assessment of the impact - using a table to designate possible consequences of occurrence from either low to catastrophic and then choosing the priority of action.

Step 4 - Risk assessment of the potential impact and adaptive response (vulnerability) to consider the ability to counter impacts.

Step 5 - Writing the risk statement to provide “the descriptive information required for a reasoned and defensible assessment of the nature and level of risk, the need for and timing of the response and the nature of useful adaptation responses”(Cobon et al., 2009).

Clear use of matrices to provide information regarding risks and vulnerabilities can then be used to estimate responses to the needs of the transformational change via improved management to address such issues as pests and diseases, impact on biodiversity, soil cover, evaluation and monitoring for feedback and further change.

Benefits and limitations

To populate an entire matrix requires sound industry knowledge in a particular region. The size of any matrix could be a benefit by including as many affecting factors as is necessary for a sound judgment. However, this could result in “task overloading”, limiting the ability of stakeholders to address all issues.

Nevertheless, a well-constructed matrix or matrices makes for a better visual understanding of climate change complexities and how they may affect the industry.

Conclusion

To cite Cobon et al (2009) in their use of matrices for the grazing industry:

The description of methodology and content of the climate change risk management matrices have provided the foundation (process and technical knowledge) to build upon and complete risk assessments for regional areas. The process was simple and allowed for a systematic analysis of a large and complex issue that can be a daunting subject for land managers. The matrices identified the

impacts, adaptive responses, and risks associated with exposure, sensitivity and adaptive capacity. Building the capacity of regional stakeholders to use this tool will provide the means for participation development of adaptive responses and actions by land managers.

References

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