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Measuring adaptive decision making in livestock grazing systems

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Abstract

Adaptive management is essential for managing complex grazing systems under environmental uncertainty. However, its implementation in grazing operations is inconsistently defined and measured. This study addresses this limitation by developing and validating the Adaptive Management Index (AMI), a standardised instrument that quantifies adaptive management at the ranch level. The AMI incorporates 64 indicators



identified through literature and validated through expert input to measure four key phases of adaptive management – planning, monitoring, evaluation and adjustment. A mail survey of 2 100 livestock producers in the Southern Great Plains of Texas yielded 255 useable responses. Principle component analysis and multivariate regression were used to create and validate the AMI. Findings reveal that while planning, monitoring and adjustment are moderately practised among respondents, the evaluation phase is underutilised. AMI scores were significantly associated with producers' mental models of grazing system dynamics, indicating a link between adaptive management implementation and perceptions of system interconnectivity. The AMI enables a more precise understanding of management complexity and provides a tool for assessing adaptive grazing strategies independent of grazing method. This study advances the conceptualisation and operationalisation of adaptive management in grazing systems and offers a foundational resource for researchers and producers to support learning-driven decision making that builds social-ecological resilience.

Keywords:

[adaptive management](#) [grazing management](#) [learning](#) [mental models](#) [rotational grazing](#)

Online supplementary data

for this article are available at <https://doi.org/10.2989/10220119.2025.2587734>

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