

Farmers use intuition to reinvent analytic decision support for managing seasonal climatic variability

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Abstract

The FARMSCAPE Information System emerged in a long-running research program aimed at making simulation models useful to Australian farmers in managing climatic variability. This paper is about how well it has worked. This is reported in relation to two standards: (1) the value to thinking and action expressed by farmers and their consultants, (2) correspondence with theory about learning and judgement in uncertain external environments. The former utilises recorded narrative interviews with participants over many years. The latter uses a cognitive framework drawn from theory of judgment and decision making featuring the relationship between intuition and analysis (McCown, 2011). The cognitive theory framework makes sense of several evaluation surprises. The first was high enthusiasm by largely-intuitive farmers for an analytic approach to soil water in conjunction with a newly appreciated “bucket” metaphor for water balance. The second surprise was the virtual absence of soil water measurement 10 years later. This had been replaced by various intuitive estimates, calibrated to maintain a heuristic relationship with regard to the “bucket” as a resource. Farmers and their advisers were facilitated in using simulation for thought experiments and planning under climatic uncertainty. Benchmarking enabled problem solving in documented conditions. Scenario analysis using historical climate records supported thought experiments by providing probability distributions that were valued for shaping expectations as a “history of the future”. In retrospective evaluation interviews, researchers were surprised to find that yield forecasting and tactical decision making, anticipated to be analyses that were both site- and season-specific forecasts, had served farmers as “management gaming” simulations to aid formulating action rules for such conditions, thus reducing the need for an on-going decision-aiding service. Equipped with their soil monitoring techniques and with their heuristic rules, farmers still reserved a place for simulation “when you’ve got a planting situation out of the ordinary.”