Adaptation responses to increasing drought frequency

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Using state contingent analysis we discuss how and why irrigators adapt to alternative water supply signals. This analysis approach helps to illustrate how and why producers currently use state-general and state-allocable inputs to adapt and respond to known and possible future climatic alternative natures. Focusing on the timing of water allocations, we explore inherent differences in the demand for water by two key irrigation sectors: annual and perennial producers which in Australia have allowed a significant degree of risk-minimisation during droughts. In the absence of land constraints, producers also had a capacity to respond to positive state outcomes and achieve super-normal profits. In the future, however, the probability of positive state outcomes is uncertain; production systems may need to adapt to minimise losses and/or achieve positive returns under altered water supply conditions that may arise as a consequence of more frequent drought states. As such, producers must assess whether altering current input/output choice sets in response to possible future climate states will enhance their long-run competitive advantage for both expected new normal and extreme water supply outcomes. Further, policy supporting agricultural sector climate change resilience must avoid poorly-designed strategies that increase producer vulnerability in the face of drought.
Our analysis explores the reliability of alternative water property right bundles and how reduced allocations across time influence alternative responses by producers. We then extend our analysis to explore how management strategies could adapt to two possible future drier state types: i) where an average reduction in water supply is experienced; and ii) where the frequency of droughts increase (Figure 1). The combination of these findings are subsequently used to discuss the role water reform policy has to deal with current and future climate scenarios. We argue current policy strategies could drive producers to more homogeneous production systems over time, which ultimately entail risky adaptation options under future water supply availability or increased drought frequency scenarios. Lastly, our analysis has shown the flexibility of applying SCA toward examining uncertainty surrounding future states of nature under climate change.

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