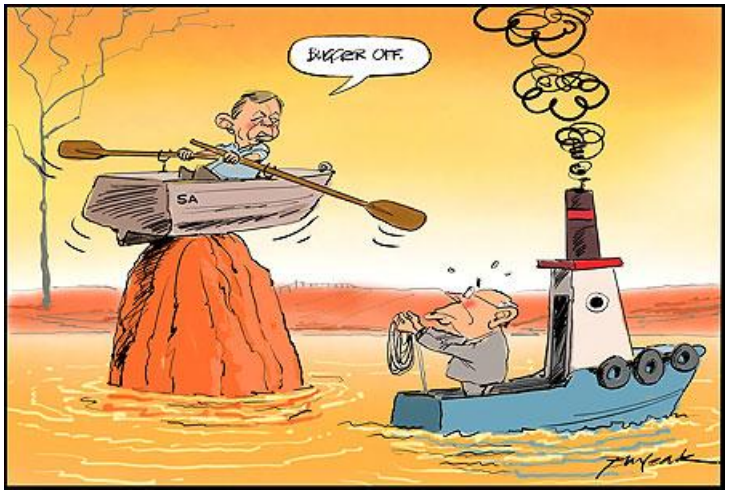
UniSA | Centre for Regulation and Market Analysis

MDB irrigator preferences for water allocation adaptation programs

Adam Loch

Certainly, not much has changed for SA in 100 years?



Well …

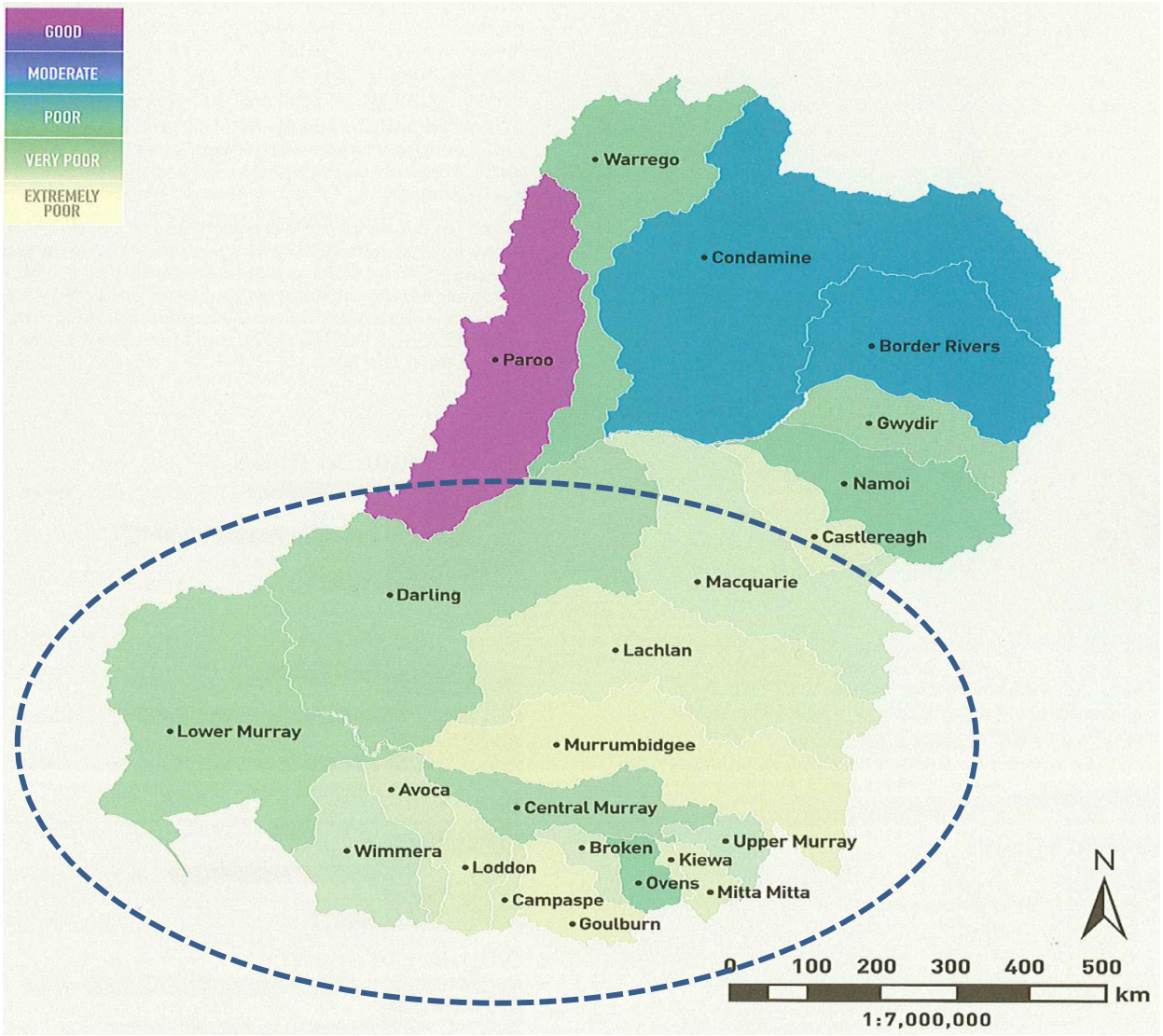
Except that cartoons are now in colour!

Uncertainty is …

- Different to risk – risk has calculable probabilities
- Future events for which the probability of occurrence is unknown and/or difficult to calculate (Knight, 1921)
  - Climate change is relatively uncertain
  - Political outcomes are relatively uncertain
  - The future is relatively uncertain
- So, … how do we adapt to that:
  - Successfully?
  - Appropriately?
  - Profitably?
  - Etc.

Ecosystem Health Assessments 2004-07

Poor to extremely poor ecosystem health in sMDB



Notes: Data Source: Expert opinion, and BRS Landuse map

Data Currency: 1999

The Tasmanian boundaries indicate IBRA5 Regions.

C6 - Degree of Changed Hydrological Conditions

Landscape Health Project

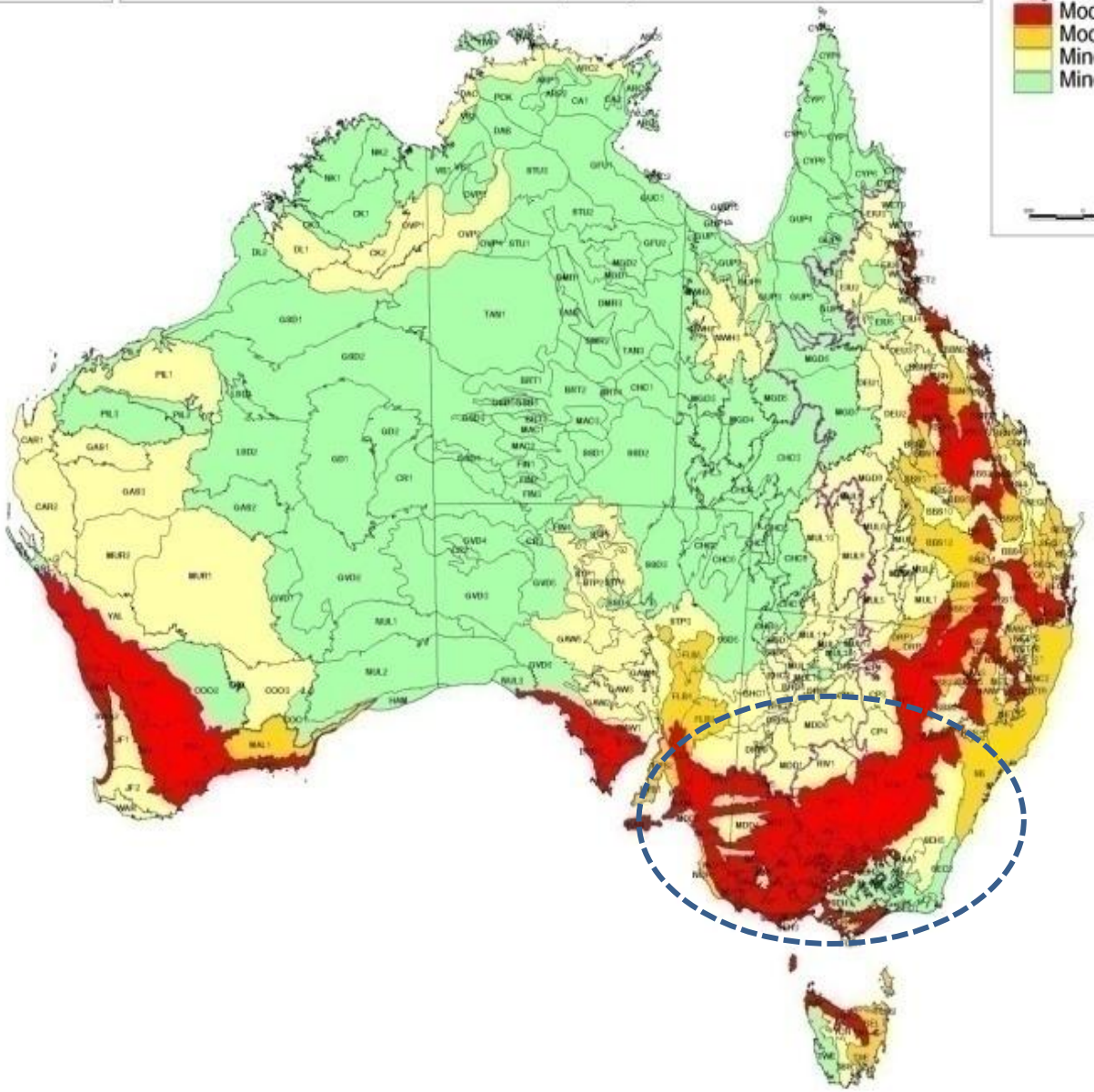
Indicative Map Only

Legend

IUZ-EUZ

Degree of Changed Hydrological Condition

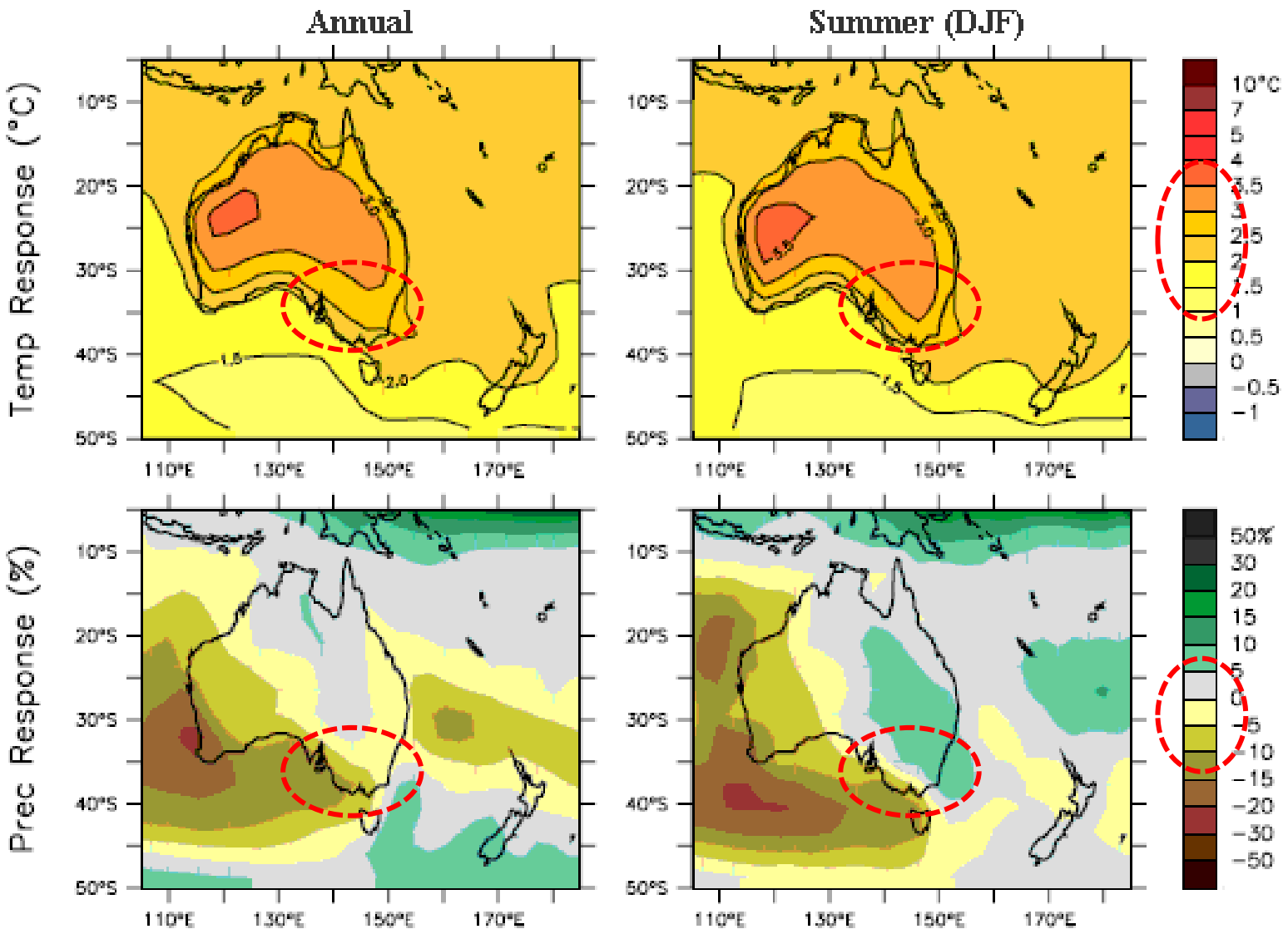
- Moderate to Major Change
- Moderate Change
- Minor to Moderate Change
- Minor Change



Moderate to major hydrological changes expected in sMDB

Environment Australia

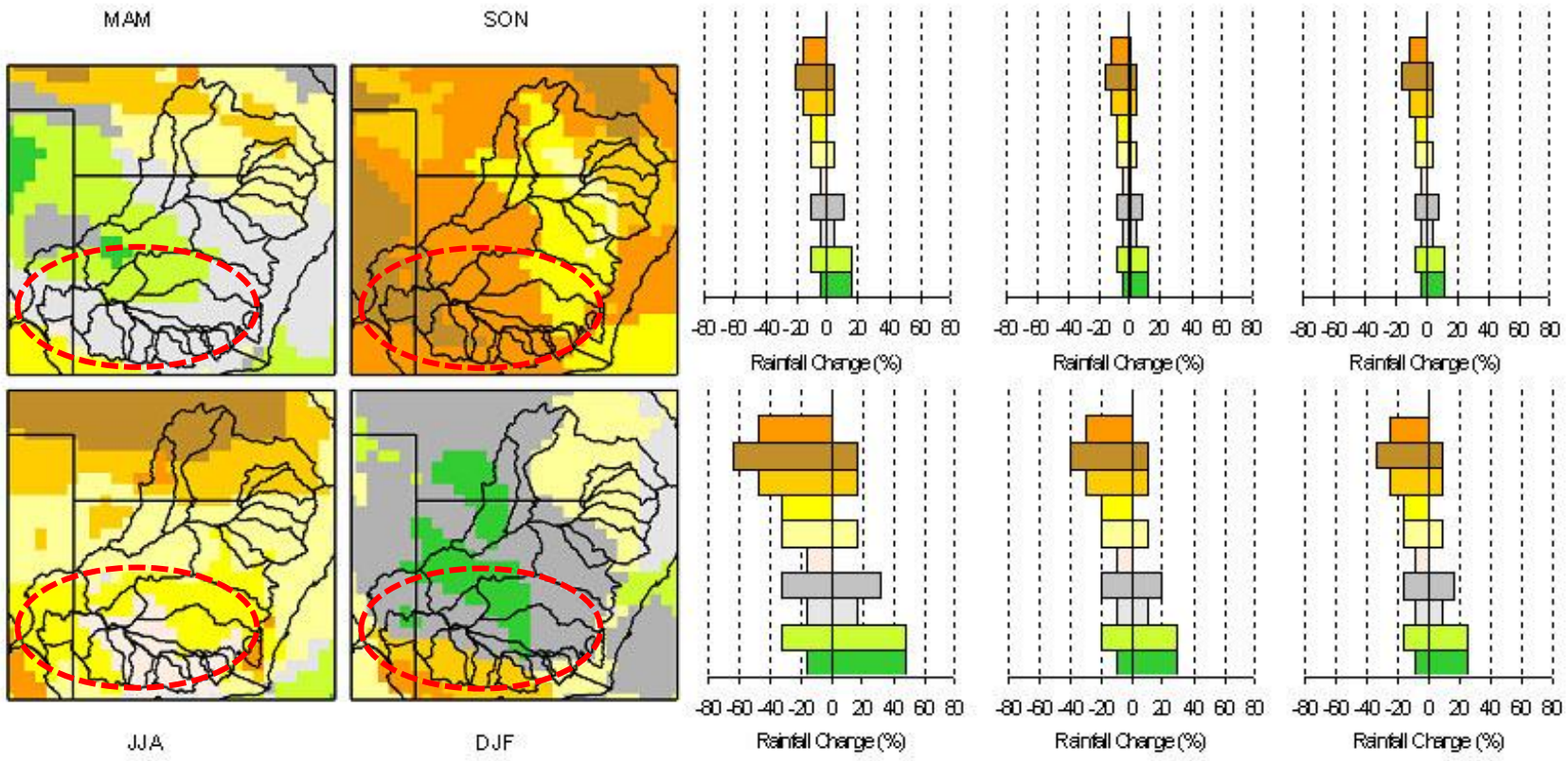
Forecast change in Temperature and Precipitation by 2099



Higher temperature

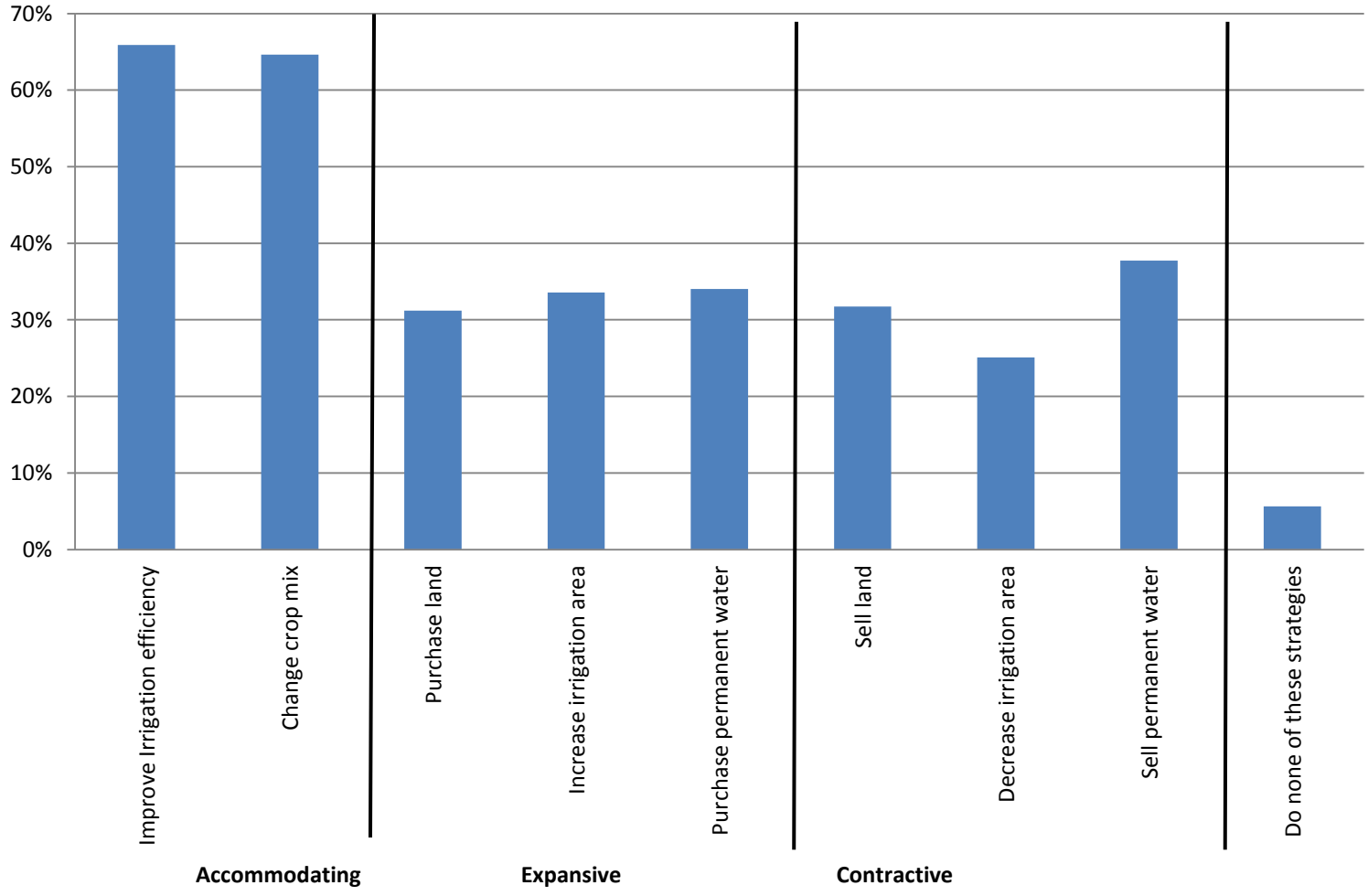
Less rainfall

Projected percentage changes point potential evaporation for the Murray Darling Basin by 2030 and 2070.



Monthly and regional uncertainty, even as we start to reduce scale

Adaptation Strategies



Wheeler *et al.* (2012)

Achievements of environmental reforms

- Increased awareness of environmental water
- Improved water plans to promote environmental water management
- A view expressed on how much is needed for sustainability (versus how much can be spared)
- Conditions on licences (particularly in absence of extensive water plans, i.e. TAS, NT, WA)
- Institutional arrangements in place for
  - Purchase of entitlements for environmental purposes
  - Environmental water managers established
  - Focus on efficiency improvement for further water

Budget amount

2009-2019 water recovery policy summary—*NPWS* and *WFF*

Policy	Water entitlement purchases	Urban water or desalination	Improved water information	Exit packages	Town and city water security	Grey and rainwater initiative	Infrastructure efficiency investment
NPWS	$3.0 B	$600 M	$480 M				$3.13 B off-farm $1.635 B on-farm $620 M metering $500 M operations
						Total:	$10.05 billion
WFF	$3.1 B (33%)	$1.5 B	$450 M	$57.1 M	$250 M	$250 M (61%)	$5.8 B across areas similar to those stated above
						Total:	$11.92 billion

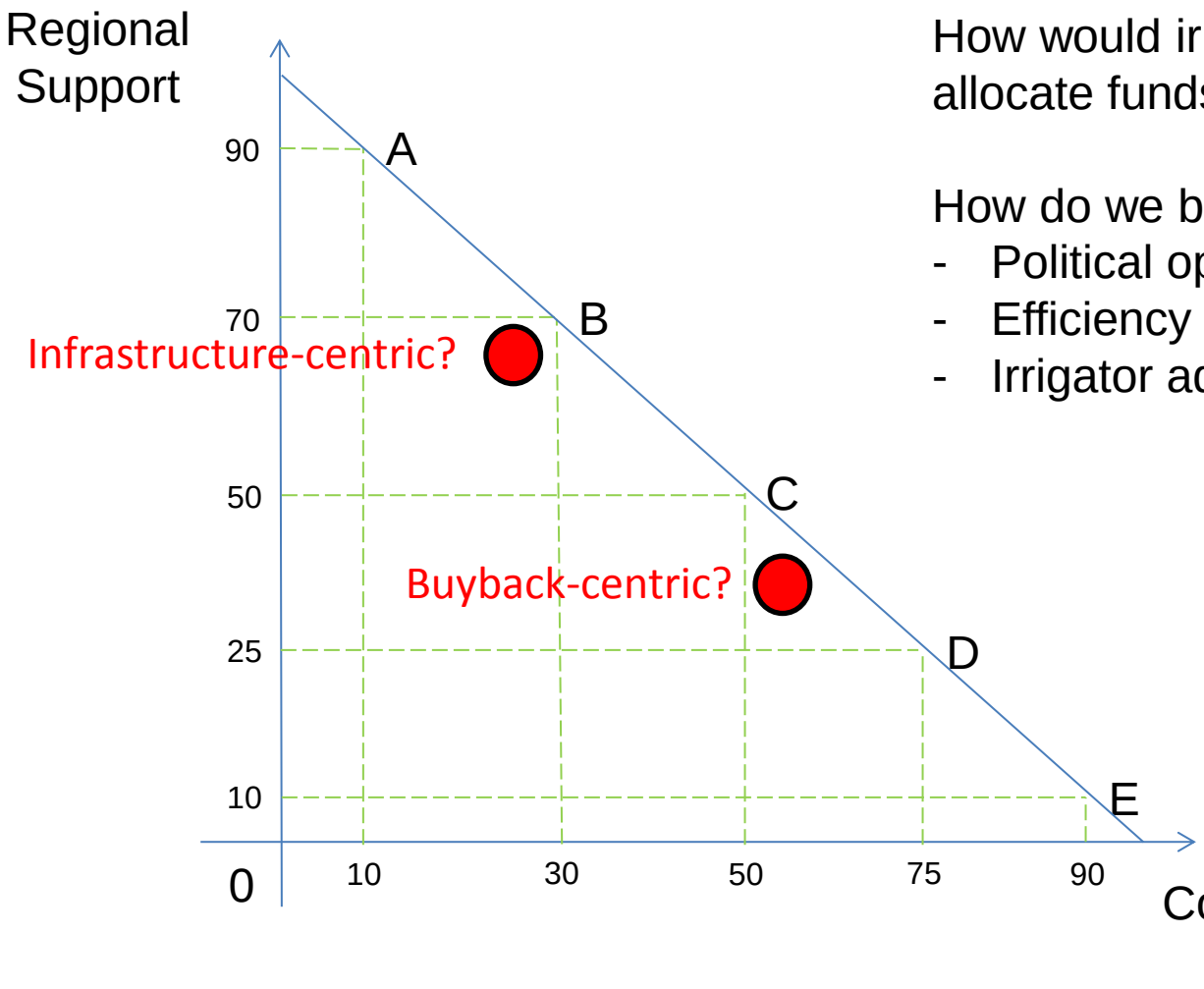
$9.5 Billion

Sources: Howard (2007), Wong (2008), DEWHA (2009), Crase & O'Keefe (2009)

What do irrigators think?

- Focus on:
  - Strategic buyback
  - Infrastructure investment
  - 650GL environmental works and measure savings
  - Irrigator groups seem happy
  - Conservation groups so-so
  - Actual irrigators … ?

How do we view the issue?



What is the efficient mix?

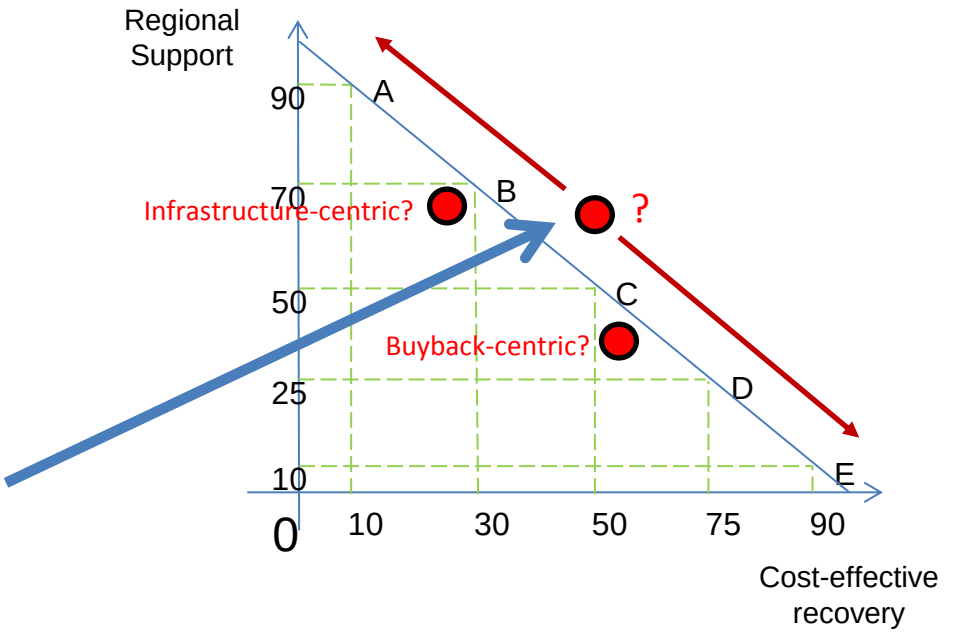
How would irrigators allocate funds?

How do we balance:

- Political optimality
- Efficiency of recovery
- Irrigator adoption/engagement

Irrigator preferences - motive

- Little general preference knowledge
  - Sectoral interests may claim otherwise
- Less specific preference driver understanding
  - Historical land/water assignments
  - Climate change perceptions
  - Future supply risk
- What do irrigators want?
  - Buyback
  - Infrastructure
  - Exit packages
- How does this contrast with current priorities?



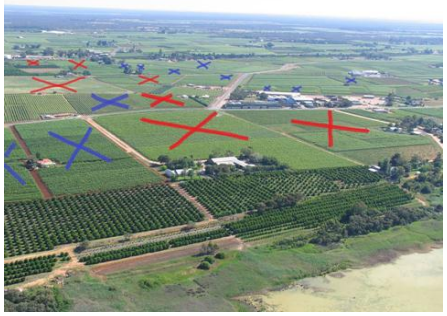
Data and model

- Sample of 946 sMDB irrigators
  - Telephone survey in 2010/11
- Sub-sample of same group
  - Mail-out survey in 2011/12 (N=535 – 66%)

- Queried about:
  - Current scope and magnitude of recovery budget
  - Views on appropriateness of current programs
  - How they would apportion budget?

Program alternatives

- Looked at six options:
  - Permanent water entitlement purchasing
  - Temporary water allocation trade
  - On-farm infrastructure investment
  - Off-farm infrastructure investment
  - Standard exit packages
  - Exit packages with revegetation payments



Irrigators asked to assign preferences out of 100% - which had to sum exactly to 100% across the six alternatives: $E[y_{im}|\boldsymbol{x_i}] \in (0,1)$ and $\sum_{m=1}^{M} E[y_{im}|\boldsymbol{x_i}] \equiv 1$ for all *i*

"How do you think the Water for the Future budget for obtaining environmental flows should be spent? Please indicate the percentage of funds that you believe should be directed towards each option for recovering environmental water"

Option	% of Budget
Permanent Water Entitlements	
Temporary Water[1]: Water Allocations/Entitlement leases/option contracts	
Upgrading on-farm irrigation infrastructure	
Upgrading off-farm irrigation infrastructure	
Standard Exit Packages	
Exit Packages and revegetation payments	
TOTAL	100%

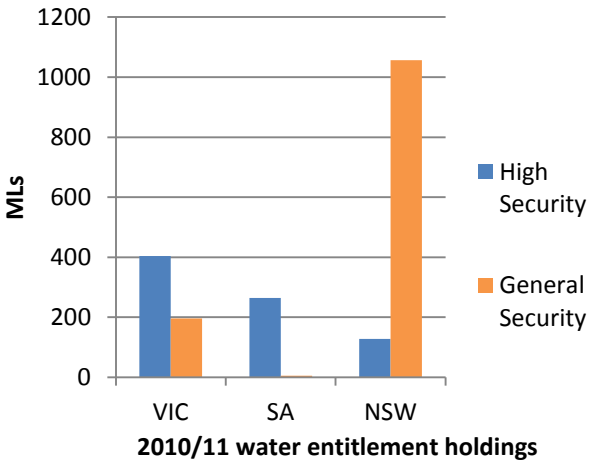
Note: Please make sure your percentages add to 100%

Note: 1. Complete descriptions of each term were provided in the survey.

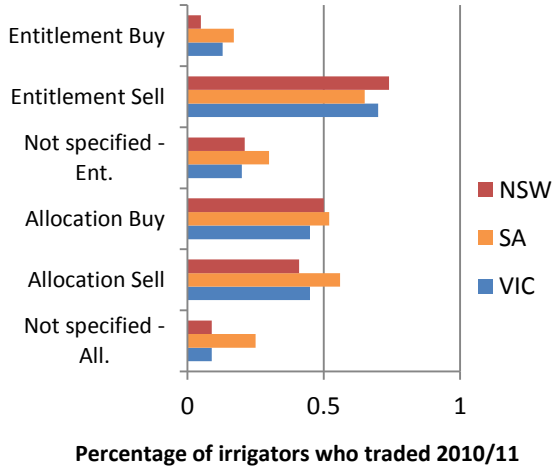
Farm characteristics – 2010/11

- NSW farms = larger size and general security
  - Also bias toward budget preference refusal
- SA farmers most likely to trade
- NSW highest water use and carryover
- NSW higher debt, land values and income

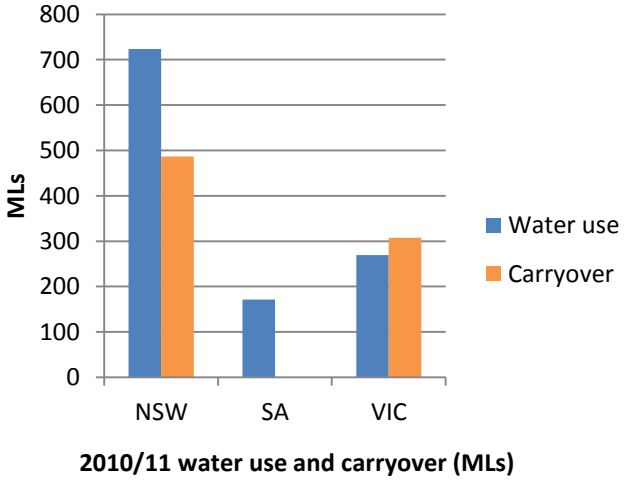
Matches to ABARES & NWC data/findings



2010/11 water entitlement holdings



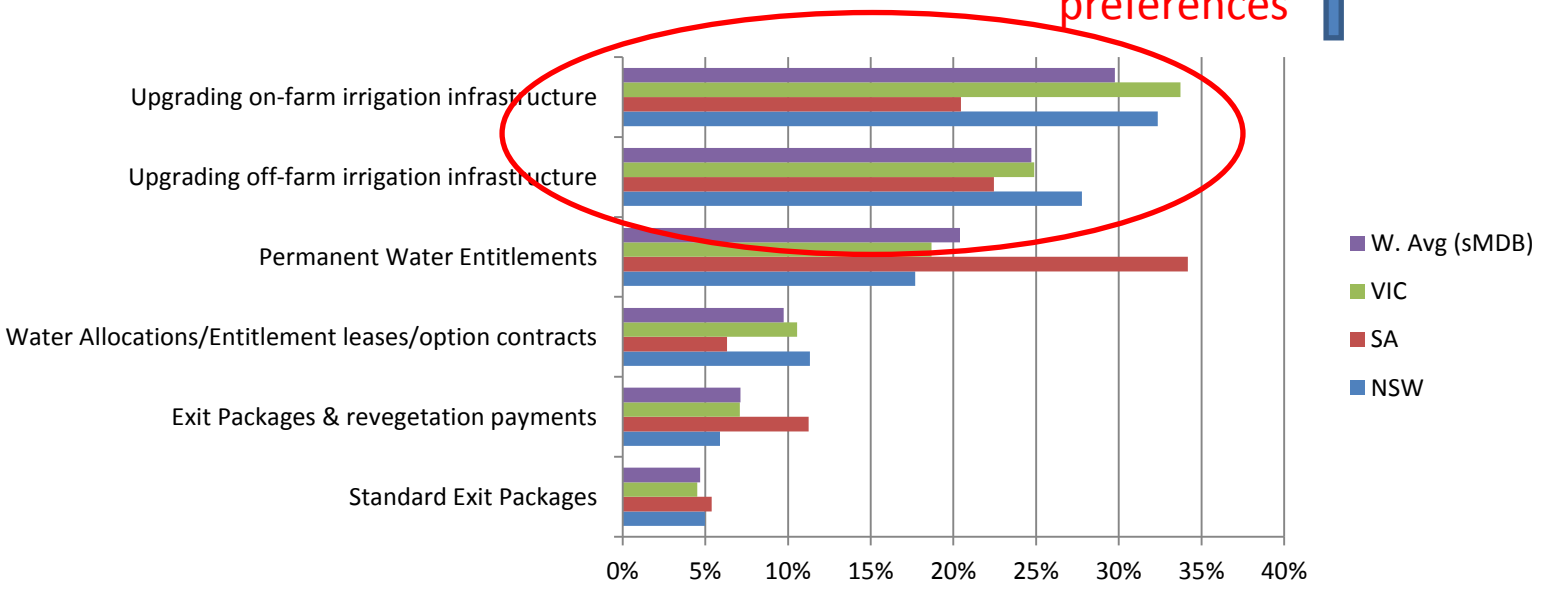
Percentage of irrigators who traded 2010/11



2010/11 water use and carryover (MLs)

Budget preferences

- Infrastructure preferences
- Targeted allocation and exit preferences



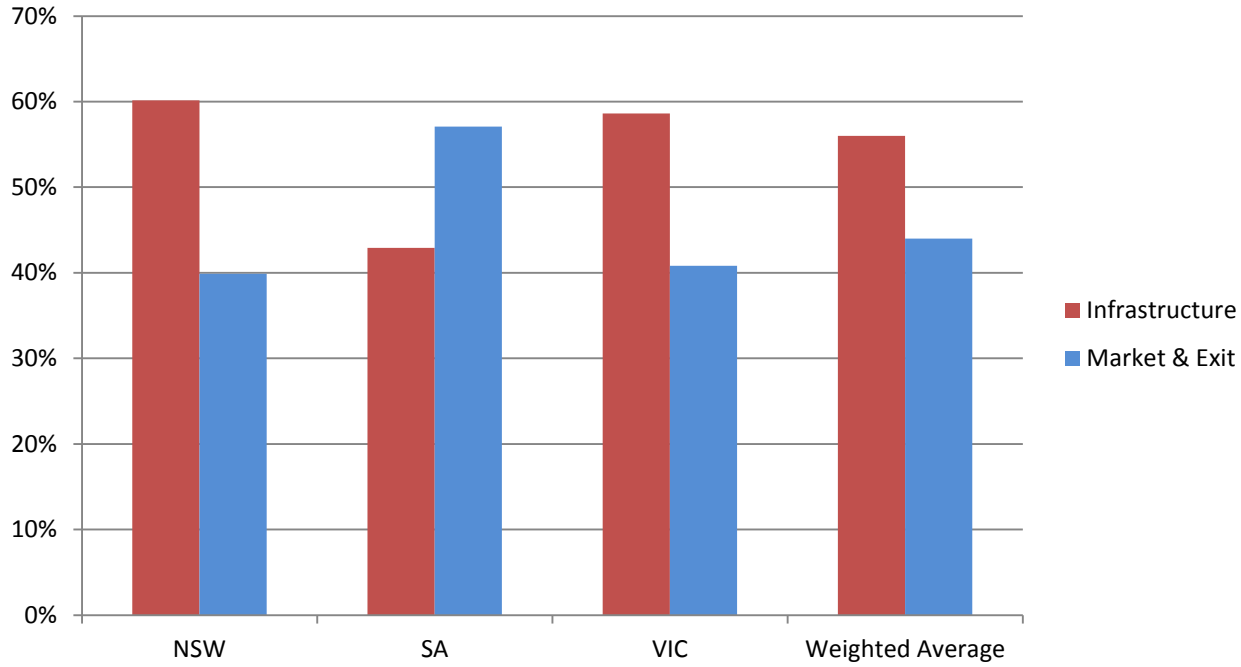
Average percent of funds that should be spent	NSW	SA	VIC	W. Average
Permanent Water Entitlement purchases	18%	34%	19%	21%
Water Allocations/Entitlement leases/option contracts	12%	6%	11%	10%
Upgrading on-farm irrigation infrastructure	32%	20%	34%	31%
Upgrading off-farm irrigation infrastructure	28%	23%	25%	26%
Standard Exit Packages	5%	5%	5%	5%
Exit Packages & revegetation payments	6%	11%	7%	7%

Note: calculation does not include 'no answer' responses

Infrastructure looks significant, but is it?

Results

- Summed infrastructure preferences:
  - On- and off-farm v. other alternatives
  - Clear state differences



Conclusions

- Budget allocation to infrastructure spending could reduce to < 60%:
  - Strong state differences, as expected
- Good support by irrigators for other budget allocations > 33%:
  - SA preferences for trade and exit packages (> where includes revegetation) = targeted
- Cost issues remain:
  - Infrastructure at $3,302/ML (mean)—26 projects
  - Buyback at $1,527/ML (mean) — 17 programs
- + socio-economic benefits in both

Thank you

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