



MANAGING CLIMATE VARIABILITY
R & D P R O G R A M



Communicating climate risk information

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An Australian Government Initiative

www.managingclimate.gov.au



MANAGING CLIMATE VARIABILITY R & D P R O G R A M



Communication

Peter Hayman + state agencies (Qld, WA, NSW, SA & Vic), CSIRO,
BoM, Consultants, MCV and Farmers



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Communication and MCV

- Communication has always been an important part of MCV – not just an afterthought.



Definition of communication

- Communication is the reciprocal construction and clarification of meaning by interacting people – a notion of trust
- Learning is remembering what interests us
Richard Saul Wurman Information Anxiety
- Major means of communication is through media – number of important studies on this – (not focus of my presentation)



Managing = Talking about the problem of climate risk rather than fixing it

- Dams – Drought proofing Australia –
Diverting the Clarence – Diverting the
weather
- The wizard vs clairvoyant
- Soil vs SOI Standing feed vs SST



A long wait for SCFs

“when more records are available, an accurate forecast can probably be made for a considerable period in advance. Needless to say, when that time arrives, it will be possible to greatly reduce, or even entirely prevent, the now constantly recurring losses in stock and crops - John Barling, after the 1902 El Nino (Agricultural Gazette)

- Barling’s family history burnt in 2002 Canberra fire



Not an easy topic to communicate

- Skilful but uncertain forecasts
- Most agricultural advisers learn stats and then forget them – 95% confidence interval on other decisions such as herbicides



If_Then_Else

- ***IF*** the season is going to be dry - ***THEN*** plant wheat & chickpeas ***ELSE*** - canola
- If the end point is better risk management, misunderstanding forecasts as categorical will result in poorer risk management than if people never heard of the forecast



Why we need probabilities

- 1. It is honest to be clear about the uncertainties.
- Laplace *“Probability refers in part to our knowledge and in part to our ignorance”*
- 2. Probabilities encourage risk management
- The belief in, and acceptance of, a range of alternative outcomes.



Communicating probability is hard

- *“Farmers have said they want to know whether it is likely to be dry, wet or average, not whether there is a 60% chance of getting 40% of the average rainfall”*
- *Mumbling so that can never be wrong*





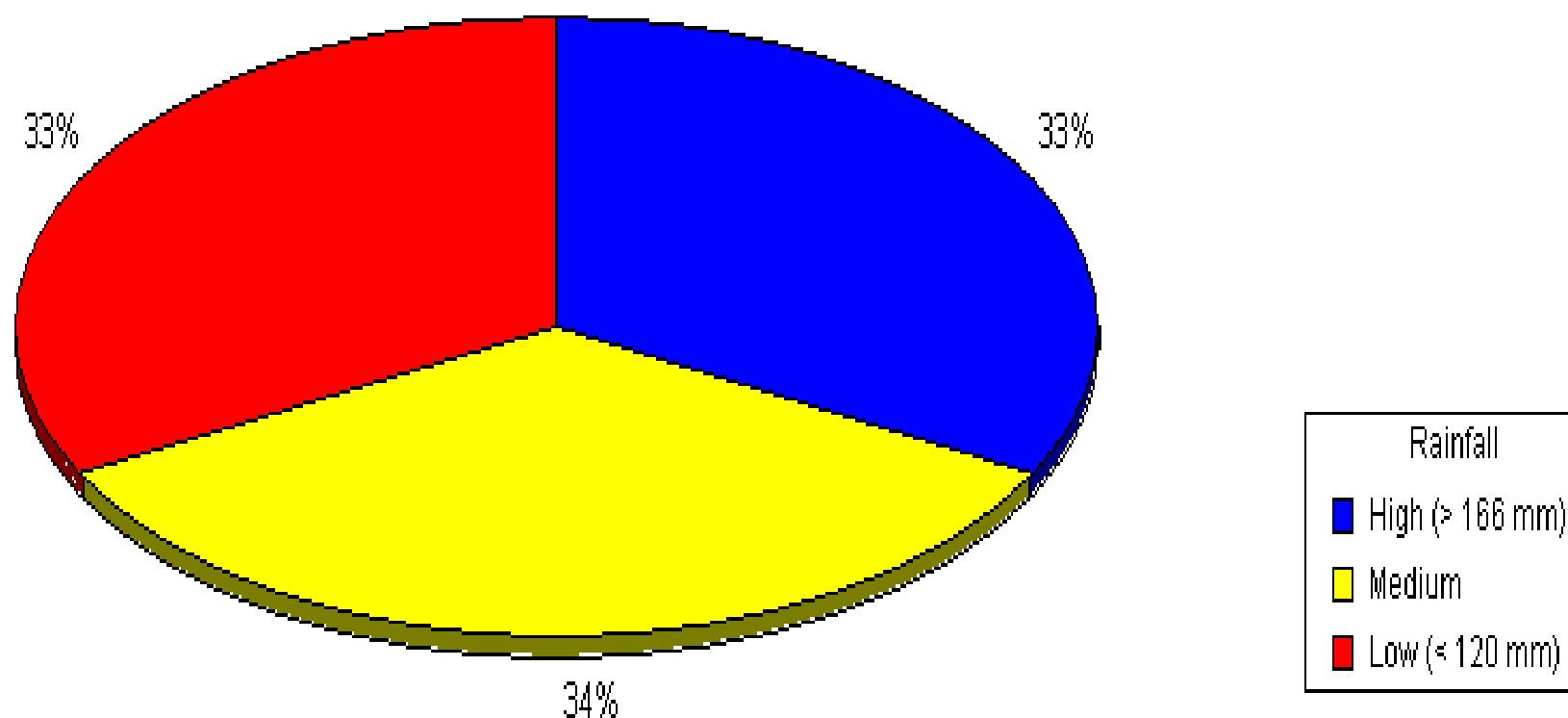
However

- People deal with uncertainty all the time
- buy shares, get married, live on fault line, plant crops, buy cattle, make important policy decisions.
- Is it that people are not used to hearing about uncertainty from scientists ?

Chance of rainfall at ROSEWORTHY AGRIC. COLLEGE

Analysis of historical data (1884 to 2005) using SOI Phases: Jun to Jul Leadtime of 0 months Rainfall period: Aug to Oct

The SOI phases/rainfall relationship for this season is statistically significant because KW test is above 0.9, and Skill Score (20.7) is above 7.6 ($p = 0.998$).



All years

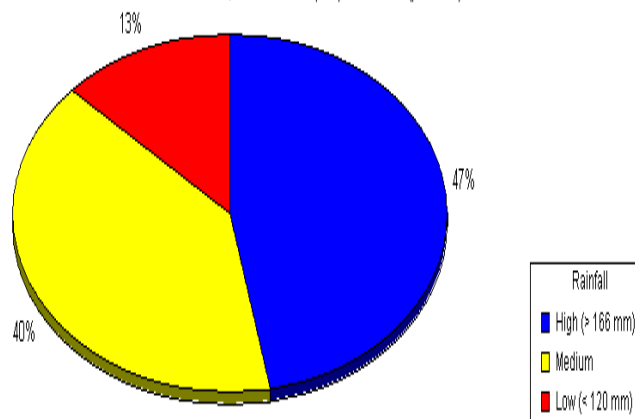
Source: Rainman StreamFlow



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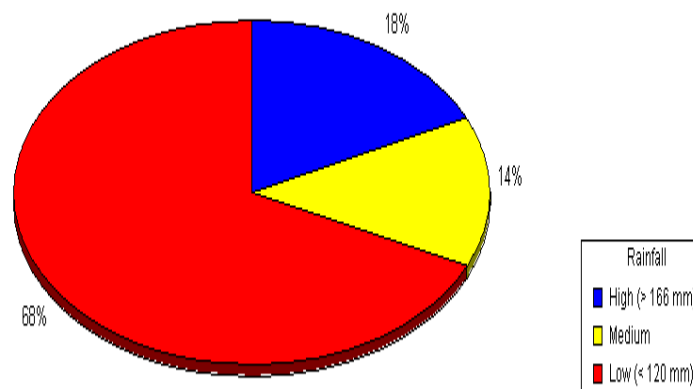
SOI positive

Source: Rainman StreamFlow

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SOI negative

Source: Rainman StreamFlow



Aware of SCF (AFFA 2002 survey n=1500 ?)

- 75% of producers aware
- 59% of those aware of SCF take them into account making decisions on the farm.
- $75\% \times 59\% = 44\%$ of farmers
- Sugar cane growers utilise these forecasts the most (74%) while sheep producers use forecasts the least (51%).
- Vegetable growers were the least likely sector to be aware of these forecasts.



Bureau of Met survey (n = 660. 2002)

- 49% of respondents used SCF. Highest in Qld 60% and NSW 57%.
- Higher in cotton 67%, cattle 54% and cane 53%
- Lowest in Vegetable production 34% and Viticulture 24%



Reasons for not using SCF (AFFA survey)

- 76% forecasting is not reliable;
- 12% indicated the weather is not a priority or essential for the farm's operation
- 9% claimed weather patterns are impossible to predict; and
- 8% said the climate is more consistent / reliable in their area.



Reasons for not using SCF

(BoM survey 2002)

- Not accurate 61%
- Not relevant to my industry 17%
- Didn't know they existed - 3%
- Not detailed enough 2%



What has the program done well in communication ?

- Strong end user focus
- Maintained emphasis on risk rather than certainty
- Multi-disciplinary – systems approaches
- Pragmatic pluralism



End user focus

- History – driven by Agricultural Science Hammer, McKeon, Meinke – response by Nicholls and Stone – facilitated by White
- Access to data and modelling especially at paddock level



The use of computers to aid farm management

- **Promising past** – late 80s to early 90s limit was seen to be software, hardware & grey ware
- **Disappointing present** – high ownership of computers but use as communication tool & record keeping
- **Uncertain future** – Use by intermediaries, university training & maybe farmers through mobile phones



25 years of DSS

- *As a field of agricultural research, DSS work is in a state of crisis....As laudable as the idea of computerised scientific tools to aid farmers' decision making may be to some researchers, persistent lack of demand by farmers for DSS cannot be ignored.*

McCown, Hochman and Carberry 2002. Ag Systems Vol 74



DSS in dryland farming as a Rosetta stone between farmer and scientist

- Attempt to understand and intervene in farmers management of risk
- Put down some of the biological complexity along side the economic and social complexity
- To learn about tactical decisions – including flatness of response (an insight from hard not soft systems analysis).
- To develop simplicity on the far side of complexity



Maintained emphasis on risk rather than false certainty

- Things should be made as simple as possible but no simpler
Albert Einstein
- BoM, QDPI & CSIRO have stuck to conveying probabilities – avoid guru role
- Encourage risk management – especially when combined with modelling in programs like Yield Prophet
- Dalglish & Coventry UQ, frequency vs prob
- Cognitive biases – White and Nicholls



Maintained emphasis on risk rather than false certainty

- Cannot refer to case studies when majority forecast occurred and probability when it doesn't
- In terms of discussing uncertainty and SCF, climate change is the elephant in the room



MCV program a genuine attempt at participatory R&D

- Knowledge is created by research, transferred by extension and used by farmers
- Pools of knowledge exist in research, extension and farming communities
- Complex dance – never too sure who is leading whom



Pragmatic pluralism

- A strength of the program has been an ability to include a wide range of organisations and individuals
- As climate science becomes more centralised – this will be harder to maintain



A challenge of diversity

“...almost every time I talk with someone from an R&D Corp or CSIRO or a government agency, they tell me they take a helicopter view. But from where I sit, all I can see is bloody helicopters buzzing round, getting in each others way and confusing us folks on the ground. I want to know who is doing air traffic control, and who is looking at the satellite picture”

Mike Stephens cited in Campbell 2006