# Evaluation of Agricultural Research at the Sub-Sector Level in Australia

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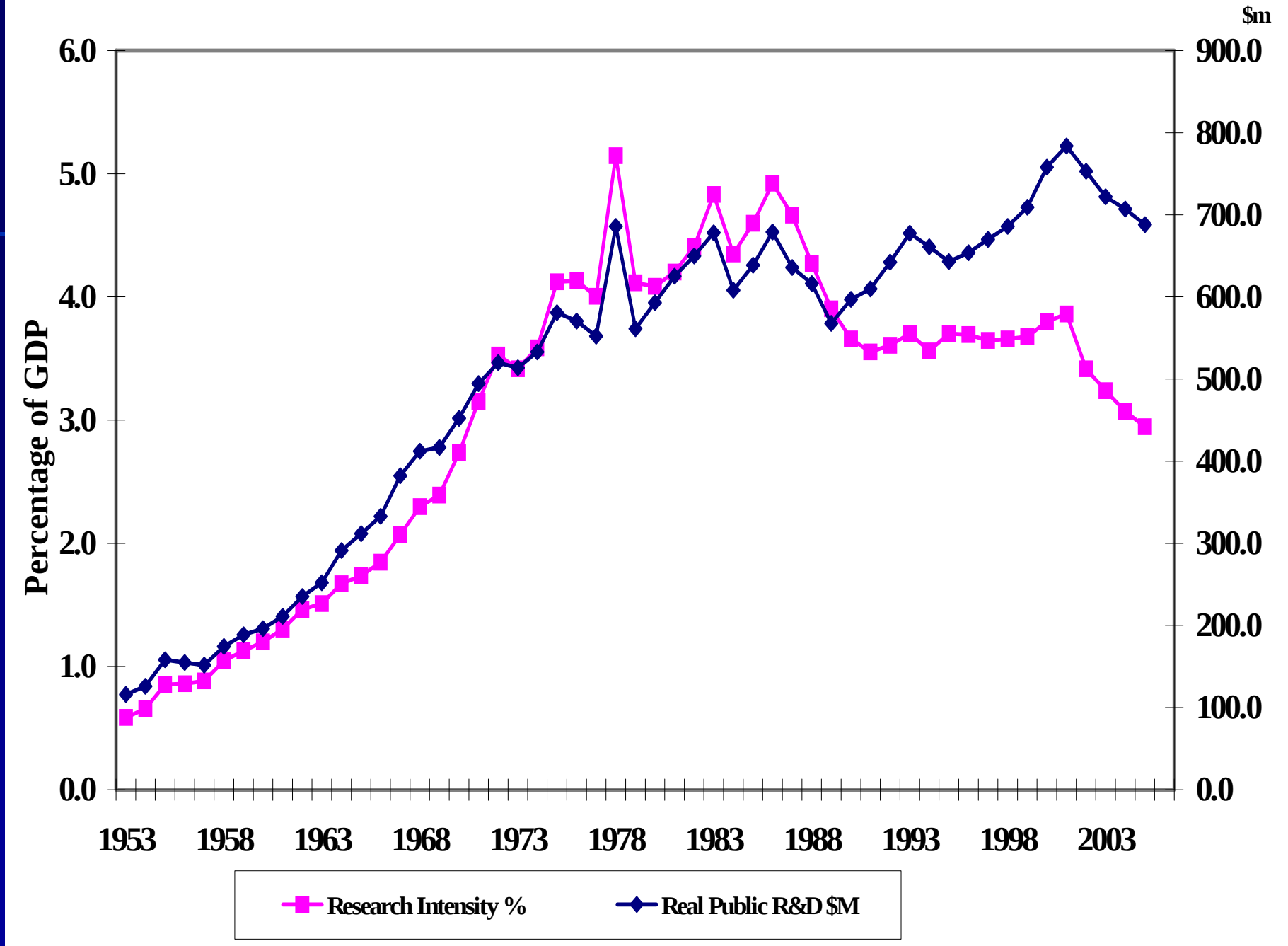
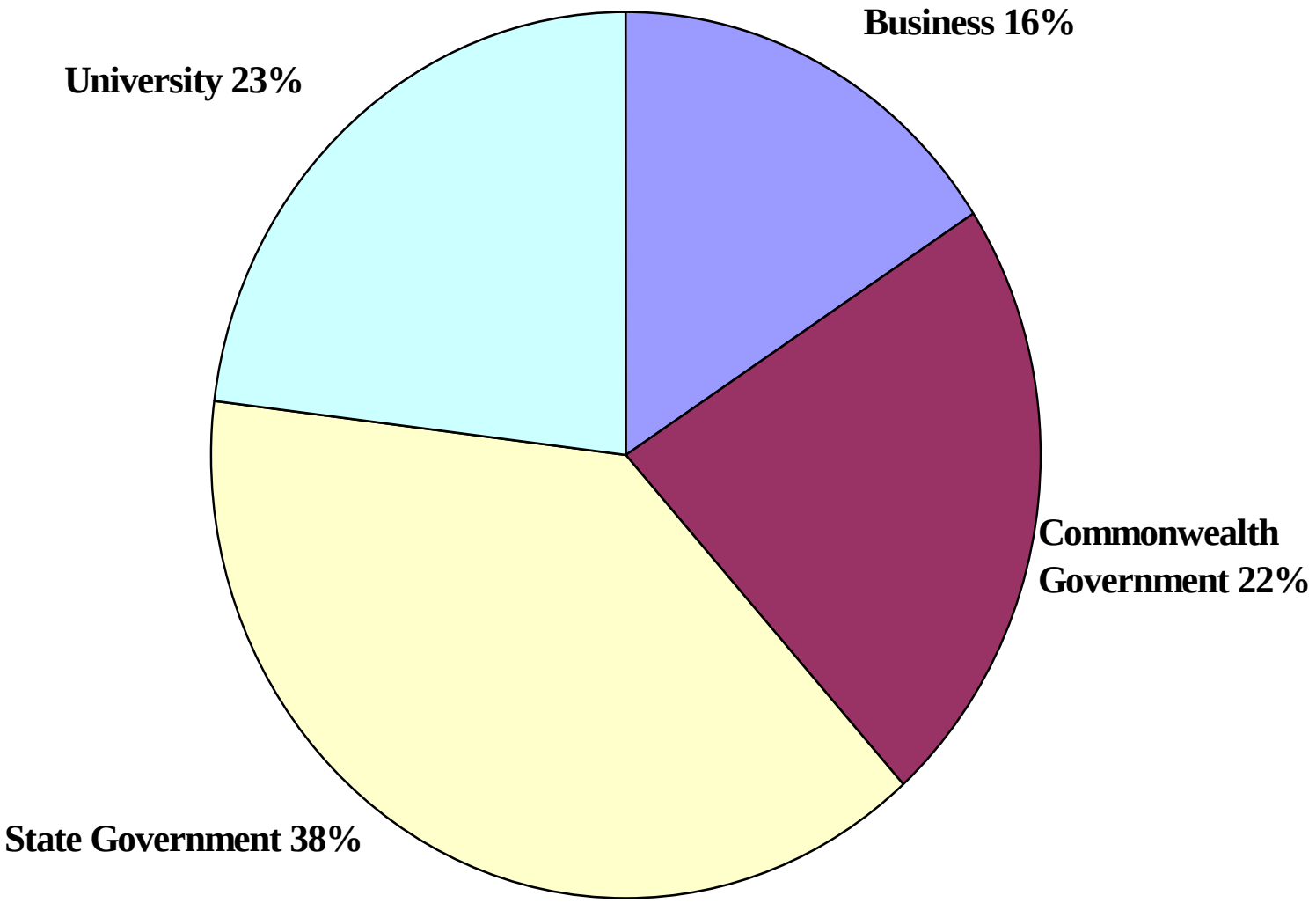
# Today's Objectives

- Review the agricultural R&D sector in Australia
- Why evaluate  R&D at sub-sector level
- Accountability
- Priority Setting
- Capacity building
- Establishing an evaluation culture


$m
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Percentage of GDP
900.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
1953
1958
1963
1968
1973
1978
1983
1988
1993
1998
2003
Research Intensity %
Real Public R&D $M

# Agricultural Research Providers



# WHO GOES WHERE

| | *Program* | *Location* |
|---|---|---|
| Fiona Scott | Systems Research | Tamworth |
| Dr Bob Farquharson | Systems Research | Tamworth |
| Dr Tom Nordblom | Rural Innovation | Wagga |
| Dr Garry Griffith | Rural Innovation | Armidale |
| Lloyd Davies | Ag and Fish | Tocal |
| Dr Robyn Hean | Resources Research | Armidale |
| Dr Rajinder Pal Singh | Systems Research | Yanco |
| Dr John Mullen | HS, SA, & E | Head Office |
| Salahadin Khairo | Systems Research | Trangie |
| Dr Randall Jones | HS, SA & E | Orange |

- My role as Research Leader is a key element

# Why We Evaluate Projects

1. **Accountability**
2. **Priority setting**
3. **Capacity Building**
   - Leads to better projects
   - Better research management

# 1. Accountability

- Demonstrate that resources are being used efficiently
- Protect flow of funding from stakeholders
  - Government and industry
- Need many independent and credible studies
- The goal posts keep changing
  - Independence
  - Sampling
  - Quantifying public goods
- Generally ex post using models varying in sophistication

# ACIAR's History with Impact Assessment

- Has been undertaking this type of analysis for over 20 years.
- Now used mostly for accountability.
- Funding increasingly becoming dependent on these.
- Need many independent and credible studies .
- Dedicated budget about 1-1.5% of ACIAR's total budget.
- Annual Program with tight deadlines. Need 6-10 per year to give coverage.
- Low budget per study – so need experts who can make judgments since cannot do detailed data collection.

# ADOPTION OF ACIAR PROJECT OUTPUTS

STUDIES OF PROJECTS COMPLETED IN

2000–2001

Australian Government
Australian Centre for
International Agricultural Research

# Review of the returns to ACIAR's bilateral R & D investments

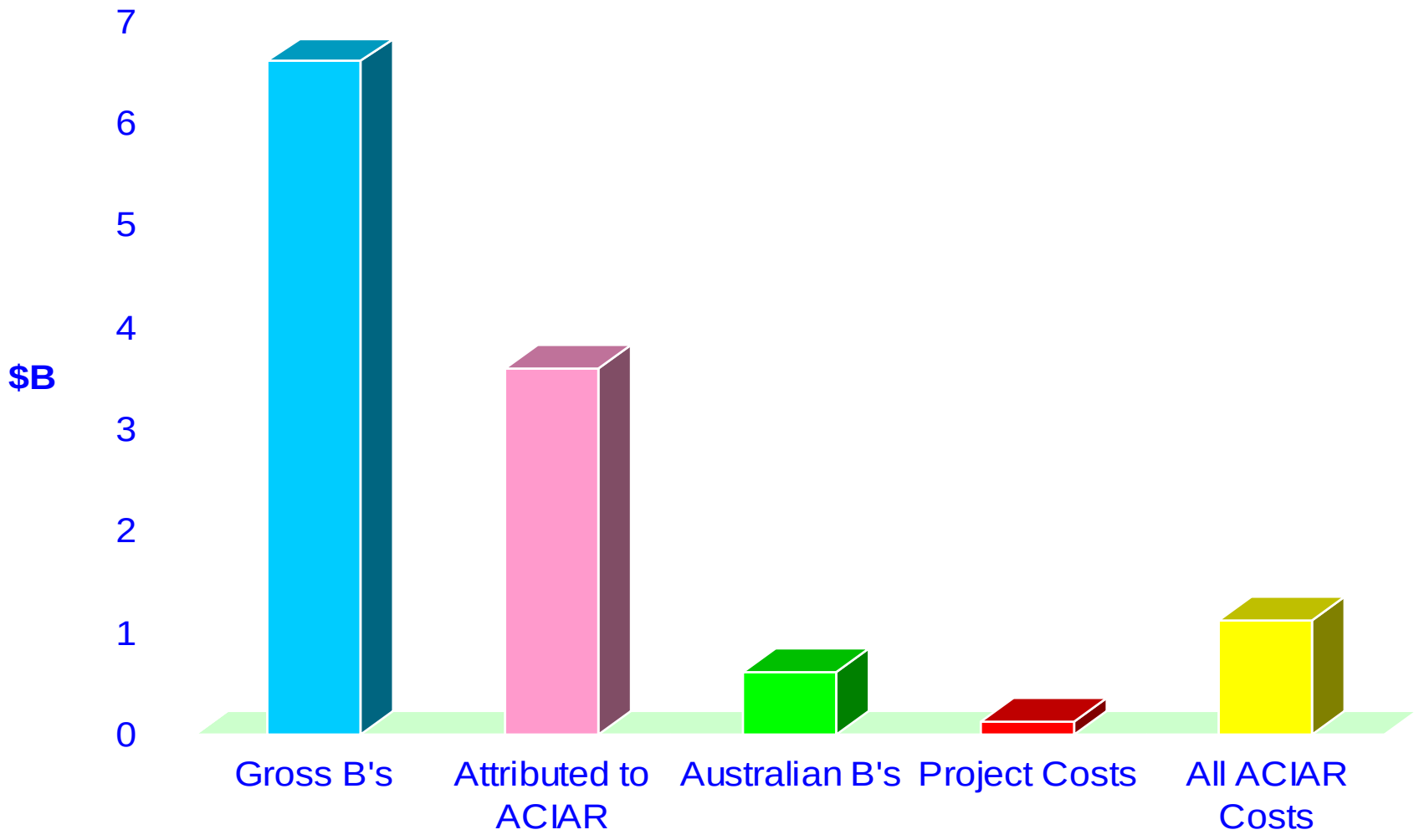
IMPACT ASSESSMENT SERIES 35

Australian Government
Australian Centre for International Agricultural Research

# Completed Project Impact Assessments

- Have now been about 46 rigorous, independent assessment studies of 96 projects (some cover more than 1 project)
- This is about 8-9% of funding and projects.
- Two recent reviews of these have summarized results.
- Will highlight a few of the summary points here to illustrate.

# Total and Australian Benefits from Assessed ACIAR Projects (PV $Billion, 2004)



# The Experience in NSW DPI

- **Mainly used for accountability purposes**
  - **15 recent IA's & Mullen's econometric analysis**
- **Degree of Difficulty – 8.2**
  - Methodologically
  - Principal / Agent Problem
- **Expensive – 1 Professional Year for 5 evaluations**
- **Exploited existing human and social capital**
- **Average benefit cost ratio – 11:1**
- **How will we judge the success of this process?**
  - Seems to be a WTP

# Recent Evaluations in DPI

- Wheat Breeding for NSW
- Waterwise
- Control of Vulpia on Tablelands
- Net Feed Efficiency in Cattle
- Conservation farming in the North
- Aquaculture research
- RiceCheck
- Economics of genetic markers
- Beef , Weeds and Wool CRC rebids
- Outfox the fox
- Conservation farming in Central and South
- QPlus at Trangie –sheep genetics
- IPM in lettuce, rice & citrus
- Forestry

- http://www.agric.nsw.gov.au/reader/10550

# 2. Priority Setting

- **Research managers are the audience**
  - **How are limited funds best used**
  - **Timeliness is critical**
  - **Helps demonstrate accountability**

- **Ideally ex ante and comprehensive across portfolio using common economic parameters**
  - Very expensive

- **Not enough timely IA studies yet in DPI**

# Setting Priorities???

- There will never be a black box to do this
- Research managers make necessarily subjective judgements
- Economists can help develop these skills if the climate is not a hostile one
- Help managers make the best case for their portfolio
- Rapid Impact Assessment processes under investigation

# Shortfalls of RIA processes

- Greater element of subjectivity
- Don’t deliver usual financial measures
- Strategic behaviour  is a potential problem BUT
- Managers eventually confront a budget constraint
- Need a strong peer review process

# Rapid Impact Assessment

- Guide PS in a timely, comprehensive but cost effective manner
- Collect information on:
  - Objectives of R&D - TBL
  - Alignment with priorities
  - Size of target industry sector
  - Naïve ‘with’ and ‘without’ scenarios
  - Nature of market failure
  - Naïve assessment of  shares to beneficiaries
  - Budget information
  - Stakeholders share of funding
- 3 Hours time limit
- Incorporate in project approval process

# Outputs from the DPI RIA process

- An indication of how program benefits and program funding align
- Guidelines for High v Low priority projects

# External Funds % > RLs Industry Benefits %

- Vertebrate pests
- Insect Collections
- Laboratory Services – some commercialised
- Pasture genetics
- Wild fisheries
- Aquatic ecosystems
- Salinity and catchment hydrology
- Forest resources

- Some of these are expected to have a high public good component

# External Funds % = RLs Industry Benefits %

- Plant health
- Aquaculture
- Biometrics
- Oilseed genetics
- Soils and recycled organics

# External Funds % < RLs Industry Benefits %

- Animal health
- Weeds
- Cotton health??
- Animal production
- Horticulture
- Viticulture
- Biotechnology
- Cereal genetics
- Beef genetics
- Sheep genetics
- Agricultural systems
- Climate science and irrigation

# What is the Appropriate level of Disaggregation?

- Somewhere between the sector level and the project level !!!!!!!
- Constrained by availability of investment data
- Impacts on attribution problems
- Impacts on how much is spent on IA
- More important for priority setting than Accountability
- Clusters of projects with the same ‘mechanism’
- Similar market failure issues

# High Priority Projects

- High industry impact and > ¾ industry funding
- AND / OR
- High human and/or environmental health impacts
- AND / OR
- Maintenance of critical scientific skills in the public sector

# Low Priority Projects

- High industry impact but little industry funding
- AND / OR
- Few environmental or human health impacts
- AND / OR
- Few consequences for scientific capacity

# Human Capital Building

- **Develop Capacity of Scientists to think more clearly about :**
  - **What can be achieved with a given budget**
  - **What drives adoption**
    - Relative advantage
  - **‘With’ and ‘Without’ Research Scenarios**
  - **Who benefits from the research**

- **DPI economists are embedded**

# Institutionalising an Eval'n Culture

- **Track record is not good**
  - **ACIAR (Jeff Davis) is the stand out**

- **The Adoption Literature Suggests Why**
  - **Relative Advantage is difficult to demonstrate**
    - Evaluation is expensive but the benefits ?????
  - **Trialability**
  - **Strengths and weaknesses misunderstood**
  - **Threatening**
  - **Principal / Agent Problem**

- **Need a champion at the highest levels**

# Some Do's and some Don'ts

- I use do and don't not always and never
- Not prescriptive for ARS/ERS
- Do start by picking some winners
- Perhaps start in areas where Investment decisions are imminent
- Do involve the scientists as co-authors
- Do help scientists understand BCA and how economists view the role of government
- Do set up opportunities for peer review of key assumptions

- Don't adopt a Big Brother approach
  - Embed economists ???
- Don't set up an evaluation unit ???

# How can costs be contained

- Use economists who know BCA and who know agriculture
- Involve scientists
- Expect economists and scientists to apply judgement to unknown parameters
- Maintain in-house capacity by doing plenty
- Standardise reporting framework and common parameters

- Need Establish Goals for Evaluation
- THEN
- Design your evaluation processes as constrained by budgets and other resources
- One size doesn’t fit all very well

# References


- Mullen, J.D., 2007, 'Productivity growth and the returns from public investment in R&D in Australian broadacre agriculture', *Australian Journal of Agricultural and Resource Economics* 51(4):359-384.


- Economics Research Reports can be found at:
  - http://www.dpi.nsw.gov.au/research/branch/health-science/economics-research/reports/
- Information about Program economists can be found at:
  - http://www.dpi.nsw.gov.au/ageconomics/pe-directory05.htm