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

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ERS/ ARS Workshop
‘Assessing the Benefits of ARS R&D within an Economic Framework: Preliminary Results’,
March 10–11, 2008, Washington, DC.
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
Agricultural Research Providers

- University 23%
- Business 16%
- Commonwealth Government 22%
- State Government 38%
<table>
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<tr>
<th>Program</th>
<th>Location</th>
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<tbody>
<tr>
<td>Systems Research</td>
<td>Tamworth</td>
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<td>Rural Innovation</td>
<td>Wagga</td>
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<td>Rural Innovation</td>
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<td>HS, SA, &amp; E</td>
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<td>HS, SA &amp; E</td>
<td>Orange</td>
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- 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
ACI AR’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 ACI AR’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.
Review of the returns to ACIAR's bilateral R & D investments
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)
<table>
<thead>
<tr>
<th>The Experience in NSW DPI</th>
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<td><strong>Mainly used for accountability purposes</strong></td>
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<td>- 15 recent IA’s &amp; Mullen’s econometric analysis</td>
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<tr>
<td><strong>Degree of Difficulty - 8.2</strong></td>
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<td>- Methodologially</td>
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<td>- Principal / Agent Problem</td>
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<tr>
<td><strong>Expensive - 1 Professional Year for 5 evaluations</strong></td>
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<td><strong>Exploited existing human and social capital</strong></td>
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<td><strong>Average benefit cost ratio - 11:1</strong></td>
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<td><strong>How will we judge the success of this process?</strong></td>
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<td>- Seems to be a WTP</td>
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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

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 $\geq \frac{3}{4}$ 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


Economics Research Reports can be found at:

Information about Program economists can be found at: