Productivity growth in developed countries: Australia

Presentation to 2013 IATRC Symposium

Peter Gooday
Australian Bureau of Agricultural and Resource Economics and Sciences
2 June 2013
Australian agriculture

- Mechanisation, fertiliser, feed
- Improved crop varieties, pasture types, livestock breeds
- Fewer, larger farms
- Growing resource pressures
- Ageing farm population
- Global food and fuel demand
Australian agriculture

- A$52 billion produced in 2011-12
- 2.4% of Australian GDP and 2.5% of employment
- Broad national presence
- Two-thirds of production exported
Productivity in Australian agriculture

Broadacre total factor productivity in Australia, 1953-2011

1953 to 2011 1.8%

Broadacre productivity growth

Agricultural terms of trade
Productivity in Australian agriculture

Broadacre total factor productivity in Australia, 1953-2011

1953 to 2011 1.8%
1953 to 1994 2.2%

Agricultural terms of trade

Financial year ended

Index


ABARES

Productivity Growth in developed countries - Australia

2 June 2013

5
Productivity in Australian agriculture

Broadacre total factor productivity in Australia, 1953-2011

- 1953 to 2011 1.8%
- 1953 to 1994 2.2%
- 1994 to 2011 0.2%

ABARES
Productivity in Australian agriculture: changing input use (1978 – 2011)

Financial year ended

Index


Annual average growth

TFP 1.0%
Materials and services 0.7%
Land -0.9%
Capital -1.8%
Labour -2.1%
Challenges for agricultural productivity

- Technology
- Resources
- Society
Technology: slowed rate of global progress

- Yield growth slowing for major cash crops
- Slower rate of technological change
- Slower uptake of technologies
- Fewer big gain technologies
- More complex technologies
- Lower confidence
Technology: changes in R&D

- Slowing growth in public R&D investment

**Public agricultural R&D, annual average growth**

**OECD**

- 1980s: Growth rate
- 1990s: Growth rate

**World**

- 1980s: Growth rate
- 1990s: Growth rate

Source: Pardey and Pingali (2010)
Technology: changes in R&D

- Slowing growth in public R&D investment
- Shift away from public extension
- Changing R&D priorities
Resources: growing resource pressures

- Land and water availability
- Climate variability
- Ageing population
- Urbanisation
- Pests and diseases

Annual rainfall anomaly
- based on 30 year average (1961-1990)

Australian area under agricultural production

Australian locust plague, 2010
Society: preferences affect productivity

Growing concerns from society
- Biodiversity and vegetation
- Animal welfare
- Health and safety
- Trade and foreign investment

Global adoption of GM crops

Source: ISAAA (2011)
International productivity performance

Index (US 1961 = 100)


1.8% - United States
1.2% - Canada
1.6% - Australia
International productivity performance

Index (US 1961 = 100)

0 50 100 150 200 250


1.8% - United States
1.2% - Canada
1.6% - Australia

Productivity Growth in developed countries - Australia

2 June 2013
Structural change in broadacre

Population of broadacre farms

Average farm scale

Farms


DSE (dry sheep equivalent)
Changing sources of growth

1. Many reforms complete

2. Cropping technologies extensively adopted

3. New technologies are required
Australia’s Research and Development System
Research and Development Corporations Model

**RESEARCH AND DEVELOPMENT CORPORATIONS**
- Cotton
- Fisheries
- Grains
- Grape and Wine
- Rural Industries
- Sugar
- Australian Egg Corporation Limited
- Australian Livestock Export Corporation
- Australian Meat Processor Corporation
- Australian Pork Limited
- Australian Wool Innovation
- Dairy Australia
- Forest and Wood Products Australia
- Horticulture Australia Limited
- Meat and Livestock Australia

**AUSTRALIAN GOVERNMENT**
- Matching Public Funds
- Levy Funds
- Public R&D Priorities

**INDUSTRY**
- Industry R&D Priorities
- Levy Funds
- Research and Development
Technology: lifting productivity potential

- Public R&D and extension account for almost 2/3 of agricultural productivity growth
- Long lags between R&D investment and productivity payoffs
- Balance between extension and R&D

Contribution of RD&E to Australian agricultural productivity growth

- Total Public R&D 49%
- Domestic 17%
- Foreign 32%
- Extension 14%
- Other Factors 37%
On-farm determinants of innovativeness & productivity

- Tertiary education
- Labour availability
- Land use intensity
- Farm size
- Off farm income
- Use of contract services
On-farm determinants of innovativeness & productivity

- Tertiary education
- Labour availability
- Land use intensity
- Farm size
- Off farm income
- Use of contract services

Farmers with university qualifications were 7% more likely to be high innovators (compared with those who had completed year 12 only).

A 1% increase in farm size increased the probability of being a high innovator by 4%.
Conclusion
Conclusion

• Foster research and development
• Minimise (environmental) regulatory burden
• Pursue broader reform agenda
Conclusion

- Foster research and development
- Minimise (environmental) regulatory burden
- Pursue broader reform agenda
- R&D becoming increasingly important
- Sustained effort required
Thank you

www.daff/abares.gov.au