Public Investment in Agri-food Sector R&D
A bridge too far?

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Why do we care about investment in R&D

- Economic growth is fundamentally tied to productivity growth
- Productivity growth is about getting more output from a given set of inputs
  - Or using fewer inputs to get a given level of output
- Tied to technological change
- Comes about through scientific discovery and R&D
- Focal point for innovation strategies worldwide
- Evidence of underinvestment persists
- Concerns over changes in public sector investment in R&D
What’s happened to agri-food sector R&D

Changes in AAFC research expenditure (source: Gray 2008)

![Graph showing changes in AAFC research expenditure by type from 1996 to 2004. The graph indicates a decline in research expenditure, particularly in Crop Research and Animal Research, while Resource Conservation and Food Research show slight increases.](source: Agriculture and Agri-Food Canada (AAFC 2007 Unpublished)).

**AR e v i t a l i z a t i o n o f A g r i c u l t u r a l R e s e a r c h**

I believe Canada is at a crossroads where we can plausibly foresee a reversal of the recent downward trend in agricultural research. Accelerated demand growth for agricultural products, combined with developments in biotechnology and general interest in innovation, could renew interest in agriculture research as a potential economic driver. I want to

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Source: Agriculture and Agri-Food Canada (AAFC 2007 Unpublished).

Figure 2. AAFC research expenditures by type 1996–2004 ($2005)
What’s happened to agri-food sector R&D, cont

Intramural (industrial) R&D investment

Source: Statistics Canada

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What’s happened to agri-food sector R&D, cont

Private agricultural R&D investment as a share of the total

Source: Pardy et al. (2008) *Agricultural Research: A Growing Global Divide?*
What’s happened to agri-food sector R&D, cont

Public agricultural R&D spending per $100 agricultural GDP

Source: Alston et al. (2010) *Persistence Pays*
What’s happened to agri-food sector R&D, cont

Public agricultural R&D spending per capita

- Canada
- All OECD
- France
- United Kingdom
- Australia
- Germany
- Japan
- United States

Public Ag R&D Spending Per Capita

Source: Alston et al. (2010) Persistence Pays
What’s happened to agri-food sector R&D, cont

- Reduction in public investment for primary production
- Increase in public investment in food and conservation focused research
- Increase in private sector investment (ag & food)
- Private sector accounts for larger share of total agricultural R&D investment
- Red Queen public sector spending
Why the changes?

- Budgetary pressure
- Re-focusing on farm income stabilization
- View that government spending crowds out private spending
- Canada as a beneficiary of international R&D spillovers
I would argue yes, but it depends on the context

1. Public bad (negative externality, e.g. communicable animal disease) versus private good (e.g. enhance flavour or taste)
2. If private benefits cannot be appropriated by those who invested (i.e. is there a free-rider problem?)
3. When the market is unwilling (or unable) to bear the risks associated with investment in R&D
4. Economies of size, scale or scope (complementarities) in research activities (especially if these encourage competition)

Avoid crowding-out
Is investment the only instrument governments can use to expand R&D?

- R&D tax credits
- Governments have within their power the ability to create institution
- System to protect intellectual property rights (e.g. patents):
  - Trade off excludability for private sector investment
  - Who benefits (e.g. Moschini et al. 2000 *RR soybeans*)?
  - Can create scope for patent thickets and anti-commons
    - Too many property rights
  - Lack of coordinated effort; creates holdup problems
- Legislation that enables establishment of NGOs that administer check-off based levy schemes
Producer check-off based R&D efforts

- Slew of provincial check-off programs
  - R&D, promotion, product development

- *Farm Products Agencies Act* provides enabling legislation to establish promotion-research agencies
- Can collect levies on sale of relevant commodity
- Funds used to undertake research, promotion and consumer education
- Majority of those affected by a levy must support agency’s establishment

- Only one national agency to date: *Canadian Beef Cattle Research, Market Development and Promotion Agency*
Mandatory versus voluntary check-off levies
- Provision point mechanisms to limit free-riding (Norwood et al. 2006)

Contentiousness amplified by view in some jurisdictions to reducing or eliminating public matching of producer check-off funds (e.g. Productivity Commission proposals in Australia)

Raises the possibility of ‘non-private’ sector R&D being entirely funded via check-off; this is a challenge because:
1. Check-off rates typically low
2. Hard to change

Alston & Fulton (2012): underinvestment can occur, even with supermajority requirements, but diverse producer preferences regarding the check-off rate (levy ↑, support ↓)
Public-Private Partnerships

- Seen growth in government based matching programs, as well as matching requirements for non-government programs (i.e. check-off based)
- Viewed by some as a means to crowd-in research
- But does it: what would the private sector spend in the absence of public sector matching funds?
- Crowding-in versus expanding scale and scope?
- What is the optimal matching rule (public investment: private investment)?
  - Product development versus cost of production reducing research
  - Primary production versus post farm-gate
- Public co-pays for science/innovations that can be appropriated by private sector
  - Value for money for taxpayers?
But is it just the public and private sector?

- No
- Participatory sector (Gray et al 2007.)
- Farmer lead biological innovation (Olmsead & Rhode *Creating Abundance* 2008)

- Diffusion of innovations critically important to mobilizing public sector spending
- Whither extension system and experiment stations

- Collaboration
- Coordination
- Cooperation