



# GREEN GROWTH INDICATORS: HOW DOES CANADIAN AGRICULTURE STACK UP AGAINST OTHER OECD COUNTRIES

Dimitris Diakosavvas  
Trade and Agriculture Directorate

CAPI Workshop on *Optimizing Land Use for Sustainable Growth: A  
CAPI Dialogue*, 21-22 February 2019, Calgary, Alberta, Canada



# Outline of presentation

---

- Background
  - What is green growth and what does it imply in addressing the challenges facing agriculture?
  - Policy and monitoring progress challenges
- Monitoring progress towards green growth in agriculture
  - The OECD Green Growth Measurement Framework
  - How does it apply to agriculture?
  - What does the empirical evidence show?
- Key lessons – What work OECD is doing?

# What is green growth and what does it imply in addressing the challenges facing agriculture?





# What is green growth?

---

*Green growth is the pursuit of **economic growth and development**, while preventing environmental degradation, biodiversity loss and un-sustainable **natural resource** use. To do this it must catalyse investment and innovation which will underpin sustained growth and give rise to new economic opportunities*



# The Green Growth Agenda: Key characteristics

---

- No necessary conflict between growth and environment in the long run
- Tool to achieve sustainable development
- Focus on fostering innovation, investment and competition that can give rise to new sources of economic growth
- Coherence of policies



# Green growth is widespread as a goal...

---

- **OECD** – *Green Growth Strategy*
- **UNEP** – *Green to Grow*, focusing on a low carbon future
- **FAO** – *Greening the Economy through Agriculture*, focusing on food security
- **World Bank** – *Moving to a Green Growth Approach to Development*, focusing on poorer countries
- **Many countries** have embraced green growth (Korea, Denmark, etc.)
- **Many companies** are also developing green growth strategies



# Green Growth in agriculture means ....

---

- providing enough food, feed, fibre and fuel for a growing population...
- ...with greater pressure on land, water, energy and biodiversity resources - and the impact of climate change...
- ...and the need to limit the harmful and enhance the beneficial environmental impacts and reduce waste in the food supply chain
  - So **productivity** has to rise faster than population and income, while reducing environmental footprints – “sustainable intensification”...
  - ... Increasing productivity in a sustainable manner – from R&D, innovation, to uptake all along the food supply chain, while addressing *social concerns*.



# The policy challenge ...

---

## Policies that mutually reinforce *green and growth* –

- Increasing productivity in a sustainable manner

- Investing in knowledge generation - R&D, innovation
- Investing in knowledge creation - training, advisory
- Investing in knowledge transfer - extension services
- Investment and trade

## Policies specifically aimed at *greening growth*

- Market-based instruments

- Agri-environmental payments, environmental taxes, etc.

- Non-market instruments

- Regulation, voluntary agreements, technical assistance

❖ **But a lot of green is not priced..**



# »» The monitoring progress challenge

---

*You can't manage what you don't measure*



- If governments are going to pursue policies designed to promote green growth, they need **indicators** that can:
  - raise awareness
  - measure progress
  - identify potential opportunities and risks

# Monitoring Progress Towards Green Growth in Agriculture



# OECD Green Growth Measurement Framework - Four dimensions

---

- ***Is growth becoming greener?***
  - Low-carbon, resource-efficient economy:
    - ✓ **Indicators of environmental and resource productivity**
- ***Is there a risk of future shock to Growth?***
  - Rising productivity is not enough: often, an absolute decline in environmental pressures is needed to **keep the natural asset base intact**



# OECD Green Growth Measurement Framework - Four dimensions

---

- **How the environment affects people?**
  - Capturing the direct interaction between people and the environment: **indicators of environmental quality of life**
- **How “green” helps growth and employment?**
  - **Economic opportunities** from environmental considerations and **policy responses**.



# The monitoring progress challenge: four dimensions

<b>1</b>	<b>The environmental and resource productivity of the economy</b>	<ul style="list-style-type: none"><li>• Carbon and energy productivity</li><li>• Resource productivity: materials, nutrients, water</li><li>• Multi-factor productivity</li></ul>
<b>2</b>	<b>The natural asset base</b>	<ul style="list-style-type: none"><li>• Renewable stocks: water, forest, fish resources</li><li>• Non-renewable stocks: mineral resources</li><li>• Biodiversity and ecosystems</li></ul>
<b>3</b>	<b>The environmental dimension of quality of life</b>	<ul style="list-style-type: none"><li>• Environmental health and risks</li><li>• Environmental services and amenities</li></ul>
<b>4</b>	<b>Economic opportunities and policy responses</b>	<ul style="list-style-type: none"><li>• Technology and innovation</li><li>• Environmental goods and services</li><li>• International financial flows</li><li>• Prices and transfers</li><li>• Skills and training</li><li>• Regulations and management approaches</li></ul>
	<b>Socio-economic context and characteristics of growth</b>	<ul style="list-style-type: none"><li>• Economic growth and structure</li><li>• Productivity and trade</li><li>• Labour markets, education and income</li><li>• Socio-demographic patterns</li></ul>



## Guiding criteria for the selection of green growth indicators for agriculture

---

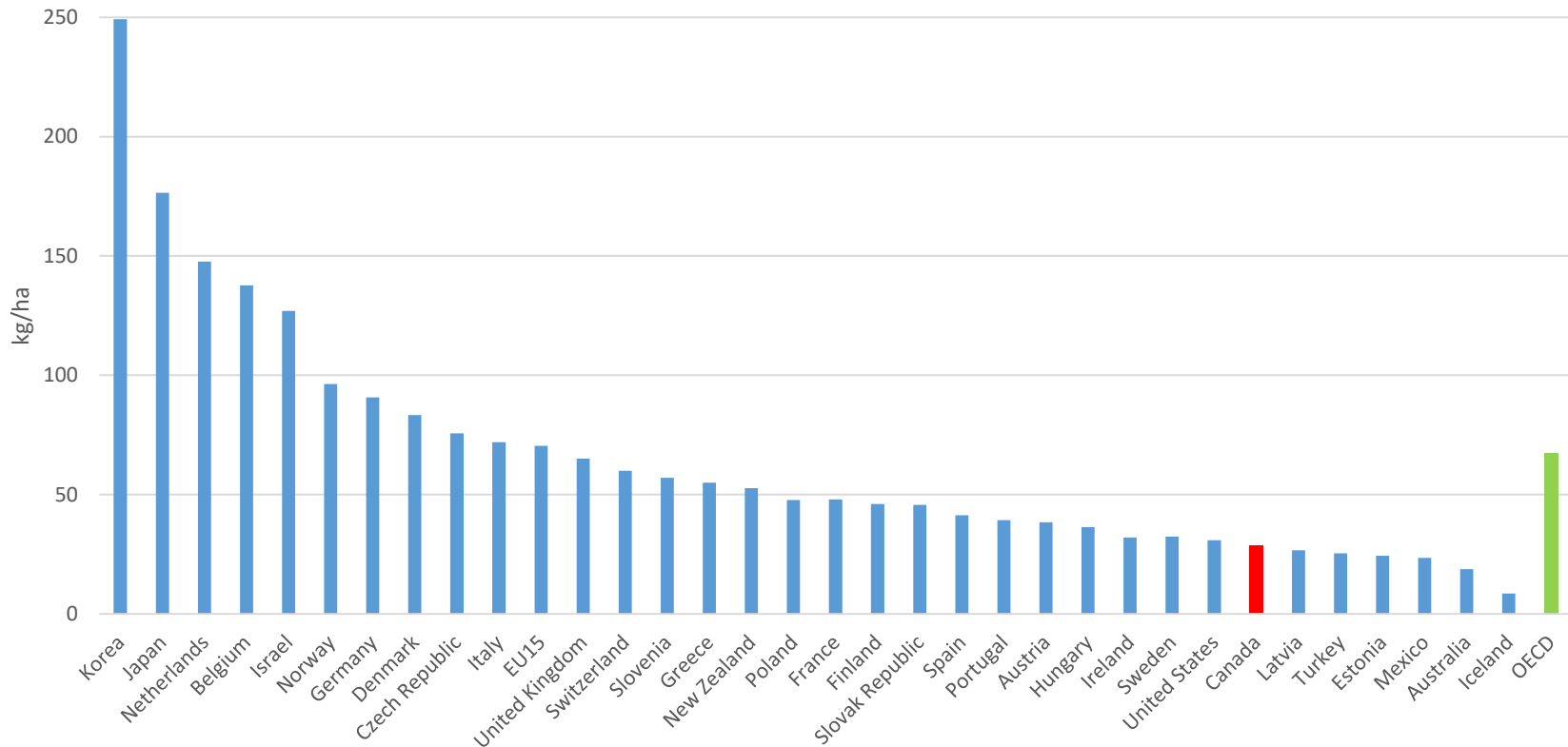
- Capture the nexus between the environment and the economy
- Be measured and comparable across countries
- Reflect key global environmental issues
- Ease of communication
- Alignment with the OECD framework
- Use existing data



# **Environmental and resource productivity: What does the empirical evidence show?**



# Nitrogen balance per hectare, 2013-15



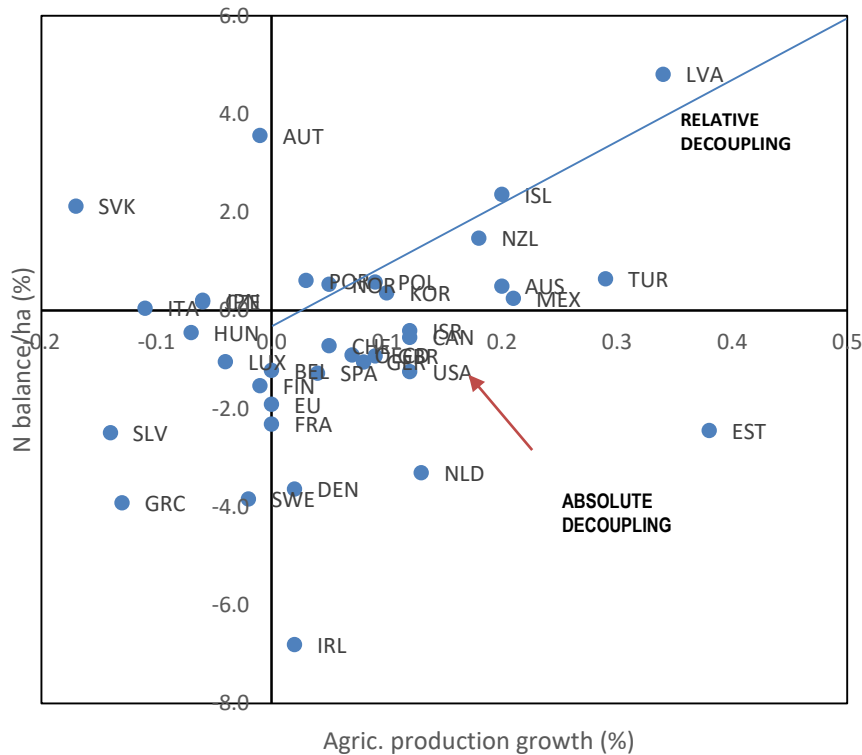




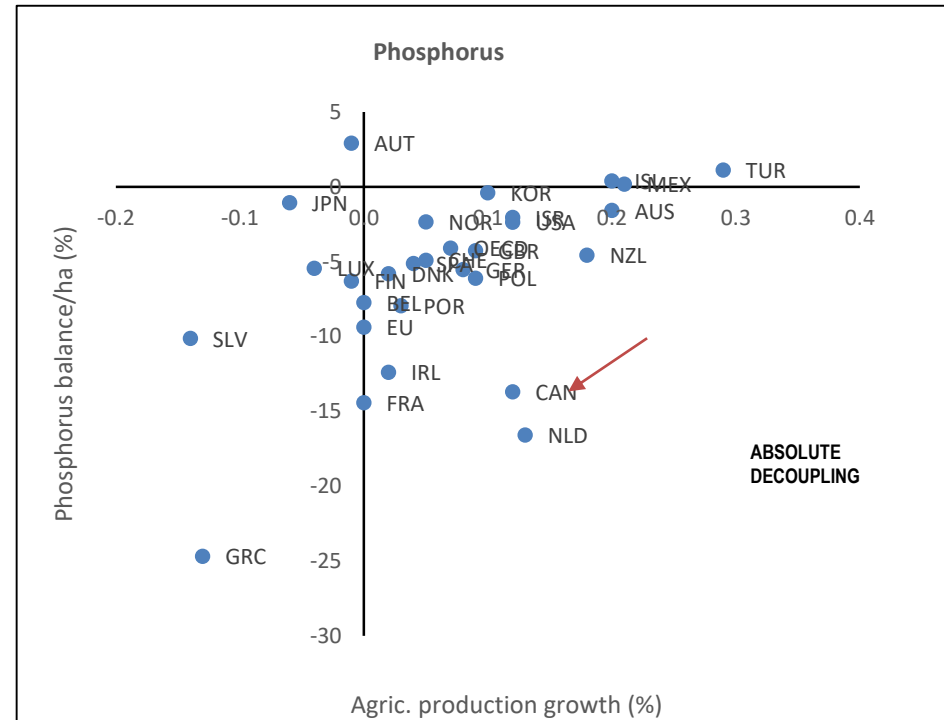
# Nutrient surpluses declined relative to agricultural production .....

2003-15 % changes

## Nitrogen



## Phosphorus



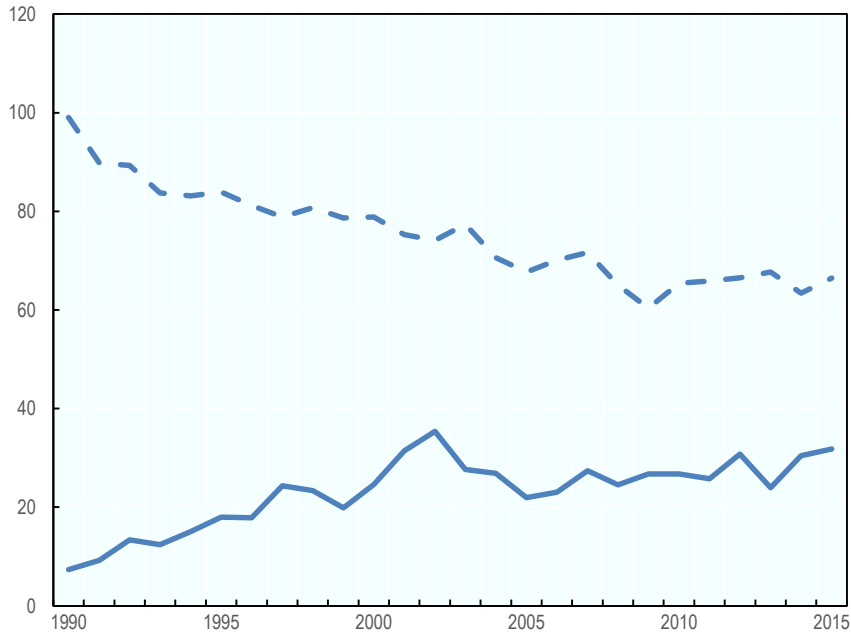


# But in Canada nutrient surpluses increased relative to agricultural land

Nitrogen balance

— Canada    - - - OECD

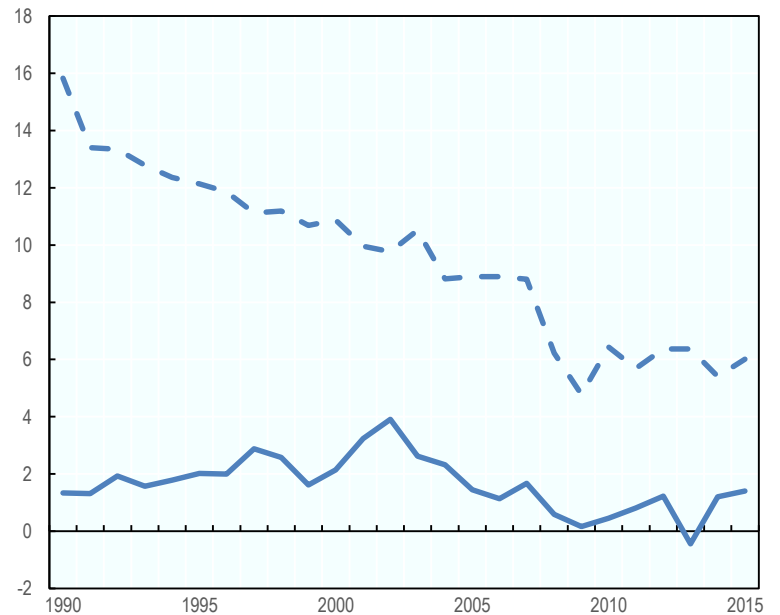
kg/ha of agricultural land



Phosphorus balance

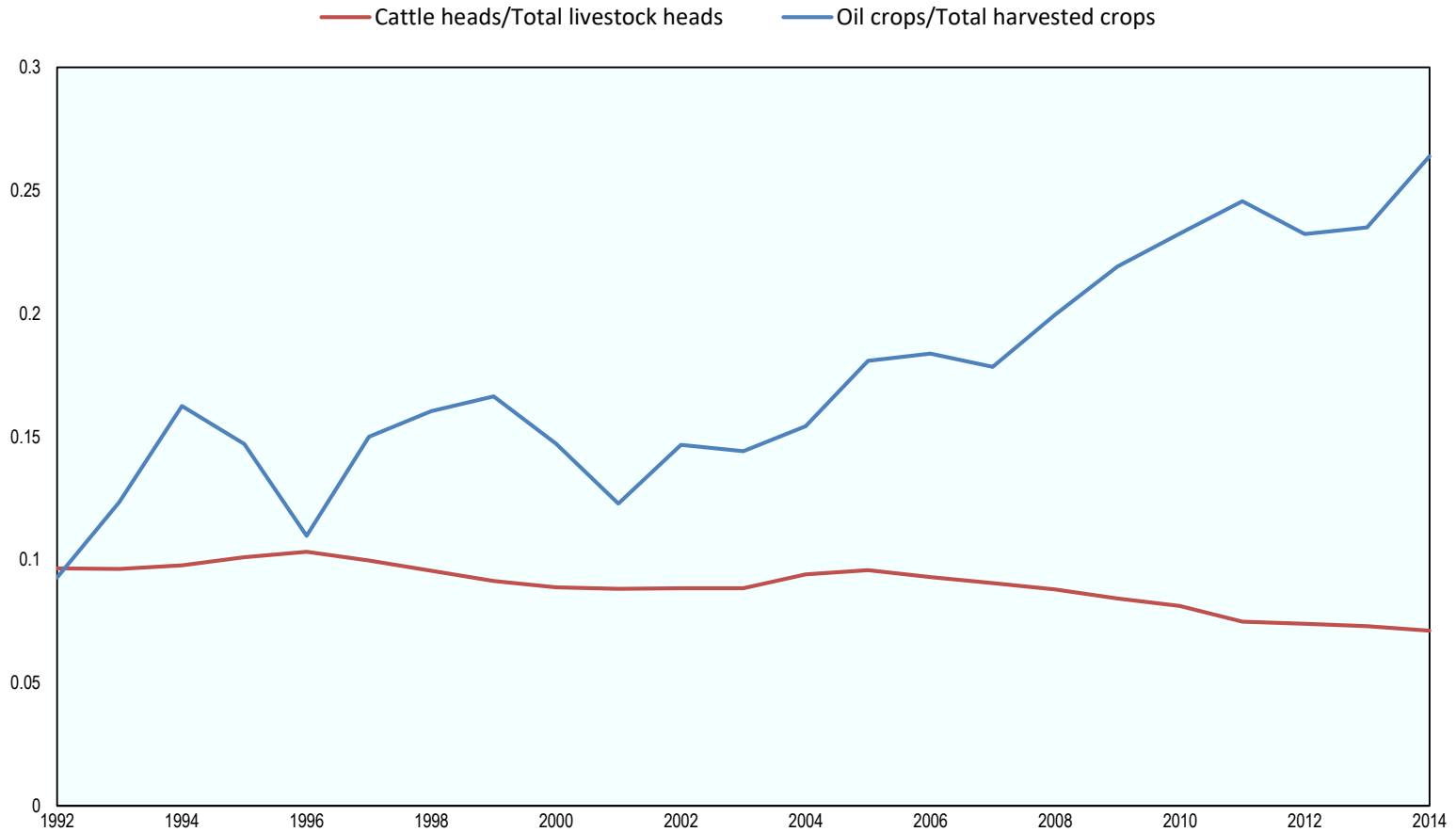
— Canada    - - - OECD

kg/ha of agricultural land





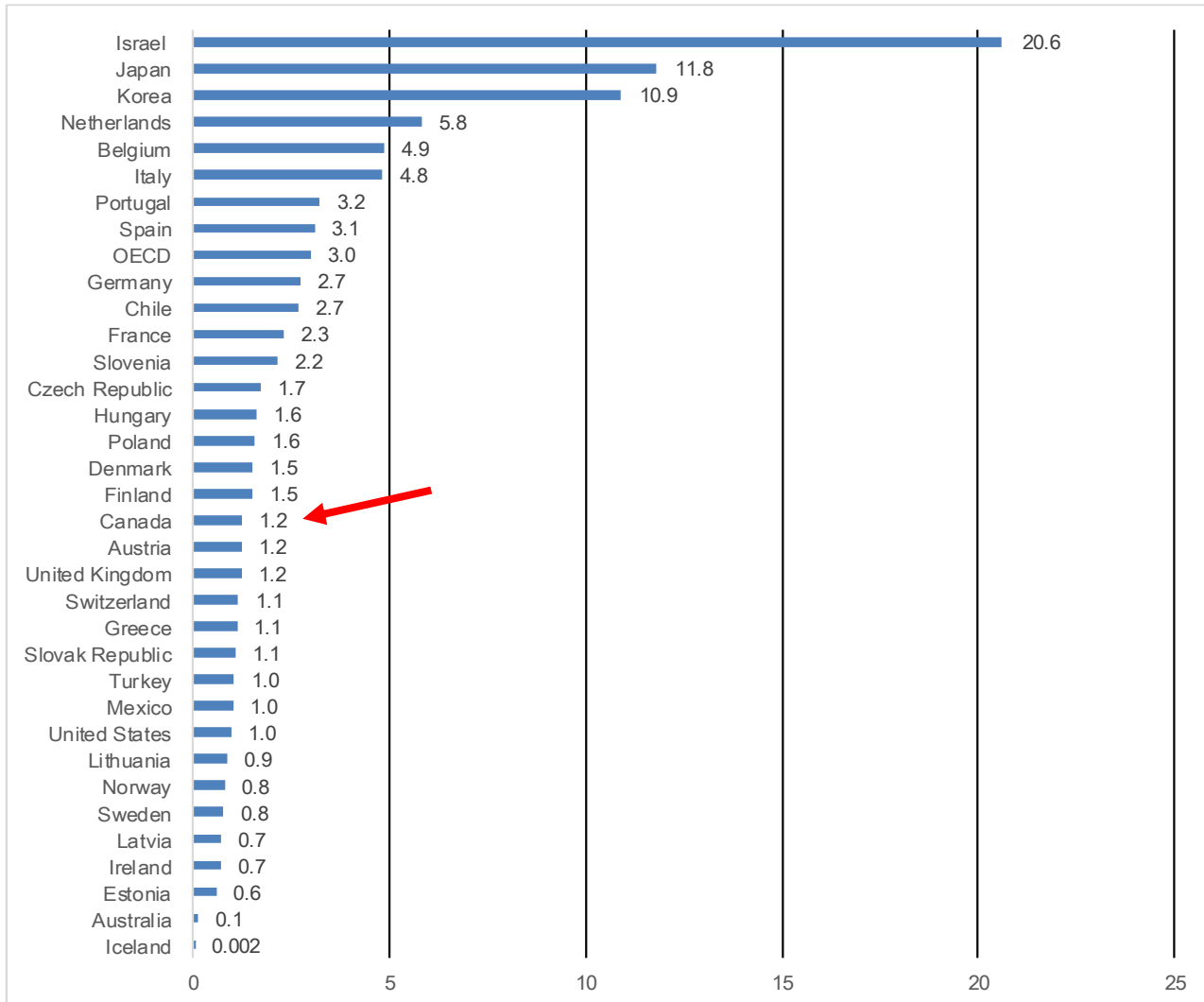
# Evolution of livestock composition and crop mix





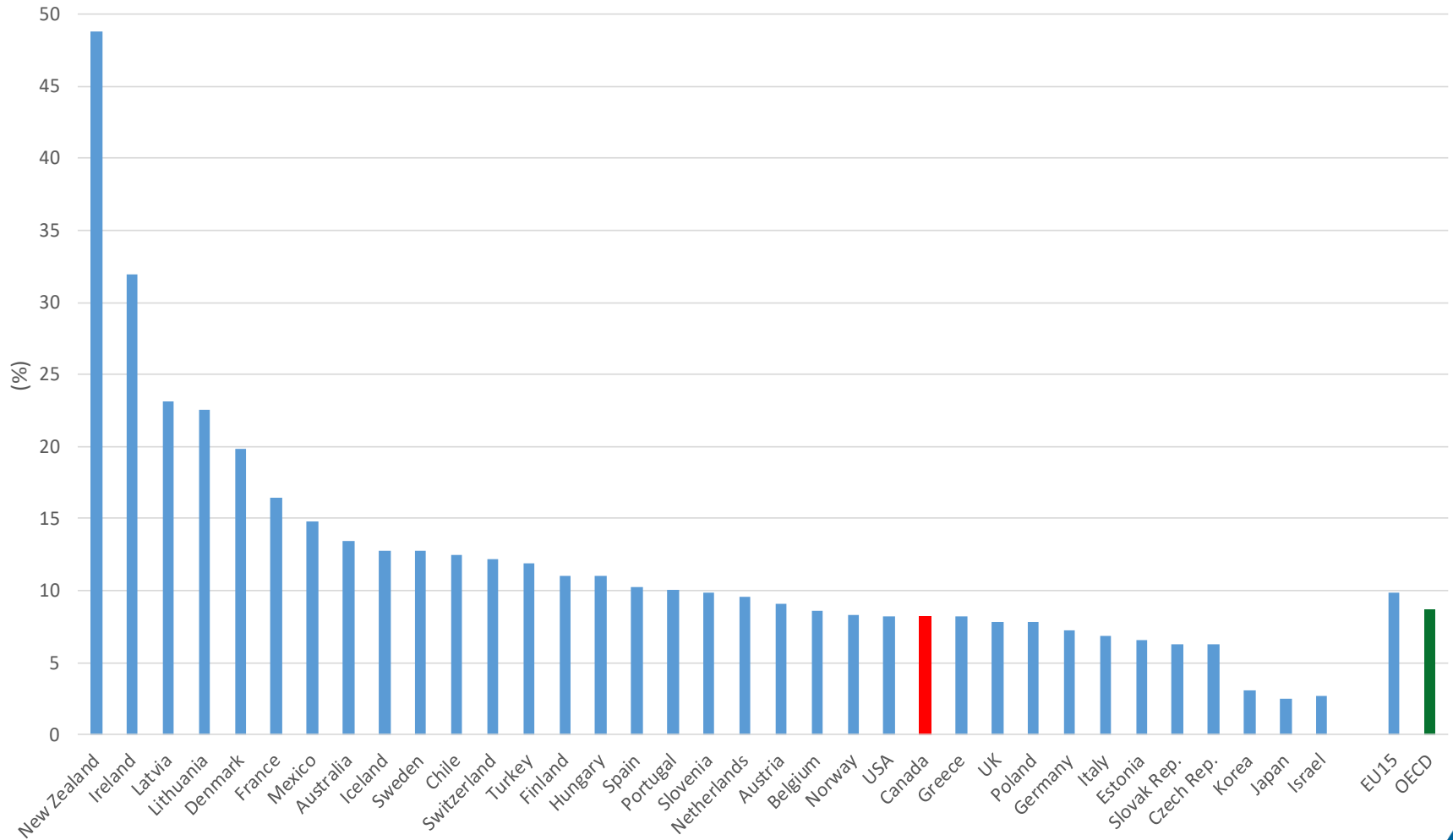
# Pesticide sales per unit of land much lower than the OECD average

Average annual pesticide sales per ha (2011-15)





# Share of agricultural GHG emissions in total 2013-15





# Progress with decoupling GHG emissions from production growth in several countries



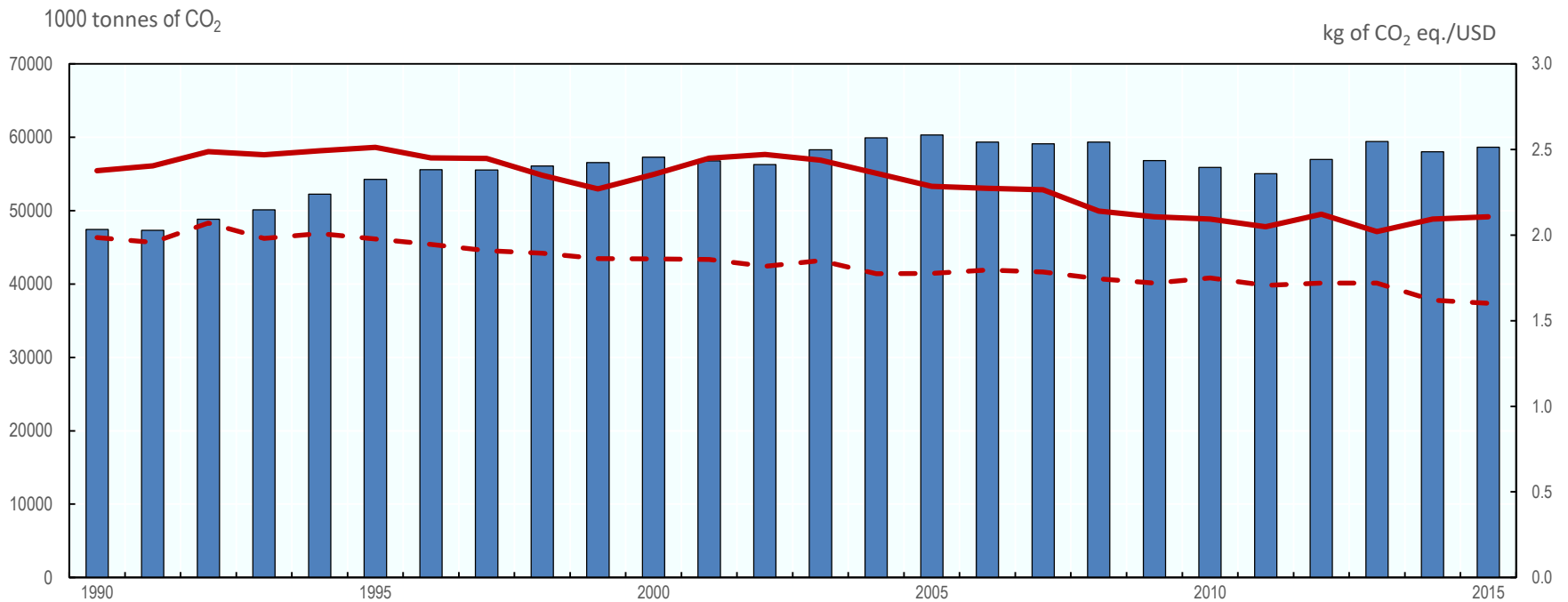


# Progress with decoupling GHG emissions from agricultural production

Canada agricultural GHGs emissions

Canada GHGs emissions intensity

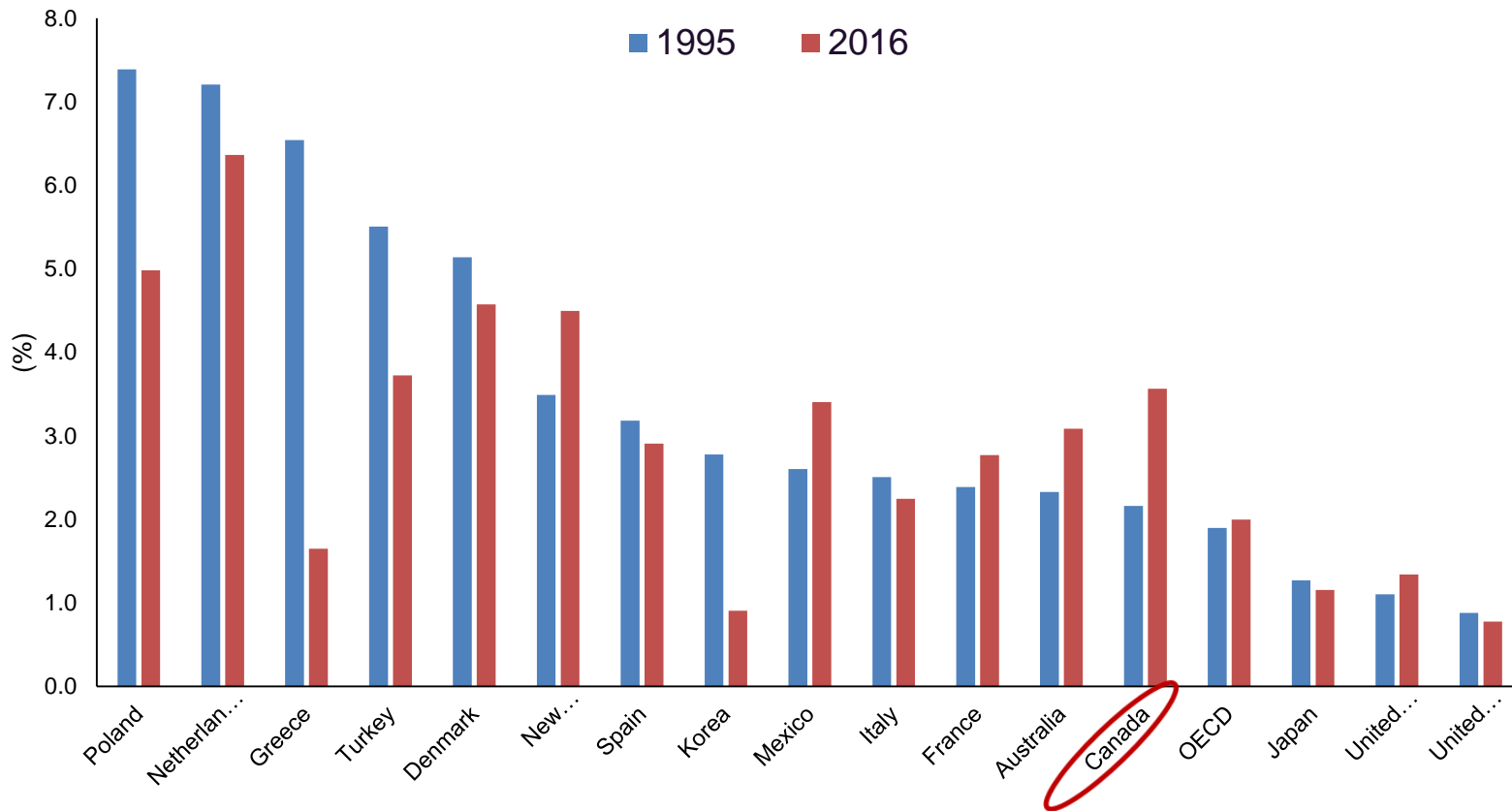
OECD GHGs emissions intensity





# On-farm energy use comparable to OECD average, but is increasing...

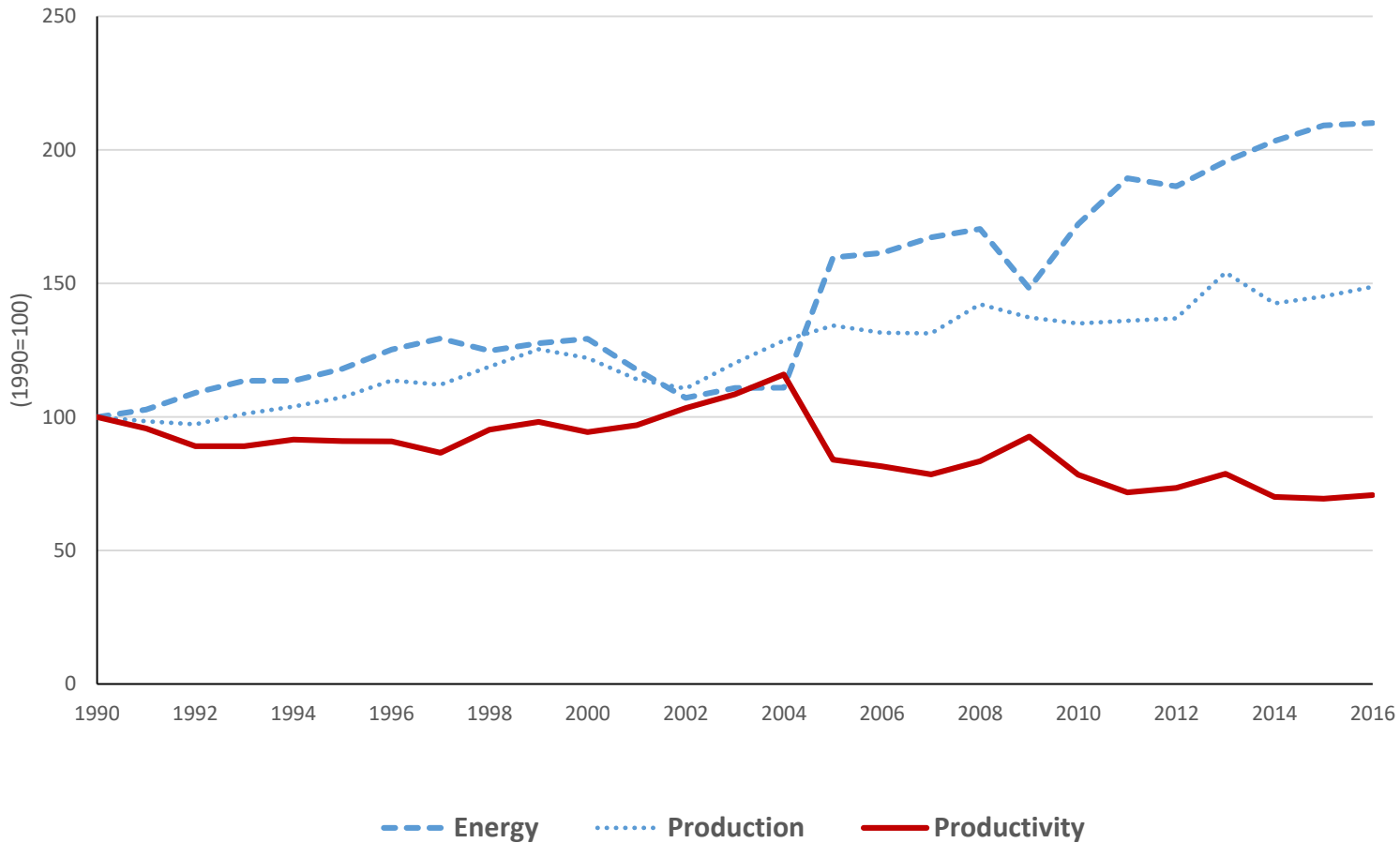
Share of agriculture in total energy (%)





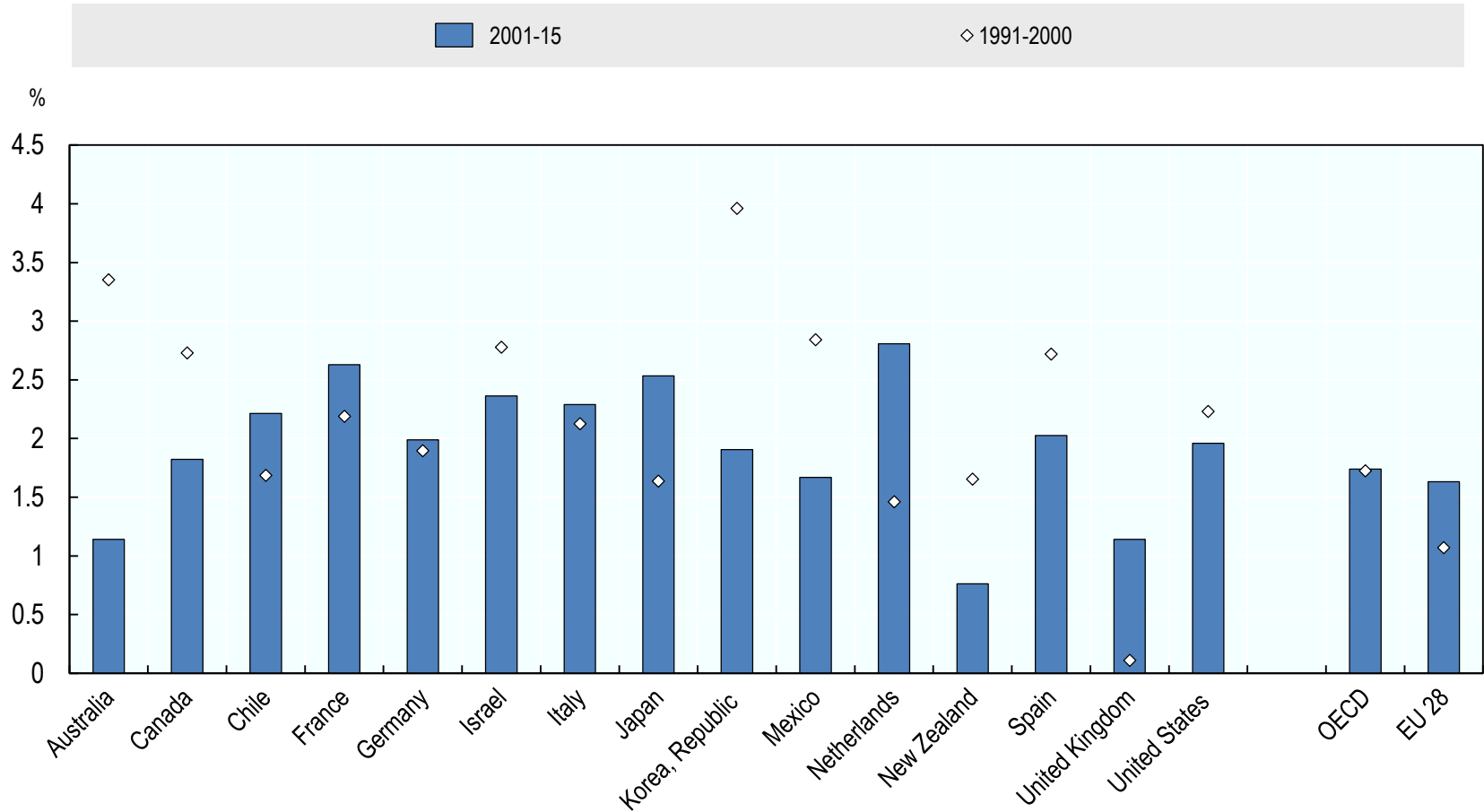


# Energy productivity is declining...





# TFP growth in primary agriculture is comparable with OECD, but slowed down

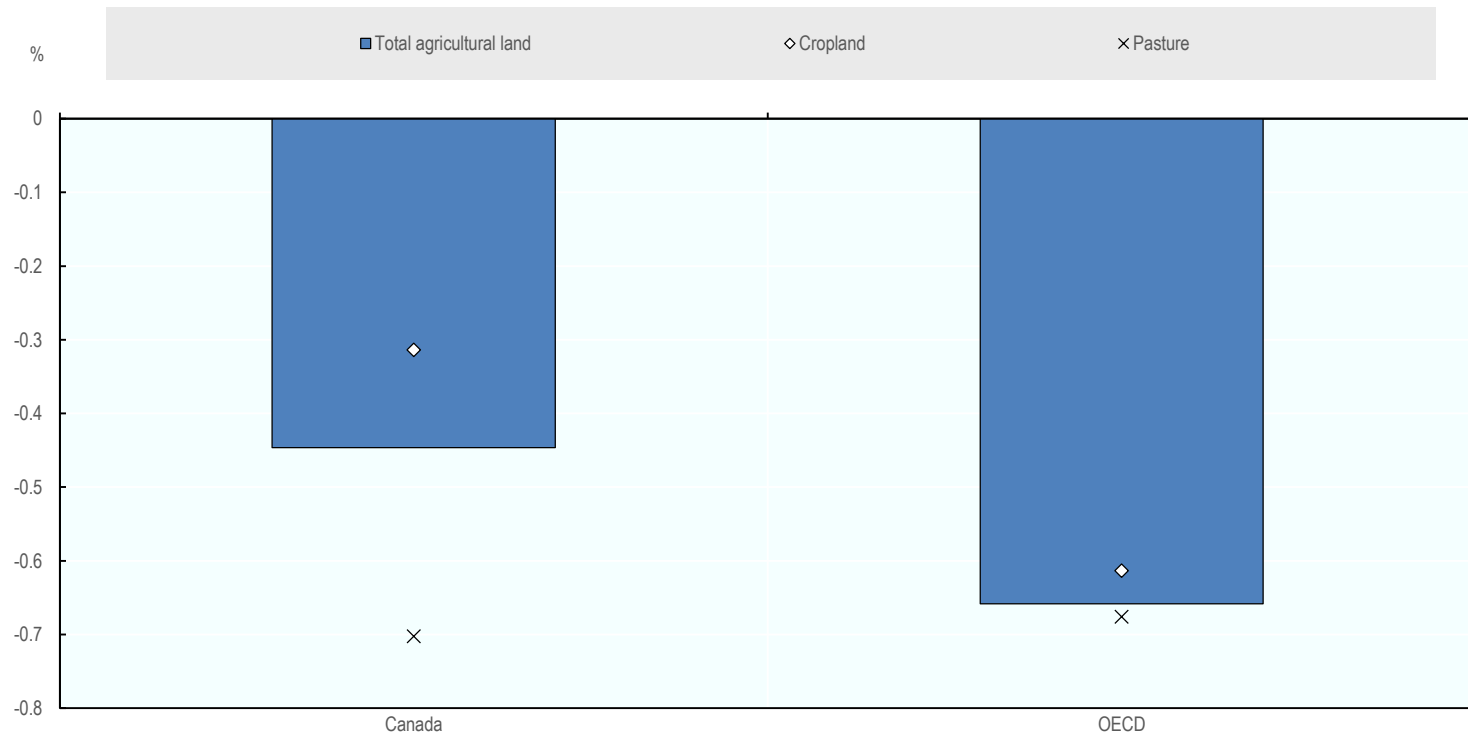


**Natural asset base:  
What does the empirical evidence show?**



# Land use change

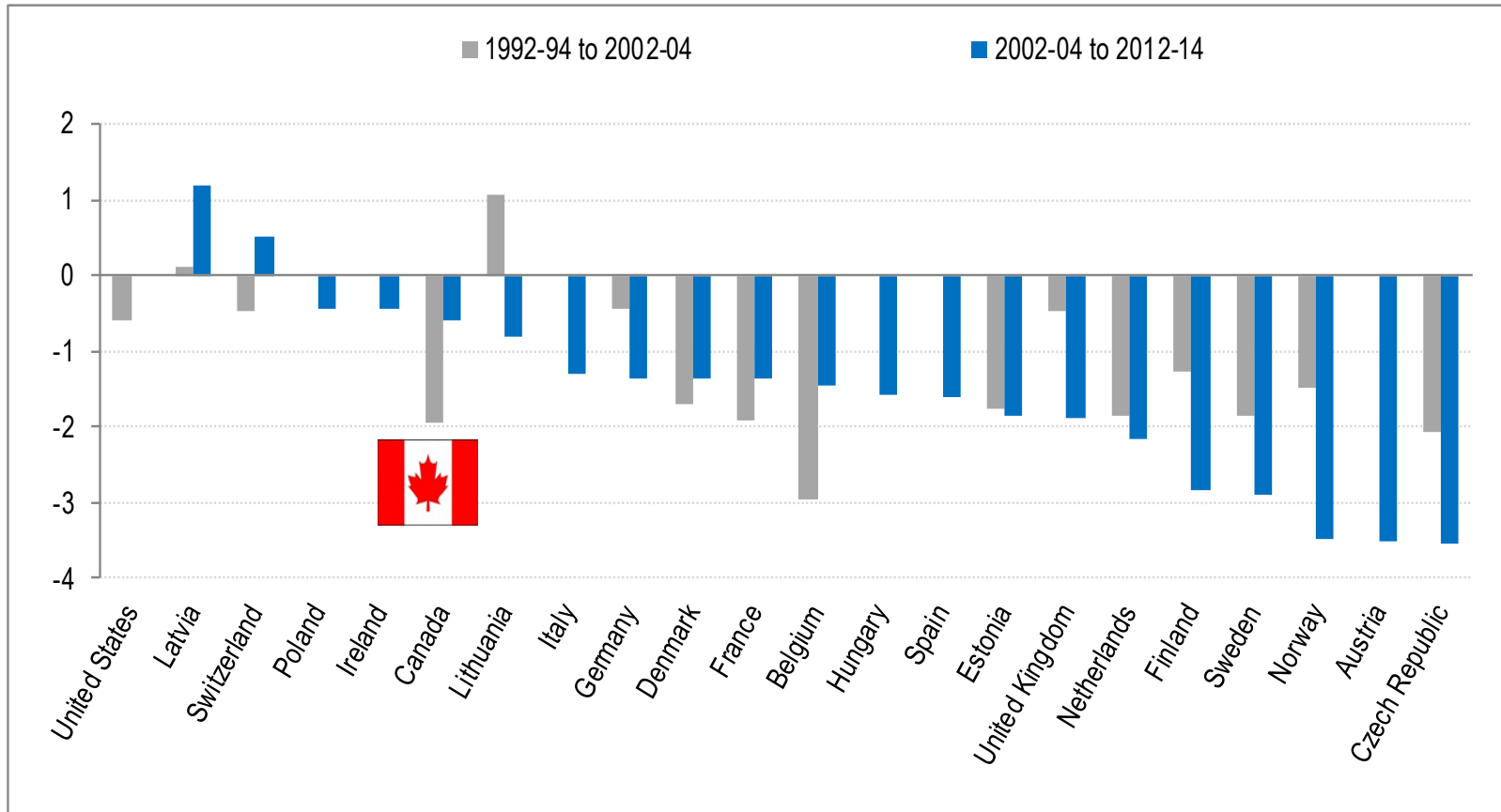
Average annual % change 2005 to 2015





# Farmland bird populations continue declining

Average annual % change in farmland bird index (2000=100)



# **Economic opportunities and policy responses: What does the empirical evidence show?**



# Evolution of agricultural policies in OECD countries

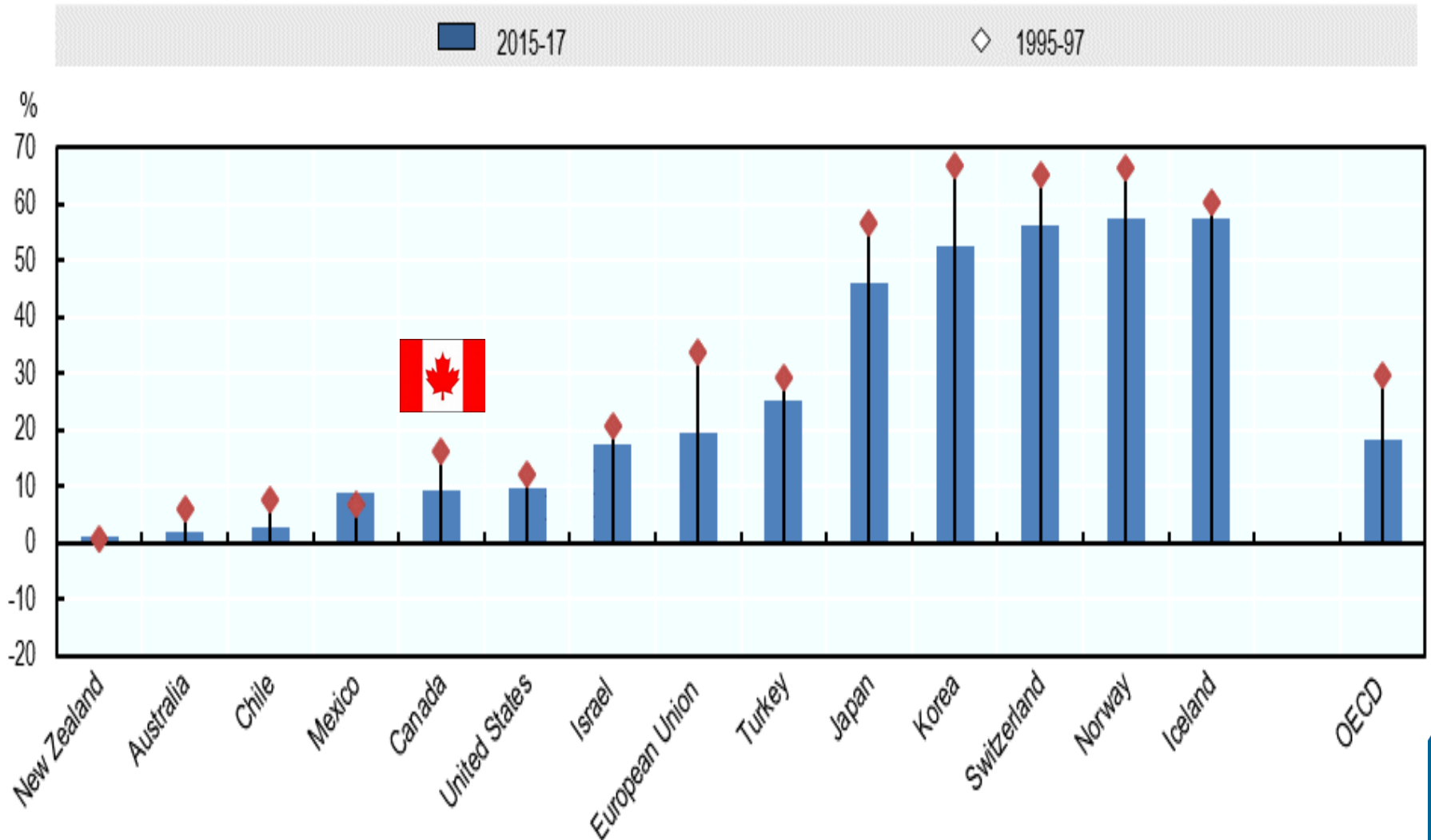
---

- Agricultural **policy reform** in OECD countries has been progressing slowly – but it is still a protected sector
- Some **reduction in support** and shift towards public goods (e.g. environment) and other objectives (e.g. rural development)
- Less emphasis on which commodities farmers can produce, but **more restrictions** on how they produce them





# Producer support is half than the OECD average ...

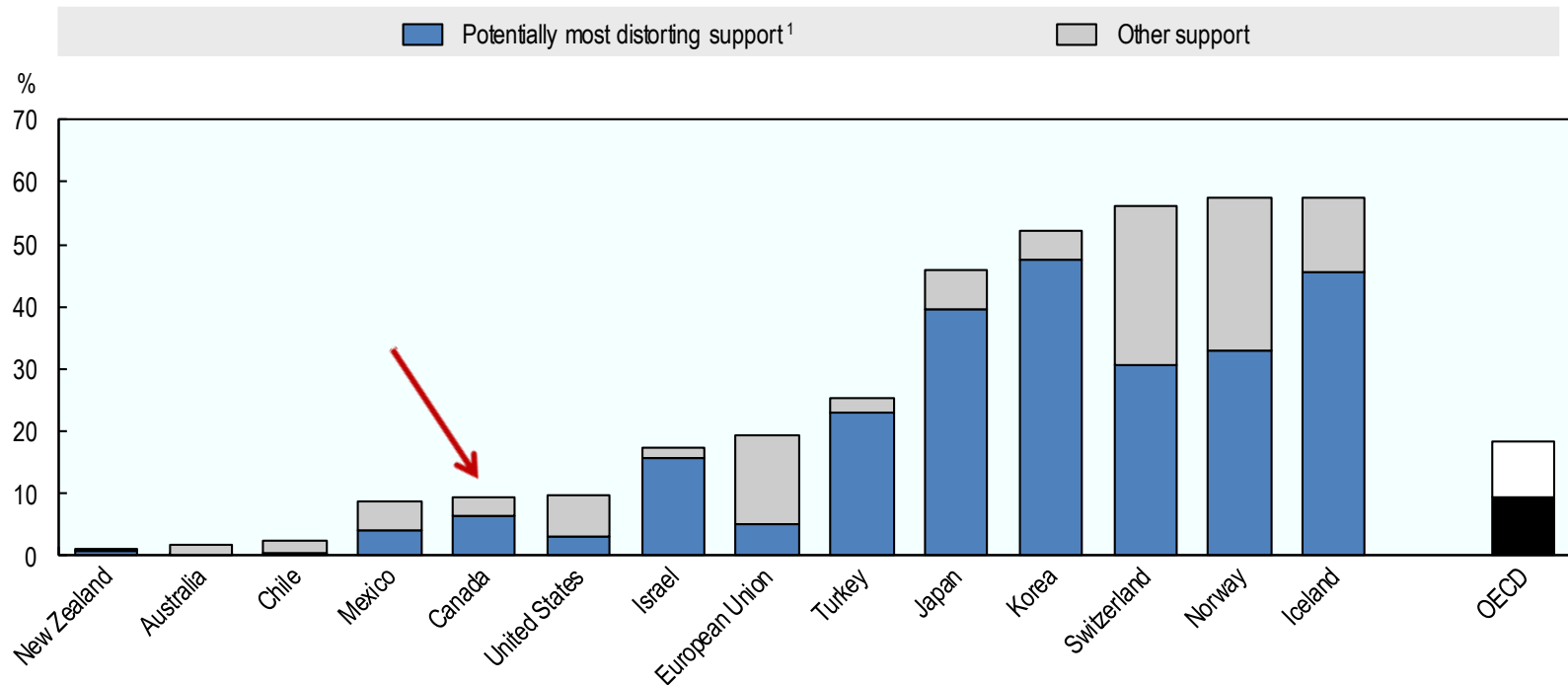






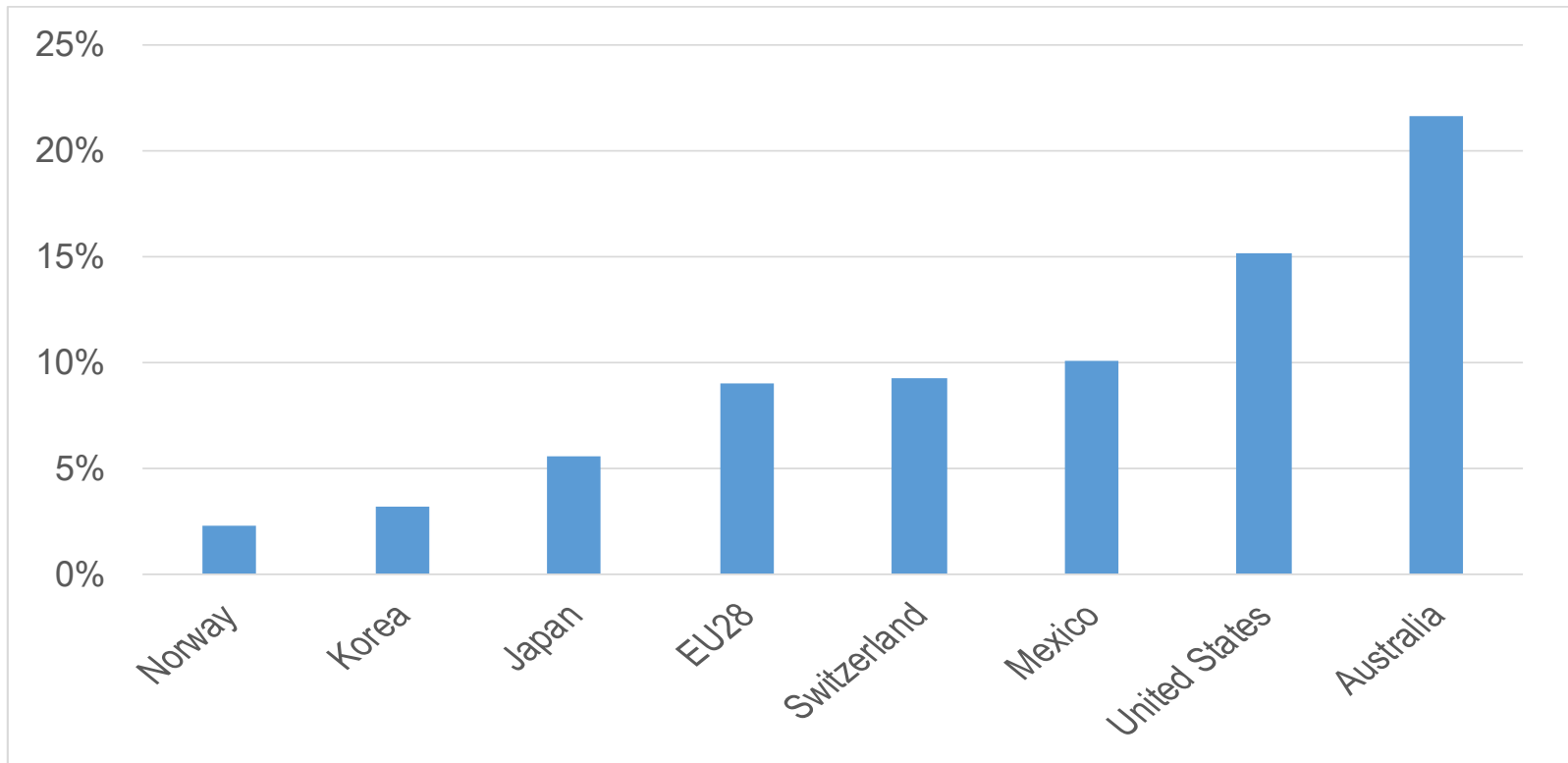
# But potentially most distorting support is similar to the OECD average

(% Share in producer support, 2015-17)



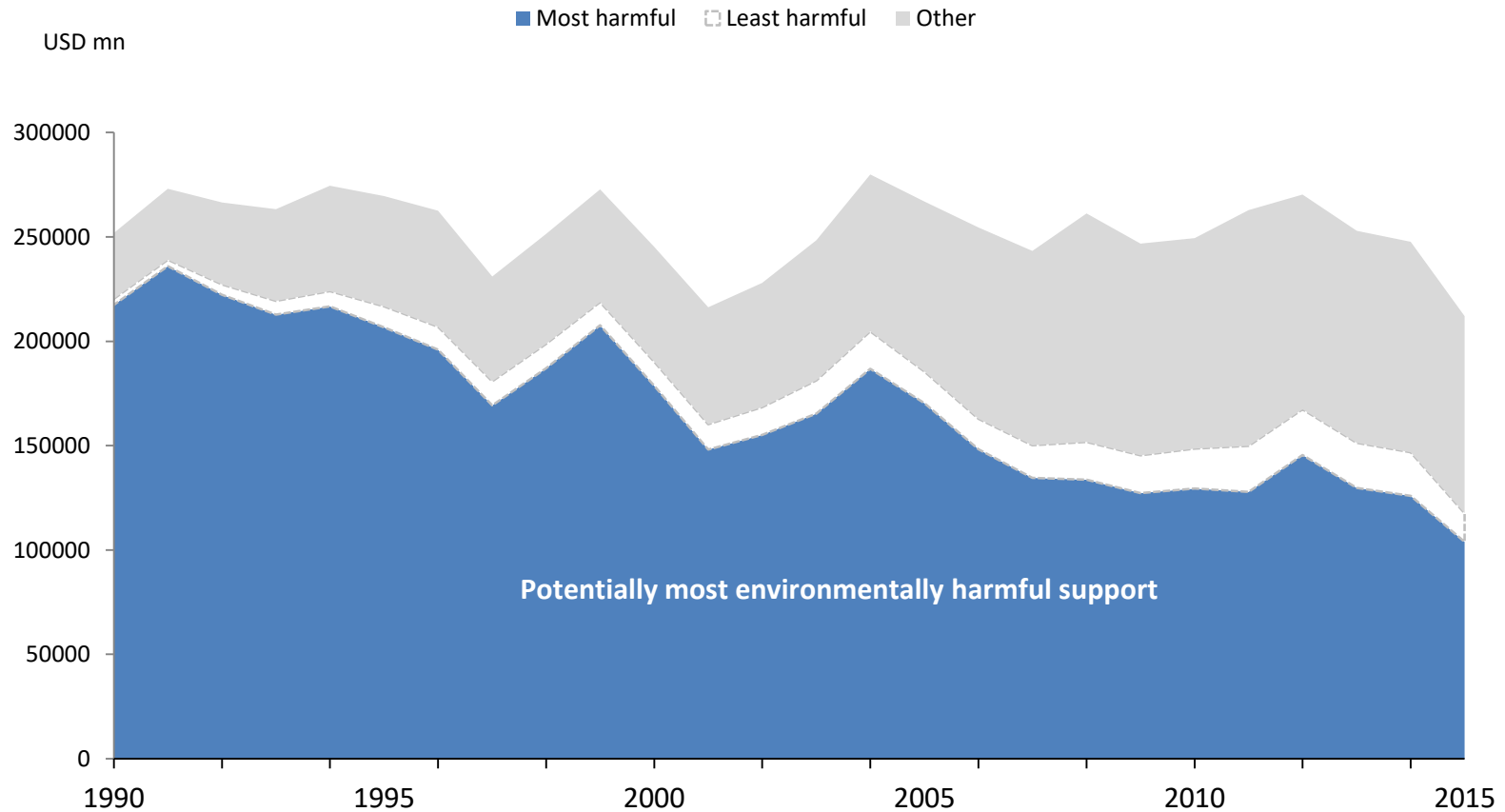


# Producer support is without environmental constraints, 2015-17 (%)





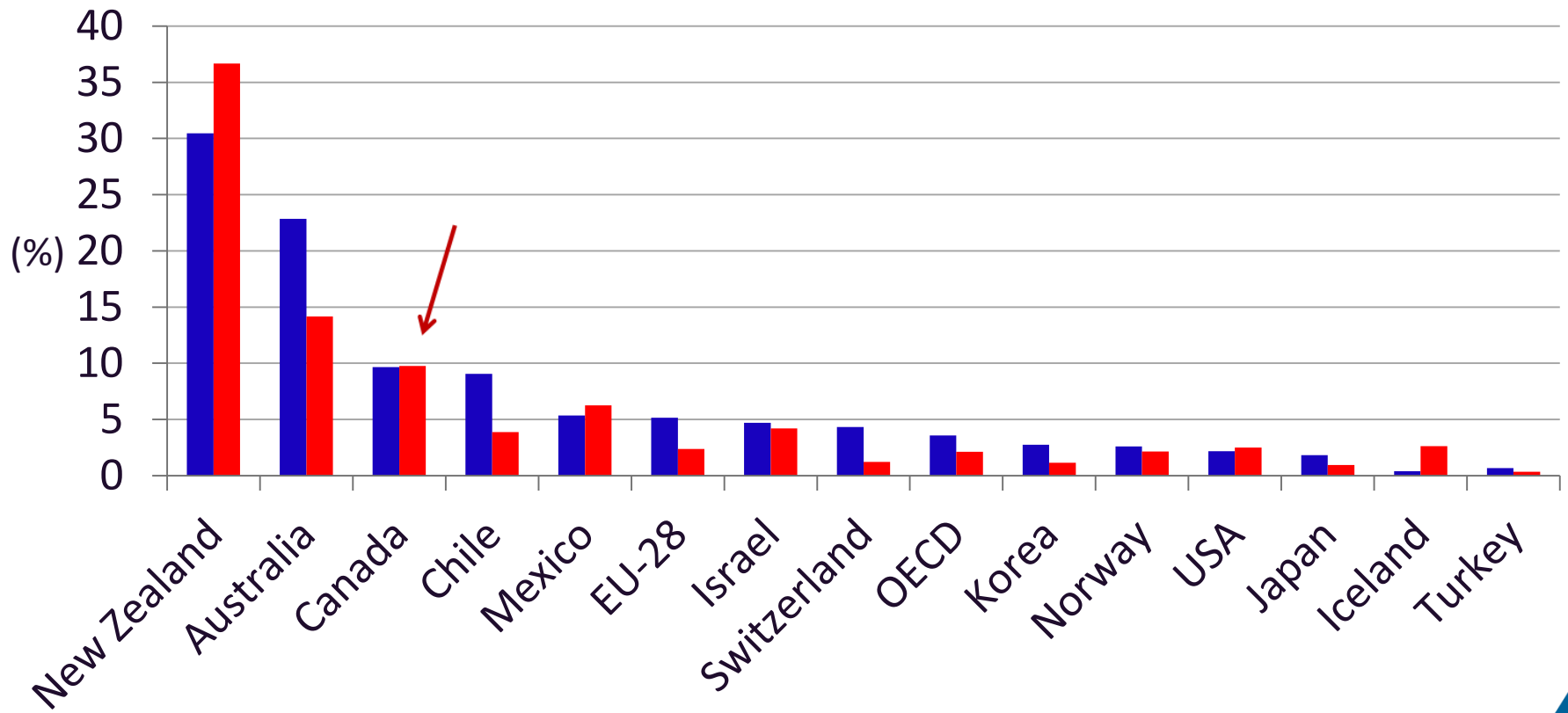
# Potentially environmentally harmful agricultural support decreased in OECD area





# High share of Government expenditures on AIS in total support to agriculture

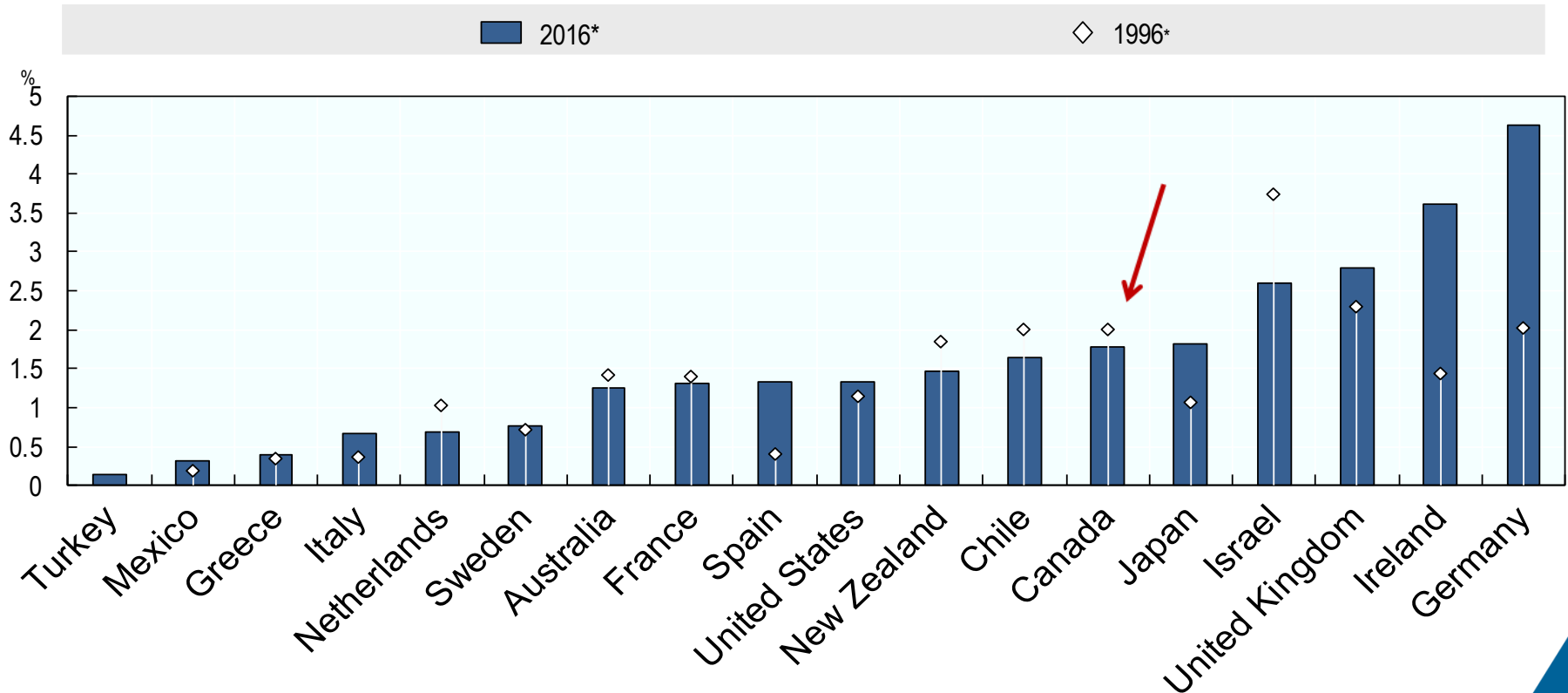
■ 1995-97 ■ 2015-17





# Public agricultural R&D intensity is the 6<sup>th</sup> largest

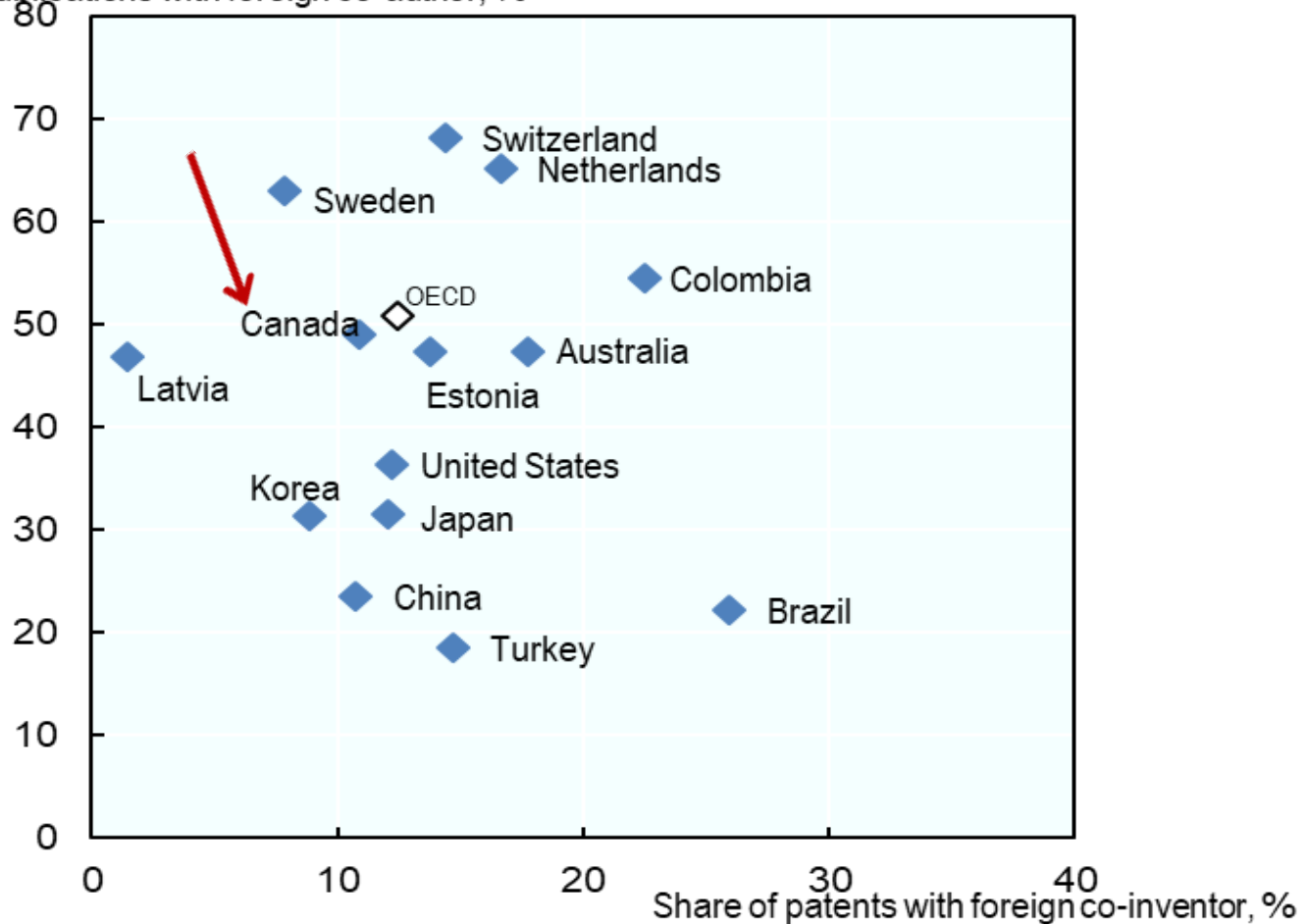
Budget allocations for agricultural sciences R&D as a percentage of agricultural value-added





# Agri-food research co-operation outputs close to OECD average

Share of publications with foreign co-author, %



Source: ECD patent statistics and Scimago.

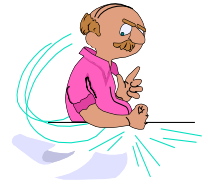
# Key lessons – what work OECD is doing?



# Key lessons

---

- Canada has made progress towards green growth in agriculture, but there is a need for further progress:
  - Nutrient balances
  - GHG emissions
  - Energy productivity
  - Total factor productivity
- Evidence is partial:
  - Gaps in data availability and quality
  - Conceptual and methodological challenges
  - Empirical evidence often confusing







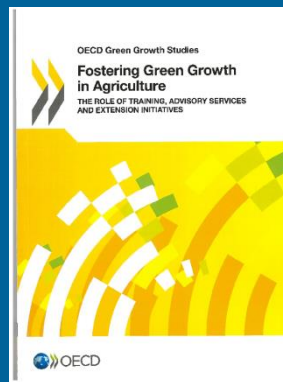
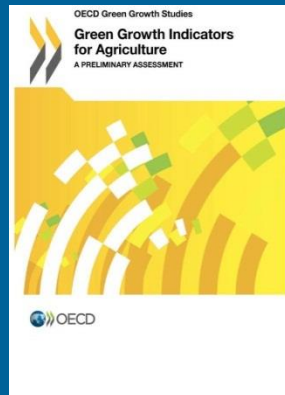
# What OECD is doing?

---

- Country reviews on innovation, productivity and sustainability
- Agri-environmental indicators
- Environmental impacts of agricultural policies
- OECD co-ordinated Network on Total Factor Productivity and the Environment
  - 4-5 April 2019
  - 30-31 October 2019



# Thank you for listening!



**Contact:**  
[dimitris.diakosavvas@oecd.org](mailto:dimitris.diakosavvas@oecd.org)



# Green Growth framework

## Enabling conditions

- Balanced tax structures
- R&D and innovation policy
- Competition
- Infrastructure investment
- Openness to trade and FDI

## Key policy tools

- Pricing of pollution and resource use
- Subsidy reform
- Regulatory and policy predictability
- Support to basic research and emerging technologies
- Governance of natural assets

## Major environmental issues

- Water scarcity
- Climate change
- Health impacts of pollution
- Biodiversity loss

## Promoting transition

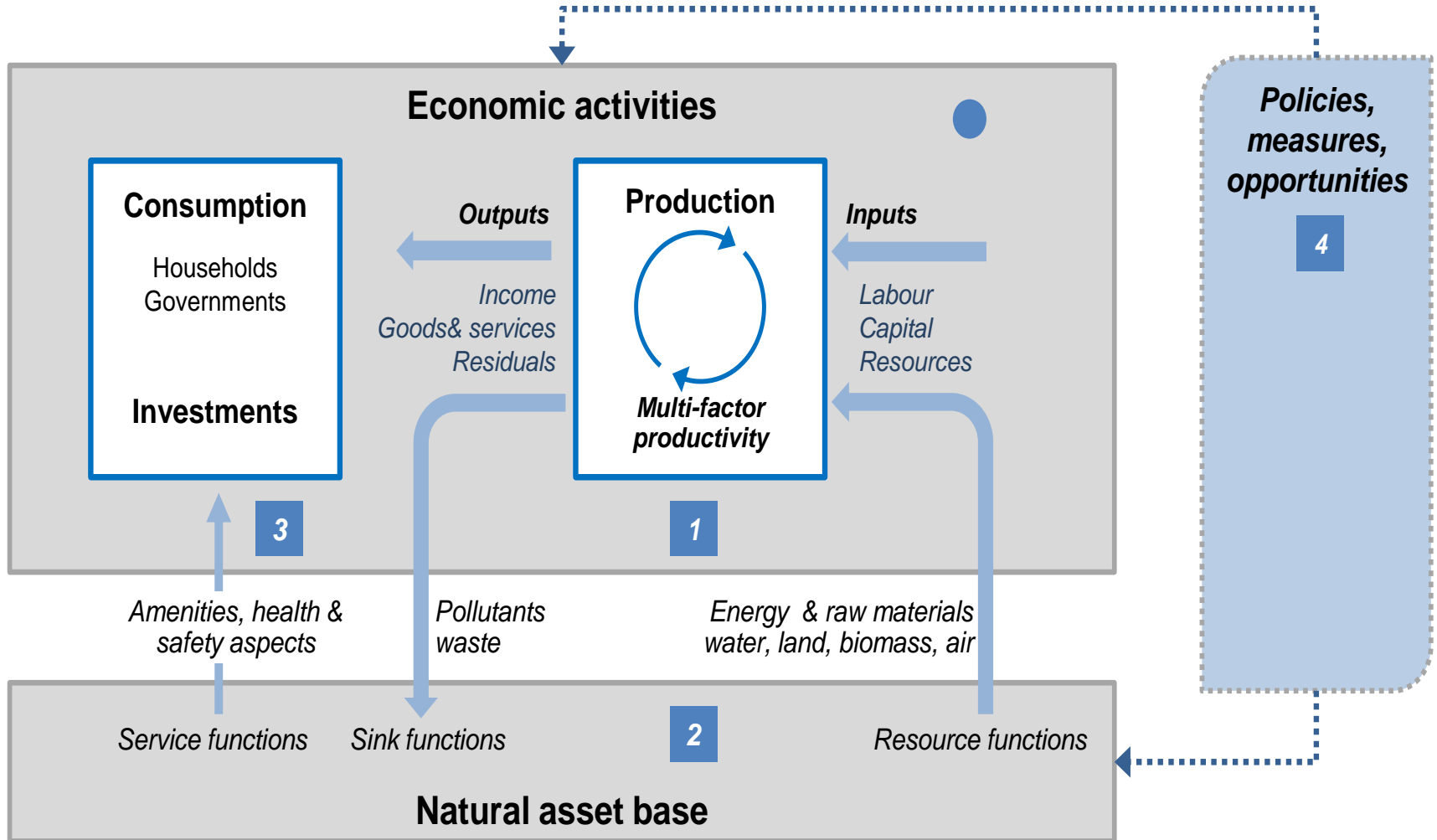
- Skills and labour market adjustment
- Distributional and competitiveness concerns
- Science and technology cooperation
- Development assistance
- Management of global public goods

## Measurement agenda

- Productivity of resource use
- Physical evolution of the natural asset base
- Environmental quality of life
- Opportunities arising from environmental considerations
- Evolution of policy and social responses
- Promoting efforts consistent with international standards



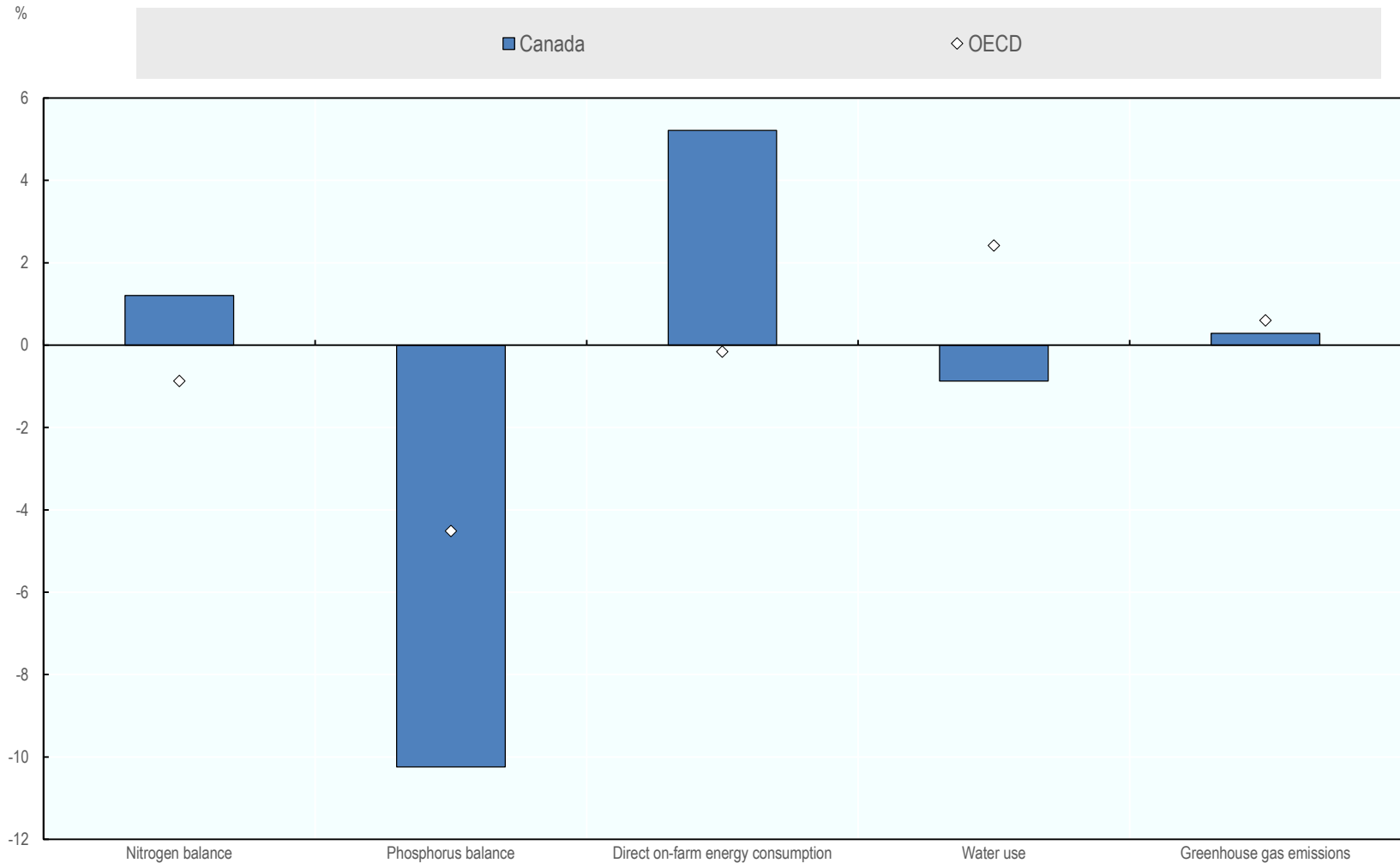
# Framework for green growth indicators





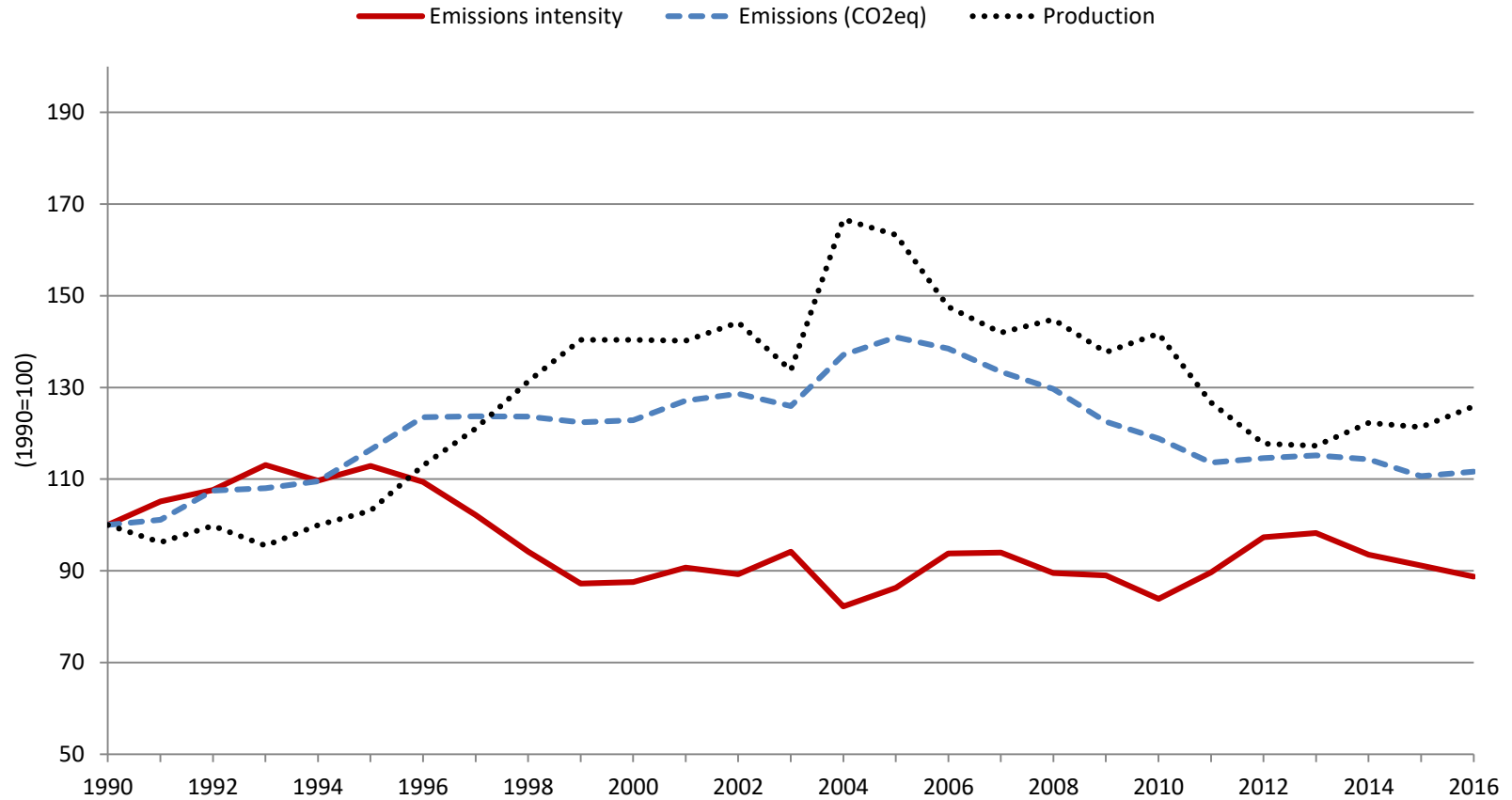
# Agri-environmental progress

Average annual change (2003-05 to 2013-15)



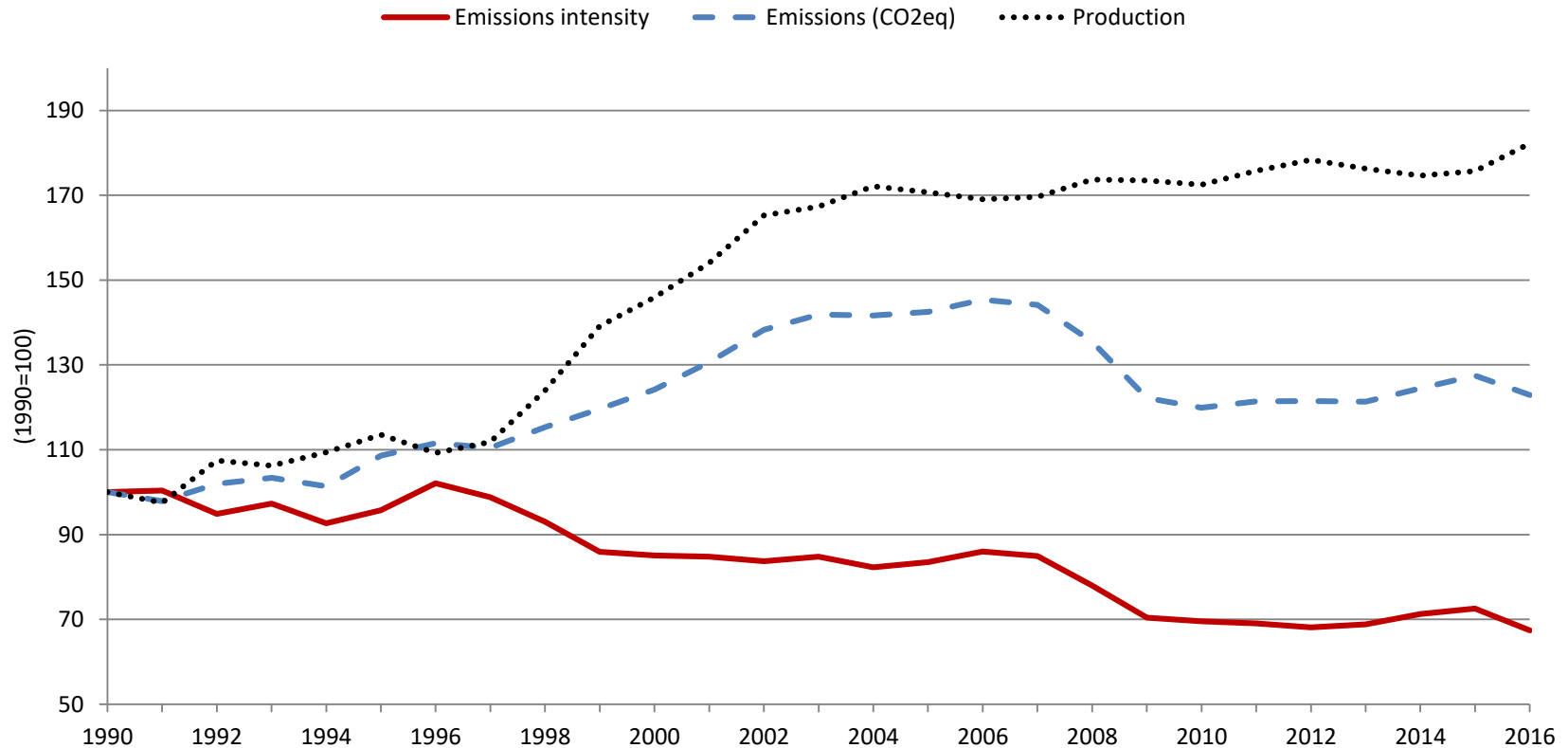


# Beef: Limited progress with decoupling GHG emissions from production



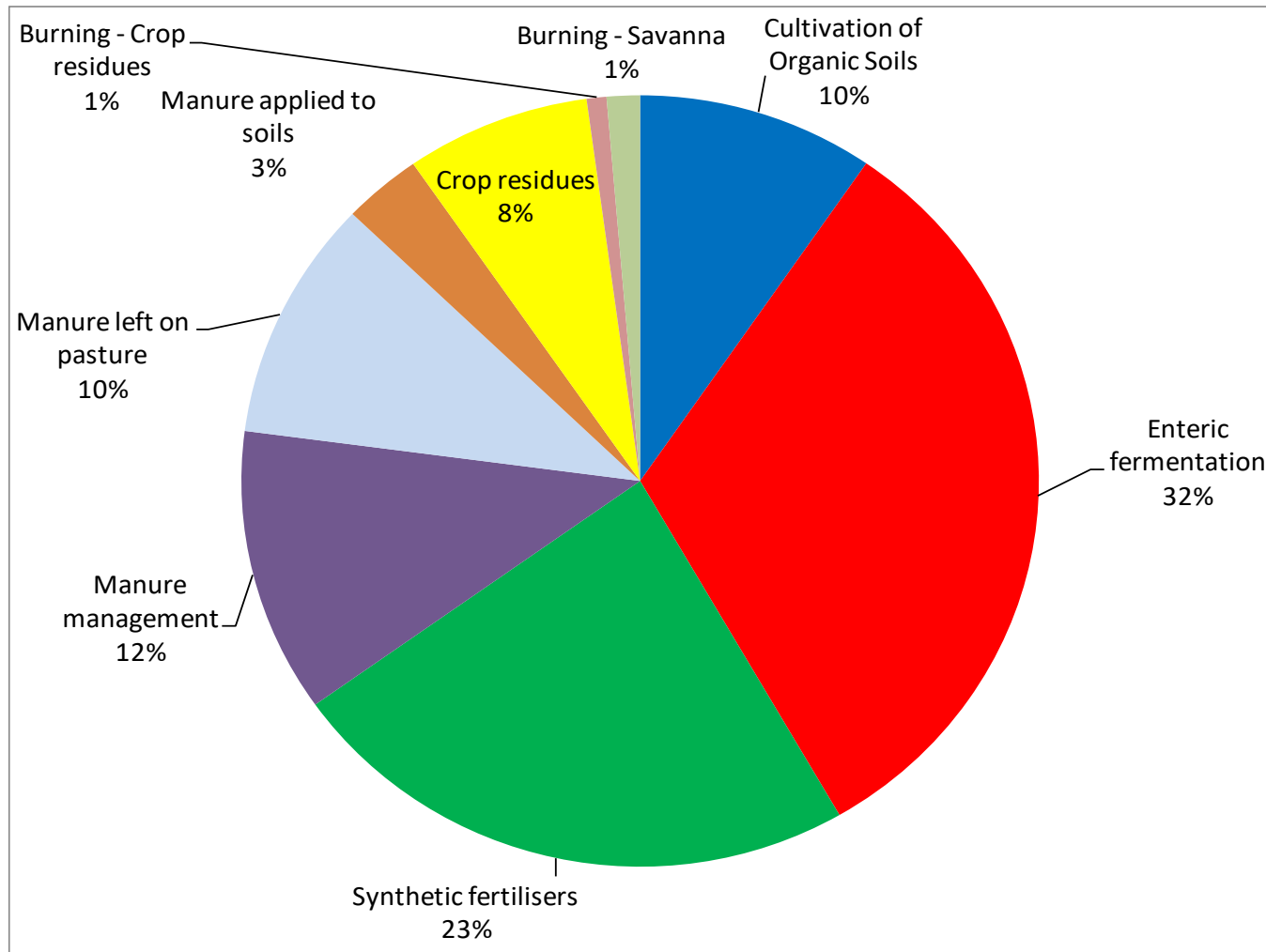


# Pigmeat: Progress with decoupling GHG emissions from production





# Livestock accounts for more than half of GHG emissions (2016)



Source: FAOSTAT