

# Crunching the Numbers: A Snapshot of Canada's Agricultural Technology Landscape

Presented at the CAGONT Conference  
Saturday, October 28, 2023

## McKenzie Huneke, MS

Sustainability Management PhD Candidate  
School of Environment, Enterprise and Development  
University of Waterloo  
[m2huneke@uwaterloo.ca](mailto:m2huneke@uwaterloo.ca)

## Tara Vinodrai, PhD

Associate Professor  
Institute for Management and Innovation  
& Tri-campus Department of Geography and Planning  
University of Toronto  
[tara.vinodrai@utoronto.ca](mailto:tara.vinodrai@utoronto.ca)

## Heather Hall, PhD

Associate Professor  
School of Environment, Enterprise and Development  
University of Waterloo  
[h.hall@uwaterloo.ca](mailto:h.hall@uwaterloo.ca)

# Canada's Agriculture System



- Employs 2.1M people
- Provides 1 out of 9 Canadian jobs
- Generates \$134.9B (6.8%) of Canada's GDP
- Advanced technologies are reshaping the sector

Source: [Agriculture Canada](#)

# Digital Agriculture in Canada

- Agricultural technologies have the potential to help farmers and growers to:
  - Enhance efficiency
  - Reduce costs
  - Address sustainability
- However, little is known about:
  - Canadian agricultural technology producers/firms
  - Business, environmental, and social benefits to ag-tech users in Canada
  - Spatial connections between ag-tech firms and rural farming

# Research Questions

- What are the characteristics of Canadian agricultural technology firms?
  - Location: urban vs. rural, regional differences
  - Application areas and types of technology
- What benefits do Canadian agricultural technology firms emphasize?
  - Business, environmental, and/or social benefits?
- Is there a relationship between organizational structure and environmental or social benefits?
  - Organizational structure
  - Gender diversity on management teams

# Methods

- Used Crunchbase to identify 923 firms classified as ‘Agriculture’ in Canada
- Developed unique database of 247 organizations that met the following criteria:
  - Canadian-owned
  - Active business operations
  - Developing digital technologies specifically for agriculture
- Collected additional information from firm websites
- Coded variables:
  - Headquarter locations (urban vs. rural, region), organization type, structure, & leadership
  - Target use cases & agricultural applications, technologies, intended user benefits
- Limitations: information from Crunchbase & company websites only

# FINDINGS

# **ORGANIZATION CHARACTERISTICS**

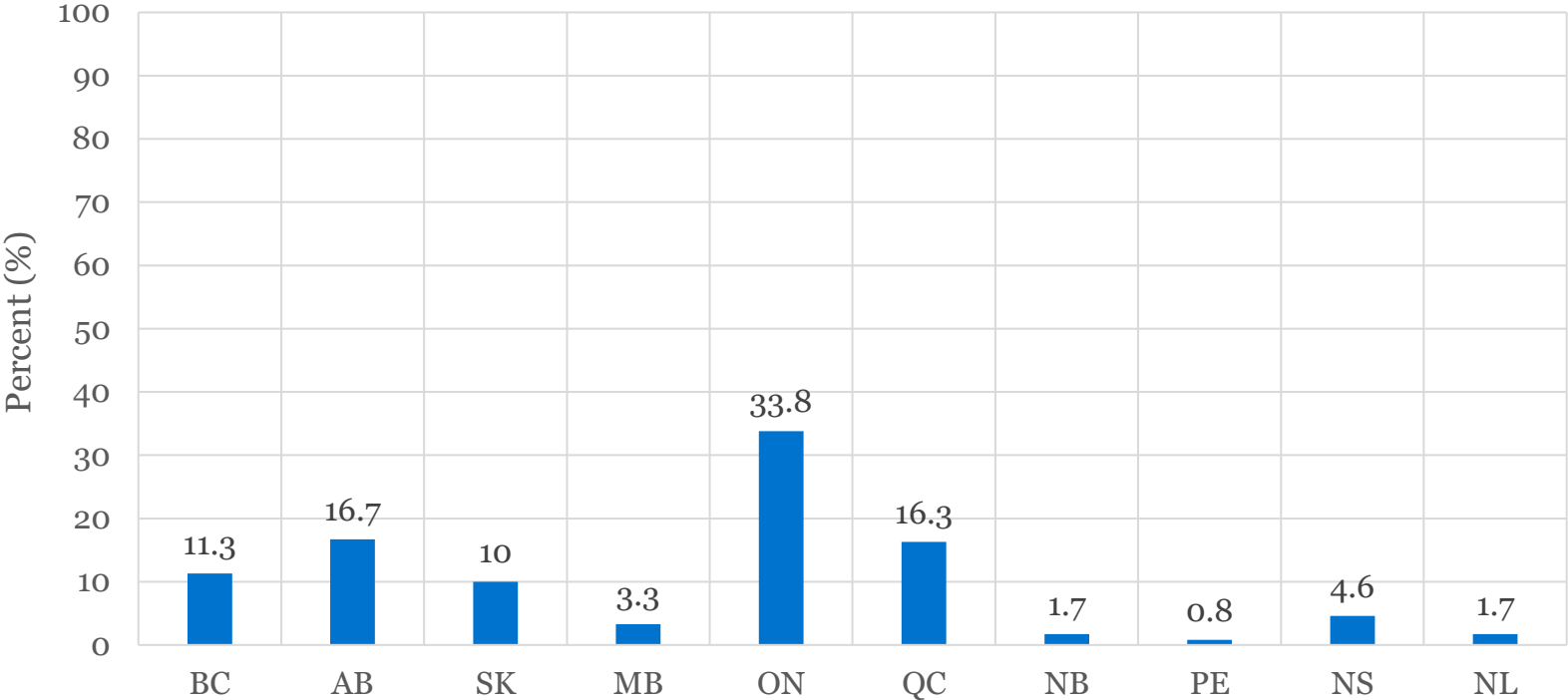
# Organization Characteristics

- Majority of organizations (91.6%) are for-profit businesses
- Small to medium sized businesses
- Typically generate less than \$10M in annual revenue
- Fewer than 50 employees
- In operation for less than 10 years

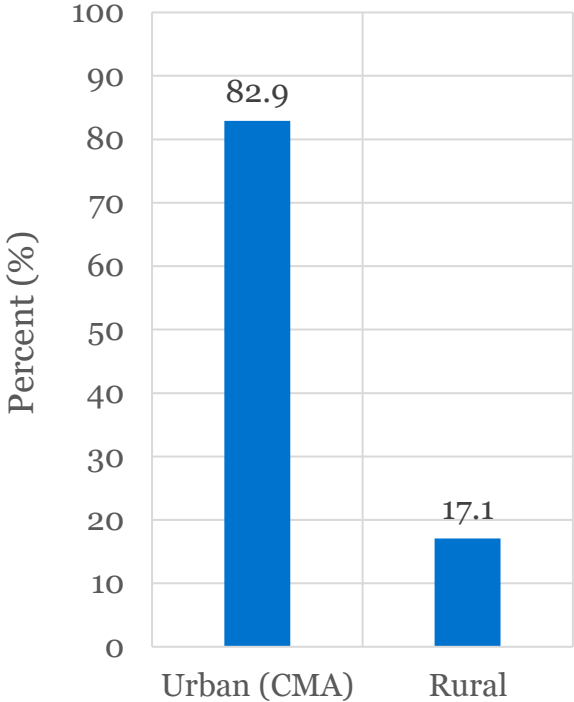


# Location of Ag-Tech Organizations

### Ag-Tech Organizations by Province

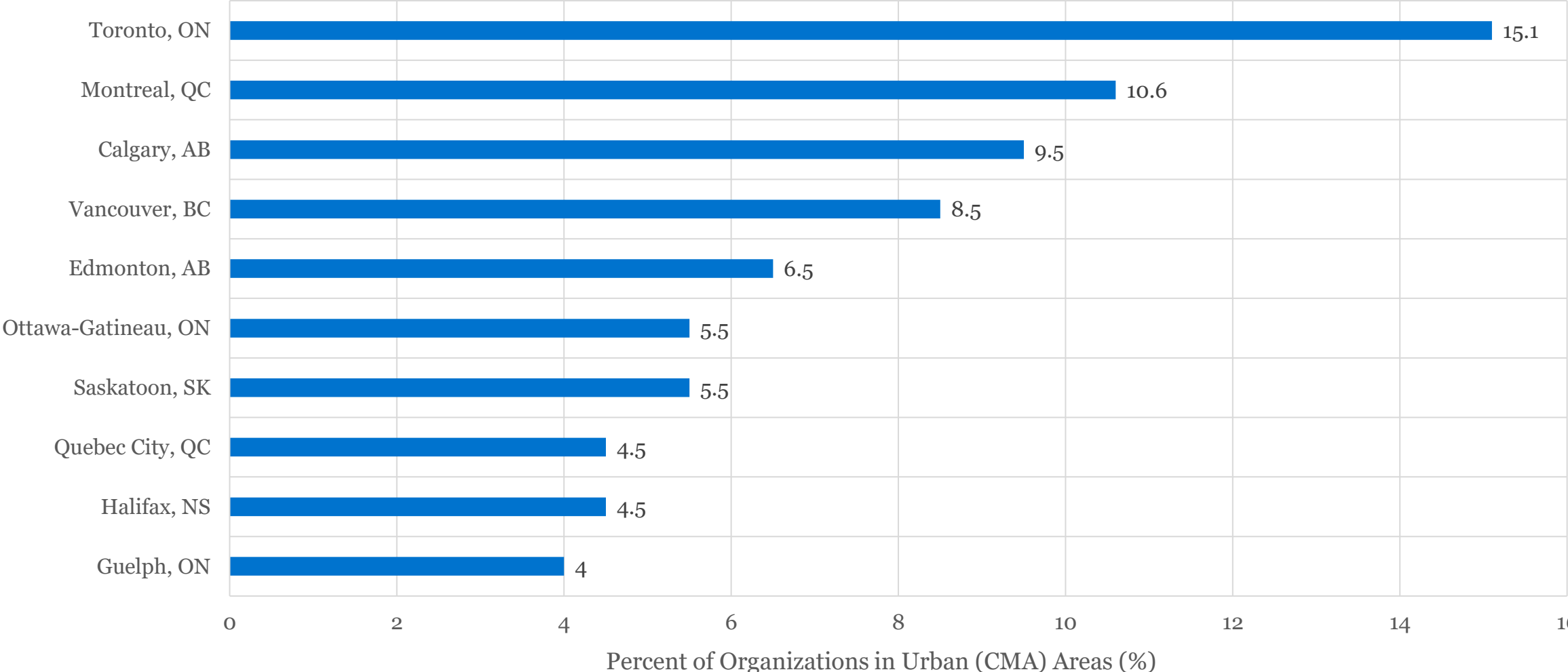


### Ag-Tech Organizations: Urban vs. Rural



# Location of Ag-Tech Organizations: Urban (CMA) Areas

Ag-Tech Organizations by Top 10 Urban (CMA) Areas



# Location of Ag-Tech Organizations: Rural Areas

## BC

- Campbell River
- Chase
- Clearwater
- Summerland

## AB

- Camrose
- Carstairs
- Irricana
- Lloydminster

## SK

- Beechy
- Kindersley
- Naicam
- Norquay
- Rosetown
- Sedley
- Senlac
- Sherwood
- Swift Current

## MB

- Arborg
- Morden
- Carman

## ON

- Ayr
- Blenheim
- Exeter
- Lindsey
- Mitchell
- McNab-Braeside
- Norwich
- Tavistock

## QC

- Gaspé
- La Pocatière
- Napierville
- Nicolet
- Normandin
- Saint-Germain-de-Grantham

## NB

- Chamcook

## PE

- Victoria
- North Wiltshire

## NS

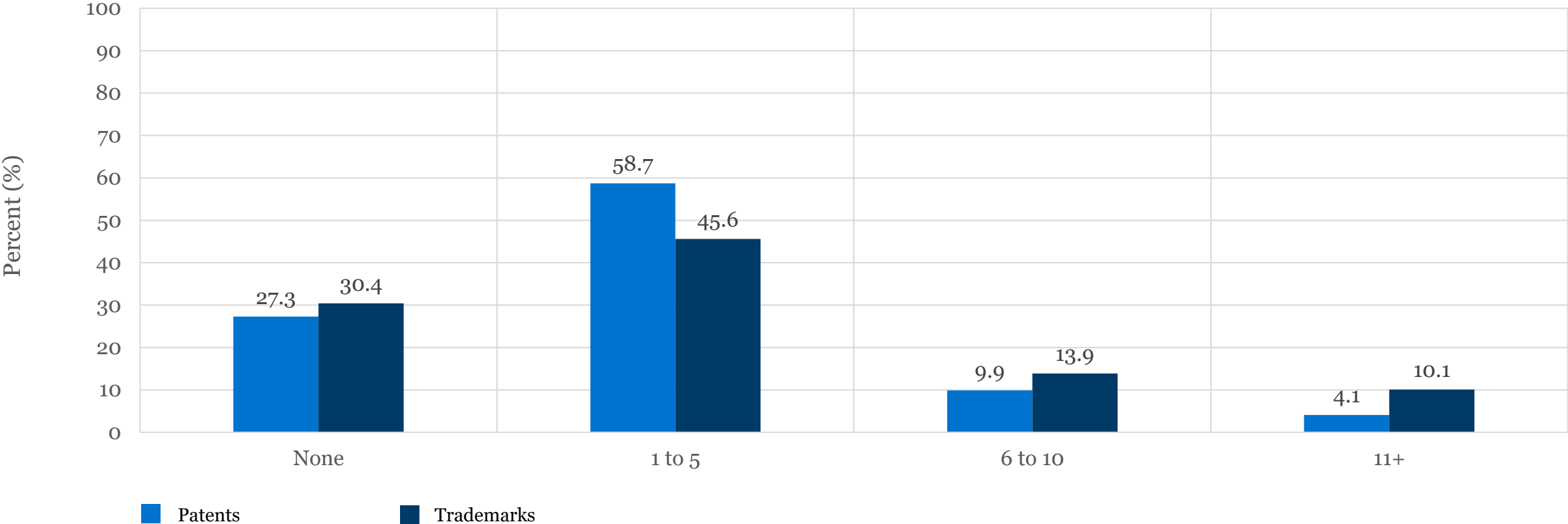
- Great Village
- Kentville

## NL

- Main Brook

# Organizations by Intellectual Property

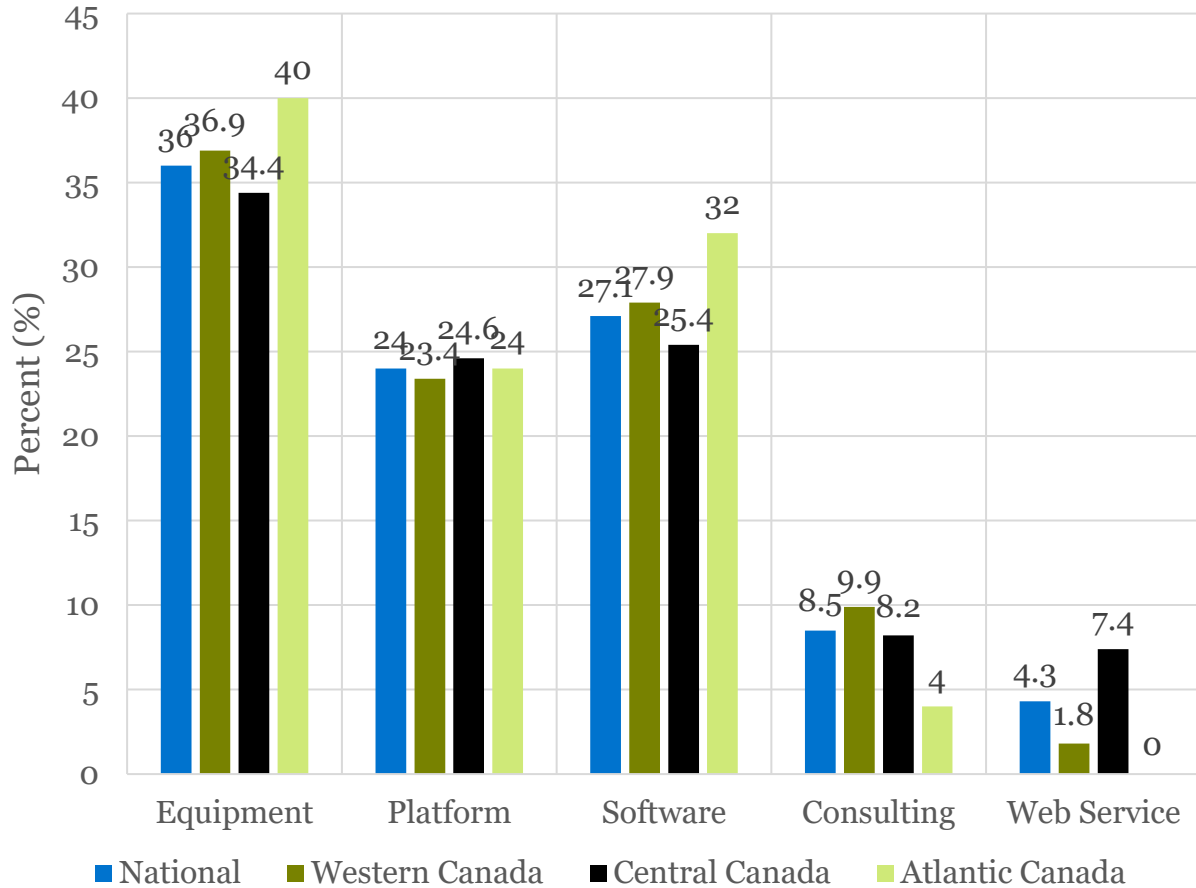
Ag-Tech Organizations by Number of Registered Patents & Trademarks



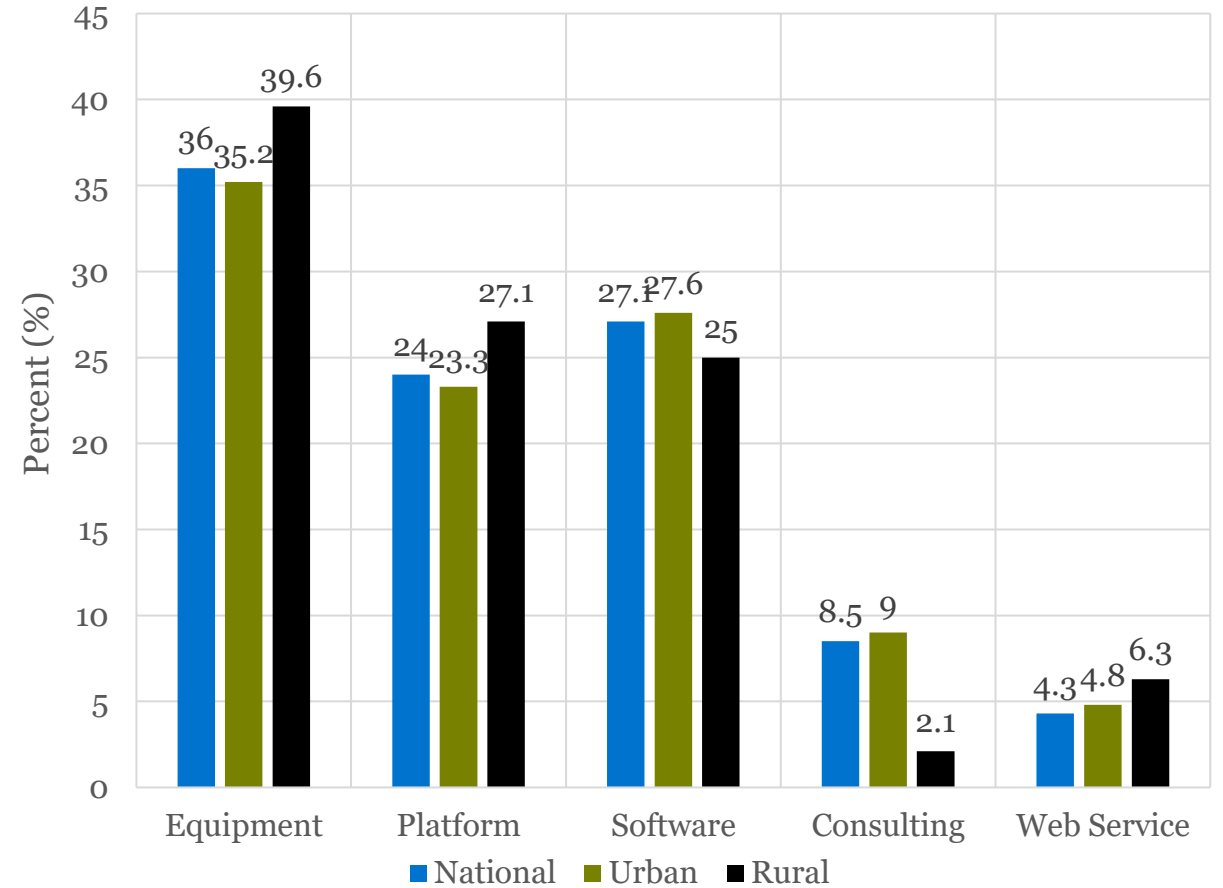
# **TYPES OF AG-TECH PRODUCTS**

# Types of Canadian Agricultural Technology

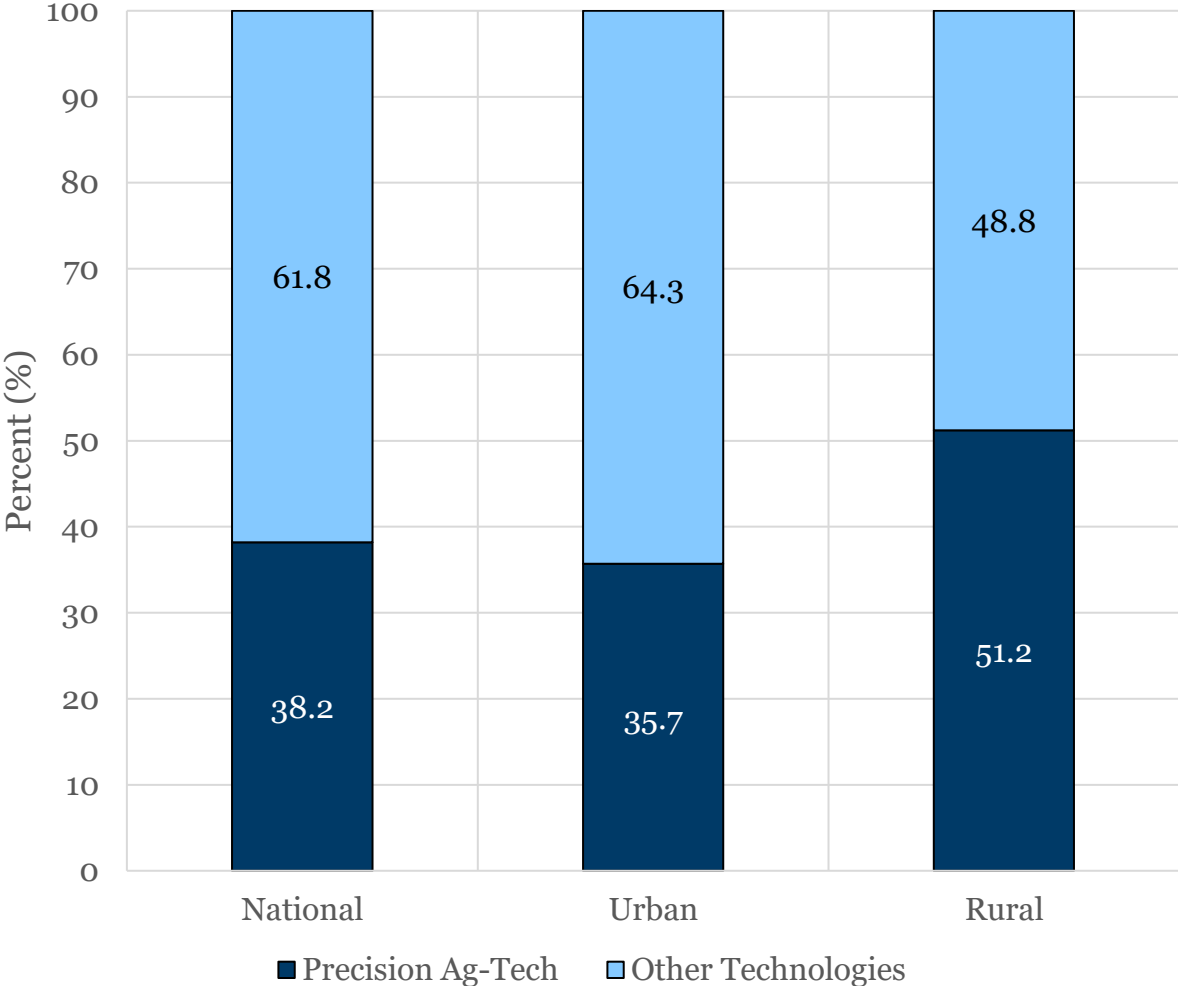
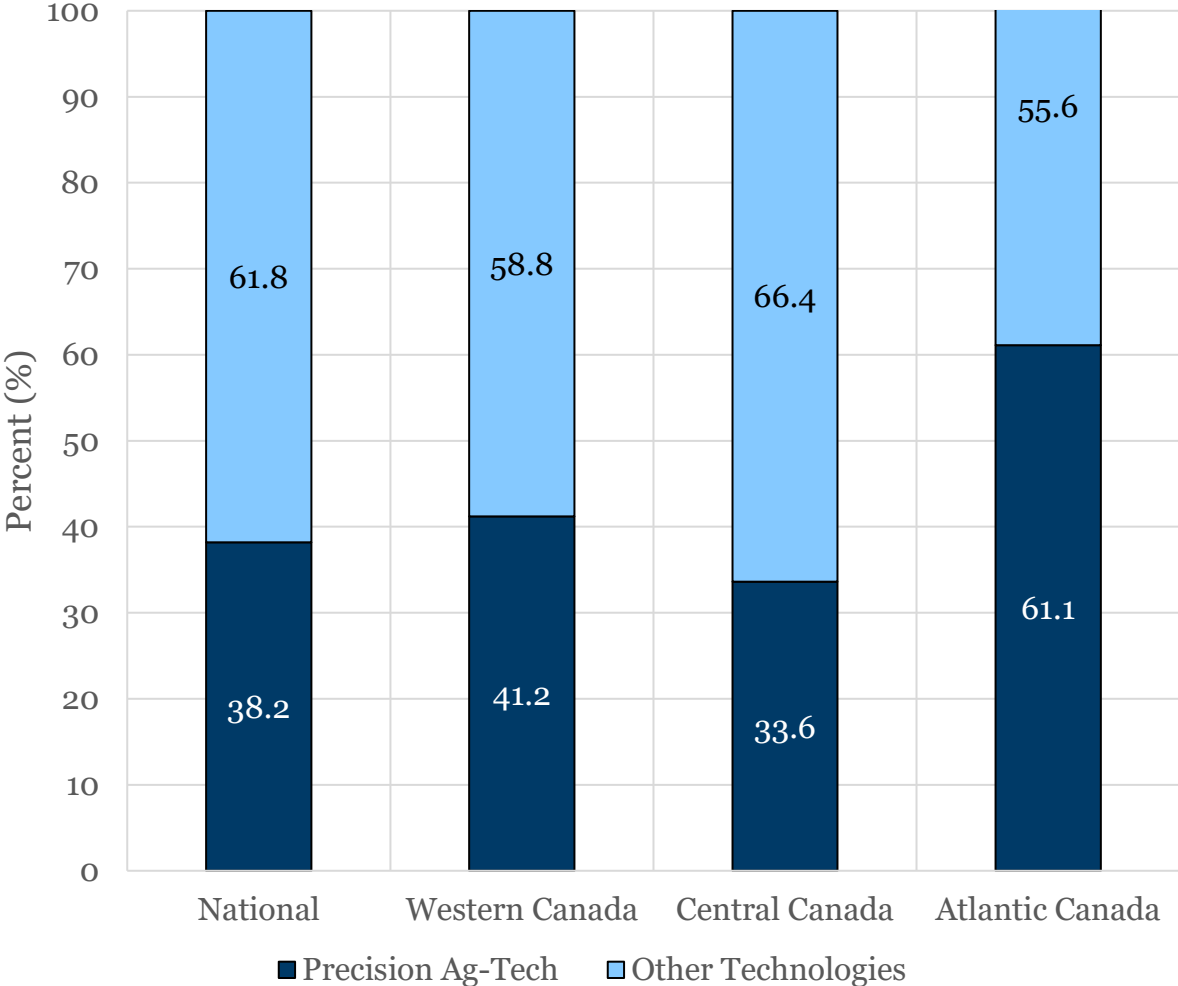
## Technology Types by Region



## Technology Types by Urban vs. Rural

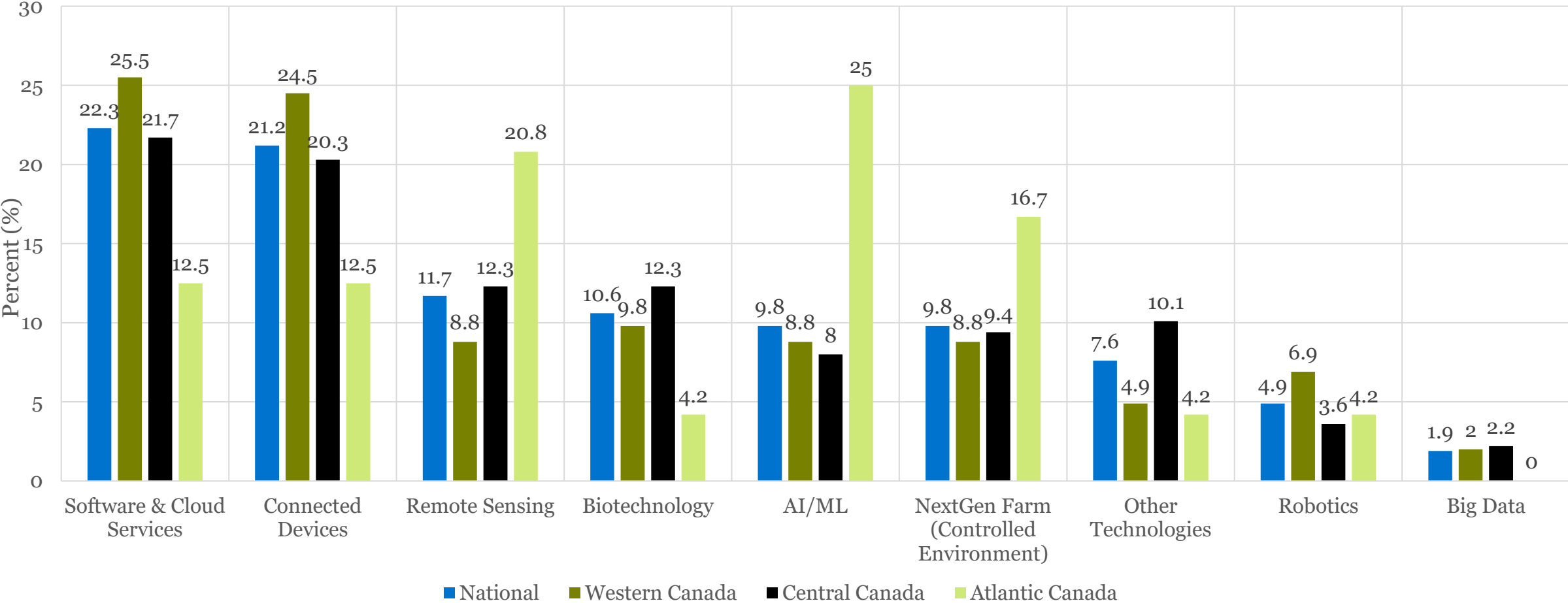


# Precision Agriculture vs. Other Technologies: Geographic Differences



# Supporting Technologies by Region

Technology Types by Region

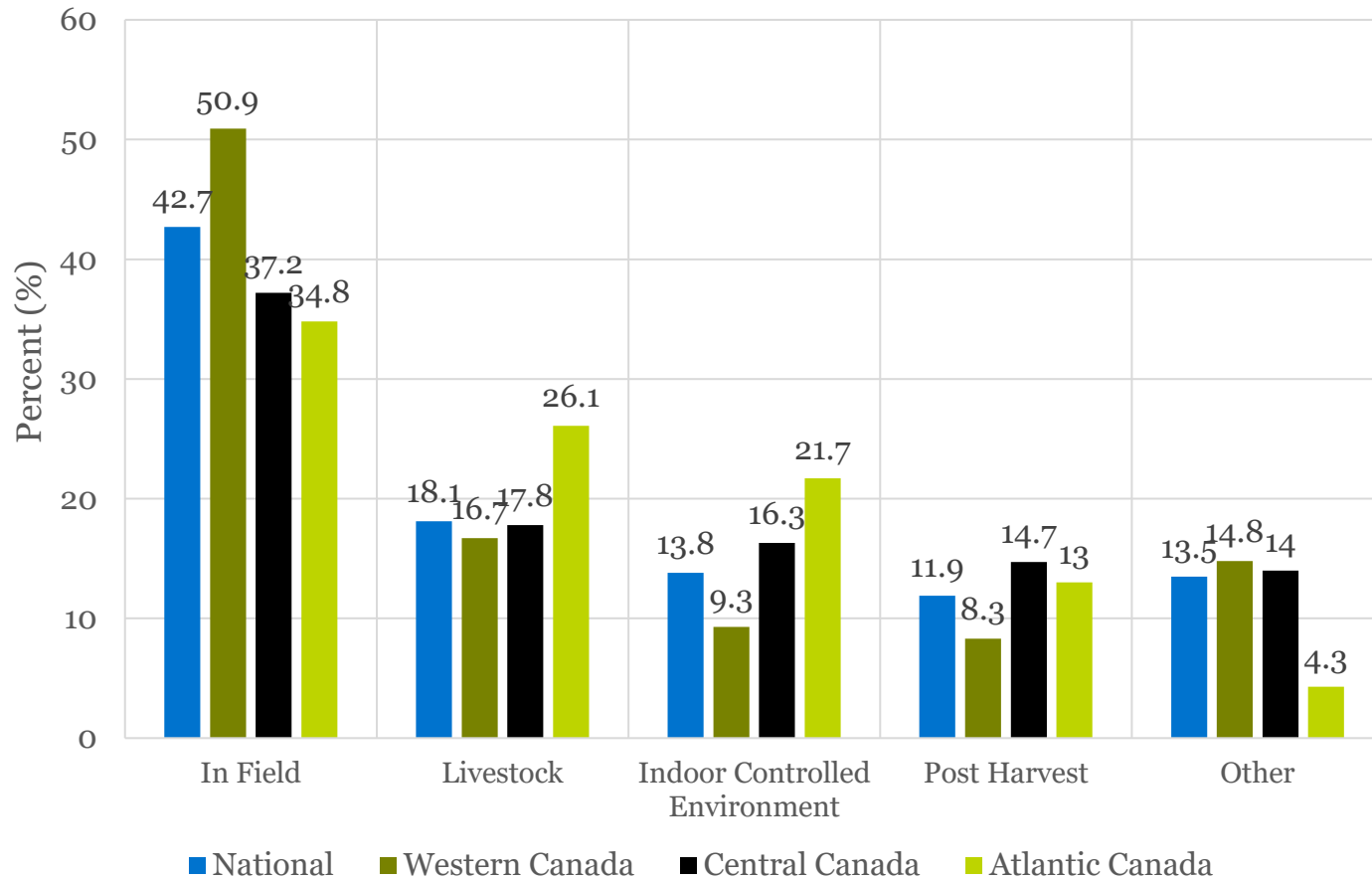




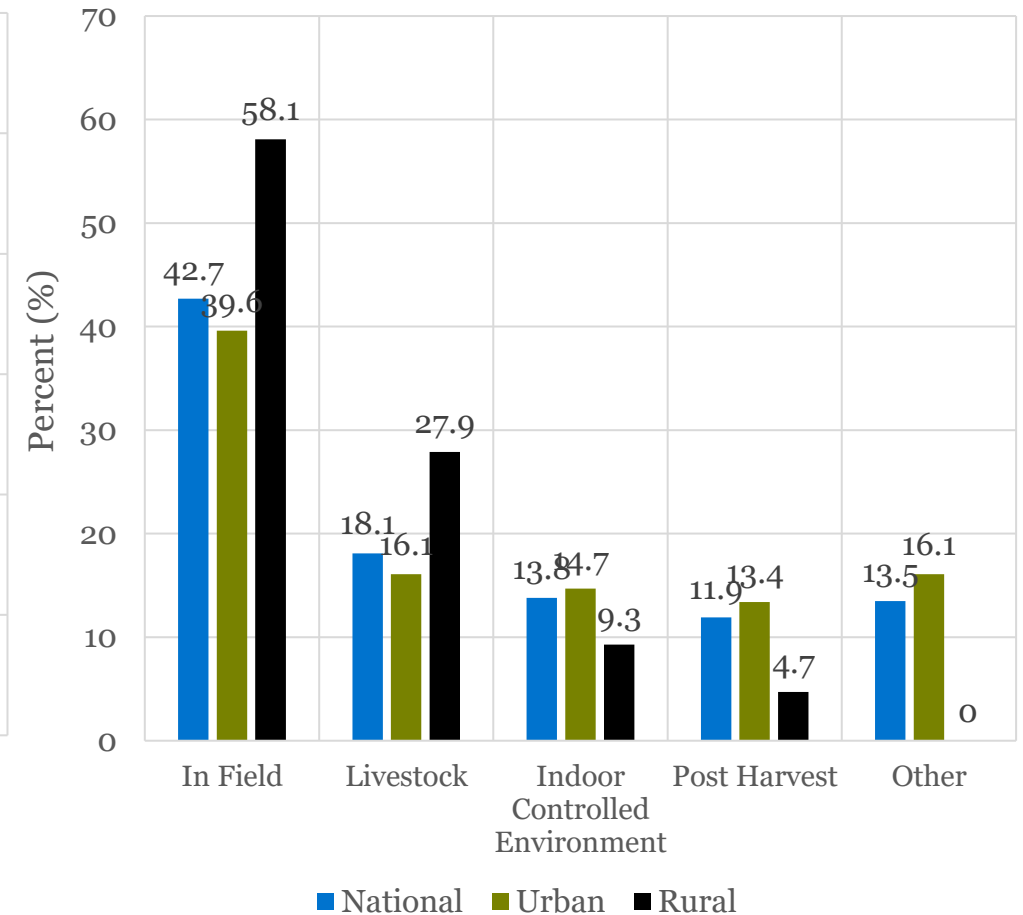
# TARGET APPLICATIONS

# Agricultural Applications

## Agricultural Applications by Province

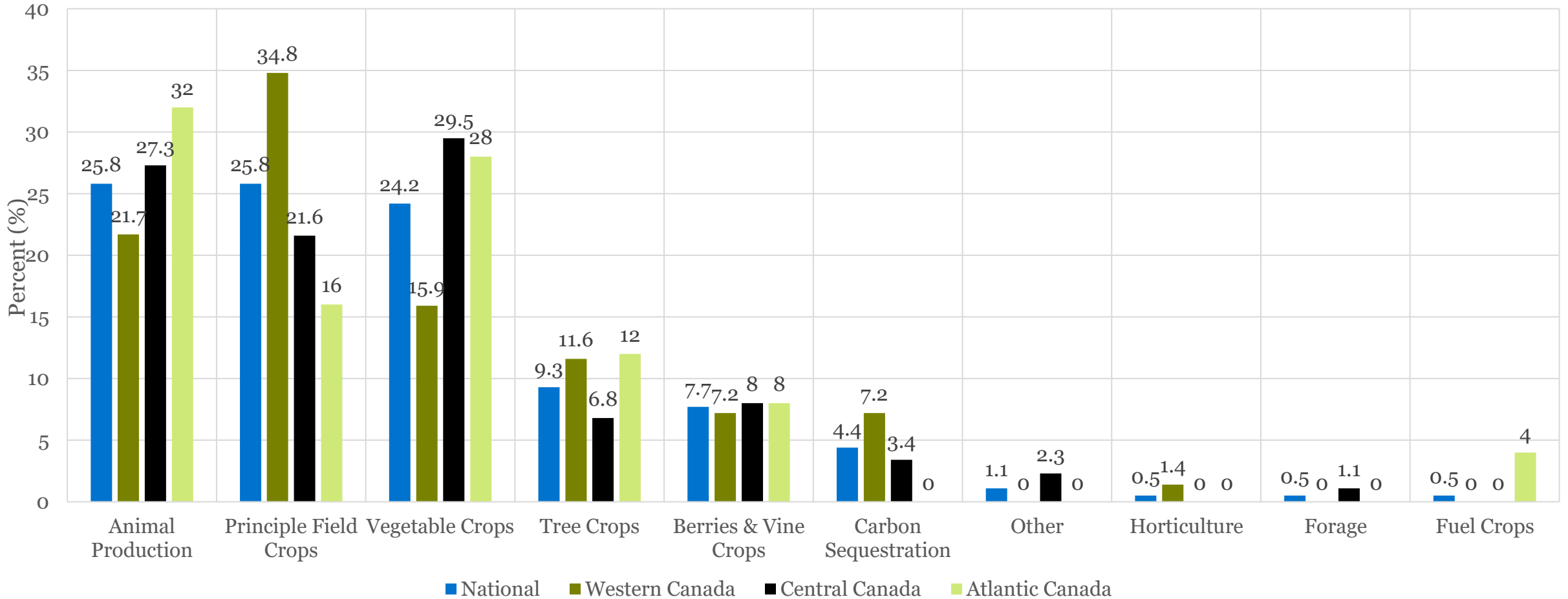


## Agricultural Applications by Urban vs. Rural



# Application by Commodity Type & Region

Technology Types by Region



# **USER BENEFITS**

# Business Benefits

<b>Business Benefits</b>	<b>National %</b>	<b>Western Canada %</b>	<b>Central Canada %</b>	<b>Atlantic Canada %</b>	<b>Urban %</b>	<b>Rural %</b>
<b>Labour Saving</b>	17.5	18.5	16.7	16.2	16.3	14.4
<b>Enhance Decision Making</b>	17.5	16.8	17.4	21.6	17.6	18.6
<b>Increase Output</b>	13.3	13.8	13.2	10.8	13.3	14.4
<b>Reduce Production Costs</b>	11.8	14.7	10.3	5.4	11.3	15.5
<b>Improve Quality</b>	11.6	10.8	11	21.6	12.2	10.3
<b>Pest/Disease Management</b>	9.3	8.2	10	10.8	9	11.3
<b>Improve Livestock Health &amp; Safety</b>	6.7	5.6	7.1	10.8	6.5	8.2
<b>Increase Market Share</b>	4.2	3	5.3	2.7	4.7	2.1
<b>Improve Consumer Safety</b>	3.1	1.7	4.6	0	3.6	1
<b>Climate/Frost Management</b>	1.6	1.7	1.8	0	1.8	1
<b>Improve Employee Safety</b>	1.6	1.7	1.8	0	1.6	2.1
<b>Comply with Regulations</b>	0.9	1.7	0.4	0	0.9	1
<b>Other</b>	0.5	0.9	0.4	0	0.7	0
<b>Enhance Reputation</b>	0.4	0.9	0	0	0.5	0

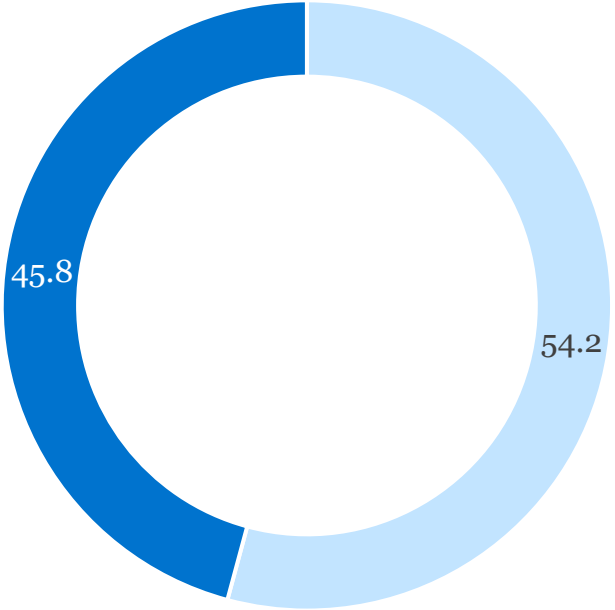
# Environmental & Social Benefits

	National %	Western Canada %	Central Canada %	Atlantic Canada %	Urban %	Rural %
<b>Environmental &amp; Social Benefits</b>						
<b>Water conservation</b>	13.9	16.2	13.3	10.8	13.6	16.7
<b>Reduced pesticide use</b>	12.9	13.1	12	16.2	12.4	16.7
<b>Other/Non-specific</b>	12.9	12.1	13.3	13.5	13.6	8.3
<b>Reduced fertilizer use</b>	11.6	12.1	10.1	16.2	10.9	16.7
<b>Improved soil health</b>	8.2	9.1	8.9	2.7	8.1	8.3
<b>Reduced waste</b>	7.8	7.1	9.5	2.7	7.8	8.3
<b>Agricultural intensification</b>	7.1	8.1	5.7	10.8	7.4	5.6
<b>Energy reduction</b>	6.8	6.1	7.6	5.4	6.6	8.3
<b>Food security</b>	5.4	3	4.4	16.2	5.8	2.8
<b>Reduced food miles</b>	5.1	5.1	5.7	2.7	5.4	2.8
<b>Reduced GHG emissions</b>	4.4	6.1	4.4	0	4.7	2.8
<b>Reduced inequalities</b>	2	0	3.2	2.7	1.9	2.8
<b>Reduced erosion</b>	1.7	2	1.9	0	1.9	0

# **ORGANIZATION STRUCTURE**

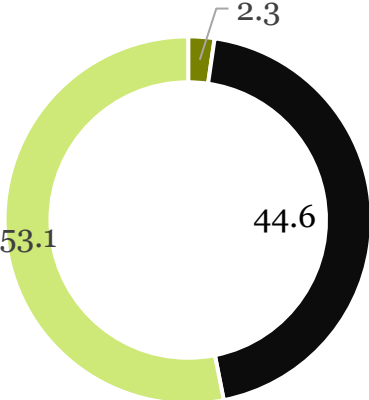
# Gender Diversity & Location

### Organizations Reporting Management Team Gender



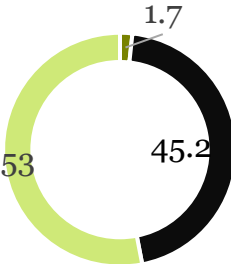
■ Reporting ■ Not Reporting

### Management Team Gender Diversity

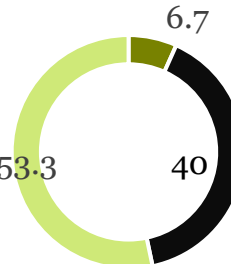


■ Women Only in Leadership  
■ Mixed Genders in Leadership  
■ Men Only in Leadership

### Urban Orgs: Management Team Gender Diversity



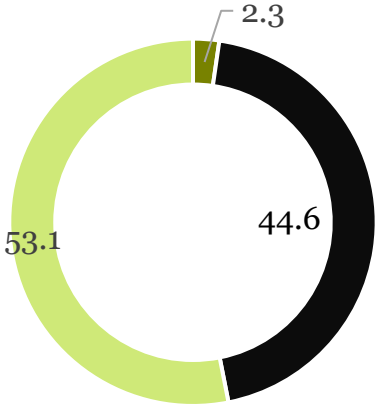
### Rural Orgs: Management Team Gender Diversity





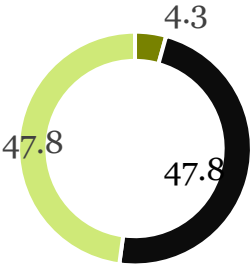
# Gender Diversity & Organizational Focus

Management Team Gender Diversity

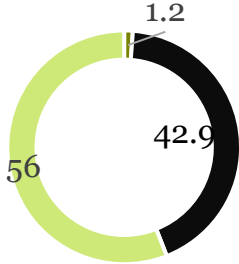


- Women Only in Leadership
- Mixed Genders in Leadership
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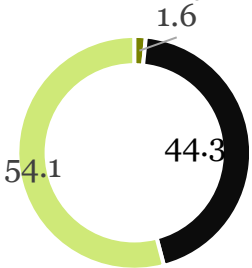
Precision Ag: Management Team Gender Diversity



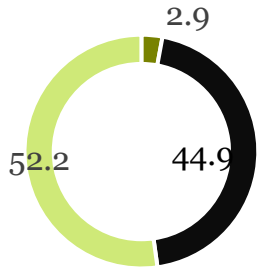
Other Technologies: Management Team Gender Diversity



Sustainability Benefits: Management Team Gender Diversity



No Sustainability Benefits: Management Team Gender Diversity



# **SUMMARY**

# Summary

- Characteristics of Canadian Ag-Tech orgs:
  - Majority located in urban centres
  - Diverse application areas and technology types, influenced by location
- Benefits:
  - Subset of firms focus on environmental & social benefits
  - More coverage among Atlantic Canada orgs
- Organizational structure and focus
  - Majority of management teams are exclusively male
  - Exclusively female management teams more likely to be headquartered in rural locations

# Thank you!

Questions?

[m2huneke@uwaterloo.ca](mailto:m2huneke@uwaterloo.ca)

[tara.vinodrai@utoronto.ca](mailto:tara.vinodrai@utoronto.ca)

[h.hall@uwaterloo.ca](mailto:h.hall@uwaterloo.ca)

University of Waterloo Disruptive Technologies Website:

<https://uwaterloo.ca/disruptive-technologies-economic-development/>

Funded by OMAFRA New Directions Program