

Agribenchmark Beef and Sheep Conference 2019

Windhoek Namibia

Adoption strategies and farmer attitudes towards climate  
change

“Why (or not) Canadian farmers adopt GHG  
mitigating practices”

Project Team: Sven Anders, Debra Davidson, Curtis Rollins

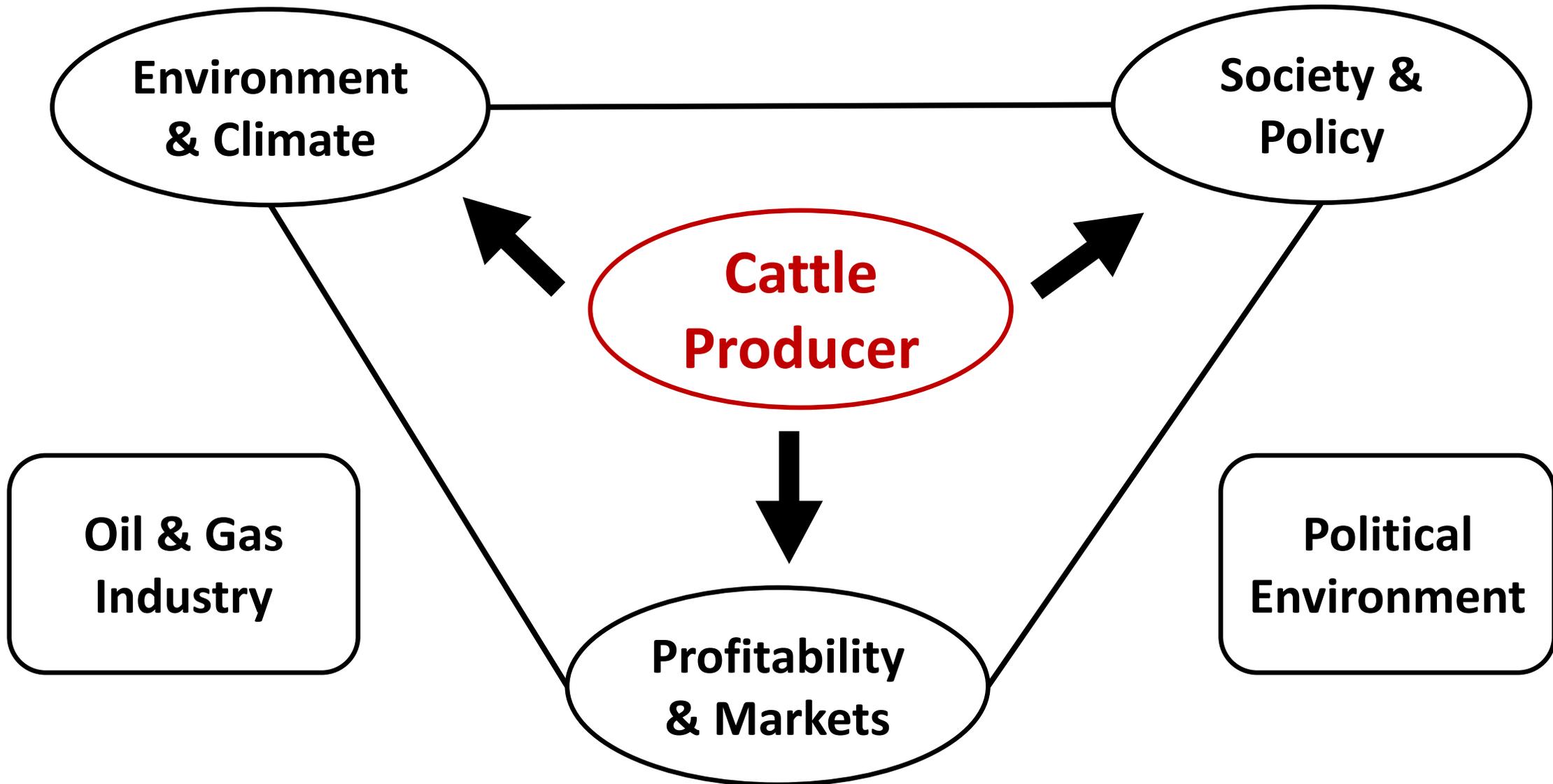


UNIVERSITY OF ALBERTA  
DEPARTMENT OF RESOURCE ECONOMICS  
AND ENVIRONMENTAL SOCIOLOGY

**Weston**<sup>®</sup>  
George Weston Limited



# What's The Issue



# The Study

1. What are producers thinking about climate change?

What are their perceptions, attitudes and beliefs around climate change?

2. Are producers willing to change practices and/or adopt new technologies that provide GHG mitigative benefits?

Which practices or technologies are being adopted (or not)?

3. Which factors influence possible GHG mitigative adoption behaviours?

## What we did

Survey of 300 commercial mixed and cattle farms across Alberta

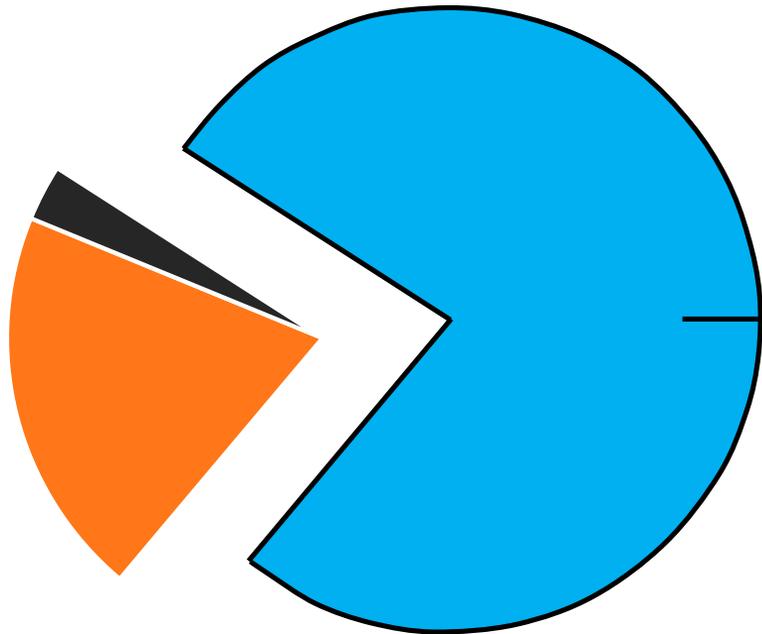
Economic models of adoption, policy and partner preferences

# The Alberta Producers, N = 301

- **54 years** of age (median Canada = 49 years)
- **29 years** of farm-management experience
- **89 % male**
- **53 %** primarily conservative
- **69 %** mixed farms (31% pure cattle sample quota)
- **3599 acres** farm size (median = **2000 ac**, Alberta average = **1200 ac**)
- **69 %** trade diploma or higher education
- **78 %** derive +60 % of household income from farming
- **55 %** farms have a Environmental Farm Plan (Alberta certified)
- **58 %** plan to transfer or sell their land after retirement (default = kids)

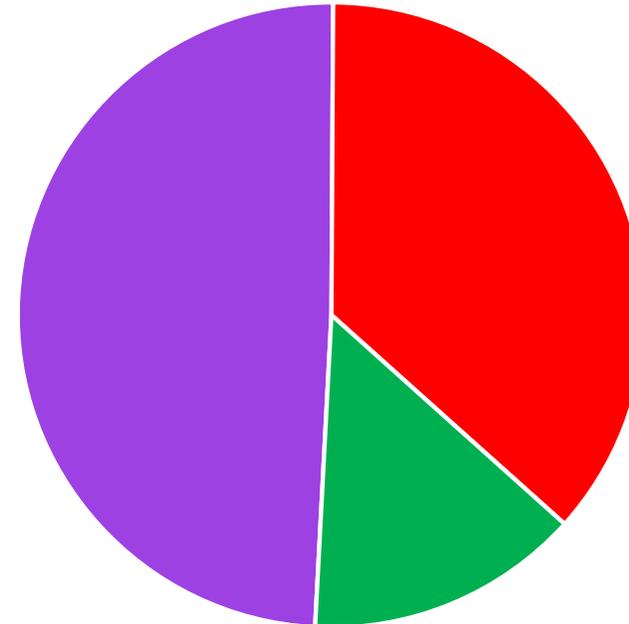
# Farmer Climate Change Beliefs

Is climate change occurring?



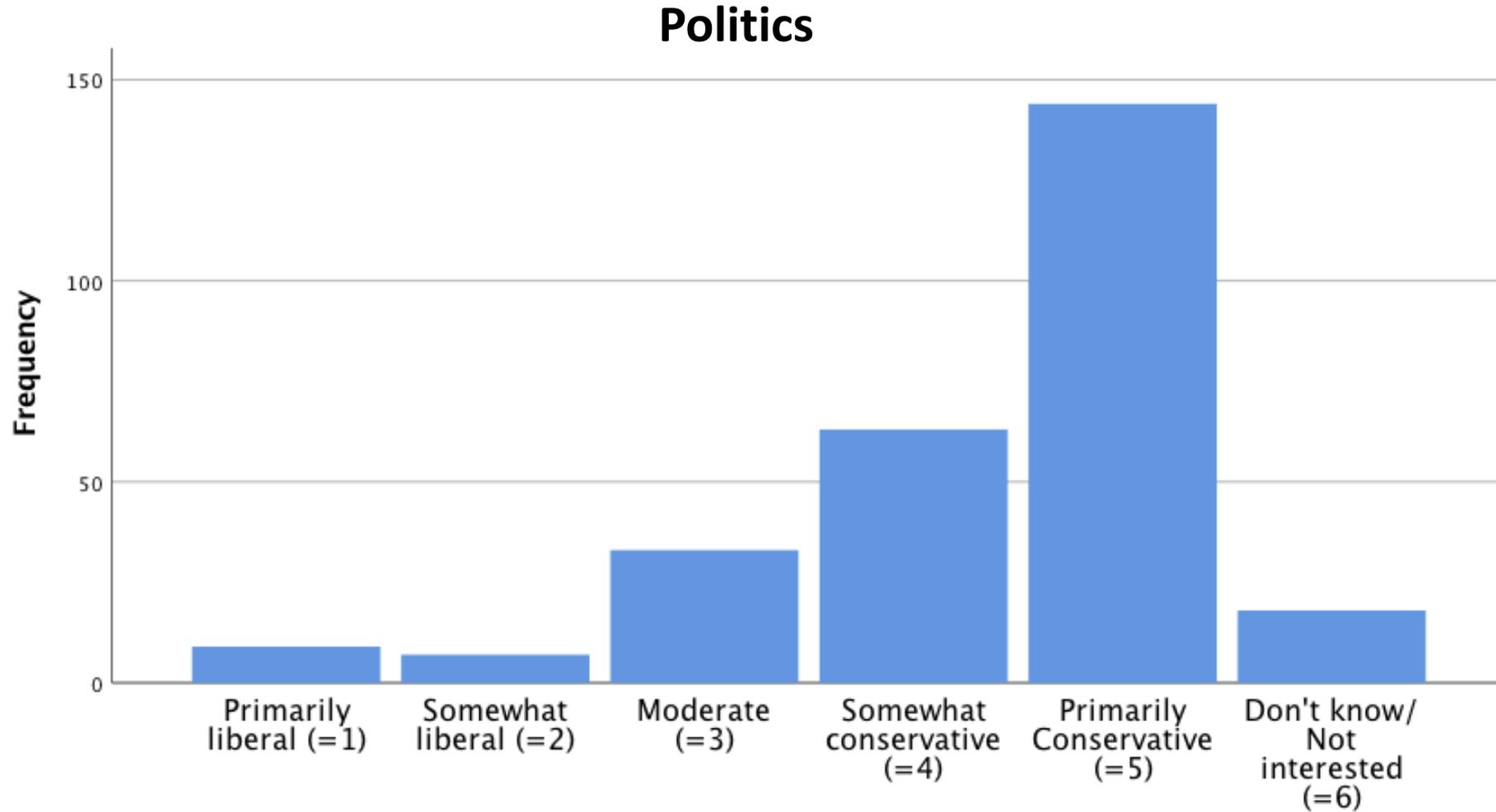
- No
- Insufficient evidence to judge
- Yes

If so, what is causing climate change?



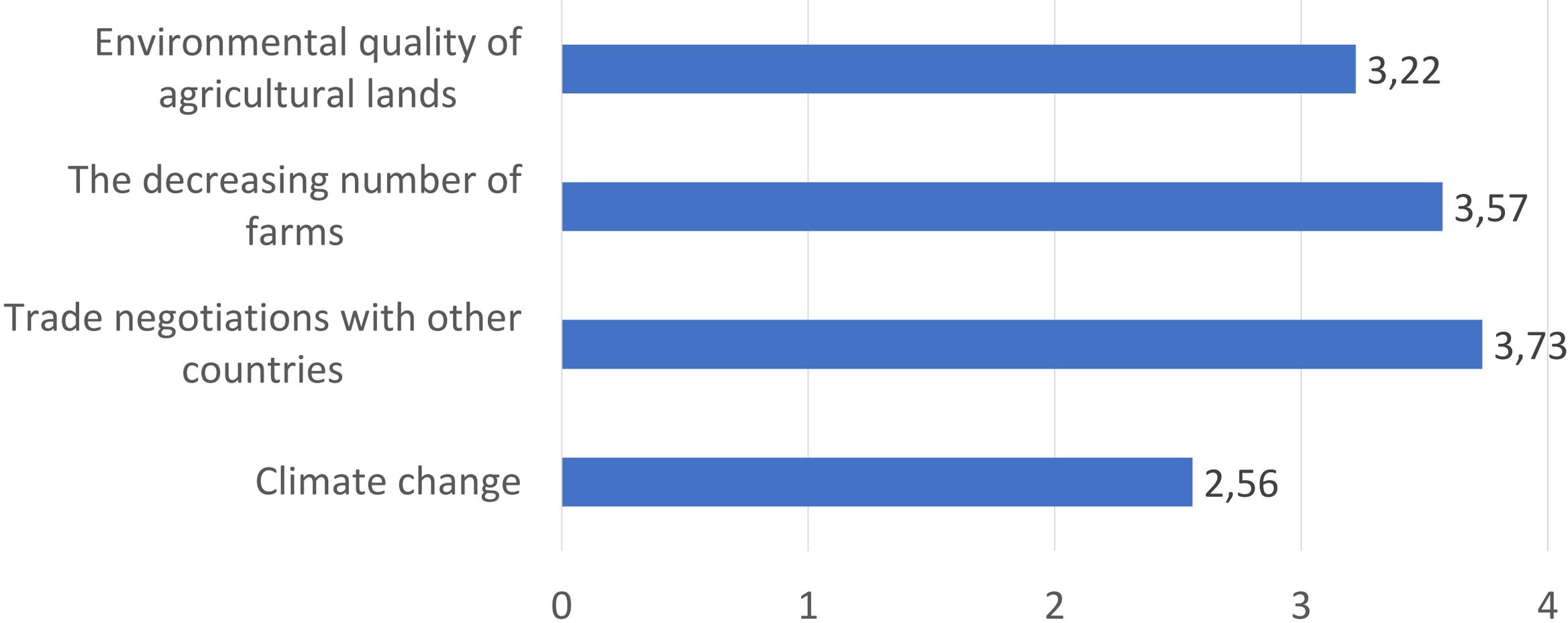
- Equally caused by humans and natural enviro. change
- Caused by natural environmental change
- Caused by humans

# How would you describe your political views?



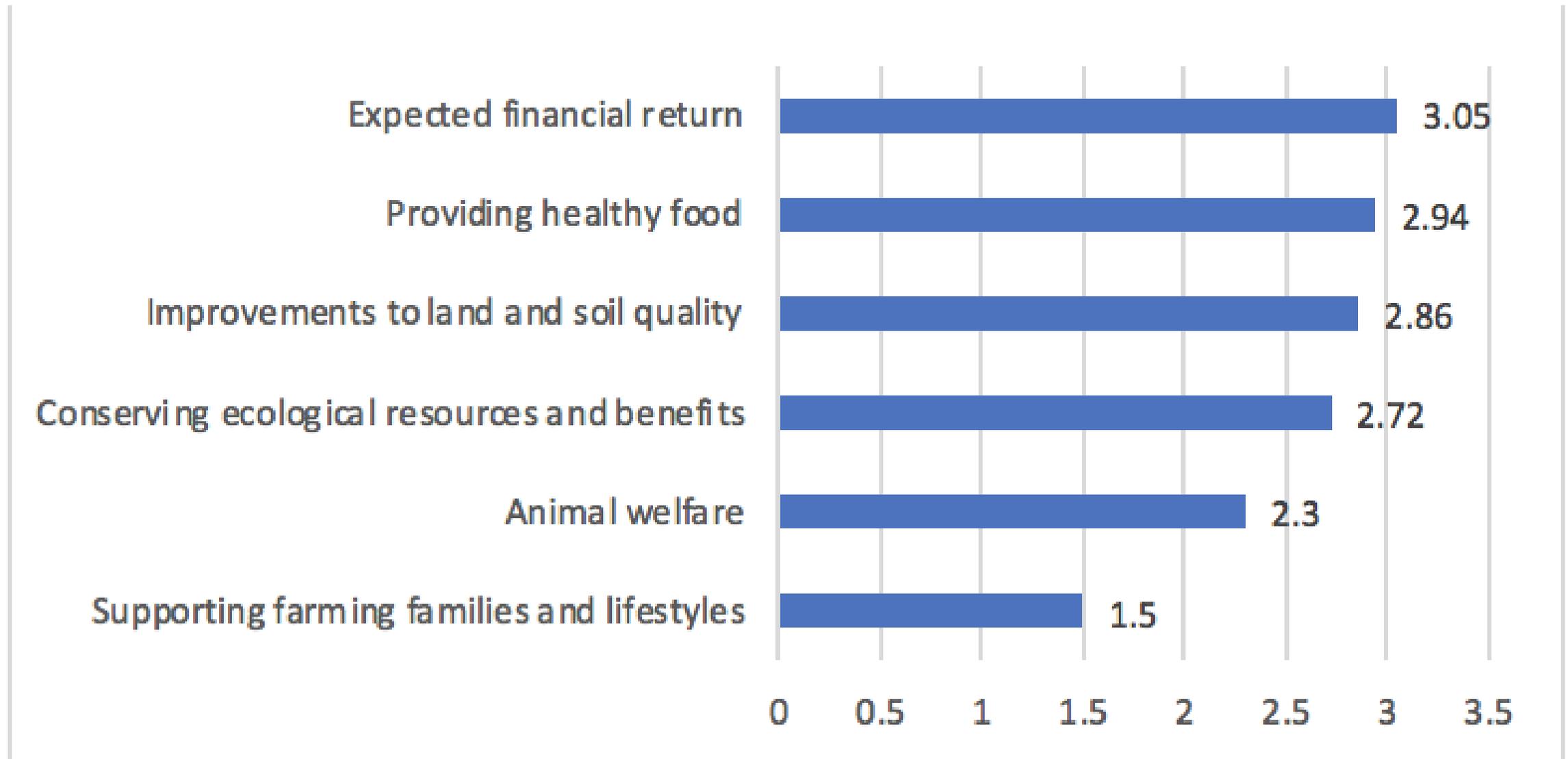
N = 274  
Range: 1 to 6  
Mean: 4.39  
Median: 5

# How concerned are you about the following issues affecting the future of Canadian agriculture?

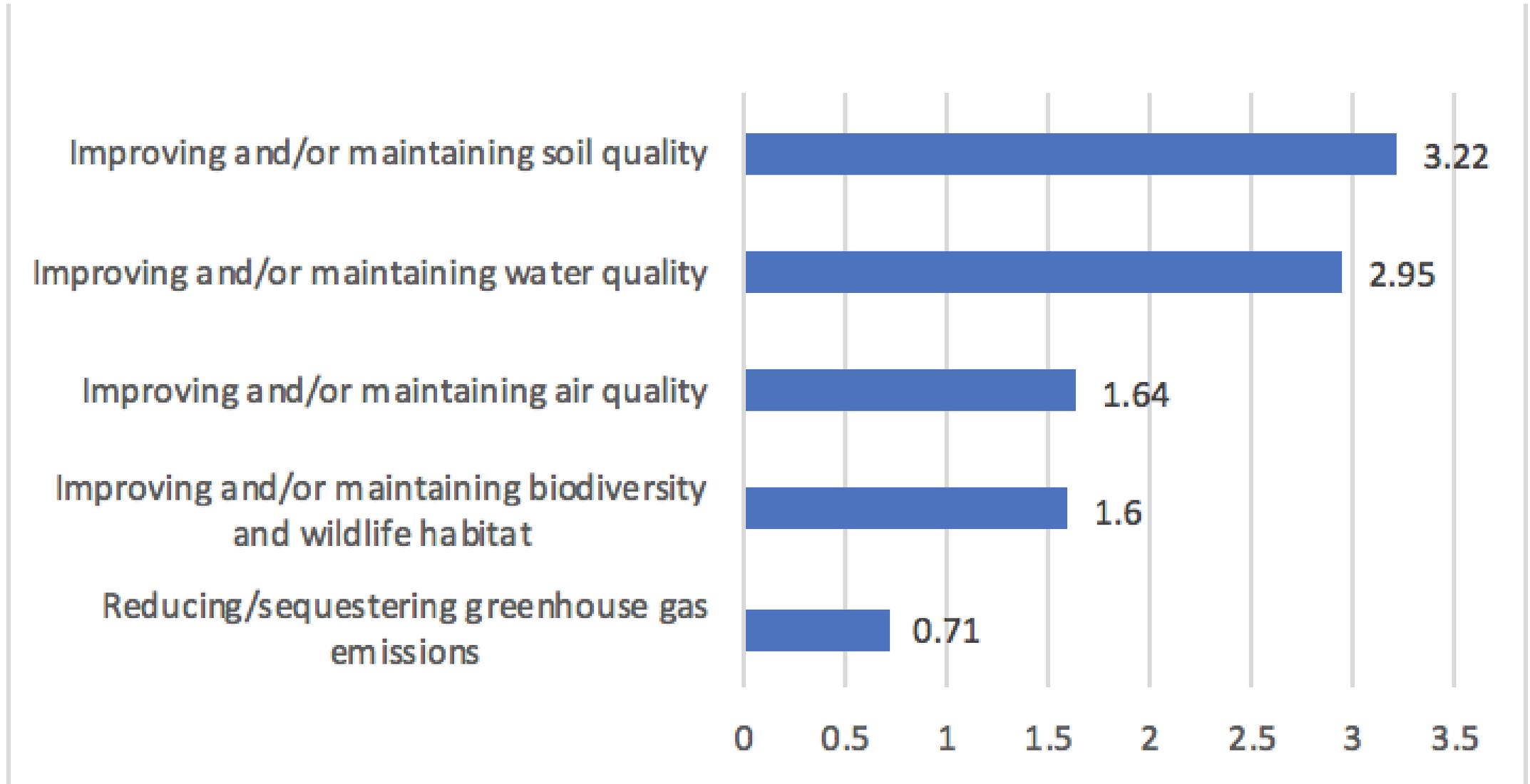


Level of Concern: 1 = Not at all – 5 = Extremely concerned

Farms often need to prioritize many different goals. Please rank the following farm management priorities in order of importance to you.



Please rank the following environmental issues in order of importance to you on your farm (most important = 5)



Now, are these producers willing to change their production practices to benefit climate change mitigation?

Which practices and/or technologies are more or less “acceptable”?

Which personal, managerial, farm structural and other factors influence adoption decisions?

Practice	Adopted	Would Consider	Not Adopted	N
Leave/spread crop residue in fields after harvest	97	2	1	260
Zero-tillage	82	12	6	252
Use GPS, precision agriculture, variable rate fertilizer technology	81	16	3	250
Installed LED lights	80	19	1	299
Manure composting	79	19	2	148
Make animal breeding decisions to improve feed efficiency	79	15	5	156
Include perennial, forage, and/or legume crops in rotations	71	23	6	231
Improved the energy efficiency of buildings	68	30	2	289
Introduce legumes, other nitrogen fixers into grazing lands	67	29	3	147
Maintain wetlands	62	23	14	222
Fenced off riparian areas & sensitive ecosystems to protect from livestock	60	27	12	139
Planted tree belts or lots	58	26	16	267
Converted cropland to pasture or other vegetation	52	24	24	250
Planted permanent/perennial vegetation on marginal lands & field edges	51	33	16	250
Supplement feed with ionophores, lipids, oil seed, or bacterial supplements	39	39	21	132
Reduce slaughtering age of cattle by 2+ months	39	49	12	116
Plant cover crops	36	46	18	192
Restored wetlands	33	42	25	209
Installed solar panels	19	67	14	276
Production of bioenergy	10	61	29	165

Practices TOP Adoption	Adopted	Would Consider	Not Adopted	N
Leave/spread crop residue in fields after harvest	97	2	1	260
Zero-tillage	82	12	6	252
Use GPS, precision agriculture, variable rate fertilizer technology	81	16	3	250
Installed LED lights	80	19	1	299
Manure composting	79	19	2	148
Make animal breeding decisions to improve feed efficiency	79	15	5	156

Practice	Adopted	Would Consider	Not Adopted	N
Planted permanent/perennial vegetation on marginal lands & field edges	51	33	16	250
Supplement feed with ionophores, lipids, oil seed, or bacterial supplements	39	39	21	132
Reduce slaughtering age of cattle by 2+ months	39	49	12	116
Plant cover crops	36	46	18	192
<b>Restored wetlands</b>	33	42	25	209
<b>Installed solar panels</b>	19	<b>67</b>	14	276
<b>Production of bioenergy</b>	10	<b>61</b>	29	165
<b>Built a covered manure storage facility</b>	5	<b>41</b>	<b>54</b>	99

You previously responded that you haven't adopted certain practices or projects but may be willing to. For which of the following reasons have you been unable to complete any of the projects?



# Which Factors Influence Adoption Decisions?

Model:

The probability of a producer adopting a specific practice depends on

**Personal** (education) **Managerial** (farming philosophy), **Farm Structure** (Size), and **Environmental / Climate** Factors

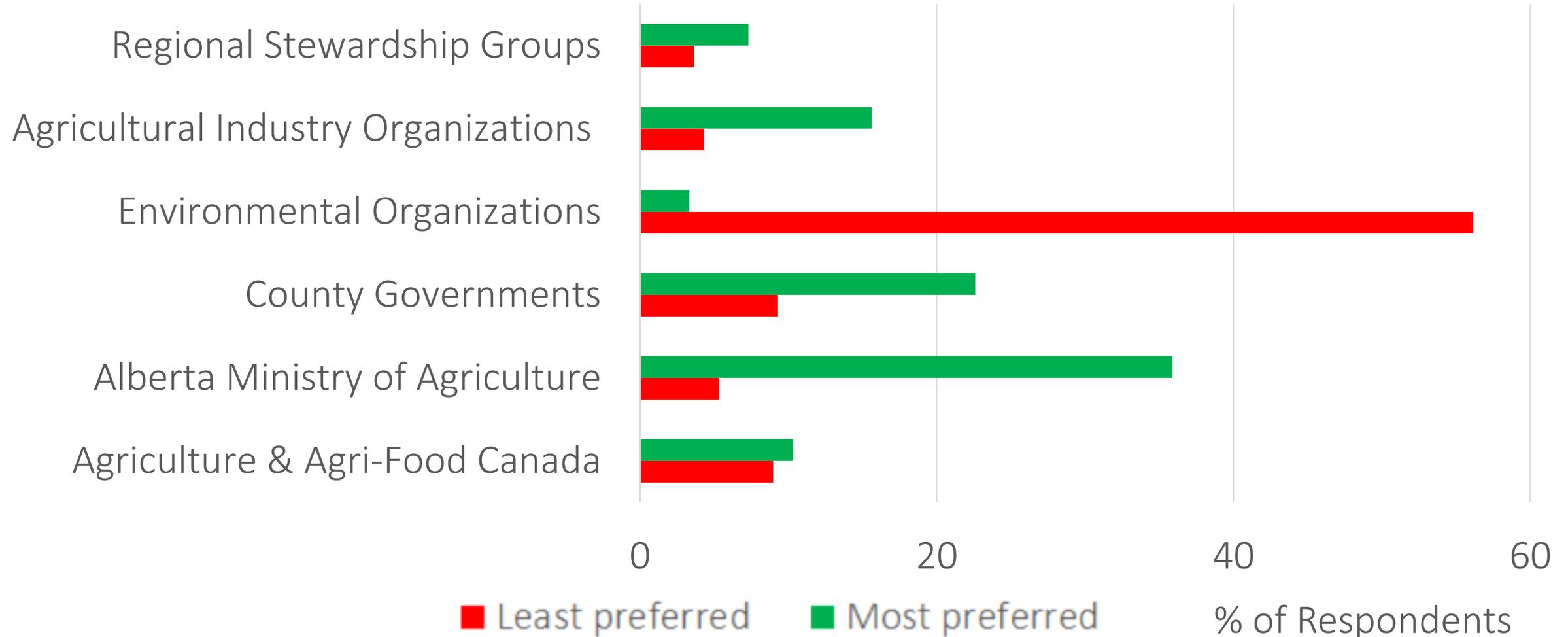
Conditional Probability of Adoption	Coef.	S. E.	P	Marg. Eff.
Gender = male	0.01	0.15	0.92	0.01
University degree	-0.04	0.09	0.67	-0.01
College diploma	-0.08	0.09	0.39	-0.03
% farming income	0.05	0.18	0.76	0.02
Primary crop income	-0.35***	0.10	0.00	-0.13
Acres (1000s)	0.03***	0.01	0.01	0.01
Cattle (100s)	0.00	0.00	0.84	0.00
Environmental Farm Plan	0.26***	0.08	0.00	0.10
<b>Climate change beliefs</b>				
<b>Mostly caused by humans</b>	-0.09	0.16	0.56	-0.04
<b>Equally natural and human-caused</b>	0.10	0.10	0.32	0.04
<b>Caused by natural changes</b>	0.07	0.11	0.56	0.02
<b>Climate change norms</b>	0.03	0.05	0.62	0.01
Conservation Orientation	0.09***	0.05	0.05	0.04
Learning Orientation	0.11***	0.05	0.02	0.04

How can we entice (more) producers to adopt climate-smart practices?

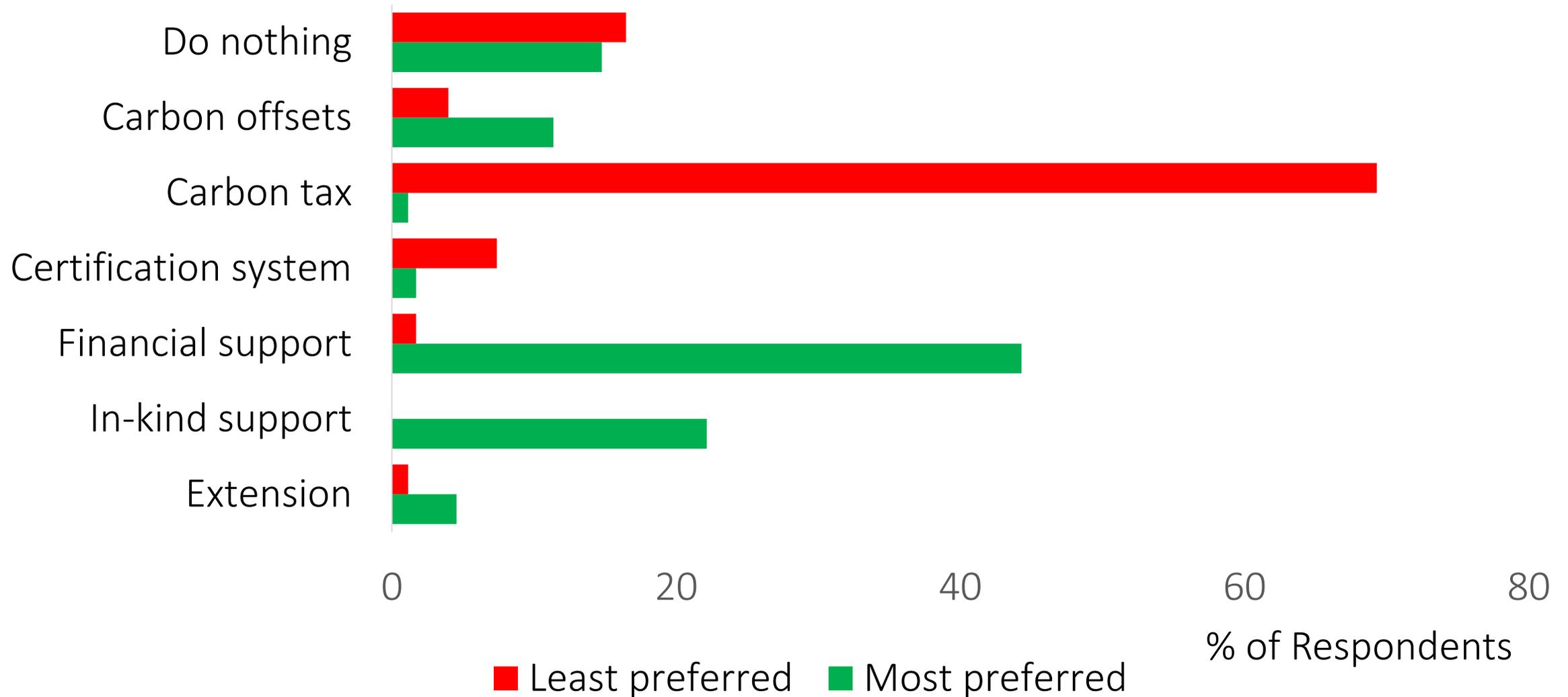
- Livestock (Agricultural) producers are not in the business of saving the climate.
- Climate Smart practices may not benefit farm profitability.

**Would policy program initiatives be able to sway Alberta producers towards climate mitigative practices?**

Suppose the federal and provincial governments were to fund programs focused on improving environmental outcomes on farms. Who would you prefer most or least to work with?



Which type of policy or program aimed at climate change mitigation would you be most or least supportive of?



# Key Findings

- Some Alberta farmers have adopted climate-mitigative practices.
  - Many are motivated for many reasons, BUT not for climate science reasons.
- Farmers do respond to climate-mitigative practices that offer private economic benefits, align with farming business philosophy.
  - Economic and structural factors matter.
- To date many policies are build on GHG awareness & education that mismatch with farmer beliefs about climate change.



CrossMark

## LETTER

# Just don't call it climate change: climate-skeptic farmer adoption of climate-mitigative practices

### OPEN ACCESS

#### RECEIVED

13 September 2018

#### REVISED

13 December 2018

#### ACCEPTED FOR PUBLICATION

20 December 2018

#### PUBLISHED

15 March 2019

Debra J Davidson<sup>1</sup> , Curtis Rollins<sup>1</sup>, Lianne Lefsrud<sup>2</sup>, Sven Anders<sup>1</sup> and Andreas Hamann<sup>3</sup>

<sup>1</sup> Department of Resource Economics and Environmental Sociology, University of Alberta, Canada

<sup>2</sup> Chemical and Materials Engineering Department, University of Alberta, Canada

<sup>3</sup> Department of Renewable Resources, University of Alberta, Canada

E-mail: [debra.davidson@ualberta.ca](mailto:debra.davidson@ualberta.ca)

**Keywords:** agriculture, climate mitigation, farmer behaviour, agricultural production



**UNIVERSITY OF ALBERTA**  
DEPARTMENT OF RESOURCE ECONOMICS  
AND ENVIRONMENTAL SOCIOLOGY

**Weston**<sup>®</sup>  
George Weston Limited