What is Climate Smart Agriculture and How Does it Impact Fruit and Vegetable Growers?

Dr. Emmalea Ernest, Scientist, Fruit and Vegetable Program, University of Delaware

Climate Change

There is increasing discussion about climate change and its potential impacts. Please select one statement that best reflects your beliefs about climate change

Climate change is not occurring.

There is not sufficient evidence to know with certainty whether climate change is occurring or not.

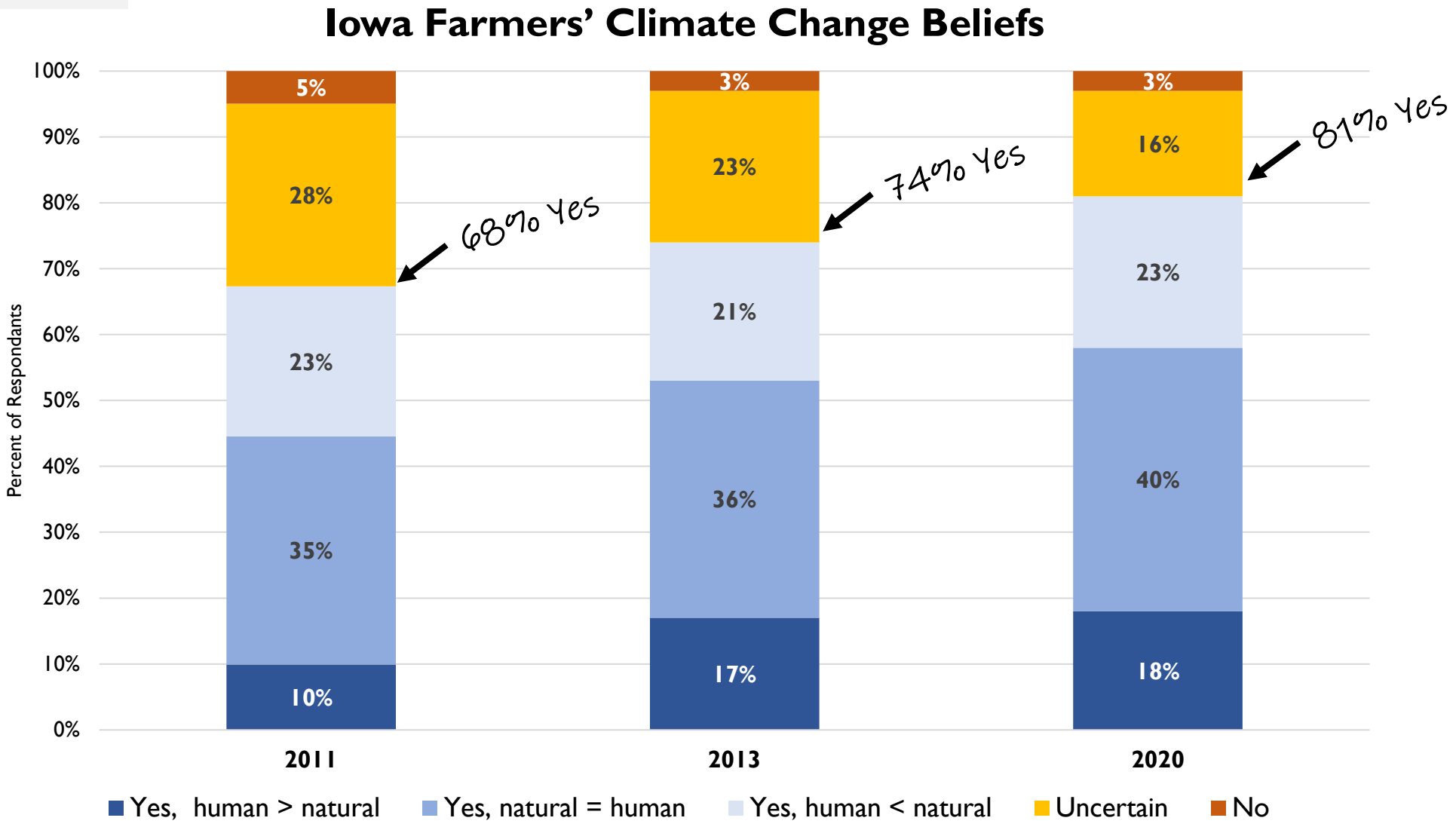
Climate change is occurring and it is caused mostly by natural changes in the environment.

Climate change is occurring and it is caused more or less equally by natural changes in the environment and human activities.

Climate change is occurring and it is cause mostly by human activities.

Climate Change

In 2021, 67% of Iowa adults agreed with the statement, "Global warming is happening."



2020 Summary Report - Iowa Farm and Rural Life Poll
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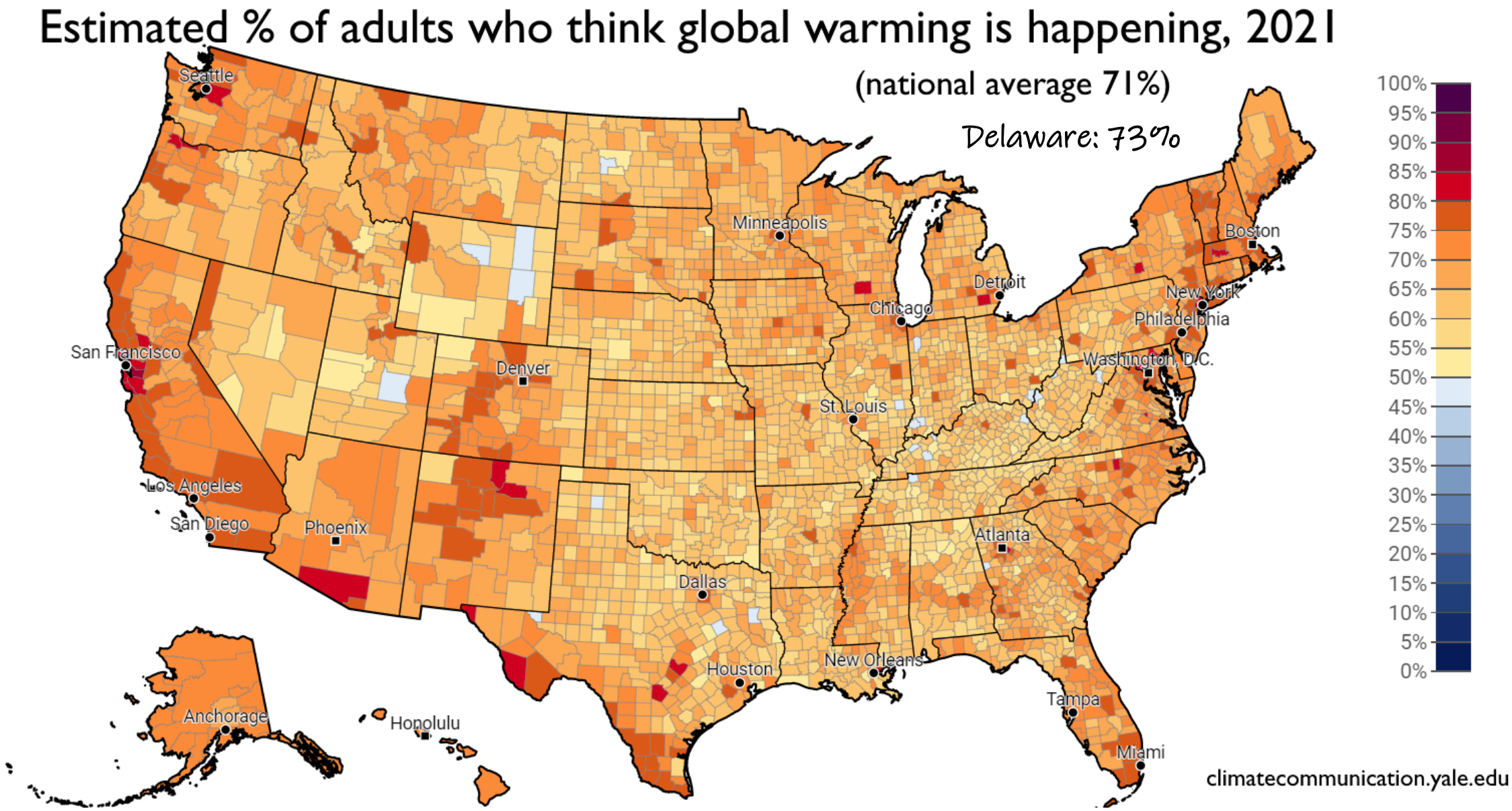
2020 sample size: 1,059

Climate Change



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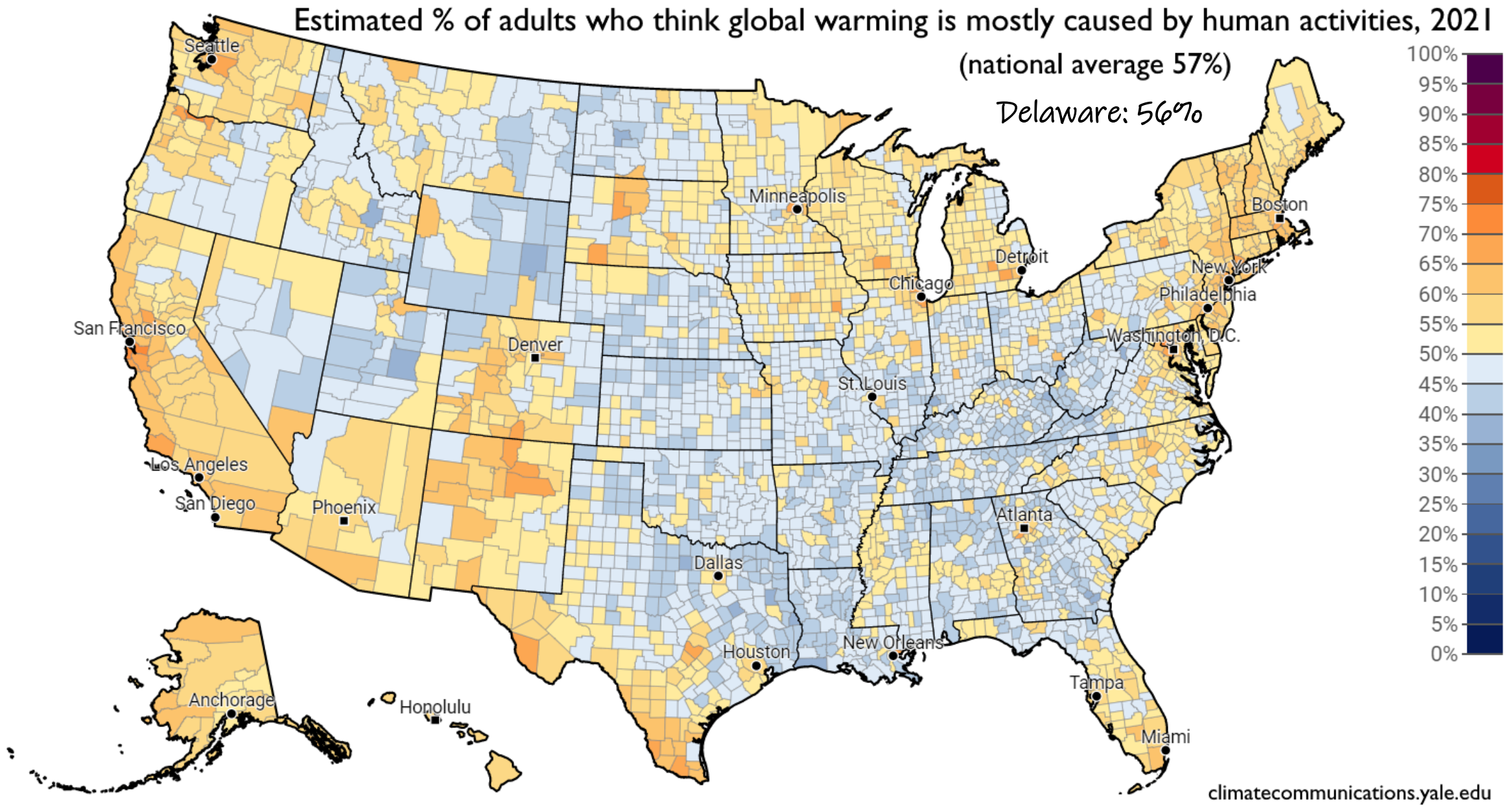
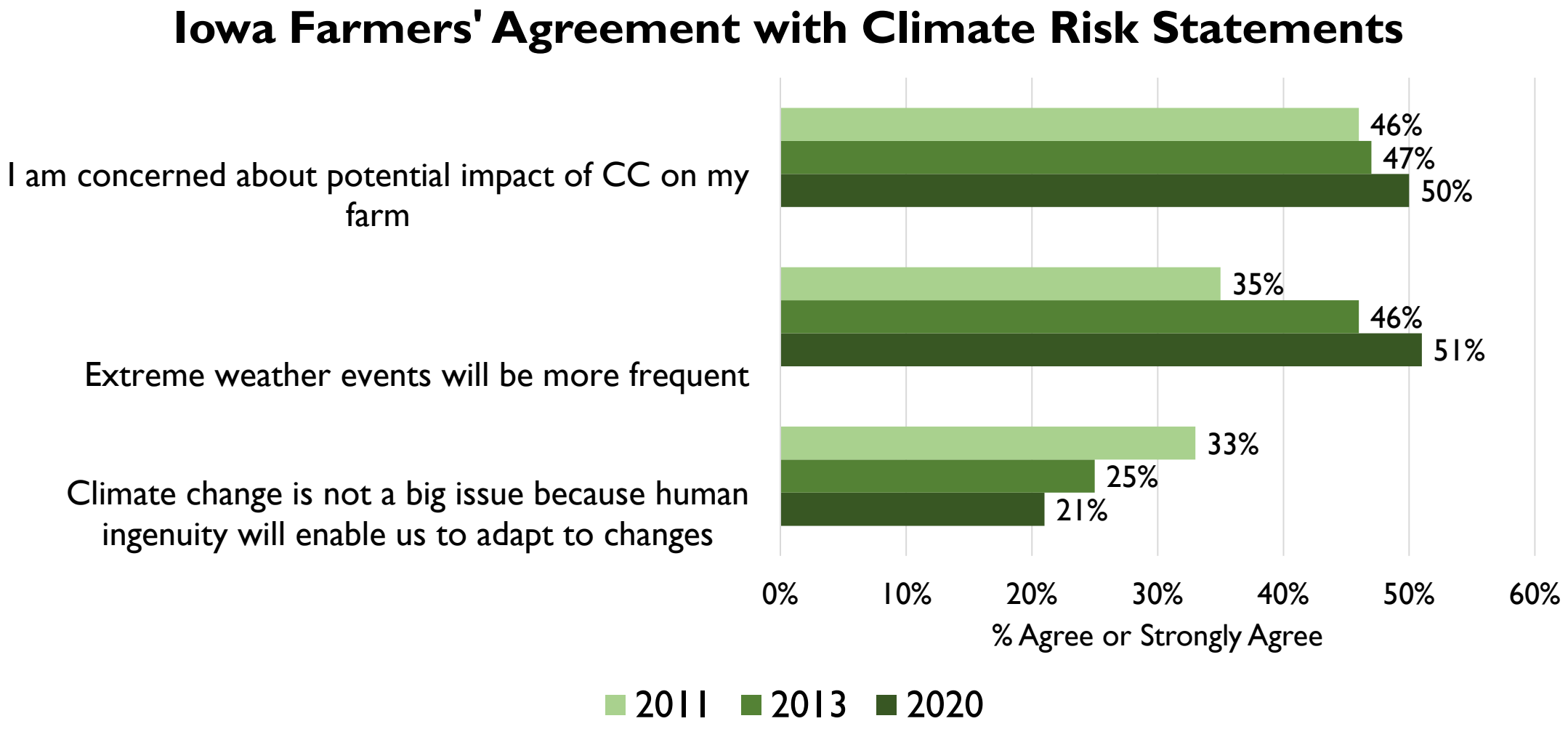


Climate Change



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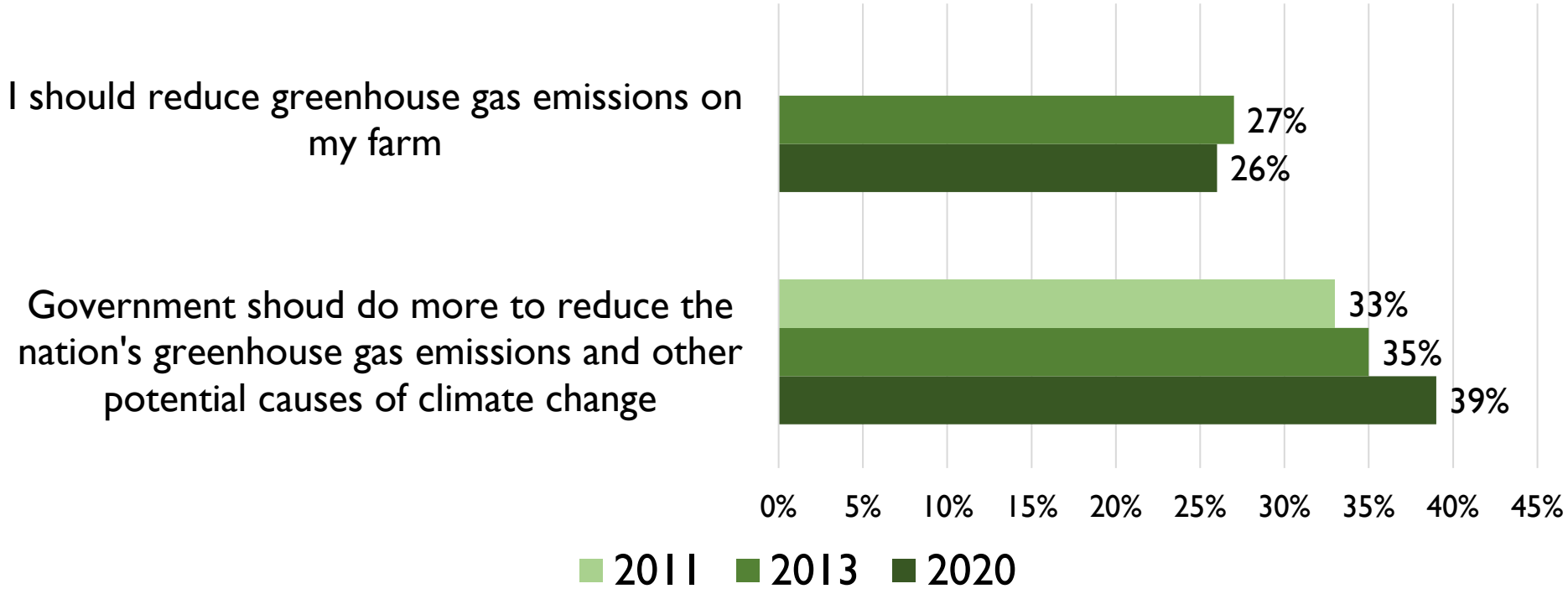
Climate Change

Iowa Farmers' Agreement with Greenhouse Gas Action Statements



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Climate Change

Locally and globally, air and ocean temperatures are increasing.

Increasing temperatures have impacted long term weather patterns (climate).

Changing climate means that our past way of doing things may not be the best way for the future. → **Adaptation**

Human activity is the major contributor to climate change through release of greenhouse gasses: carbon dioxide, nitrous oxide, methane

Continued or increased greenhouse gas emissions will change the climate to a point of catastrophic impacts on human life.

People should change their activities to reduce greenhouse gas emissions. → **Mitigation**

Climate Smart Agricultural Practices

Most “climate smart” agricultural practices are things you have already heard of.

Many “climate smart” agricultural practices are things you are already doing.

Adaptation Practices

Increased Summer Temperatures

- Irrigation
- Adjust crop planting dates
- Plant heat tolerant crops
- Plant heat tolerant varieties of heat sensitive crops
- Plant different crops
- Manage new crop pests (weeds, insects, diseases)
- Increase soil organic matter (cover crops, amendments)
- Use shading

Increased Winter Temperatures

- Manage new crop pests (insects, nematodes)
- Adjust crop planting dates
- Plant different crops

Sea Level Rise

- Manage saltwater incursion impacted fields

Higher Volume Rainfall Events

- Field drainage
- No-till, minimum tillage
- Practices to reduce compaction
- Increase soil organic matter (cover crops, amendments)
- Practices to reduce soil-borne disease (biofumigation?)
- Cover crops
- High tunnel production

Mitigation Practices

Increase Carbon Sequestration

- Irrigate to maximize crop growth
- High biomass crops
- Reduced tillage
- Cover crops
- Maintain vegetative buffers

Decrease Methane Emissions

- Vegetable & fruit growers are off the hook

Decrease Nitrous Oxide Emissions

- Apply N fertilizer according to crop needs
- Time N application to crop demand
- Improve drainage to decrease duration of saturated soil conditions.
- Reduce tillage?

Decrease Carbon Dioxide Emissions

- Reduce tillage
- Use renewable energy

<u>Mitigation</u> practices are the practices that are likely to be supported by subsidies.

Mitigation/Adaptation Overlap

Increase Carbon Sequestration

- **Irrigate** to maximize crop growth
- High biomass crops
- **Reduced tillage**
- **Cover crops**
- Maintain vegetative buffers

Decrease Methane Emissions

- Vegetable & fruit growers are off the hook

Decrease Nitrous Oxide Emissions

- Apply N fertilizer according to crop needs
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- **Reduce tillage**?

Decrease Carbon Dioxide Emissions

- **Reduce tillage**
- Use renewable energy

Irrigation
Reduced Tillage
Cover Crops
Drainage

Mitigation practices are the practices that are likely to be supported by subsidies.

Mitigation Practices with Other Benefits

Practice	Production	Quality	↓ Costs	Adapt	Sequester C	↓ CO_2	↓ NO_2
Irrigation							
Reduced Tillage			$			C	
Cover Crops							
Vegetative Buffers							
Renewable Energy			$			C	
N Management			$				N
Drainage							N

Mitigation Practices with Other Benefits

Business Benefits

Adaptation Benefit

Mitigation Benefits

Practice	Production	Quality	↓ Costs	Adapt	Sequester C	↓ CO_2	↓ NO_2
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Reduced Tillage							
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Renewable Energy			$			C	
N Management			$				N
Drainage							**N**

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Vegetative Buffers							
Renewable Energy			$			C	
N Management			$				N
Drainage							N

Mitigation Practices with Other Benefits

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N Management			$				N
Drainage							N

So Many Questions

Can we reduce tillage in vegetables?

Which practices will be subsidized?

How do we maximize production benefits of practices?

How will subsidies work?

How do we manage increasing disease/pest threats?

Will practices be mandated?

What practices minimize nitrogen loss?

What should my farm do to adapt to climate change?

Which mitigation practices fit with my farm business?

Do I really need to think about this ?

My Advice

Climate change is not occurring.

There is not sufficient evidence to know with certainty whether climate change is occurring or not.

Talk to some old people about outdoor ice skating and pole lima bean growing.

Climate change is occurring and it is caused mostly by natural changes in the environment.

Think about your farm's vulnerabilities and what you can do to adapt.

Climate change is occurring and it is caused more or less equally by natural changes in the environment and human activities.

Climate change is occurring and it is cause mostly by human activities.

Think about what mitigation strategies work with your farm business.

My Advice

Talk about climate change questions and policy with:

Extension folks and researchers

policy makers and regulators