

# Examining Teacher Candidates' Moral and Ethical Perspectives on Climate Change Using Drawings as Data

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Maryland and Delaware Climate Change  
Education, Assessment, and Research

# Project Overview



Maryland and Delaware Climate Change Education, Assessment, and Research (MADE CLEAR)

NSF Phase I & II Climate Change Education Partnership (CCEP) grant

Partners include:





# Project Goals Guiding This Study

- Build and sustain the capacity of educators to deepen student understanding of climate change.
- Enhance the climate change learning content of pre-service teacher preparation programs.

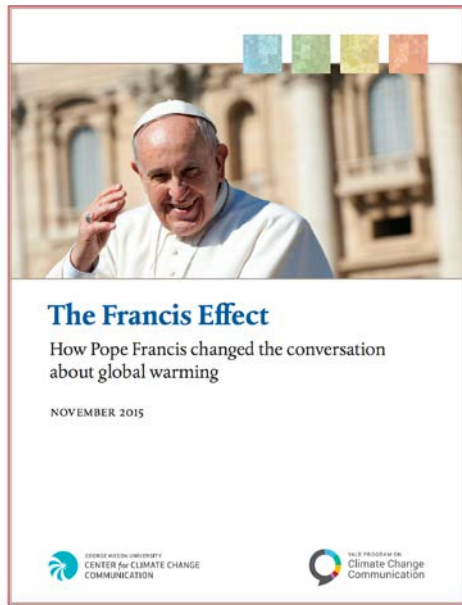


## Our Research Question

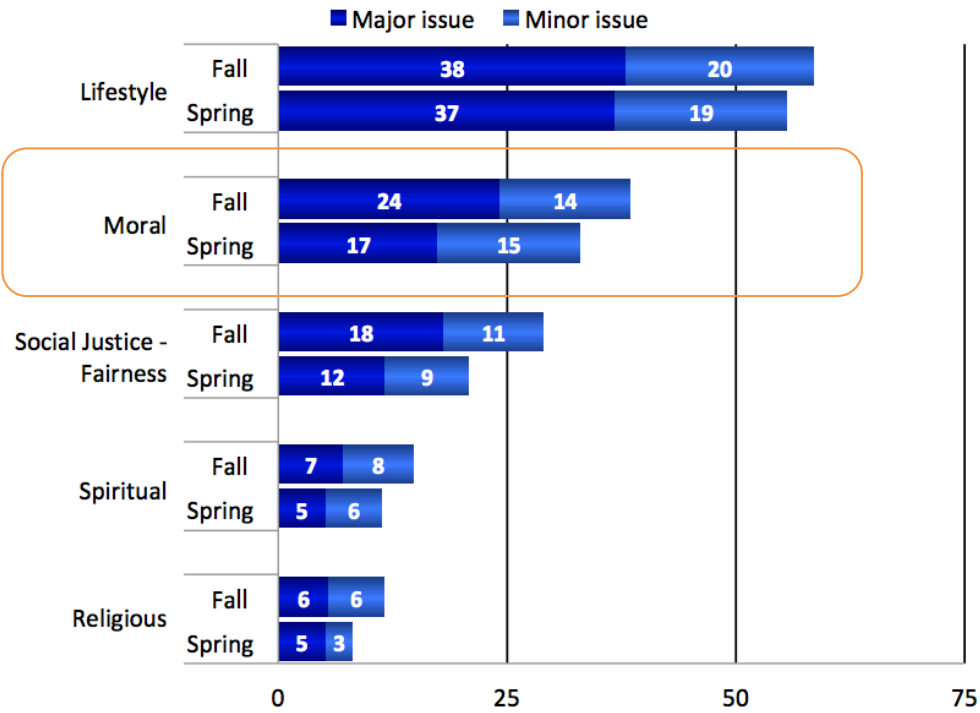
*What insights might prospective elementary teachers' drawings of the causes and effects of climate change provide regarding their developing environmental identities, specifically their moral and ethical stances related to the issue?*

# Moral/Ethical Dimensions of Climate Change

Climate change gaining recognition as a moral issue in U.S. (Maibach et al., 2015)



*In your opinion, do you think global warming is a ...?  
(if yes) Do you think global warming is a major of minor .... issue?*



Base: Americans 18+ (n=905). March, 2015 & Oct. 2015.



# Socioscientific Issues in Teacher Education

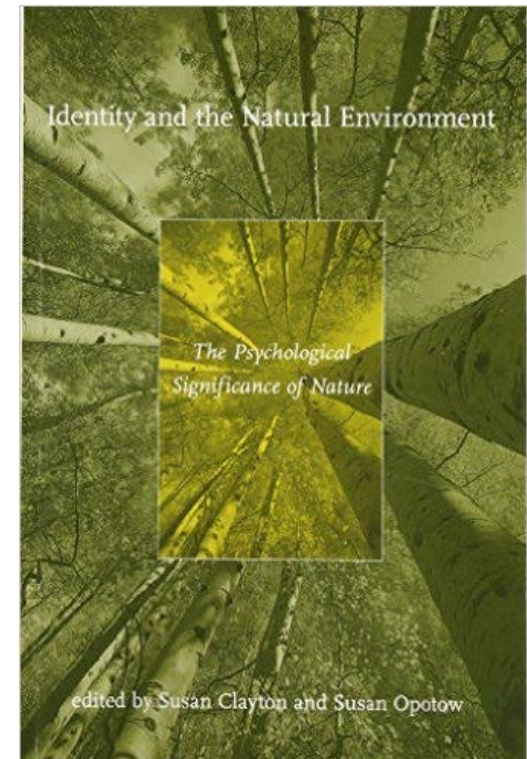
- Science teaching and learning – including science teacher education - must include consideration of morality (McGinnis, 2003) and moral/ethical dimensions of SSIs (e.g., climate change) (Zeidler, Sadler, Simmons, & Howes, 2005)
- Even when teachers view moral/ethical dimensions of science as important:
  - “[Teachers] may not view them as an equally important dimension of their developing professional identity if not **explicitly supported in teacher education programs**”  
(Forbes & Davis, 2008, p. 831)

# Theoretical Perspective

Environmental identity as a dimension of science teacher professional identity

From social psychology:

“Because **environmental issues appear to engage moral reasoning and beliefs in a unique and powerful way**, we need a better understanding of the **connection between environmental issues and identity**” (Clayton & Opatow, 2003, p. 19 – *Identity and the Natural Environment*)





# Literature Review:

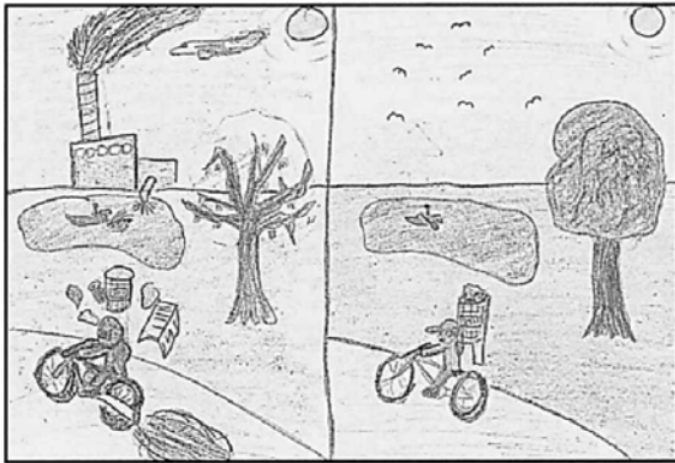
## Environmental Identity, Teacher Identity, and Socioscientific Issues

- Learners' environmental identities may exist in tension with other kinds of identities (e.g., consumer-materialist identities), creating internal conflict (Blatt, 2013; 2014)
- Beginning teachers experience tension in evolving identities, creating discrepancies between beliefs and actions (Katz, McGinnis, Riedinger, Marbach-Ad, & Dai, 2013)
- Teachers may avoid teaching potentially sensitive topics (Cross & Price, 1996; McGinnis & Simmons, 1999; Sadler et al., 2006)



# Literature Review:

## Using drawings to gain insight into environmental perspectives



From Alerby (2000)

- “Draw and explain” approach; insight into learners’ environmental perspectives (Alerby, 2000; Barraza, 1999; Bonnett & Williams, 1998; Shepardson et al., 2007)

- Conversations about drawings may provide information about concern, empathy; moral/ethical considerations

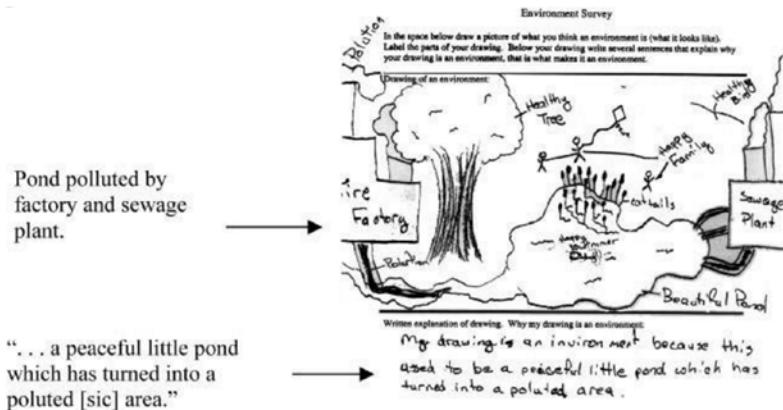


Figure 5. Example student response: Model 3, a place impacted or modified by humans.

From Shepardson et al. (2007)



# Study Context and Participants

- Elementary Education teacher education program
- Large Mid-Atlantic university
- Elementary science methods course
- Senior-level undergraduate teacher candidates (N=59)



# Data Collection

Drawing prompt (for all participants):

*Draw all that you know about the causes and effects of climate change. Write what you intended to communicate in your drawing.*

- Follow-up interviews with subset of participants (n=2) within the semester



# Drawing Analysis

## Phase 1

Open coding of drawings and accompanying written explanations examining **what appeared salient** to participants through their drawings (*salience* as first stage of environmental identity development – Kempton & Holland, 2003)

## Phase 2

Coding of **affective** (good/bad feelings; optimism/pessimism) and **behavioral dimensions** of drawings and written explanations (human actions impacting environment positively or negatively)



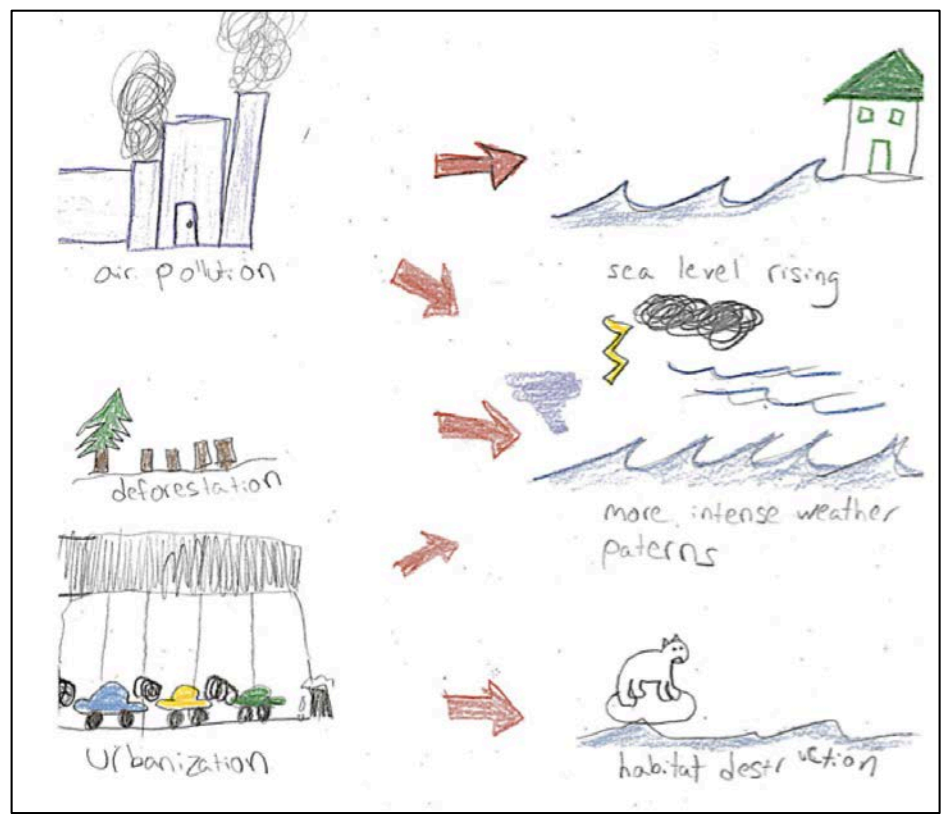
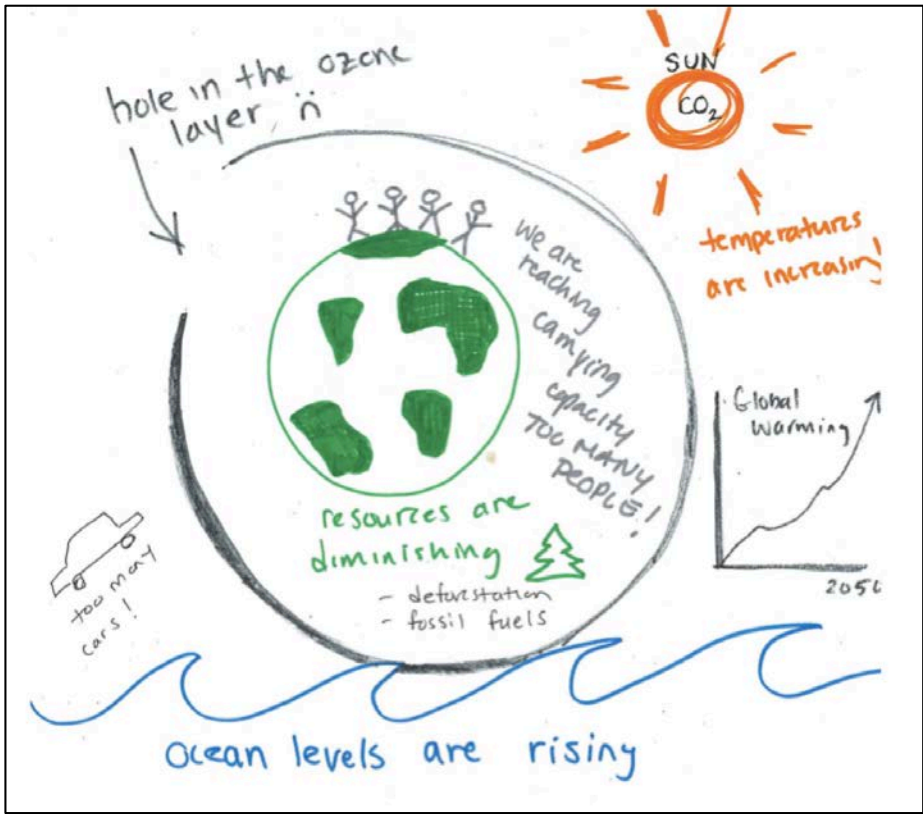
# Insights from Drawing Analysis

**Phase 1:** Climate change elements that appeared salient to teacher candidates:

- Rising temperatures
- Gases released
- Melting ice
- Ozone hole
- Dying/endangered animals
- Pollution (air and water)
- Sea level rise
- Habitat destruction
- Overpopulation of humans

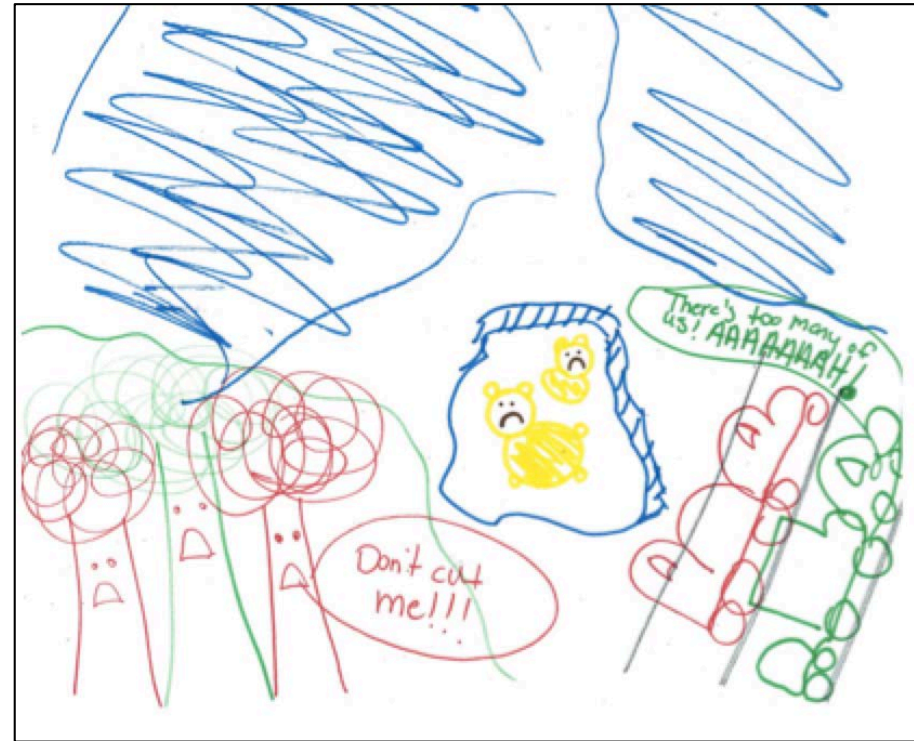
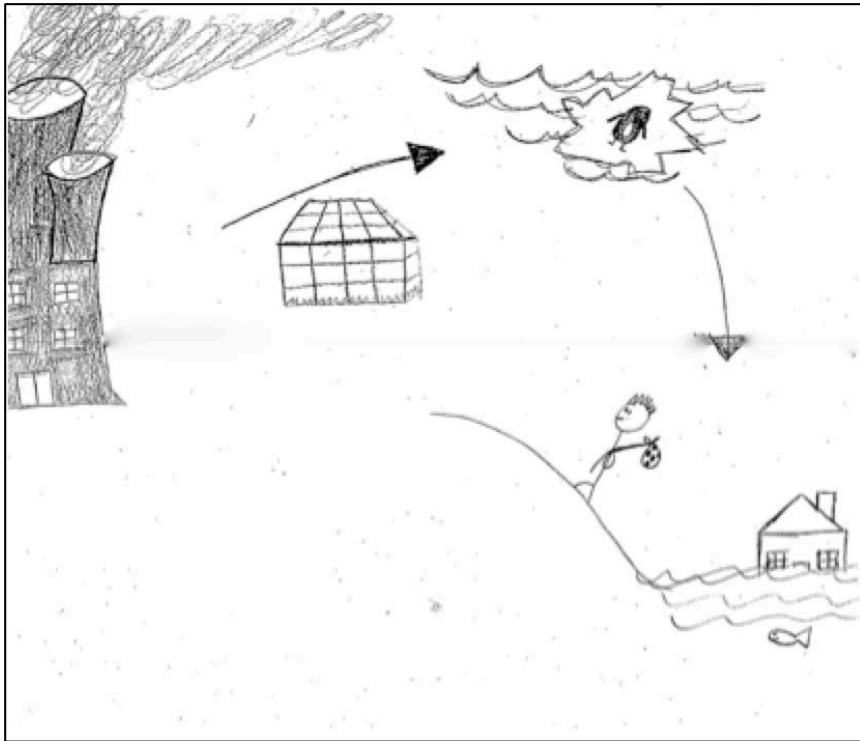


# Examples



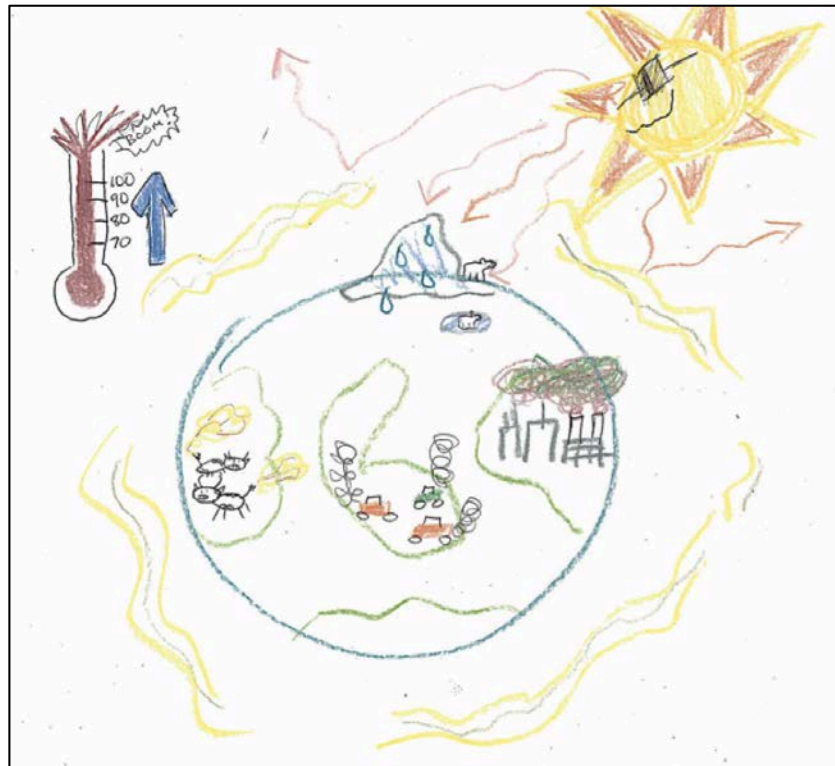
# Insights from Drawing Analysis

**Phase 2:** Affective dimension – often expressed through facial expressions (anthropomorphism); exclamations; solitary humans/animals



# Insights from Drawing Analysis

**Phase 2:** Behavioral dimension – often included emissions, deforestation, habitat destruction; people (actors) rarely specified





# Insights from Focal Participants

**Focal participant: Jill**

**Salient:**

A cool/warm cycle; past conditions; time; threats to wildlife

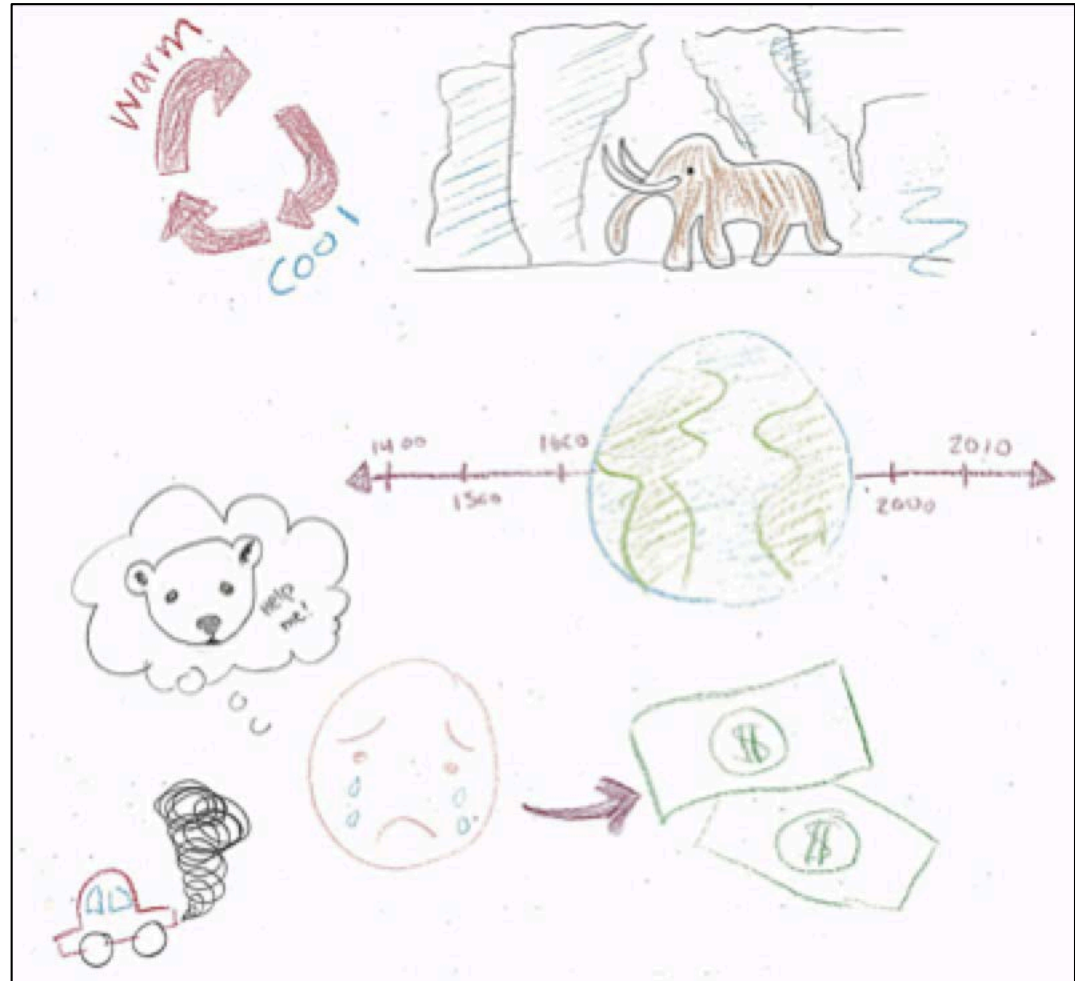
**Affective:**

“Help me”; crying

**Behavioral:**

Emissions from cars

**To probe:** Connection to money/economics

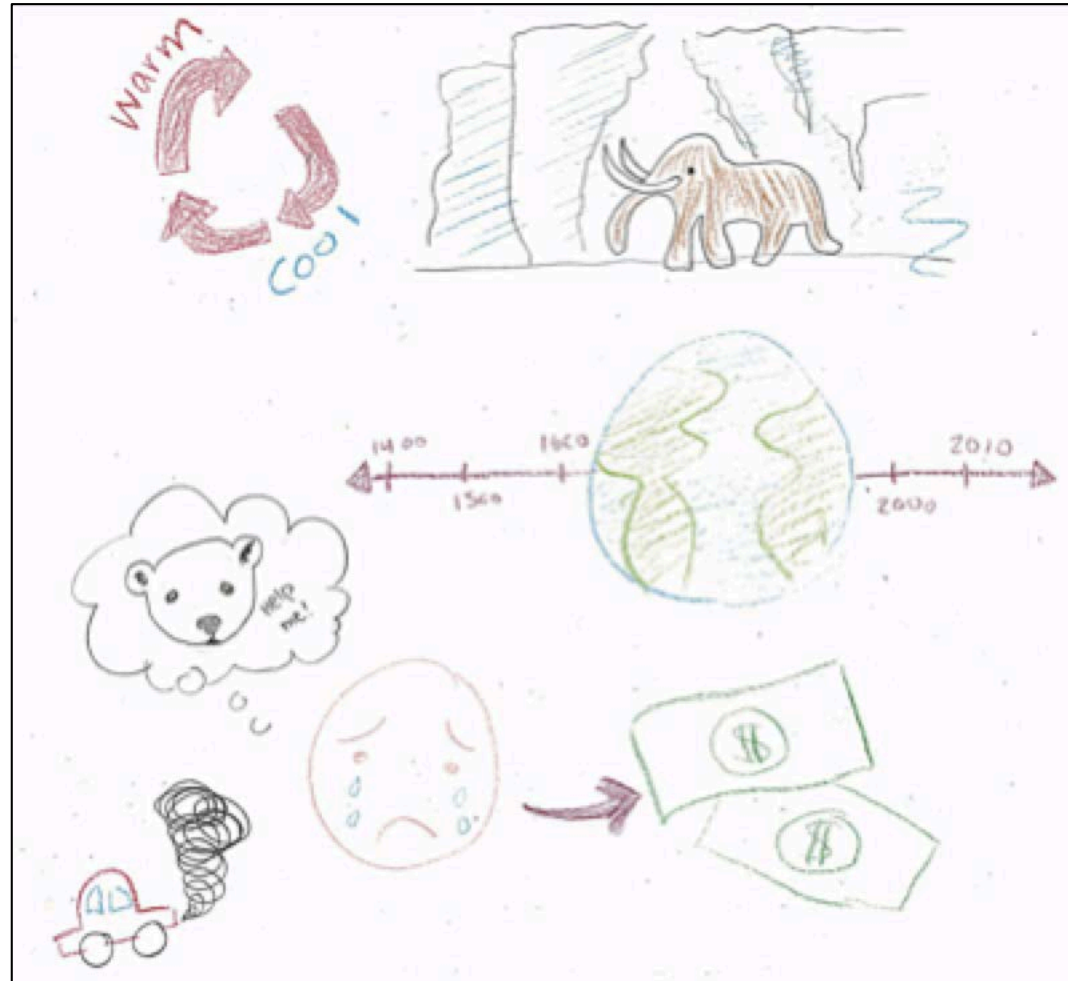


# Insights from Focal Participants

## Jill's written explanation:

“Earth goes through cool and warm cycles... There have been incidents of cooling and warming periods in the past (Ice Age, Little Ice Age, Medieval Warming Period)”

“Government/organizations take advantage of ‘human-caused global warming’ for \$.”

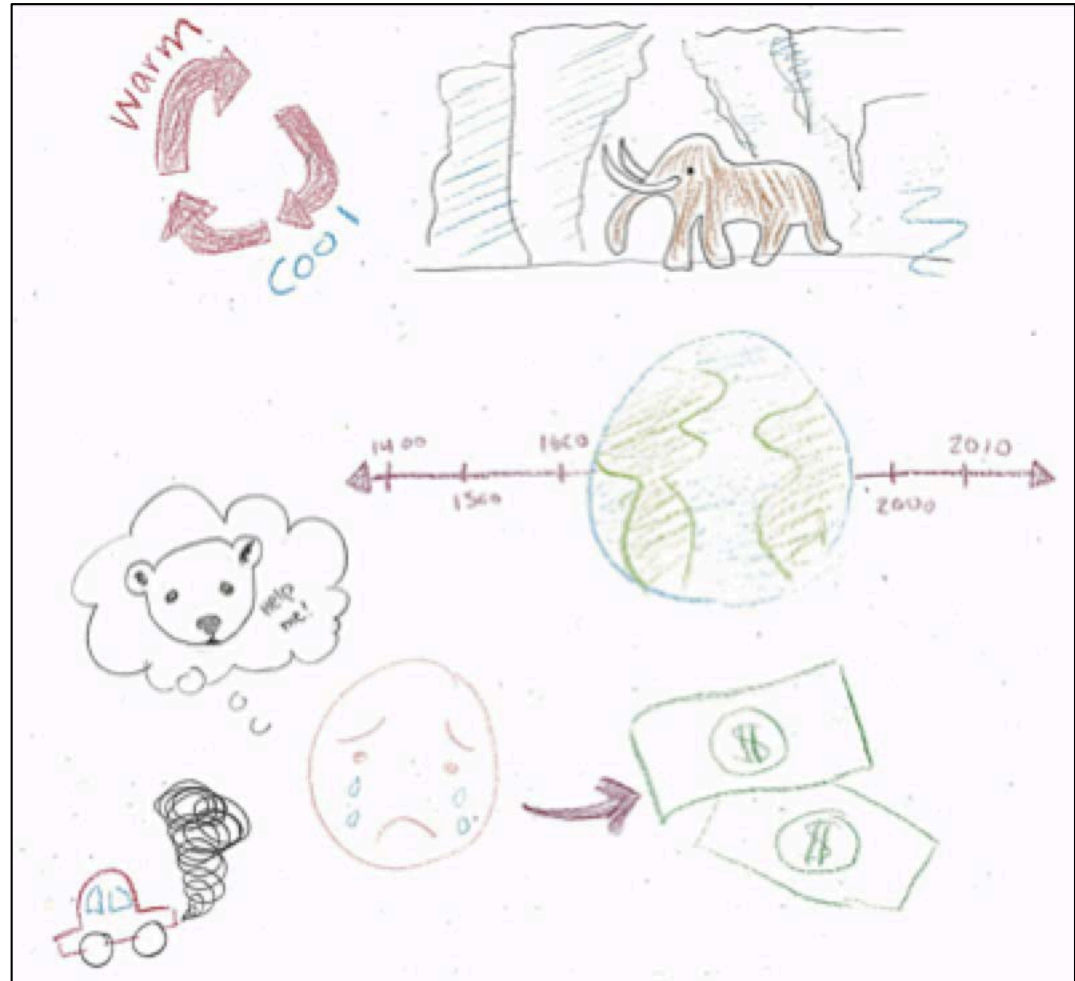


# Insights from Focal Participants

## Jill's Interview

[Do you see climate change as connected with any moral or ethical issues?]

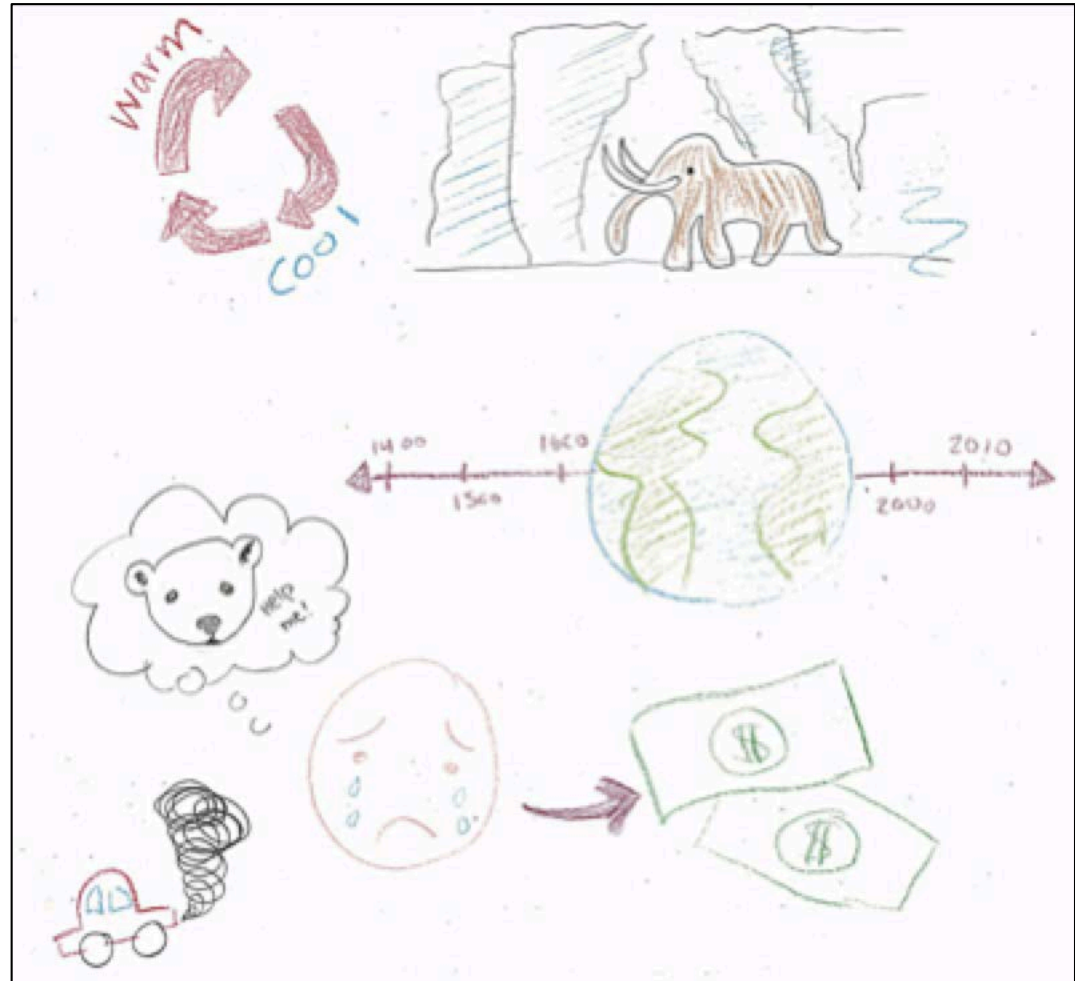
*"Yes, definitely. If the government is realizing...there isn't much human impact on the environment, then they are taking advantage of people's money and using people's sympathy for polar bears and basically lying to society."*



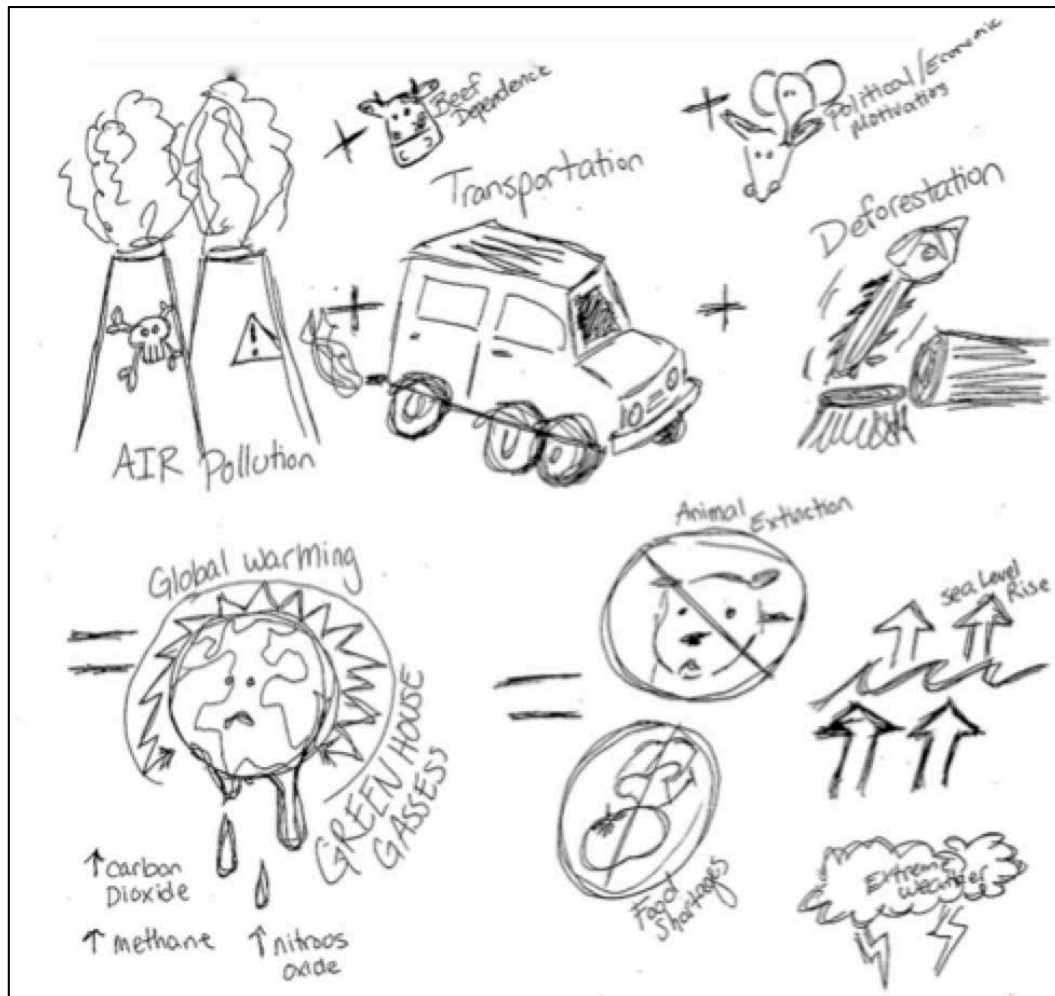
# Insights from Focal Participants

## Jill's Interview

*"My teacher was big on how humans did not cause the global warming, that that was a propaganda... we have an impact on the environment, but we don't have enough power to change the entire climate... Sometimes organizations or the government may take advantage... And get people to make donations and use that money... Just a theory."*



# Insights from Focal Participants



## Focal Participant: Melissa

### Salient:

Emissions, meat consumption, deforestation, politics/economics, greenhouse hotter temperatures, animal extinction, food shortages, sea level rise, extreme weather

### Affective:

Expressed through facial expressions (Earth, (polar?) bear)

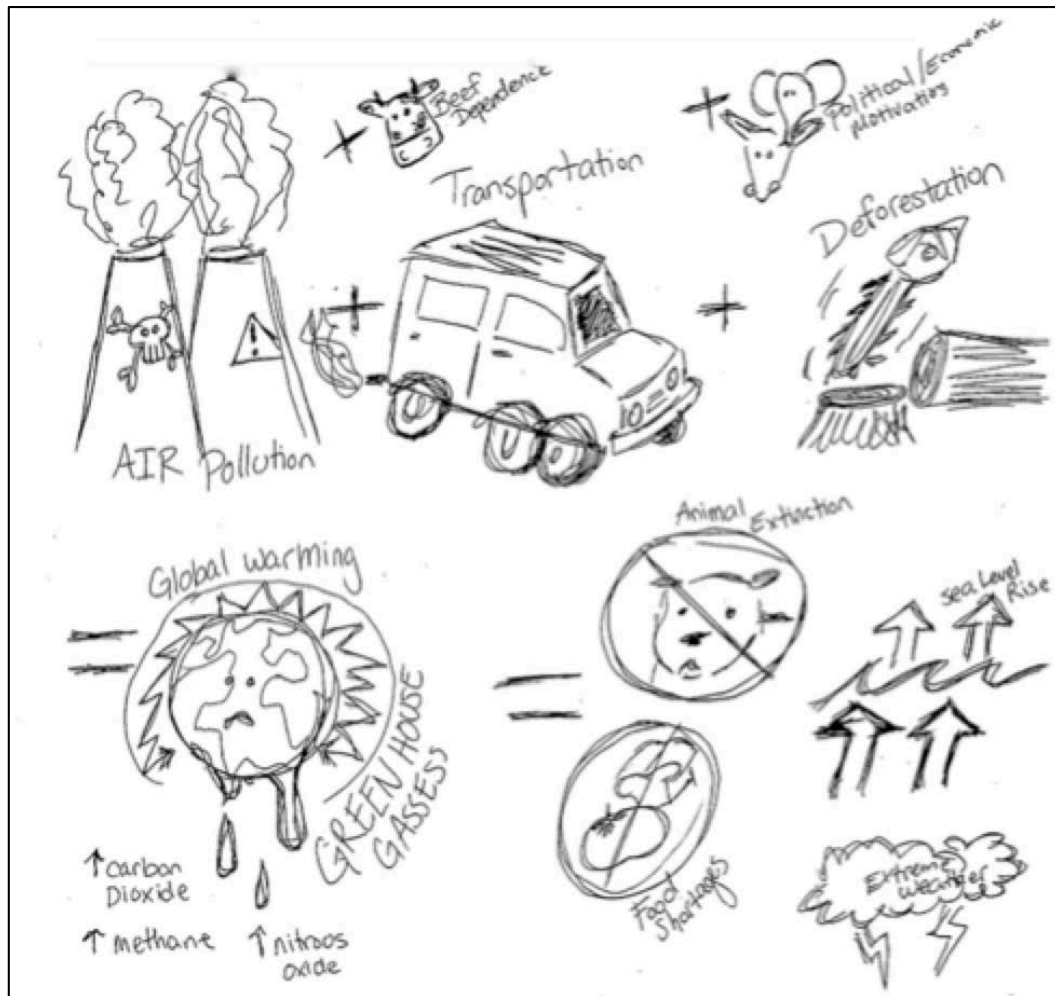
### Behavioral:

Emissions, deforestation, beef production, political activity

### To probe:

Who is responsible for activities?

# Insights from Focal Participants

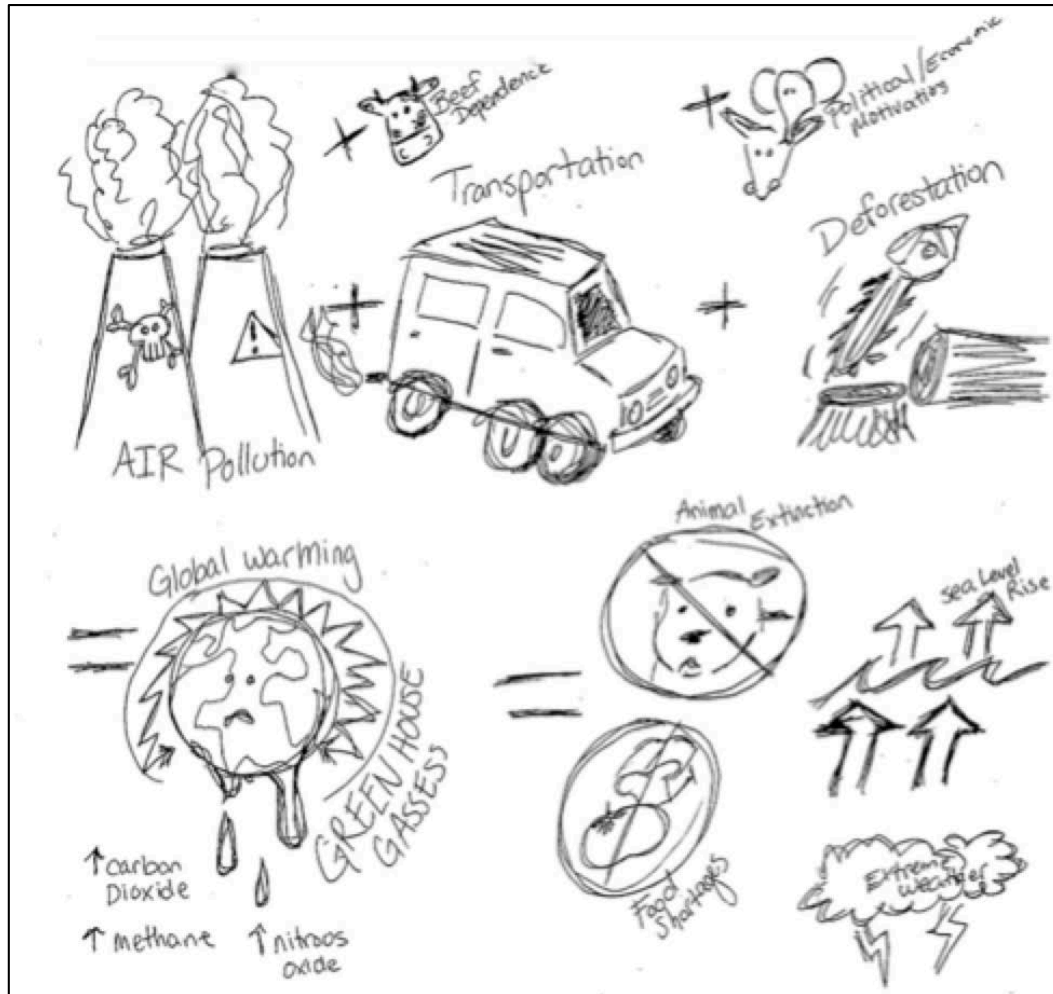


## Melissa's commentary:

- Described role of methane emissions from beef production, deforestation reducing the amount of carbon that could be stored on land

*"With a lot of the solutions [to climate change]... we know what the solutions could be, but there are political and economic reasons why we don't do those things."*

# Insights from Focal Participants

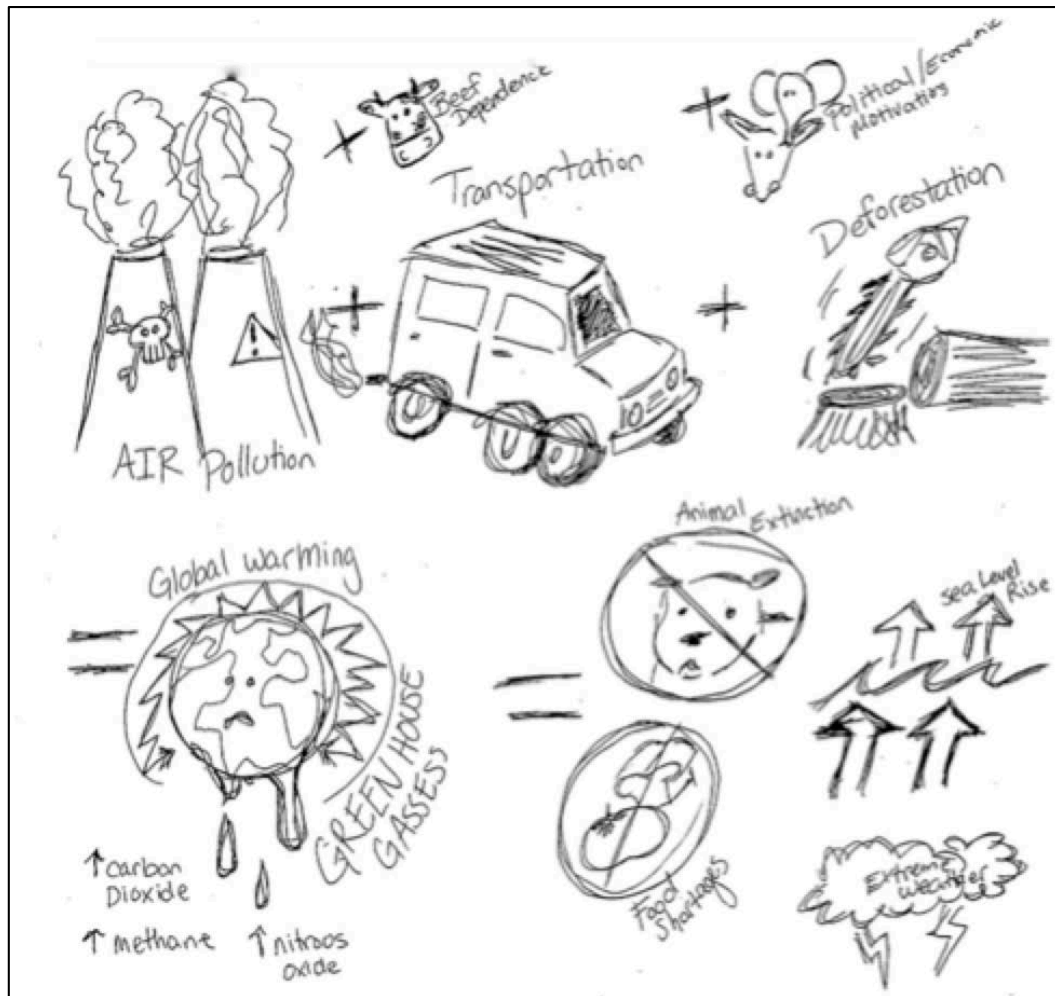


## Melissa's interview:

[Do you see climate change as connected with any moral or ethical issues?]

*"When it gets into political and economic talk, **it's a matter of what we value.** Do we value, you know, transportation in our cars with gasoline over maybe not traveling as much? Or do we value job creation, which goes a lot into the air pollution and factories. Do we value that higher than we value the Earth? I think it's all a balance of whether we value the product we're getting... versus the benefits that it's gonna give the Earth."*

# Insights from Focal Participants



## Melissa's Interview:

- Did not see climate change as highly urgent, most effects not yet impacting society
- Learned about climate change in university classes and in everyday life at “very green conscious campus”
- Watched “*An Inconvenient Truth*” with her mother
- Learned about climate change at her “very politically liberal” church





# Conclusions

- **Drawings afforded:**
  - [For researchers] Insight into moral and ethical dimensions of pre-service teachers' climate change ideas
  - [For teacher candidates] a tool to reflect on climate change ideas
- **Challenges:**
  - Making inferences regarding moral/ethical stances from drawings alone; written explanations, interviews were essential
  - Interpreting how participants saw themselves in relation to climate change, or in relation to natural environment (environmental identity) → decided to slightly change drawing prompt
- **Next question:**
  - Implications of teacher candidates' moral/ethical considerations around climate change for future teaching practice?

A satellite-style map of the Earth showing continents and oceans. The map is centered on the Atlantic Ocean, with North America on the left, South America at the bottom left, Africa in the center, Europe and Asia on the right, and Australia at the bottom right. The oceans are a deep blue, and the landmasses are shown in various shades of green, brown, and tan, representing different vegetation and terrain types. The North Pole is visible at the top, and the South Pole is at the bottom, both covered in white ice.

Paper available at:  
[www.ClimateEdResearch.org/NARST2016](http://www.ClimateEdResearch.org/NARST2016)

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