

Cultivating Climate Change Education

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ERG



My climate (education) story

- AmeriCorps Citizen Schools Teaching Fellow
- Energy and Resources Group (ERG)
- Master's Project: Farm to school program evaluation in San Juan Islands
- Climate change and school garden curriculum development
- Piloting in Oakland, CA and Lopez Island, WA
- My approach: unite research and practice



Mother-daughter climate education team; Lowell School
Fall 2016



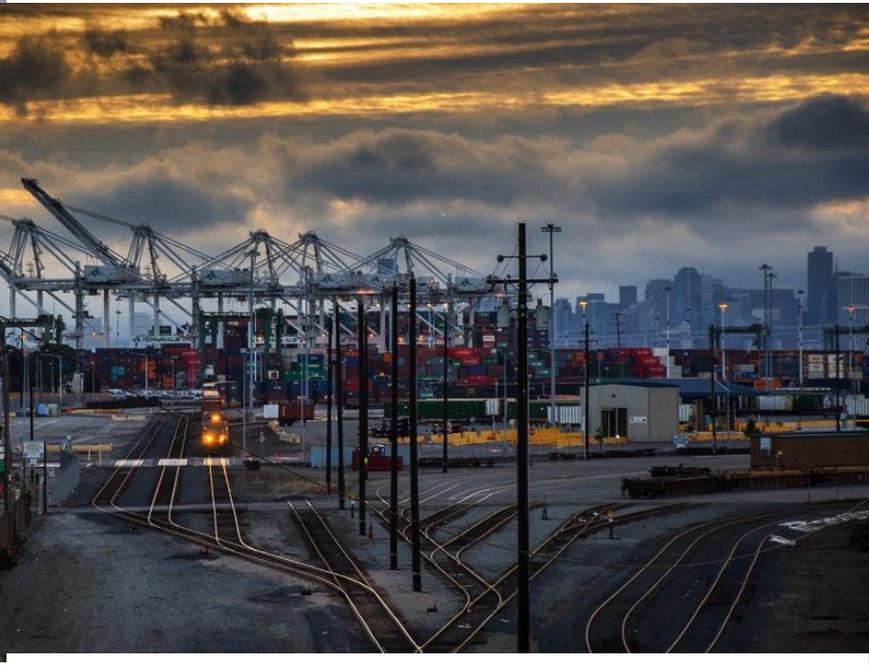
Climate Education Contexts



Oakland, CA



Lopez Island, WA





1. Food and Climate Change

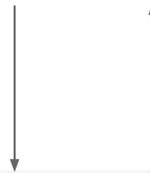
- Agriculture accounts for up to $\frac{1}{3}$ of greenhouse emissions (Gilbert 2012)
- Large source of emissions, but also large sink capacity via soil carbon sequestration and improved N-fertilizer management (Lal 2011, 2012)
- Land management and agroecology strategies for climate change mitigation are high potential, low cost solutions with multiple benefits



How food/ag impacts climate change:

- Source of carbon emissions (could be sink)
- Personal food choices
- Transportation

FOOD SYSTEM



CLIMATE SYSTEM

How climate change impacts food/ag:

- Decreased ag yields
- Unstable climate-altered precipitation and heat trends



*Climate change, quite simply,
can't be halted without fixing
agriculture.*

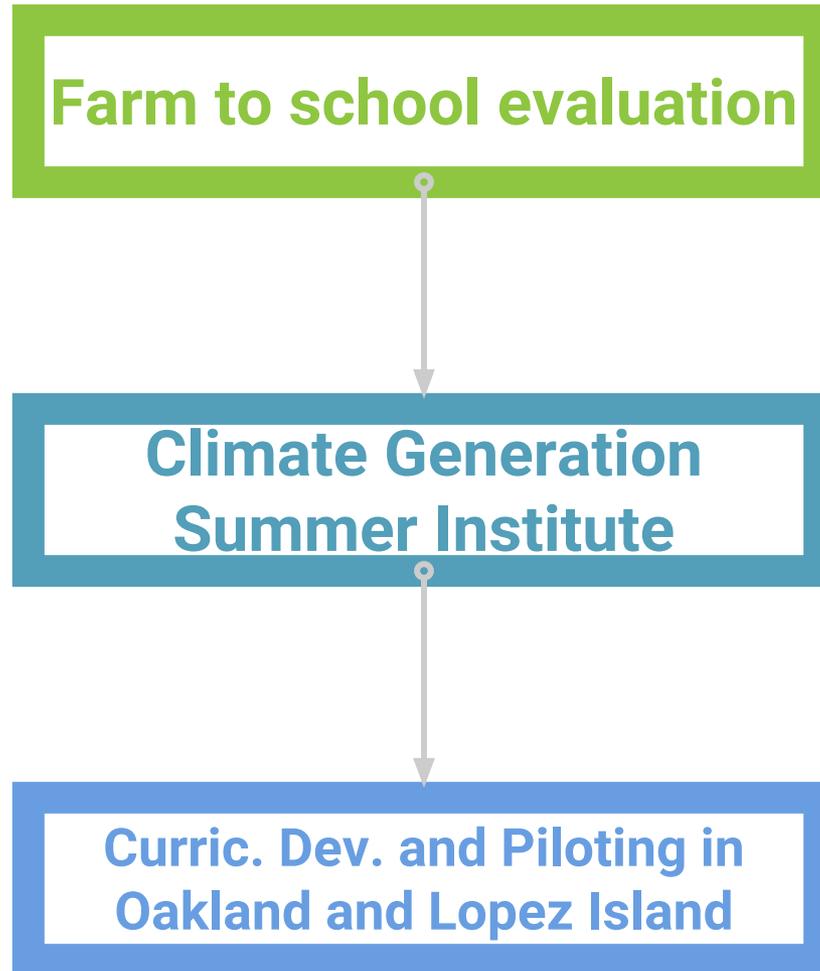
~ Michael Pollan



Climate Education Opportunity

- Food “frame” for climate change instruction
- Teach climate while engaging students in solutions in school garden
- Garden system is a good metaphor for the complexity of the climate system (OUSD garden instructor)
- Build on the success/efficacy of outdoor garden-based education (Blair 2009)

Curriculum Development Process





2. Curriculum pedagogy

- Hypothesis: experiential learning and hands-on activities are better strategies for teaching climate change to youth than didactic, lecture-based instruction (want to explore this further in my PhD research)
- Inspired by Paolo Freire's critical pedagogy, David Kolb's experiential learning cycle

Next Generation Food and Climate Curriculum Overview

Learning Objective	Topic	Experiential Activity
1. What is climate change? How do food systems interact with climate systems?	Weather vs. climate	Climate storytelling exercise, weather data-logging in garden
2. What factors, including agriculture, have caused the rise in global temperatures?	Causes of climate change; Carbon cycle	CO ₂ Freeze Tag
3. What are the effects of climate change and what will that look like here?	Effects of climate change	Garden resilience plan
4. How can we monitor effects locally?	Farmer monitoring efforts	Guest speaker or tour of local farm
5. What are local solutions to climate change?	Climate action and solutions	Composting
6. Launch class food-climate action project(s)	Student determined, i.e. biochar	School garden improvement project



Example of solutions-oriented lesson: Composting

Students are composting in the Lopez school garden, adding material to the appropriate bin after learning about the potential for compost application to increase soil carbon sequestration capacity.



Who is the curriculum for?

- Farm to school programs
- School garden teachers
- Science teachers (ideally with a school garden)
- Informal educators
- Education NGOs w/ focus on curriculum development or dissemination

42,587

Schools participating in Farm to School

High potential to incorporate food and
climate education



3. Results

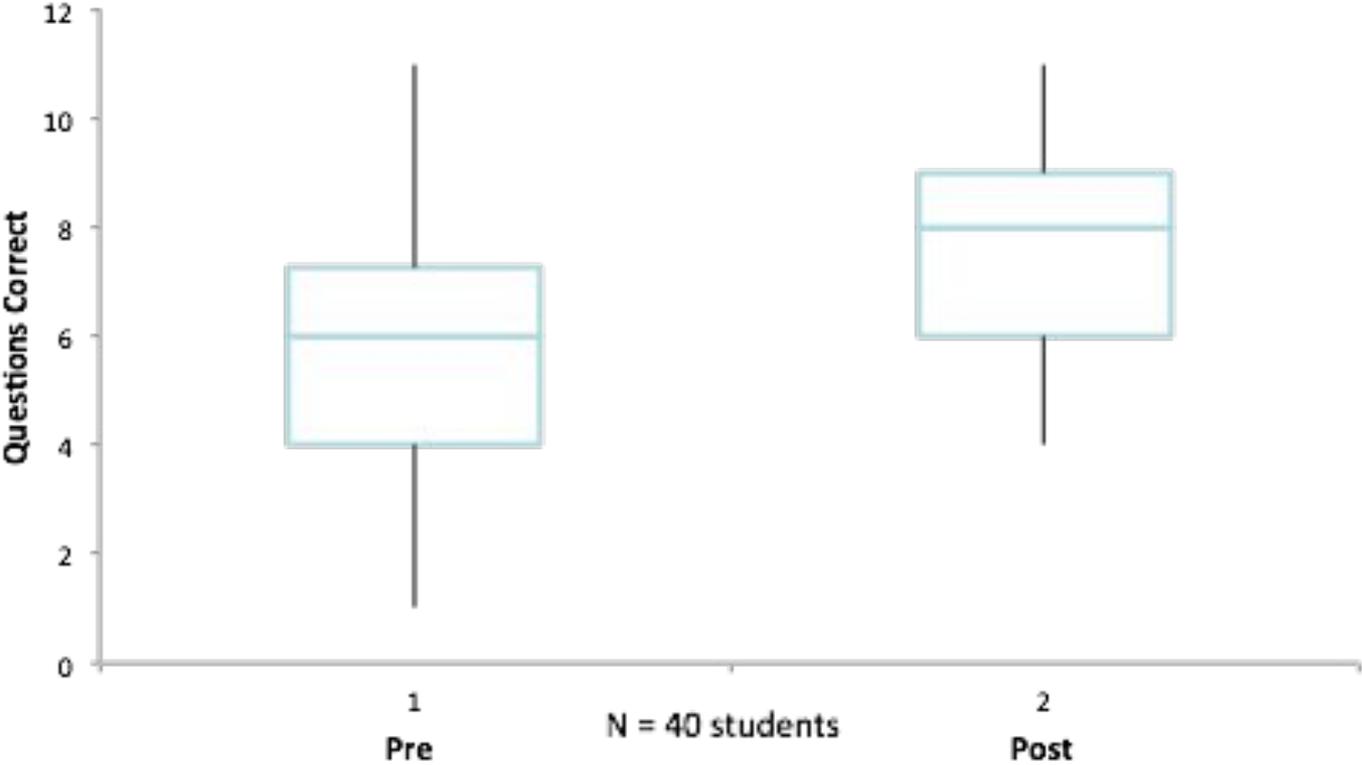
- Based on 4 school pilots, 65 students
- Ongoing- implementation in 5-6 additional schools this spring (in California and Oregon)

Student Environmental Literacy- San Juan Islands (% Correct)

	Main GHG	GHG Concentration	Global Temp. Rise	Water Cycle
Lopez	42	42	17	50
Orcas	52	3	32	71
San Juan	22	0	11	22

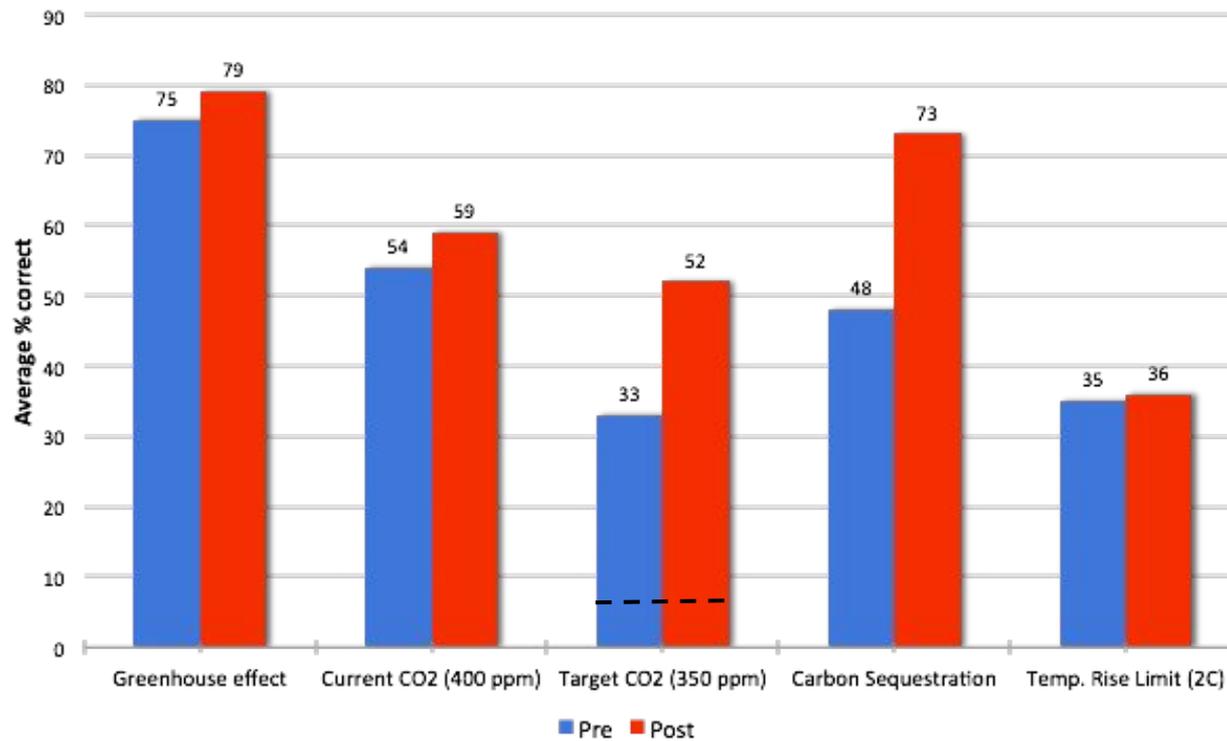
Curriculum Piloting- Pre/Post Surveys, Oakland

Box Plot of Pre/Post Survey Results (All Schools)



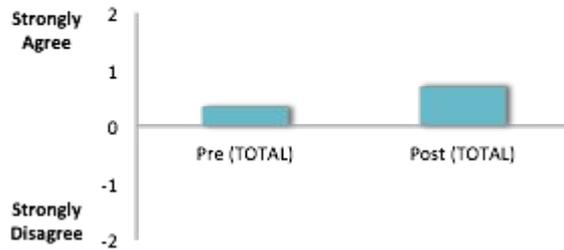
Mean: 53% (pre) vs 68% (post)
t-score = 3.18, P-value = .001

Results by Question- Oakland

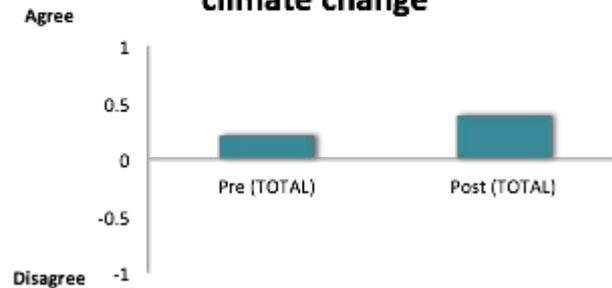


Curriculum Piloting- Student Engagement, Oakland

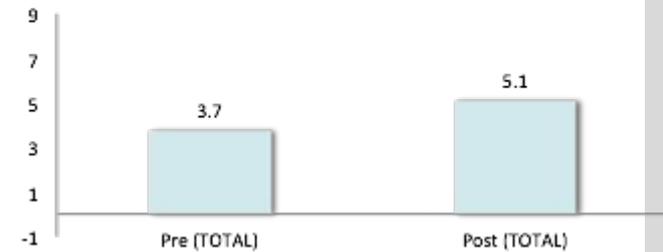
Addressing and acting on climate change is a priority for me in life



What I do personally matters when it comes to mitigating climate change



Number of Environmental Activities I Participate In (out of 10)





Research Highlights

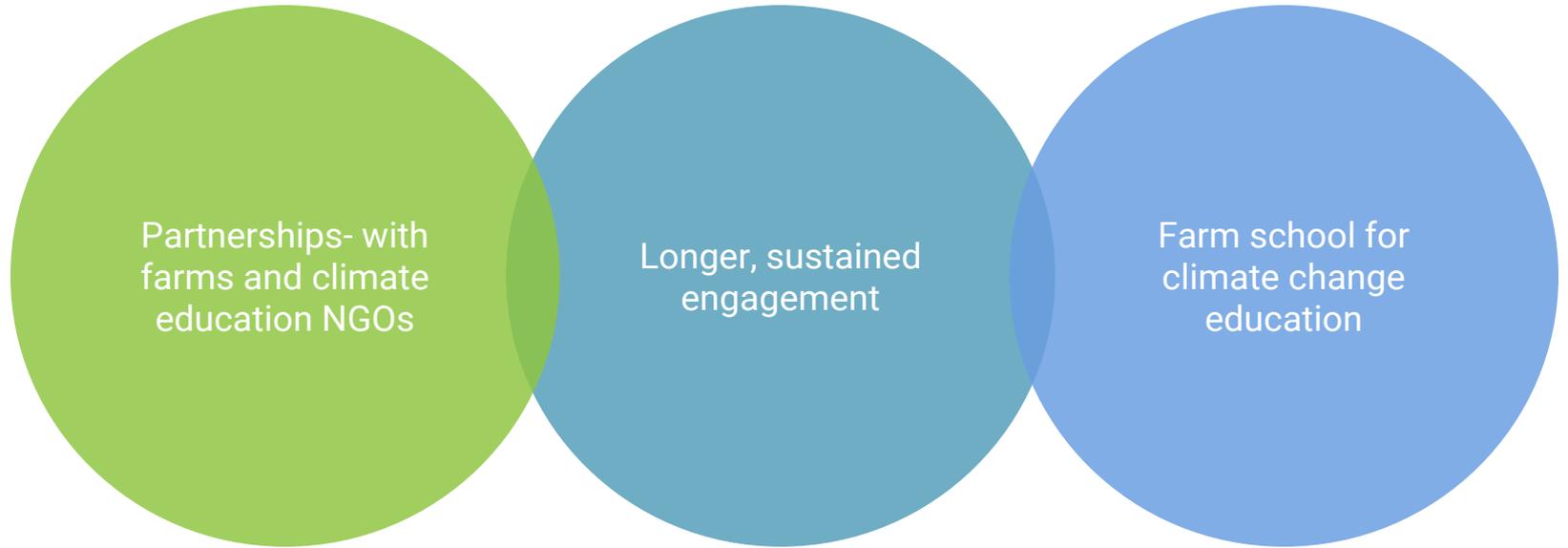
- Student: knowledge improvements (15%), positive feedback
- Co-teacher interviews
 - *“A lot of climate change is out of control and scary for kids, but to teach while doing something positive balances that out.”*
 - *“One of the things I like about having co-teachers is that it just means more to [students], they listen better... and I learned from the experience and I can begin to weave it into what I do and teach.”*
- Challenges:
 - For some students, climate change still feels like a future issue, more pressing concerns day to day
 - Keeping it interactive and engaging, minimizing “teacher talk”



Key takeaway:

Gains are positive, but
want to do better!

Path Forward



Thanks!
Any questions?

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