Mapping the Landscape of Nonformal Climate Communication and Education across the United States

Full Report

October 2024

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Mapping the Landscape of Nonformal Climate Change Education in the United States

Given the gaps in climate change education policy at the K-12 and higher education levels[i,ii] in the United States, organizations that offer climate change communication and education (CCE)[1] represent a vital avenue for spurring the required scale and speed of climate action. CCE organizations (CCEOs) include a broad array of non-governmental organizations, community-based organizations, zoos, museums, parks, libraries, and private companies which educate about climate change. These organizations use a wide range of educational modalities such as camps, workshops, campaigns, and afterschool programs to empower learners of all ages to take climate action. CCEOs may provide CCE in interaction with teachers and schools within the formal education system. They may also work outside the formal education system to build public awareness of, and public participation in, climate solutions through nonformal and informal education opportunities. Through networking, coalitions, and partnerships, CCEOs may also play a key role in policy development at all levels of government, including state, national, and international levels.[iii,iv]

> **Organizations that offer CCE represent a vital and key avenue for spurring the required scale and speed of climate action.**

About the Research

As it becomes increasingly likely that global warming will exceed 1.5°C, and that the impacts will disproportionately fall on vulnerable communities,[v] it is still possible to avoid crossing the 2°C threshold with sufficiently strong responses.[vi,vii] Due to the potential of CCEOs to reach learners both inside and outside of the formal education system, it is important to understand the programs, networks, and challenges of these organizations. Prior to this study, little was known about the extent, distribution, or types of CCEOs in the United States, nor of their CCE approaches, programs, and services.[viii] This study helps fill these knowledge gaps. The study's

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[1] This report defines climate change communication and education as including formal education (pre-primary, primary, secondary, and tertiary education); nonformal education (activities and programs such as short workshops, afterschool programs, and seminars offered outside of, and often in complement to, formal education); informal education (educates the population at large through non-institutionalized methods such as radio, television, newspapers, and internet, which often overlaps with communication and public awareness, public access to information, and public participation); and formal, nonformal, and informal education, as well as training (teaches practical and applied skills typically delivered in Technical and Vocational Education and Training (TVET) settings).[1]

overarching goal is to map the types and foci of CCEOs in the US. The study used two complementary approaches of a census and a survey to address the following questions:

1. How many CCEOs are there in the US? In which locations and political contexts are they to be found? At what levels do they focus their activities?
2. What do CCEOs do? What kinds of CCE approaches, programs, and services do they offer?
3. What are the strengths, weaknesses, challenges, and needs of CCEOs?

An online census[2] identified CCEOs in the US through a structured search protocol across search engines, social media, and network directories. The searches combined keywords for climate change (e.g., climate change, climate crisis) with organization-related terms (e.g., NGO, museum, zoos). In total, 1,020 CCEOs across the 50 states and the District of Columbia were identified. A directory was complied with organization name, contact information, state, region, organization type, mission and vision, year of establishment, level of focus, and CCE approaches.[3]

An online survey was then conducted using Qualtrics between February and April 2023. The survey collected organizational data (e.g., size, funding, organization type) as well as information on programs, services, challenges, and networks. The survey was disseminated to all CCEOs in the directory as well as through the networks (e.g., LinkedIn, Facebook, Twitter, listservs) of the study partners, the North American Association for Environmental Education (NAAEE), Monitoring and Evaluating Climate Communication and Education (MECCE) Project, and Centre for Sustainable Futures at Columbia University. Respondents were asked to nominate other CCEOs and surveys were sent to the contact information provided. It was recommended that the Director or person most knowledgeable about the CCEO complete the survey. The respondent's organizational role and demographics (e.g., gender, ethnicity, education level) were also collected.

Overall, there were 187 survey responses (166 from the census, and 21 from other samples), an 18% response rate of the 1,020 American CCEOs in the directory. On average, the survey took 20 minutes to complete.

The census and survey data were analyzed separately. The analysis included frequency distributions for key variables and cross-tabulations to examine the relationship between key variables such as organization type (e.g., NGO, research center, business), geographic region, and state political affiliation.[4]

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[2] The study therefore presents a census of organizations active online with updated websites and contact information.
[3] The UNFCCC's "Action for Climate Empowerment" framework, which organizes CCE according to education, training, public awareness, public access to information, and public participation guided the study's definitions of CCE approach.
[4] States were categorized as Democrat or Republican based on the Cook Political Report's Partisan Voter Index and FiveThirtyEight's Partisan Lean Metric which averages the political leaning of a state based on presidential and state-legislative election results.

Summary of Findings

The key findings from this study of CCEOs in the United States are:

1. The politicization of public discussions about climate change is a significant challenge for CCEOs in the US (78%). Serious challenges for CCEOs also include the spread of misleading (68%) and deceptive (62%) information, government inaction (62%), and youth anxiety (57%).

2. When developing new initiatives, most CCEOs have the goals of promoting collective action (70%) and sharing information about the science of climate change (68%). CCEOs are less likely to have the goals of addressing social and emotional learning (33%), climate anxiety (31%), or Indigenous knowledge (25%) when developing new initiatives.

3. While most CCEOs (76%) report working in nonformal education, many are engaging with formal education in their work (60%). CCEOs are most likely to offer community-based programs (36%), activities and programs in formal education (30%), and outreach programs to increase public awareness (30%).

4. Of the 1,020 CCEOs identified in the US, 33% are located in the South, 29% are in the West, 25% are in the Northeast, and 13% are in the Midwest.

5. CCEOs are more likely to be in Democrat-leaning states (69%) than Republican-leaning states (31%).

6. The typical CCEO is highly formalized. They have well-articulated visions, missions, and goals (98%); are legally registered (96%); have formal annual budgets (72%); and have several staff (65%). Over half (57%) of CCEOs are NGOs or CBOs, and most (51%) were established in the last 20 years. More recently established organizations more likely to have 'climate' in their name.

7. The majority of CCEOs (72%) operate at the state level, are members of climate change-related networks (74%), and participate in national conferences about CCE (58%).

8. In their work, most CCEOs draw on international reports and agreements such as IPCC reports (73%), the Paris Agreement (67%), and the Sustainable Development Goals (59%).
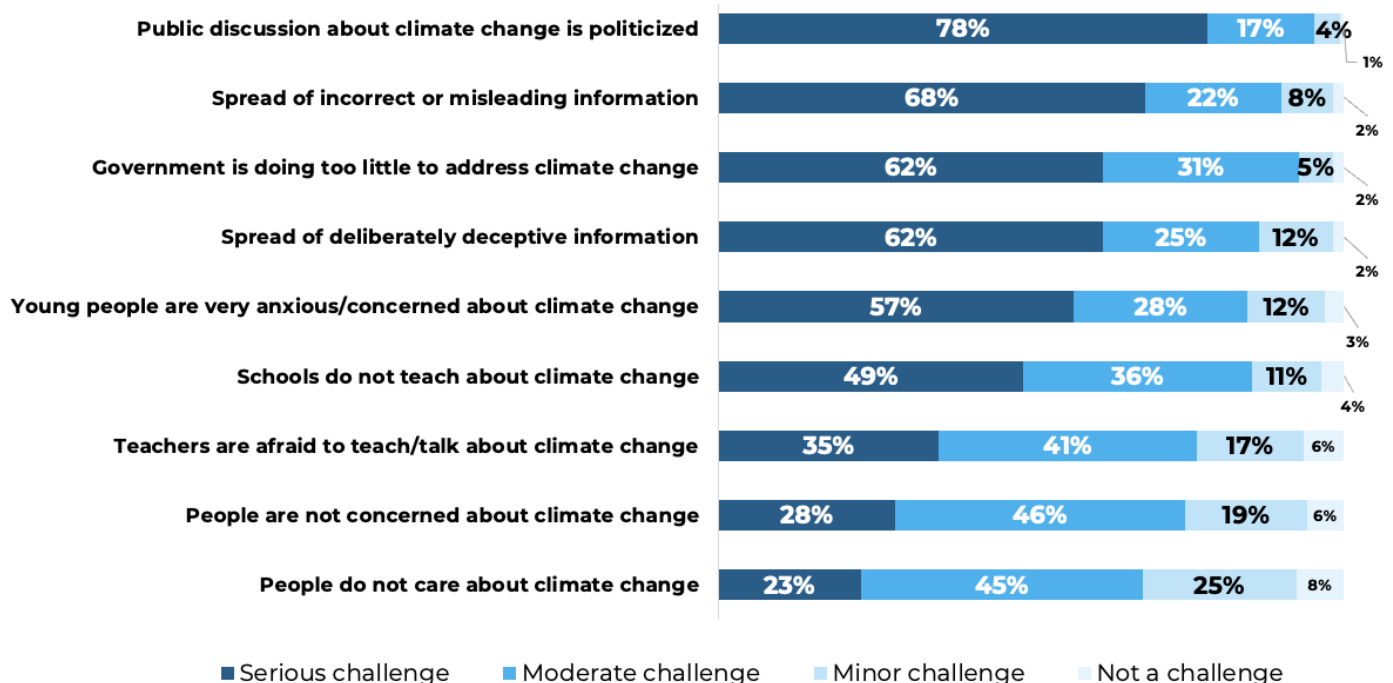
Key Findings #1

The politicization of public discussions about climate change is a significant challenge for CCEOs in the US (78%). Serious challenges for CCEOs also include the spread of misleading (68%) and deceptive (62%) information, government inaction (62%), and youth anxiety (57%).

The majority of CCEOs (78%) that responded to the survey report being seriously challenged by the politicization of public discussions about climate change, with nearly all (95%) indicating this is at least a moderate challenge. Serious challenges for CCEOs also include the spread of incorrect or misleading information (68%), the spread of deliberately deceptive information (62%), and government inaction on climate change (62%). Moderate to serious challenges for CCEOs include young people's anxiety about climate change (85%), schools not teaching about climate change (85%), and teachers being afraid to teach or talk about climate change (76%). CCEOs were less likely to agree a lack of care or concern about climate change were serious challenges for them.

Figure 1. Percentage of CCEOs and levels of perceived challenges regarding different issues in climate change communication and education (n = 187).

	Serious challenge	Moderate challenge	Minor challenge	Not a challenge
Public discussion about climate change is politicized	78%	17%	4%	1%
Spread of incorrect or misleading information	68%	22%	8%	2%
Government is doing too little to address climate change	62%	31%	5%	2%
Spread of deliberately deceptive information	62%	25%	12%	2%
Young people are very anxious/concerned about climate change	57%	28%	12%	3%
Schools do not teach about climate change	49%	36%	11%	4%
Teachers are afraid to teach/talk about climate change	35%	41%	17%	6%
People are not concerned about climate change	28%	46%	19%	6%
People do not care about climate change	23%	45%	25%	8%

Key Findings #2

When developing new initiatives, most CCEOs have the goals of promoting collective action (70%) and sharing information about the science of climate change (68%). CCEOs are less likely to have the goal of addressing social and emotional learning (33%), climate anxiety (31%), or Indigenous knowledge (25%) when developing new initiatives.

When asked about their goals when developing new initiatives, most CCEOs (70%) surveyed consider the goals of promoting collective and community action a great deal—much more than promoting change in individual behaviors (40%). Most CCEOs also report considering the goals of sharing climate science information (68%), empowering civic participation (60%), and advancing climate justice (59%) a great

Figure 2. Goals that CCEOs consider 'a great deal' when developing new CCE initiatives (n = 187).

Goal	Percentage
Promoting collective and community action	70%
Sharing climate science information	68%
Empowering civic participation	60%
Advancing climate justice	59%
Developing system thinking	51%
Developing critical thinking	51%
Promoting change in individual behaviors	40%
Supporting social emotional learning	33%
Reducing climate anxiety	31%
Connecting to Indigenous Knowledge	25%

deal when developing new CCE initiatives. Much fewer CCEOs are considering supporting socio-emotional learning (33%) or reducing climate anxiety (31%) as goals when developing new CCE initiatives. CCEOs are least likely to consider connecting to Indigenous knowledge as a goal when developing new CCE initiatives: over a half report this is 'not considered at all' or 'just a little.'

Key Findings #3

While most CCEOs (76%) report working in nonformal education, many are engaging with formal education in their work (60%). CCEOs are most likely to offer community-based programs (36%), activities and programs in formal education (30%), and outreach programs to increase public awareness (30%).

Overall, as shown in Figure 3, most CCEOs (76%) surveyed indicate they provide nonformal education services such as short courses and workshops. However, three in five CCEOs (60%) also report engaging with formal education and slightly over half (55%) of CCEOs report engaging in informal education activities such as radio and television. Few (18%) CCEOs are engaged in technical and vocational education and training (TVET).

CCEOs that are higher education research centers and institutes are far more likely (81%) to report engaging with the formal education system than any other type of organization in the study. See Figure 4.

Figure 3. CCEO engagement with nonformal, formal, informal education or technical and vocational education and training (TVET) (n = 187).
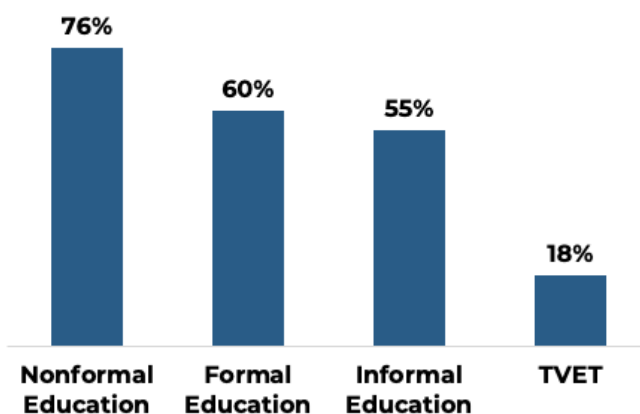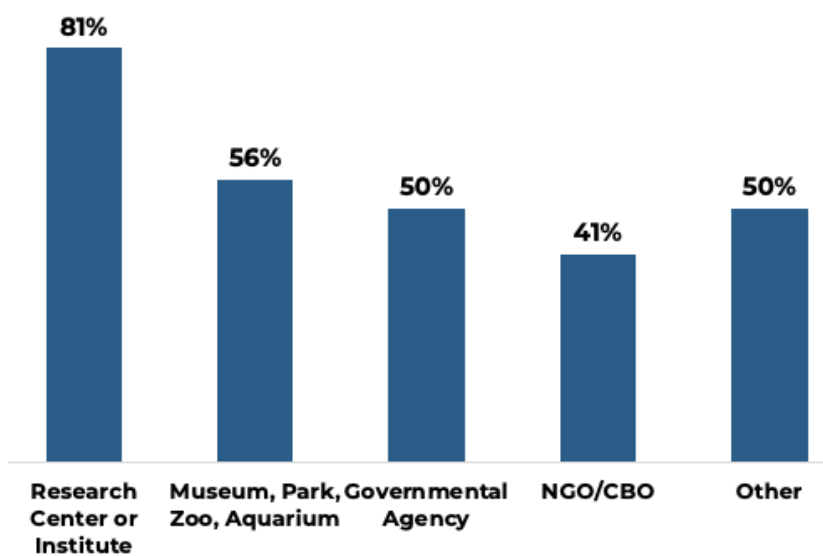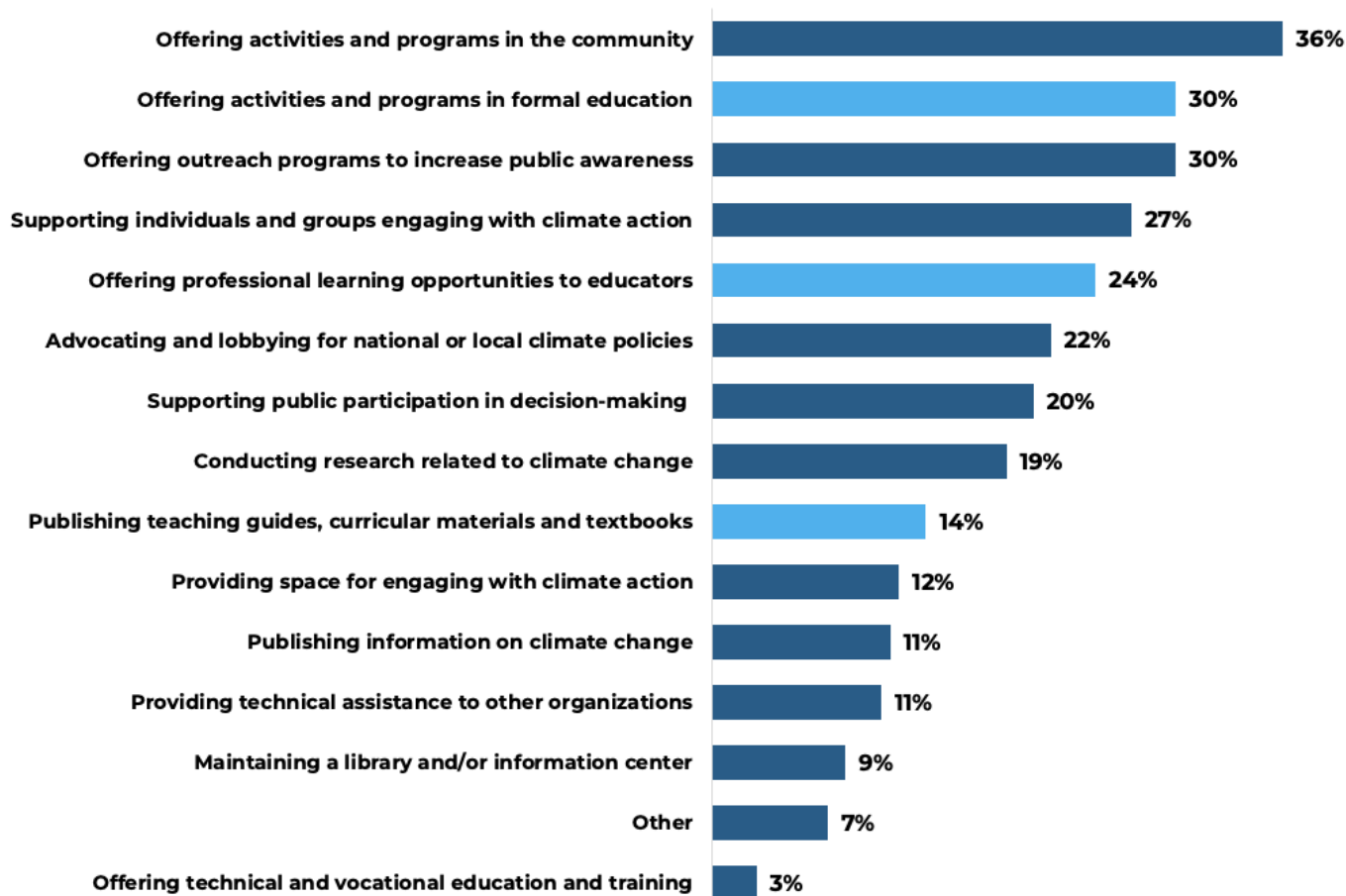

Figure 4. CCEO engagement with formal education, by type of CCEO (n = 187).

The CCEOs surveyed most often report offering activities and programs in the community (36%), in formal education settings (30%), and through outreach programs to increase public awareness (30%). In addition to offering activities and programs in formal education settings, CCEOs report working with the formal education system via educator-focused professional learning opportunities (24%) and the publication of teaching guides, curricular materials, and textbooks (14%) (light blue in Figure 5).

Figure 5. CCEO activities and services (n = 187).

Activity	Percentage
Offering activities and programs in the community	36%
Offering activities and programs in formal education	30%
Offering outreach programs to increase public awareness	30%
Supporting individuals and groups engaging with climate action	27%
Offering professional learning opportunities to educators	24%
Advocating and lobbying for national or local climate policies	22%
Supporting public participation in decision-making	20%
Conducting research related to climate change	19%
Publishing teaching guides, curricular materials and textbooks	14%
Providing space for engaging with climate action	12%
Publishing information on climate change	11%
Providing technical assistance to other organizations	11%
Maintaining a library and/or information center	9%
Other	7%
Offering technical and vocational education and training	3%

* Activities related to formal education are highlighted in light blue.

Key Findings #4

Of the 1,020 CCEOs identified in the US, 33% are located in the South, 29% are in the West, 25% are in the Northeast, and 13% are in the Midwest.

The online census identified 1,020 CCEOs in the US, with information on the head office location available for 985 CCEOs. Figure 6 shows that the South has the highest percentage of CCEOs (33%), and that CCEOs are overrepresented in the West (29% vs 24% of the population) and Northeast (25% vs 17%) compared to the US population. Many southern states (including Texas, Alabama, and Tennessee) have high proportions of CCEOs relative to their populations (Figure 7). Washington, DC has the highest prevalence of CCEOs relative to its population, with 78 CCEOs having main offices located there. Rounding out the top 10 were California (74 CCEOs), Massachusetts (56), New York (54), Oregon (41), Pennsylvania (37), Texas (32), Maryland (31), Illinois (30), and Washington (25).

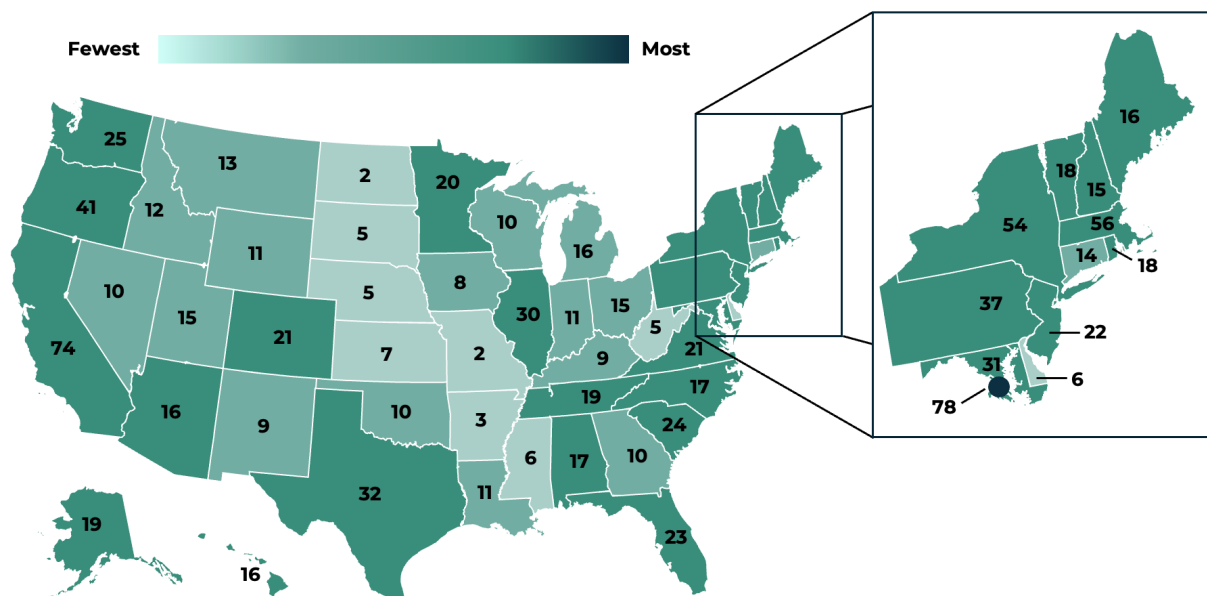**Figure 6. CCEOs by region compared to region population (n = 1,020).**

Percentage of CCEOs	Proportion of US Population
29%	24%
33%	38%
25%	17%
13%	21%

☐ Midwest ☐ Northeast ☐ South ☐ West
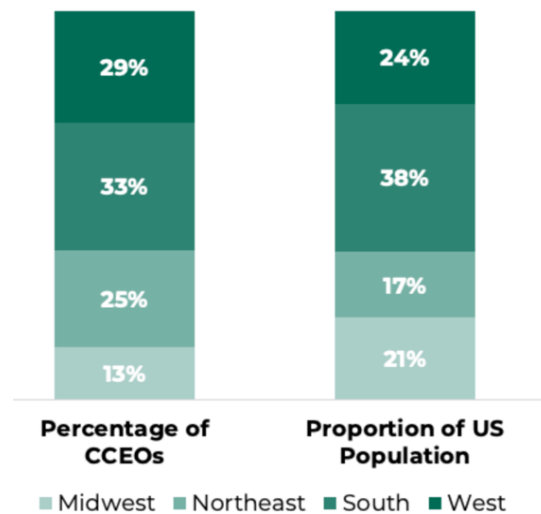
Figure 7. Prevalence of CCEOs by state (n = 985).*

* The shading represents the number of CCEOs standardized by state population.

Key Findings #5

CCEOs are more likely to be in Democrat-leaning states (69%) than Republican-leaning states (31%).

CCEOs are significantly more likely to be in Democrat-leaning states (Figure 8) compared to the overall population (p<0.001), with 69% of CCEOs being in Democrat-leaning states (vs. 51% of the US population residing in Democrat-leaning states).[5]

In Democrat-leaning states, CCEOs are much more likely to be private companies (83%) compared to Republican-leaning states (17%). By contrast, in Republican-leaning states, there is a more even spread between the CCEO organization types examined. Specifically, in Republican-leaning states, 43% are government agencies at local or national levels; 43% are museums, parks, zoos, or aquariums; 39% are NGOs; 38% are higher education centers and institutes; and 38% are non-formal groups. See Figure 9.

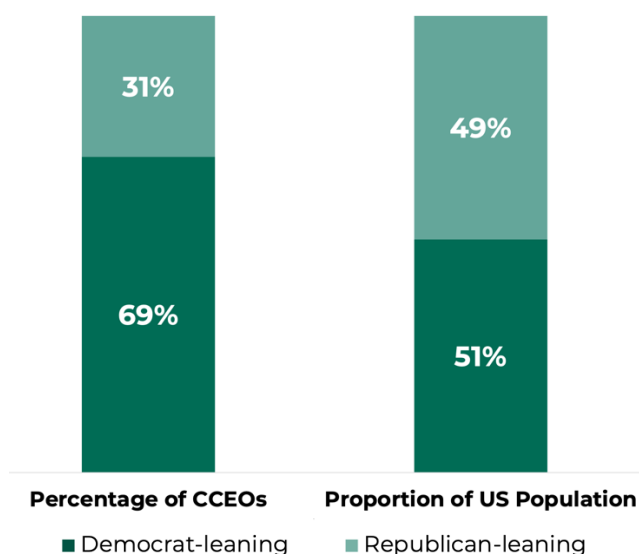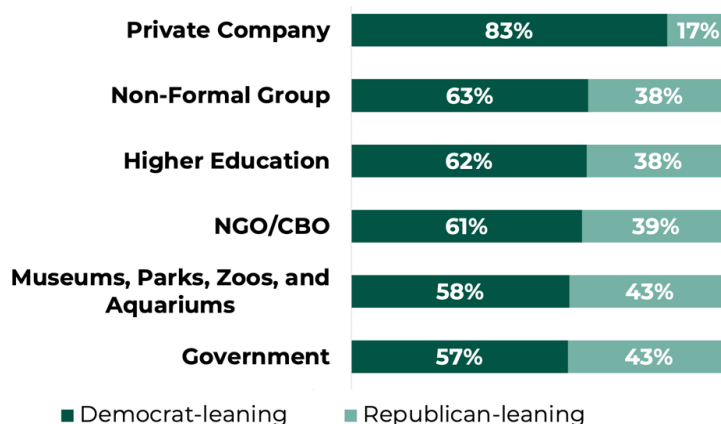Figure 8. CCEOs by Democrat- and Republican-leaning states (n = 1,020).

Figure 9. Organization type of CCEOs, by Democrat- and Republican-leaning states (n = 1,020).

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[5] The difference between the number of CCEOs in Democrat- and Republican-leaning states compared to the overall population distribution in those states was analyzed using a paired t-test.

Key Findings #6

The typical CCEO is highly formalized. They have well-articulated visions, missions, and goals (98%); are legally registered (96%); have formal annual budgets (72%); and have several staff (65%). Over half (57%) of CCEOs are NGOs or CBOs, and most (51%) were established in the last 20 years. More recently established organizations more likely to have 'climate' in their name.

Nearly all (98%) CCEOs that responded to the survey report they have a well-articulated vision, mission, and goals. The vast majority are legally registered (96%), offer programs that address the needs of their members/clients (97%), and use evidence-based programs and activities (93%). Slightly more than half (54%) have adequate financial resources.

Figure 10. CCEOs that strongly agree or somewhat agree relating to a series of statements about the organization (n = 187).

Statement	Strongly agree	Somewhat agree
Legally registered entity	91%	5%
Well-articulated vision, mission, and goals	80%	18%
Uses evidence-based programs and activities	69%	24%
Programs address member/client needs	67%	30%
Adequate financial resources	17%	37%

■ Strongly agree ■ Somewhat agree

Finances

The majority (87%) of CCEOs report having a formal budget. Those who operate with a formal budget usually have an annual budget (72%), rather than project-based budgets (15%). When asked about the source of their funding, most (77%) receive funding from individual donors, foundations (73%), and government (61%). CCEOs were less likely to receive funding from corporations (48%), national NGOs (36%), multilateral donors (12%), international NGOs (12%), or international governmental organizations (9%). There is some variation in funding source based on organization type. For example, most NGOs report their funding comes from foundations and individual donors; many research institutes report being funded by governmental agencies; and many museums, zoos, parks, and aquariums report are funded by individual donors.

Figure 11. CCEOs by sources of funding (n = 187).

Staffing and Offices

Nearly all (98%) CCEOs have at least one person in a management or leadership position, with nearly two-thirds (65%) having three or more people in management positions. Most CCEOs have at least one paid employee (88%). Over half have an office or meeting space (58%). Nearly half (42%) of CCEOs have more than one location in the United States. CCEOs with multiple locations often have locations in different cities or nearby states. Others operate with chapters that allow for groups of people across the United States to start local chapters. Few CCEOs (11%) were local branches of international organizations in the United States.

Figure 12. Staffing and offices of CCEOs (n = 187).

98% At least one person in **leadership**

88% At least one **paid employee**

65% Three or more **managers**

58% **Office or meeting** space

Public Profile and Communications

When asked about their public profile, 90% of CCEOs surveyed report being known by other CCEOs, while most (65%) report being known by the public. Few (8%) CCEOs report experiencing negative reactions from the public about their work or activities. Most organizations use social

media to communicate with the public, with Facebook being the most dominant platform (73%), followed by Instagram (69%), Twitter (54%), and YouTube (51%).

Figure 13. The public profile of CCEOs (n = 187).

90% of CCEOs are known by **other organizations**

65% are known by the **general public**

8% experience **negative reactions** from the public

Most CCEOs use **social media** to communicate with the public

73% **f**   69% **⊙**

54% **✗**   51% **▶**

Organization Type

As shown in Figure 14, the census found that slightly over three-quarters of CCEOs in the census are either NGOs/CBOs (57%) or higher education centers and institutes (21%). Government agencies are the next most common type of CCEO (9%). Less common CCEOs included museums and parks (4%), private companies (3%), and nonformal groups (2%). Examples of organizations identifying as 'other' include international organizations, partnerships, media outlets, and nonformal groups.

CCEOs are much more likely to be NGOs in most regions of the US. In total, 62% of CCEOs are NGOs in the West, 60% are NGOs in the South, and 58% are NGOs in the Northeast parts of the country. In the Midwest, CCEOs are most likely to be higher education centers and institutes (31%) compared to 25% in the Northeast, 17% in the South, and 17% in the West.

Figure 14. CCEOs, by organization type (n = 1,020).

- NGO/CBO
- Higher Education
- Government
- Museums, Parks, Zoos, Aquariums
- Other
- Private Company
- Non-Formal Group
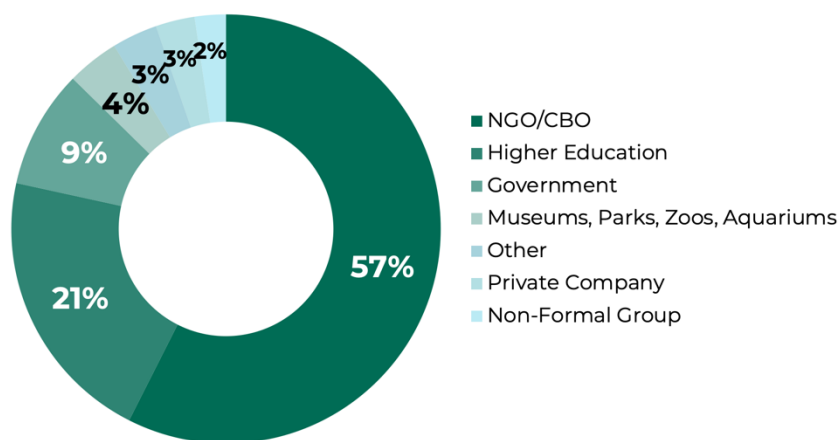
Figure 15. CCEOs by region and organization type (n = 1,020).

	Midwest	Northeast	South	West
Other	30%	24%	29%	28%
Higher Education	31%	25%	17%	17%
NGO/CBO	42%	58%	60%	62%

■ NGO/CBO ■ Higher Education ■ Other

Organization Age

Of the 623 (of 1,020) organizations with a year of establishment collected through the census, 51% were established in the past 20 years. Legacy organizations established before the year 2000 include the Sierra Club, Nature Conservancy, Smithsonian, National Museum of Natural History, Woods Hole Oceanographic Institute, and North American Association for Environmental Education.

Figure 16. Percentage of CCEOs, by decade of establishment (n = 623).
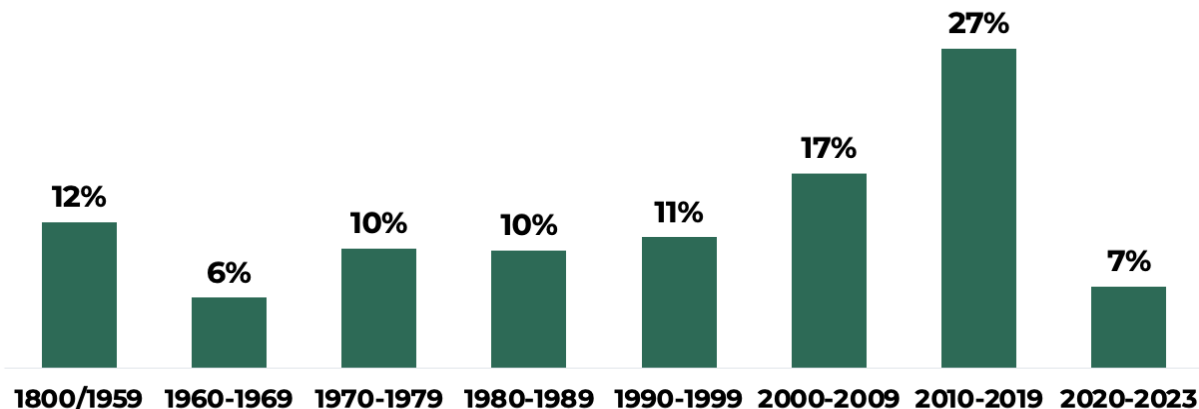
Organization Names over Time

The census also found that organizations established in the past 20 years are more likely to have 'climate' in their name, as opposed to 'environment.' This trend grew from 20% of organizations established in 2000-2010 having 'climate' in their name, to 52% between 2010-2020, and continues into the last three years (2020-2023). About 89% of all organizations with 'climate' in their name were established after the year 2000. This pattern suggests that more CCEOs are focusing specifically on climate change as the need for climate action grows.

Figure 17. Percentage of CCEOs, by decade of establishment and title keyword (climate vs environment vs. other) (n = 623).
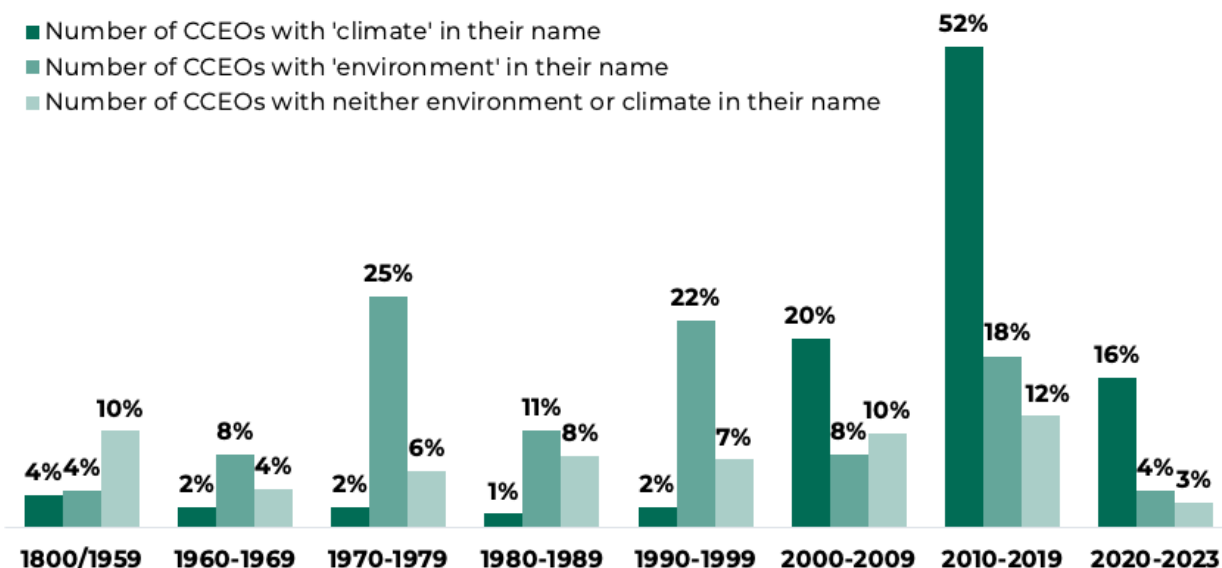
Key Findings #7

The majority of CCEOs (72%) operate at the state level, are members of climate change-related networks (74%), and participate in national conferences about CCE (58%).

The census found that most (72%) CCEOs operate at the state level, with far fewer working at national (20%) and international level (8%). A majority of CCEOs (76%) were established by individuals or local groups focused on local environmental or climate change issues. See Figure 18.

Figure 18. CCEOs by level of operations (n = 1,020).

- 8%
- 20%
- 72%

■ International
■ National
■ State
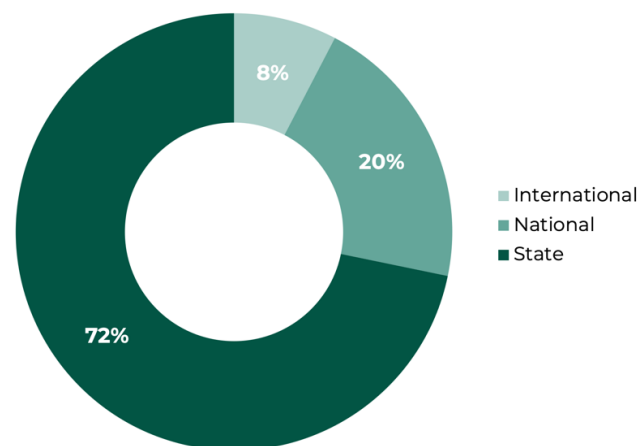
State and regionally focused organizations often work with nearby communities on locally based climate and environmental resources, ecosystems, and issues. This includes organizations such as the Wild Center, Cascadia Wildlands, GrowNYC, Iowa Environmental Council, Michigan Alliance for Environmental and Outdoor Education, or the New Orleans Environmental Education Collaborative. Nationally focused organizations often have multiple branches, offices, or groups across states such as the Zinn Education Project, the Audubon Society, Citizen's Climate Lobby, or the Indigenous Environmental Network. Internationally focused organizations often list multiple headquarters in two or more countries and conduct climate and environment communication activities at international levels. For example, the World Wildlife Foundation, the Nature Conservancy, 350.org, or the Climate Reality Project.

As shown in Figure 19, nearly three-quarters (74%) of CCEOs indicate being a member of a climate network. Being part of a network was more common in the Northeast (89%) and Midwest (83%) regions. The most popular networks mentioned were the CLEAN Network, NAAEE, Climate Action Network, NOAA Climate Change Education, Drawdown, American Society for Adaptation Professionals, Aspen Climate Coalition, and Climate Generation.

In total, over half (58%) of survey respondents reported participating in national conferences or meetings about CCE (Figure 20). CCEOs from the Midwest (71%) and Northeast (65%) are more likely to attend national conferences and meetings about CCE compared to those located in the South (59%) or West (44%).

Figure 19. Percentage of CCEOs that are members of climate change-related networks, all and by region (n = 187).

Slightly over one-third (35%) of CCEOs attend international conferences or meetings and 30% attend the UN Conference of the Party (COP), where matters related to the Paris Agreement are negotiated every year. CCEOs from the Northeast (36%) and South (30%) are more likely to attend international and COP meetings compared to their counterparts in the Midwest (23%) and West (22%). Research centers and institutes report a higher rate of attending international conferences and meetings (46%) whereas other types of CCEOs (i.e., NGOs/CBOs, government agencies, and museums, parks, zoos, or aquariums) report attendance rates of between 11-28% for international conferences and COP meetings.

Figure 20. CCEO attendance at national or international meetings in the last five years, all and by region (n = 187).
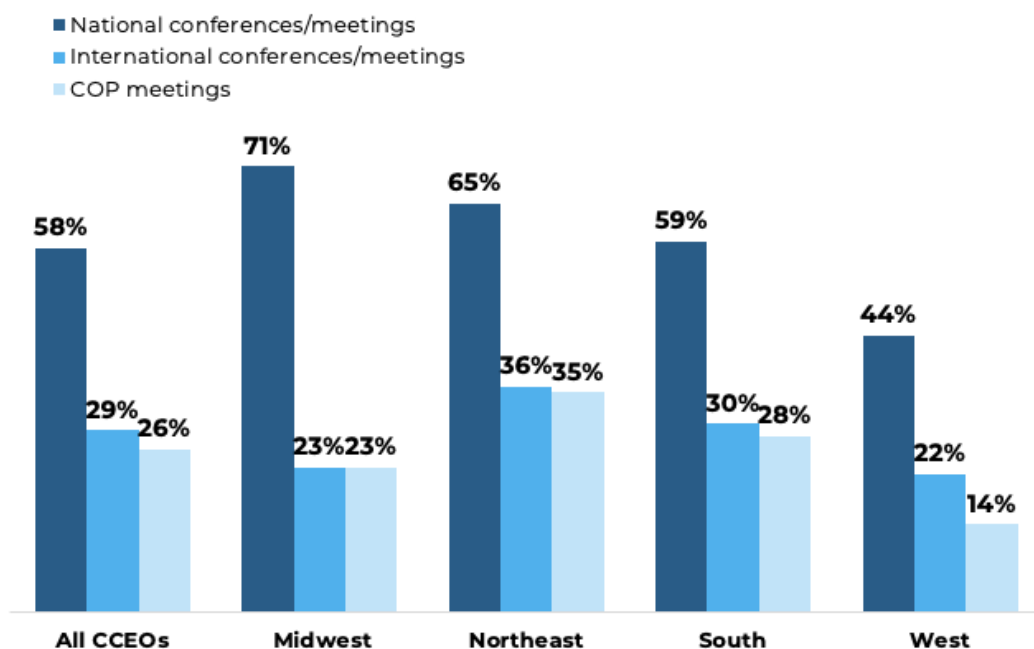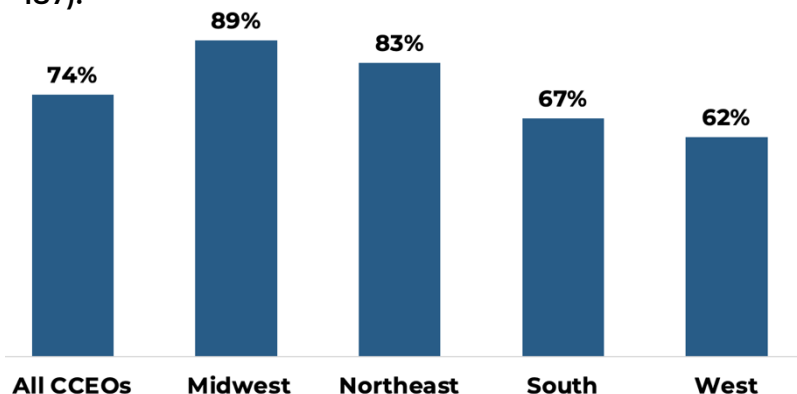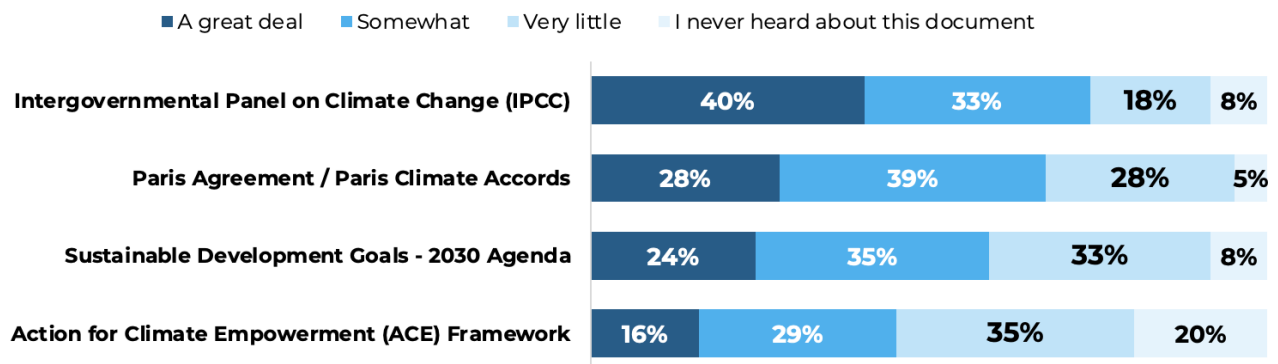
Key Findings #8

In their work, most CCEOs draw on international reports and agreements such as IPCC reports (73%), the Paris Agreement (67%), and the Sustainable Development Goals (59%).

When asked whether they refer to key climate change-related international documents and agreements to which the US is signatory, most CCEOs (73%) report engaging at least somewhat with Intergovernmental Panel on Climate Change (IPCC) reports, which provide the latest science on climate change, the UN's Paris Agreement (67%) and Sustainable Development Goals (59%). By contrast, most of CCEOs (55%) had either never heard or referred to the UNFCCC's Action for Climate Empowerment (ACE) Framework.

Figure 21. CCEO engagement with international programs, documents, and texts (n = 187).

Legend: ■ A great deal ■ Somewhat ■ Very little ■ I never heard about this document

	A great deal	Somewhat	Very little	I never heard
Intergovernmental Panel on Climate Change (IPCC)	40%	33%	18%	8%
Paris Agreement / Paris Climate Accords	28%	39%	28%	5%
Sustainable Development Goals - 2030 Agenda	24%	35%	33%	8%
Action for Climate Empowerment (ACE) Framework	16%	29%	35%	20%

In total, one-third (34%) of CCEOs report having working relationships with international organizations such as the IPCC (28%), UNFCCC (24%), UN Environment Programme (22%), UN (21%), or Fridays for Future (20%). CCEOs in the Northeast and South are more likely to work with international organizations compared to those located in the Midwest or West. Refer to Figure 22.

Figure 22. CCEO with connections to international organizations (n = 187).

All CCEOs	Midwest	Northeast	South	West
34%	24%	45%	39%	20%
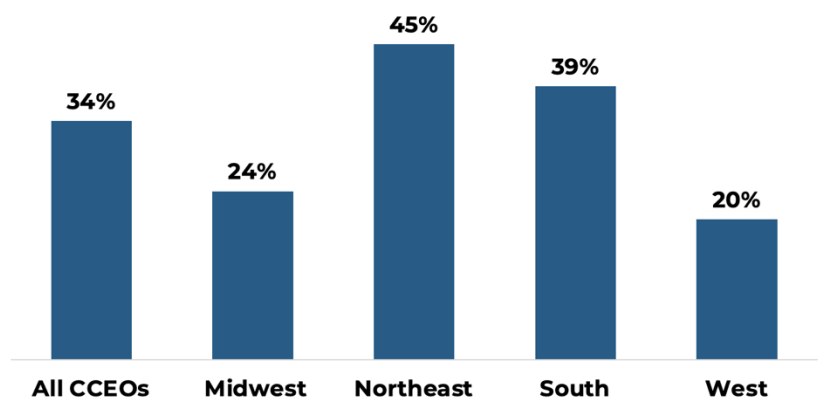
Summary and Recommendations

This study illustrates that CCEOs in the US are navigating a complex landscape. Polarizing politics, the spread of misinformation, government inaction, and piecemeal uptake of CCE in a highly de-centralized formal education system magnifies the need for effective CCE at all levels, inside and outside of the formal education system. CCEOs are also particularly concerned about government inaction in addressing climate change, high anxiety among young people, and the lack of climate change education in schools. The findings highlight the importance of providing learners with the tools to manage anxiety about the climate crisis, which in turn highlights the need for educators to have sufficient resources and training to confidently and adeptly address climate change topics.

This study also paints a picture of a rapidly growing CCE field that is working to fill gaps in response to the climate crisis, with older legacy organizations operating alongside a rapidly growing cohort of younger organizations. CCEOs are typically locally connected, but they also engage nationally and internationally, including through networks, conferences, and meetings. That CCEOs are more likely to be in Democrat-leaning states is unsurprising; however, the higher-than-expected prevalence of CCEOs in the South, and the fact that CCEOs work in both nonformal and formal education contexts, suggests that CCEOs are filling gaps where they are needed. The gap in CCEOs in Republican-leaning states represents an opportunity for CCEOs as Americans become increasingly concerned about the climate crisis,[ix] including some groups of Republicans.[x, xi]

CCEOs indicate they are not challenged by getting people to care about climate change. This represents a key advantage for CCEOs—they can be devoted to more to empowering climate action than to changing hearts and minds. In their programming, CCEOs emphasize collective and community action and civic participation, with a lesser focus on individual behavior changes. CCEOs are also emphasizing climate justice as well as critical and systems thinking, which are important skills for navigating information about climate change.[xii] In contrast to this study of CCEOs, research on K-12 and higher education policy in the US found low uptake of holistic CCE,[xiii] with low attention being paid to action- and social and emotional-oriented learning and climate justice.[i, ii, xiv, xv] Taken in combination, this suggests that CCEOs in the US may be offering higher quality CCE than formal education systems on average. However, the study shows room for CCEOs to increase social and emotional considerations, including addressing climate anxiety. In addition, despite CCEOs reporting engagement with climate justice, there was a very low prioritization of connecting to Indigenous knowledge in programs.

Recommendation #1

Provide holistic CCE with a focus on places, communities, and stories that are relevant to the learner.

CCE is more impactful when it is holistic and relational. New research on CCE across a variety of educational contexts suggests that quality CCE focuses on the overlapping and mutually reinforcing relationships between climate change and places, communities, and stories.[xvi] Connections to natural or important local places can help improve understandings of the local impacts of climate change and involve learners in locally meaningful, systemic climate action that addresses those impacts. Quality CCE also connects climate change to the existing values and priorities of community members. This includes supporting livelihoods, addressing politics, and attending to relevant social justice aspects, including Indigenous knowledge. Finally, the stories we tell about climate change and past and future selves, places, and communities help to make climate change matter, so that learners feel the need to act on climate change.

As locally connected organizations, CCEOs are ideally posed to provide relational CCE that is situated within places, communities, and stories of relevance to learners. Quality CCE should be iteratively developed in collaboration with the CCE's intended participants to ensure relevance to their needs and values, including by addressing the politics of the day and supporting livelihoods.[xvii, xviii, xix, xx] As important leaders in the climate movement in the US, partnerships with Indigenous communities can help provide locally relevant frameworks for pedagogical materials.[xxi, xxii] The use of experiential, participatory pedagogical approaches such as digital storytelling, poetry, and song can equip learners to unpack their emotions, deal with changing realities, discern credible sources of information, challenge misleading or inaccurate information, and communicate with others more effectively.[xxi, xxiii]

Recommendation #2

Support teachers to teach quality CCE by providing research-informed resources and training.

This study of CCEOs aligns with others which have found that teachers feel they lack the confidence, skills, and resources to effectively teach climate change, especially in non-STEM classes.[xxiv, xxv] However, few of the CCEOs in the study are offering professional development for educators, and even fewer are publishing resources such as teaching guides, curricular materials, and textbooks. Access to resources is predictive of teacher's confidence in their ability to address climate change in response to student inquiries. CCEOs can step in to fill gaps in the availability of research-informed classroom resources, such as lesson plans, small group activities, games, and digital resources across science and social science subjects. Further, there are opportunities for CCEOs to provide access to evidence-informed interdisciplinary teacher training opportunities including resources, professional development, and speakers through outreach activities.

Recommendation #3

Develop partnerships to share knowledge and resources, and conduct searches for new partners regularly.

This study found the CCEO field is predominantly comprised of a mix of older and newer organizations, with a steep increase in new organizations being created in the past 20 years. With the census in this study locating over 1,000 CCEOs across America, and many CCEOs participating in climate change-related networks and conferences, there are abundant opportunities to collaborate, share new knowledge, and exchange ideas. By partnering with one another, CCEOs can combine their strengths to improve their programs and services and share resources. For example, large, national CCEOs with large resource libraries may benefit from partnering with smaller, local CCEOs to develop tailored resources for underserved populations such as Indigenous peoples, people of color, and communities in poorer neighborhoods. Organizations looking to develop resources in new topical areas may benefit from searching for organizations that may have emerged recently to fill the gap in that area. CCEOs are also recommended to partner with teachers, schools, and education bodies to help provide access to real-world climate solutions.[xiv, xxiv]

Recommendation #4

Advocate for climate change to be included in policy, and explore policy levers outside of climate change and sustainability education.

The large intersections between CCEOs and the formal education system suggests that CCEOs are responding to a gap in provision of CCE in formal education. Given the patchy uptake of climate change in education policy and the complications caused by the highly decentralized education system in the US, CCEOs have a critical role to play in advocating for improved climate policies. Analyses of policy flows across education systems show that the presence of sustainability and climate policies at any level—schools, sub-state, state, and so on—are associated with improved sustainability uptake within education systems.[xxvi, xxvii] Policy systems can influence and mutually reinforce one another, allowing gaps in CCE provision and policy to be filled through unexpected avenues. For example, prior research has found instances of sustainability and climate change initiatives successfully accessing funding and policy support by positioning themselves as fulfilling entrepreneurial and health objectives.[xxvi] In another case, the establishment of greenhouse gas emissions reporting requirements for publicly funded buildings was associated with increased sustainability education uptake.[xxvi] As members of sometimes substantial climate change, sustainability, environmental, and education networks, CCEOs should collectively advocate for improved CCE inside and outside of the formal education system.

Conclusions

While Americans are increasingly in agreement that climate change is a serious issue that will harm future generations, arriving at a consensus about policy solutions and actions to take remains a barrier.[x, ix, xxviii] This study aims to improve understandings of the current landscape of nonformal CCE across the US. By teaching learners of all ages outside of the formal education system, nonformal CCE has vast potential to foster rapid, large-scale climate action. The study provides information on strengths and areas for improvement to support improved nonformal CCE in the US. Some of the key insights relate to the importance of ensuring CCE is holistic and engages with the places, communities, and stories of the learner; providing research-informed resources for teachers; developing strong networks and partnerships; and advocating for improved uptake of climate change in policy.

Acknowledgments

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