

Using the Six Americas Framework to Communicate and Educate about Global Warming

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Abstract

Agricultural communicators and extension educators need to make scientific information about global warming, a critical component of climate change, more salient to the general public to increase knowledge and to encourage people to take action to mitigate its effect; however, views on global warming are diverse. Scientists have repeatedly shown human activity is directly impacting the Earth's climate. Despite this, a segment of the U.S. population (including politicians with a large amount of influence) are very vocal about their mistrust of climate science and lack of belief in global warming. States located on the coasts are affected by climate change the most where extreme weather events impact the safety of residents and agricultural production more often than those located inland. This research used the Six Americas framework to identify the diverse segments of believers/nonbelievers in Florida. Findings revealed 87% of respondents believed in climate change but are not actively engaged in its mitigation. Recommendations are offered on how agricultural communicators can reach diverse segments of the population and the role extension educators can play in their communities to turn difficult to understand climate science into something the public can understand and get behind.

Keywords: climate change, Six Americas, agricultural communication, extension education, global warming

Introduction

Most major science organizations and communities agree human activities are changing the Earth's climate (Pew Research Center, 2015). Agricultural and natural resource (ANR) scientists have confirmed climate change and global warming is real and happening now and more importantly, humans are primarily to blame (Liu, Vedlitz, Stoutenborough, & Robinson, 2015). Global warming and climate change (both critical, inter-related issues facing the agricultural sector) are an environmental, cultural, and political phenomenon that is contentious by nature (Hertel & Lobell, 2014; Hulme, 2009). Global warming and climate change is currently and will continue to have an impact on the agriculture industry. The extent of that impact will depend on the ability of those working within the agricultural industry to adapt to these changes (Hertel & Lobell, 2014), which can be assisted by informed agricultural communication campaigns and extension education efforts.

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Broadly speaking, climate change issues including global warming are considered partisan in the United States (U.S.) with two sides: those that believe in its existence and those that are cautious, if not fully in denial of scientific findings (Hart, Nisbet, & Myers, 2015). Given the scientific studies documenting human impact on the Earth's climate, it is difficult for those in the scientific field to understand such a distinct and strong partisan divide (Paulson, 2016).

Global warming, a specific part of the climate change conversation, has a different semantic context, but the two words are often used simultaneously due to the ambiguity in their definitions (Lineman, Do, Kim, & Joo, 2015). Global warming is defined as “the unusually rapid increase in Earth's average surface temperature over the past century primarily due to the greenhouse gases released by human activities” (NASA, 2017, pg. 1). Climate change is defined as a “change in global or regional climate patterns” (Lineman et al., 2015, pg. 1). Although the two terms differ in meaning, the public is often exposed to them under the same context and apply them interchangeably (Weingart, Engels, & Pansegrau, 2000). This framing technique has been used often within the conservative movement to create opposition to calls for global warming interventions (McCright & Dunlap, 2000). As such, an increase in persons who do not believe climate change is a result of human activity has been observed in recent years, particularly among members of the Republican party. In 2001, 53 percent of Republicans believed climate change was human caused, whereas only 42% of Republicans in 2016 believed climate change was human caused (Energy Policy Institute at the University of Chicago, 2016). While agricultural educators, scientists, and policy makers have attempted to bring environmental problems to the public's attention, those who oppose climate change have challenged the legitimacy of the problem by asserting global warming research is uncertain and inconclusive (McCright & Dunlap, 2000).

Public understanding of climate change and global warming is largely driven by media coverage developed by those who do and do not understand natural resources or the impact it has on agriculture (Brulle, Carmichael, & Jenkins, 2012). Weber and Stern (2011) maintained that “for most Americans, exposure to ‘climate change’ has been almost entirely indirect, mediated by news coverage, Internet postings, informal conversations, and documentaries and video footage of events in distant regions” (p. 320). It has been hypothesized that Americans living in more climate change stricken areas are more concerned. However, studies have indicated extreme weather events have minimal effect on public concerns (Brulle et al., 2012).

Florida is heavily impacted by extreme weather events and changes to the natural resource landscape that impact agricultural production. This includes sea level rise, intense hurricanes, dangerous storm surges, and changes in precipitation patterns leading to flooding (Bloetscher, Heimlich, & Meeroff, 2011). The rapid warming over the past decade is expected to cause more intense rainfall events, including more severe thunderstorms, and tropical cyclones (IPCC, 2014). Since the state is surrounded by water on three sides, there are a variety of scenarios that could have major effects. According to the Federal Emergency Management Agency (FEMA, 2016), since 1995 Florida has had to declare a state of emergency 68 times due to severe storms (severe thunderstorms, tropical storms, and hurricanes) with 50% of those happening in the last decade. Additionally, the number of hurricanes and their intensity level are expected to rise because of global warming (Elsner, Kossin & Jagger, 2008; Knutson et al., 2010).

The current Governor of Florida views climate change as a variable and has publically questioned the cause and extent of climate change (Schollsberg, 2016). Additionally, an influential Senator from the state stated, “that while there is a consensus among scientists about humans contributing to what's happening, there's no consensus on how much of these changes are due to human activity...and that proposed climate change policies will do absolutely nothing to improve the environment and will make America a harder place to create jobs” (Zaru, 2016, pg. 1). Elected

officials leading and representing the state are skeptical at best of climate change and how it will affect Florida. When public officials are hesitant, it becomes even more difficult for agricultural communicators and extension educators to speak about climate science and global warming, especially when the topics are so polarized (Hart & Feldman, 2016). Therefore, a study exploring how to communicate about global warming in a state being severely impacted is an important step in assisting agricultural communicators and extension educators enhance “public and policy maker understanding of agriculture and natural resources” (Enns, Martin, & Spielmaker, 2016, p. 13) as they address complex problems.

Conceptual Framework

A group at Yale University and George Mason University introduced the concept of the Six Americas (Maibach, Roser-Renouf, & Leiserowitz, 2009; Roser-Renouf et al., 2014), which serves as the conceptual framework for this study. Per the Six Americas concept, the American public can be divided into six unique segments based on their beliefs, attitudes, policy preferences, and behaviors associated with global warming: Alarmed, Concerned, Cautious, Disengaged, Doubtful, and Dismissive (see Table 1).

Of the different segments, the Cautious and Disengaged segment group members are the most easily persuaded to become Concerned (Roser-Renouf et al., 2014). Additionally, the Doubtful segment group has been found to be the one most easily persuaded by communication efforts coming from the Dismissive segment group that are vocal about their views (Roser-Renouf et al., 2014). The Dismissive and the Alarmed cannot be swayed (Roser-Renouf et al., 2014).

The Six Americas concept introduces a vast range of beliefs regarding global warming and climate change, which is represented by only two bipartisan categories in the policy realm (Hart et al., 2015). The discrepancy between the public, elected officials, and scientific evidence has generated concern given the public makes decisions everyday regarding their use of natural resources (Guy, Kashima, Walker, & O’Neill, 2014). If agricultural communicators and extension educators are going work with the community to understand the effects of climate change and global warming, communicate about climate change and global warming, and inform the public on how their personal behaviors can be altered to mitigate its effects, it is critical to recognize the spectrum of public views on the topic (Roser-Renouf et al., 2014).

Table 1

Descriptions of the Six America Segments (Roser-Renouf et al., 2014)

Six Americas	Traits
Alarmed	The most convinced, most involved, and most worried about global warming. These individuals side with the scientific community both in regard to the idea of it being real and human involvement. The Alarmed are most likely to view global warming as a personal threat.
Concerned	The largest segment group, the Concerned are convinced global warming is happening but are less concerned than the Alarmed. They agree with the scientific community and believe human activities are the cause. They are less likely to feel threatened by it happening now compared to the Alarmed and are significantly less involved.
Cautious	The Cautious group “believe that global warming is occurring, but this belief is relatively weak, with the majority saying they could easily change their minds” (p. 45). The Cautious mostly view global warming as personally unimportant. Global warming is not viewed as dangerous to the Cautious segment group, and they do not expect it to harm future generations.
Disengaged	The Disengaged segment group do not respond when asked questions about global warming because they do not know how they feel. They do not know if climate change is happening, what the scientific community agrees on, or if it will harm them. They also rarely think about global warming.
Doubtful	Members of the Doubtful segment group do not see the relevance of global warming. While many are doubtful global warming is real, the members of the Doubtful group that do believe global warming is real feel it is caused by natural changes in the environment.
Dismissive	Members of the Dismissive segment group are very certain global warming is not real. This group is very involved in the conversation around global warming and considers themselves well informed. They believe scientific findings disagree, that if global warming is happening it is not caused by human activities, and believe that no one is in danger of being harmed. This is the only group that believes global warming is not occurring.

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Purposes and Objectives

The purpose of this study was to identify how Florida residents fall into the Six Americas segments to provide direction for how agricultural communicators and extension educators can most effectively reach those most willing to change. The study was guided by the following objectives:

1. Determine how many Florida residents belong to each of the Six Americas segment groups.
2. Describe Florida residents within each Six Americas segment group.
3. Describe the purchasing behaviors of Florida residents within each Six Americas segment group.
4. Determine where members of each segment group get their information.

Methods

The research presented here was part of a larger research project that used an online survey to capture the public opinions of Florida residents about climate change. Therefore, the target population for this study was Florida residents age 18 or older. Two sections of the questionnaire were germane to this study. These two sections were adapted from the Global Warming's Six Americas scale (Maibach, Leiserowitz, Roser-Renouf, Mertz, & Akerlof, 2011; Roser-Renouf et al., 2014) which has been widely used in climate change research and accepted as a reliable measure (Leiserowitz, Maibach, Roser-Renouf, & Smith, 2011). In addition, an expert panel specializing in public opinion research, climate science, and survey design reviewed the survey prior to distribution to ensure content validity and approval was obtained from the Institutional Review Board at University of Florida.

Using a non-probability opt-in sampling technique, the finalized survey was distributed. Respondent quotas were established *a priori* to ensure the sample would be representative and attention filters were integrated. Respondents had to fill the required quotas and pass the attention filters for their responses to be considered complete. The data collection methods resulted in 500 complete surveys. Selection, exclusion, and non-participation biases are threats when using a non-probability sampling method, therefore a post-stratification weighting method was applied (Baker et al., 2013; Kalton & Flores-Cervantes, 2003). Data were weighted using the 2010 US Census data ensuring geographic location in the state, age, and gender matched the state demographics.

A series of 15 questions organized within four categories (a) beliefs, (b) issue involvement, (c) behavior, and (d) preferred societal response were used to determine which of the Six America's categories respondents belonged (Maibach et al., 2011). The belief category comprised six questions. The first question was *do you think global warming is happening?* Nine response options were offered. The second question was *assuming global warming is happening, do you think it is?* Potential responses included (a) caused mostly by human activities, (b) caused mostly by natural changes in the environment, (c) other, and (d) none of the above because climate change isn't happening. The next two questions were *how much do you think global warming will harm you personally?* and *how much do you think global warming will harm future generations of people?*

Response options included (a) not at all, (b) only a little, (c) a moderate amount, (d) a great deal, and (e) don't know. These two questions were first recoded to exclude *Don't know* responses and then recoded again as dummy variables with *Only a little* as the omitted response category. Next, respondents were asked *when do you think global warming will start to harm people in the United States?* Six response options were offered. The final question was *which of the following statements comes closest to your view?* Five response options were offered.

The Issue Involvement category comprised the following five questions: (a) *how worried are you about global warming?* (b) *how much had you thought about global warming before today?* (c) *how important is the issue of global warming to you personally?* (d) *how much do you agree or disagree with the following statement: I could easily change my mind about global warming?*, and (e) *how many of your friends share your views about global warming?*

The Behavior category included only one question: *over the past 12 months, how often have you punished companies that are opposing steps to reduce global warming by NOT buying their products?* Response options included (a) never, (b) once, (c) a few times (2-3), (d) several times (4-5), (e) many times (6+), and (f) don't know. Responses were first recoded to omit the *don't know* responses with the mean substituted for the missing data. Responses were then recoded into dummy variables for discriminant analysis with *once* as the omitted response option.

Finally, the last category Preferred Societal Response comprised three questions. The first question was *do you think global warming should be a low, medium, high or very high priority for the next president and congress?* The next question was *do you think citizens themselves should be doing more or less to address global warming?* For the last question, participants were asked to respond to the statement *the United States should reduce its greenhouse gas emissions* with one of the following options: (a) regardless of what other countries do; (b) only if other industrialized countries (such as England, Germany, and Japan) reduce their emissions; (c) only if other industrialized countries and developing countries (such as China), reduce their emissions; (d) the U.S. should not reduce its emissions; and (e) don't know. This question was first recoded to omit the "don't know" category with the mean substituted for the missing data. It was then recoded into dummy variables for analysis; "only if other countries reduce" was the omitted response option.

In some cases, respondents answering with a *Don't know* or *Not applicable* response were excluded from analysis however some variables were dummy-coded for discriminant analysis with these responses included (Roser-Renouf et al., 2014). Using the instructions presented in the manual provided by Roser-Renouf et al. (2014), linear discriminant functions (Hair, Anderson, Tatham & Black, 1992; Tabachnik & Fidell, 1989) were used with the 15-item instrument to place respondents into six independent segments identified as the Six Americas.

Respondents were also presented with a list of possible sources for climate change information and asked to identify those they used by checking all that apply (Lamm, 2013). They were also asked a series of demographic questions, including age, race, sex, education and political affiliation. Descriptive statistics were used to reach the study objectives.

Results

Six Americas Segmentation Group Breakdown

Objective one sought to determine the of Florida residents within each of the Six Americas segments. Linear discriminant functions (Roser-Renouf et al., 2014) revealed that 87 percent ($f = 435$) of Florida residents in this study believed global warming was occurring and were Concerned ($f = 230$; 46.0%), Alarmed ($f = 117$; 23.4%), or Cautious ($f = 86$; 17.2%). Only 10 percent of Florida residents did not believe global warming was occurring and were either Doubtful ($f = 30$; 6.0%), Dismissive ($f = 20$, 4.0%, or Disengaged ($f = 17$, 3.4%)

Characteristics of Members of Six Americas Segment Groups

Alarmed segment. The second objective of this study was to describe Florida residents within each of the Six Americas. Residents grouped within the Alarmed segment were those who were extremely sure global warming is happening ($f = 84$; 71.8%) and is currently harming people in the U.S. ($f = 85$; 72.6%). Additionally, the majority of Alarmed residents ($f = 110$; 94.0%) believed global warming caused by human activities and more ($f = 58$; 49.6%) aligned with the the statement *humans can reduce global warming, but it is unclear whether we will do what's needed*. Most ($f = 71$; 60.7%) strongly disagreed that they could easily change their mind about climate change.

Regarding demographic characteristics, residents grouped within the Alarmed segment were were predominantly Caucasian/White ($f = 80$; 68.4%), evenly split between males ($f = 59$; 50.4%) and females ($f = 58$; 49.6%), and had the largest percent in the age range of 30 to 39 years ($f = 44$; 37.6%). These residents held a Bachelor's degree or higher ($f = 69$; 59%) and more self identified as Democrats ($f = 66$; 56.4%) than any other political affiliation (see Table 2).

Concerned segment. Residents grouped within the Concerned segment were those who very sure ($f = 91$; 39.6%) or extremely sure ($f = 71$; 30.9%) global warming is happening and believed it is currently harming people in the U.S ($f = 101$; 43.9%). Additionally, the majority of the Concerned residents ($f = 183$; 79.6%) believed global warming is caused primarily by human activities and more ($f = 102$; 44.3%) aligned with the statement *humans can reduce global warming, but it is unclear whether we will do what's needed*. These residents somewhat disagreed ($f = 81$; 35.2%) or somewhat agreed ($f = 67$; 21.9%) that they could easily change their mind about global warming.

Regarding demographic characteristics, the Concerned segment comprised slightly more females ($f = 124$; 53.9%) than males ($f = 106$; 46.1%), and more residents in this segment were Caucasian/White ($f = 145$; 63.0) and in the age range of 30 to 39 years ($f = 82$; 35.7%). More Concerned residents ($f = 63$; 27.4%) held a Bachelor's degree as their highest level of education, and some ($f = 33$; 28.2%) had a post-graduate or professional degree. Lastly, more Concerned residents ($f = 114$; 49.6%) were affiliated with the Democratic party than other political parties (see Table 2).

Cautious segment. Residents grouped within the Cautious segment were somewhat sure ($f = 23$; 26.7%) or not sure ($f = 22$; 25.6%) global warming is happening and believed it will cause harm to people in the U.S. now ($f = 19$; 22.1) or within the next ten ($f = 19$; 22.1%) or 25 years ($f = 18$; 20.9). Cautious residents were split in their beliefs regarding the cause of global warming, with 41 (47.7%) believing global warming is caused primarily by human activities and 38 (44.2%) believing global warming is caused by natural changes. More Cautious residents ($f = 30$; 34.9%)

aligned with the statement *humans can reduce global warming, but it is unclear whether we will do what's needed* and most ($f = 54$; 62.8%) somewhat agreed that they could easily change their mind about climate change.

The Cautious segment comprised Caucasian/White ($f = 60$; 69.8%), males ($f = 45$; 52.3%) and females ($f = 41$; 47.7%) who were split fairly evenly across age categories ranging from 20 to 69 years of age. More Cautious residents ($f = 20$; 23.3%) had attained some college experience as their highest level of education and few ($f = 13$; 15.2%) has a post-graduate or professional degree. Regarding political affiliation, more Cautious residents ($f = 35$; 40.7%) were affiliated with the Republican party than with any other political affiliation (see Table 2).

Disengaged segment. Members in the Disengaged segment were less sure of the occurrence of global warming, with more ($f = 6$; 35.3%) having indicated that they did not know whether global warming was happening. Disengaged residents were also split regarding the cause of global warming; eight (47.1%) believed global warming was caused mostly by human activities and eight (47.1%) believed global warming was caused mostly by natural changes. Additionally, more disengaged residents ($f = 8$; 47.1%) aligned with the statement *humans can reduce global warming, but it is unclear whether we will do what's needed* and more somewhat agreed ($f = 7$; 41.2%) or somewhat disagreed ($f = 7$; 41.2%) that they could easily change their minds about climate change.

Regarding demographic characteristics, Disengaged members were predominantly Caucasian/White ($f = 9$, 52.9%), female ($f = 11$; 64.7%), and who were in the age categories of 20 to 29 years ($f = 5$; 29.4) or 50 to 59 years ($f = 5$; 29.4%). More Disengaged residents ($f = 7$; 41.2%) had attained some college experience as their highest level of education and none had a post-graduate or professional degree. Lastly, more Disengaged residents were affiliated with the Democratic party ($f = 6$; 35.3%) or were Independents ($f = 5$; 29.4) than with other political affiliations (see Table 2).

Doubtful segment. Members in the Doubtful segment somewhat sure ($f = 5$; 16%), not sure ($f = 5$; 16%), or didn't know ($f = 5$; 16%) if global warming is happening. While more residents in this segment ($f = 10$; 33.3%) believed global warming will never harm people in the U.S., some ($f = 8$; 26.7%) believed global warming will start to harm people in the U.S. in 100 years. Additionally, the majority of Doubtful residents ($f = 27$; 90%) believed global warming is caused by natural changes and aligned most closely with the statement *humans can't reduce global warming even if it is happening* ($f = 22$; 73.3%). Most ($f = 19$; 63.3%) disagreed to some extent that they could easily change their minds about climate change.

As for demographic characteristics, residents within the Doubtful segment were primarily Caucasian/White ($f = 26$; 86.7%), male ($f = 19$; 63.3%), and in the age range of 60 to 69 years ($f = 11$, 36.7%). More Doubtful residents ($f = 9$; 30%) had attained a high school diploma as their highest level of education and five (16.7%) had attained a post-graduate degree. Regarding political affiliation, more Doubtful residents ($f = 14$; 46.7%) were associated with the Republican party than any other political party (see Table 2).

Dismissive segment. Finally, Dismissive members were those who were very sure ($f = 5$; 25%) or extremely sure ($f = 5$; 25%) global warming is not happening, and the majority ($f = 19$; 95%) believed global warming will never harm people in the U.S. Moreover, the majority of Dismissive members ($f = 14$; 70%) believed if global warming is happening then it is caused by natural changes, and most ($f = 12$; 60%) aligned with the statement *global warming isn't happening*.

More Dismissive members ($f = 15$; 75%) disagreed to some extent that they could easily change their minds about climate change.

Regarding demographic characteristics, the Dismissive segment had an even number of males ($f = 10$; 50%) and females, with the majority being Caucasian/White ($f = 17$; 85%), and in the age range of 60 to 69 years ($f = 10$; 50%). More members of this segment ($f = 7$; 35%) had some college experience as their highest level of education and two (10%) had a post-graduate or professional degree. More Dismissive members ($f = 14$; 70%) were affiliated with the Republican party than any other political affiliation (see Table 2).

Table 2

Demographic Breakdown by Six Americas Segment

	Alarmed $n = 117$ %	Concerned $n = 230$ %	Cautious $n = 86$ %	Disengaged $n = 17$ %	Doubtful $n = 30$ %	Dismissive $n = 20$ %
<i>Sex</i>						
Male	50.4	46.1	52.3	35.3	63.3	50.0
Female	49.6	53.9	47.7	64.7	36.7	50.0
<i>Race</i>						
Caucasian/White	68.4	63.0	69.8	52.9	86.7	85.0
Black	8.5	15.7	16.3	23.5	6.7	5.0
Native American	3.4	0.4	1.2	11.8	3.3	0.0
Asian	0.0	0.0	2.3	0.0	0.0	0.0
Multiracial	19.6	17.0	10.5	11.8	3.3	10.0
Hispanic	25.6	23.5	16.3	17.6	3.3	5.0
<i>Age</i>						
18-19	0.0	0.4	0.0	0.0	3.3	4.0
20-29	13.7	20.4	16.3	29.4	6.7	0.0
30-39	37.6	35.7	20.9	11.8	10.0	0.0
40-49	8.5	11.7	16.3	5.9	6.7	0.0
50-59	10.3	13.0	15.1	29.4	13.3	15.0
60-69	23.1	10.9	16.3	17.6	36.7	50.0
70-79	6.0	7.4	12.8	5.9	20.0	30.0
80 and older	0.9	0.4	2.3	0.0	3.3	0.0

Table 2 (continued)

Demographic Breakdown by Six Americas Segment

	Alarmed <i>n</i> = 117 %	Concerned <i>n</i> = 230 %	Cautious <i>n</i> = 86 %	Disengaged <i>n</i> = 17 %	Doubtful <i>n</i> = 30 %	Dismissive <i>n</i> = 20 %
<i>Political Affiliation</i>						
Republican	16.2	22.2	40.7	23.5	46.7	70.0
Democrat	56.4	49.6	32.6	35.3	16.7	5.0
Independent	21.3	21.7	22.1	29.4	30.0	25.0
No Preference	5.1	5.7	3.5	5.9	6.7	0.0
Other	0.9	0.9	1.2	5.9	0.0	0.0
<i>Education</i>						
Some HS or less	2.6	0.9	3.5	11.8	0.0	0.0
HS graduate	12.8	23.0	20.9	17.6	30.0	15.0
Some college	14.5	22.6	23.3	41.2	26.7	35.0
Associates	11.1	10.0	16.3	5.9	10.0	10.0
Bachelor's	30.8	27.4	20.9	23.5	16.7	30.0
Post degree	17.9	12.2	14.0	0.0	16.7	5.0
Prof. degree	10.3	3.9	1.2	0.0	0.0	5.0

Purchasing Behaviors and Preferred Societal Response Among Members of the Six Americas Segments

Objective three sought to describe the purchasing behaviors and preferred societal response among members of the Six Americas Segments. The Six Americas segments that are prone to believe global warming does not exist never punished companies for not taking steps to reduce global warming. Additionally, Concerned and Cautious respondents did not typically boycott companies although, 25.2% of Concerned and 19.8% of Cautious respondents reported they had a few times. Finally, the Alarmed respondents were more likely to boycott with 25.6% reporting they had a few times, 18.8% had several times, and 19.7% boycotting many times (see Table 3).

Table 3

Purchasing Behaviors by Six Americas Segment

	Alarmed <i>n</i> = 117 %	Concerned <i>n</i> = 230 %	Cautious <i>n</i> = 86 %	Disengage d <i>n</i> = 17 %	Doubtful <i>n</i> = 30 %	Dismissive <i>n</i> = 20 %
<i>Over the past 12 months, how often have you punished companies that are opposing steps to reduce global warming by NOT buying their products?</i>						
Never	15.4	41.3	44.2	52.9	90.0	95.0
Once	2.6	8.7	12.8	0.0	0.0	0.0
A few times	25.6	25.2	19.8	0.0	3.3	0.0
Several times	18.8	7.8	8.1	0.0	0.0	0.0
Many times	19.7	3.5	0.0	0.0	0.0	0.0
Don't Know	17.9	13.5	15.1	47.1	6.7	5.0

Note. Frequencies by column may not add up to 100% due to missing values and rounding.

The Alarmed respondents felt global warming should be a very high priority for our next President and Congress and felt citizens should be doing more. Both the Alarmed and Concerned respondents felt the U.S. should reduce greenhouse emissions regardless of what other countries do. On the opposite spectrum, 66.7% of the Doubtful respondents and 100% of the Dismissive respondents said global warming should be a low priority for Congress and 73.3% of the Doubtful respondents felt people were doing the right amount to combat climate change. Fifty percent of the Dismissive respondents felt the U.S. should not do anything to reduce its greenhouse emissions (see Table 4).

Table 4

Preferred Societal Responses Toward Global Warming by Six Americas Segment

	Alarmed <i>n</i> = 117 %	Concerned <i>n</i> = 230 %	Cautious <i>n</i> = 86 %	Disengaged <i>n</i> = 17 %	Doubtful ¹ <i>n</i> = 30 %	Dismissive <i>n</i> = 20 %
<i>[Should] global warming be a high, low, medium, high, or very high priority for our next president and Congress?</i>						
Very High	73.5	17.8	0.0	5.9	0.0	0.0
High	25.6	46.1	30.2	23.5	10.0	0.0
Medium	0.0	32.2	58.1	64.7	23.3	0.0
Low	0.9	3.9	11.6	5.9	66.7	100.0
<i>Do you think citizens themselves should be doing more or less to address global warming?</i>						
Much More	71.8	19.6	3.5	52.9	0.0	0.0
More	26.5	57.4	43.0	35.3	3.3	5.0
Doing the right amount now	0.0	8.7	38.4	0.0	73.3	45.0
Less	0.9	6.5	10.5	5.9	16.7	25.0
Much less	0.9	7.8	4.7	5.9	6.7	25.0
<i>The US should reduce its greenhouse gas emissions...</i>						
Regardless of others	86.3	67.8	43.0	52.9	30.0	15.0
If other industrialized nations do	1.7	11.3	22.1	5.9	0.0	5.0
If other industrialized countries and developing countries do	4.3	8.3	17.4	5.9	23.3	30.0
The US should not reduce its emissions	5.1	3.5	4.7	0.0	20.0	50.0

Note. Frequencies by column may not add up to 100% due to missing values and rounding.

Sources Used to get Information about Climate Change

Objective four was designed to describe the sources used by members of the Six Americas to gather information about climate change (see Table 5). Respondents from all of the Six Americas segment identified local weather forecasts as a likely source of information followed closely by television programs. Radio programs, museums, and schools were listed as least likely sources. The Dismissive respondents did not use schools, colleges, and universities as a source. Overall, respondents in the Dismissive segment used relatively few sources ($M = 2.8$), while those in the Alarmed segment used more ($M = 7.0$).

Table 5

Sources Six Americas Segments use to get Information on Climate Change

	Alarmed <i>n</i> = 117 %	Concerned <i>n</i> = 230 %	Cautious <i>n</i> = 86 %	Disengaged <i>n</i> = 17 %	Doubtful <i>n</i> = 30 %	Dismissive <i>n</i> = 20 %
Local weather forecasts	69.8	71.1	74.1	70.6	63.3	47.4
Television programs	80.3	76.2	64.0	41.2	44.8	65.0
Environmental Organizations	74.1	55.9	28.2	23.5	24.1	5.3
Family and Friends	67.2	63.3	50.0	43.8	46.7	36.8
Newspapers	73.0	62.9	52.9	29.4	30.0	31.6
Social Media	64.7	62.0	40.0	52.9	33.3	15.8
Nongovernment Websites	51.3	42.1	38.1	18.8	26.7	21.1
Magazines	50.0	44.8	27.4	6.3	20.0	10.5
Government Agencies (ex. NASA)	53.8	49.3	32.9	11.8	27.6	5.3
Radio programs	38.6	33.3	34.1	25.0	10.3	36.8
Museums, zoos, or aquariums	32.7	26.6	12.9	17.6	3.3	5.3
Schools, Colleges, and Universities	40.5	37.6	24.7	6.3	6.9	0.0

Note. Percentages by column add up to over 100% due to multiple sources being selected.

Conclusions, Implications and Recommendations

This study sought to identify how the Six Americas segments were represented within the state of Florida and how to best communicate with and educate each segment. It is important to acknowledge the limitations of the research prior to making implications and recommendations. The data in this study was weighted by geographic location in the state, age, and gender but was not weightable by race and ethnicity due to response collection methods for these variables. While weighting techniques are typically used to alleviate concerns about racial differences (Baker et al., 2013), it was unclear to what extent the sample in this study was representative of the targeted population from a race/ethnicity perspective. This limitation being acknowledged, there are significant implications found through this data that can inform the practice of extension education and agricultural communication.

Overall, the results from this study were comparable to earlier studies (Maibach et al., 2009; Roser-Renouf et al., 2014). More than three fourths of respondents acknowledged global warming was real and happening. Given this, it is interesting that several leaders of the state, those that should represent the will of the people, are vocal about being indifferent about climate change and hesitant to acknowledge its existence. Policy concerns should be understood by both the public and decision makers (Roberts et al., 2016) and previous research has recommended that agricultural educators and communicators should use interventions to improve both groups understanding of ANR issues (Taylor & Lamm, 2016).

As members of the Dismissive and Doubtful segments were the most likely to deny global warming exists or that the government should make the issue a priority, these two groups are the least likely to take action to mitigate the effects of climate change (Roser-Renouf et al., 2014). Fortunately, they also made up the smallest number of respondents (10%). While it may seem like a lost cause, it is important extension educators and agricultural communicators continue to reach out to climate change deniers to engage them in conversations in order to change the narrative since they are the loudest voice working in opposition of climate change believers. It may be difficult for formal agricultural educators to reach out to these segments since schools and universities were the lowest reported group they used as a source of information. This implies extension educators have work to do within their communities as non-formal educators if they want to be a resource for informing the community about climate science.

Across the board, local weather forecasts and television programs were identified as the greatest source of information on climate change. It is worth noting that Doubtful and Dismissive respondents reported low levels on most sources and this low level is hypothesized to be a result of the lack of interest in climate change from these two groups. A possible solution to reach all groups and to inform them of climate science would be to partner with local weather forecasters. Bloodhart, Maibach, Myers, and Zhao (2015) found routine exposure to local TV weather forecasts influenced viewers understanding and perception of extreme weather forecasts. Additionally, routine exposure was found to result in stronger beliefs and concerns about climate change, indicating TV weather forecasters play an important role in educating the public.

Additional research should be done examining how climate change communication campaigns resonate with members of the different Six Americas segments to further target extension education and agricultural communication initiatives. Focus groups could be conducted targeting different segments where communication efforts are presented and feedback received. The discussion could assist in informing the most effective communication techniques qualitatively.

This study should also be repeated in states where climate change is not having as much of a direct effect. Perhaps residents of states that are less directly affected separate themselves differently across the segments. The results could then be compared to those collected in this study to determine differences and how direct effect of weather on the state within which you live impacts perceptions of climate change.

Finally, it is recommended a content analysis be conducted examining the media surrounding climate change, global warming and climate science in the state of Florida. Based on the literature, it is expected media has a large influence. However, it is difficult to ascertain how often it is mentioned, and whether or not it is positive or negative media attention that elicits responses without knowing what is being presented. The media could also be used in a focus group format to elucidate reactions and determine its effect on public perceptions of climate change.

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