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Case Study

Perception of climate change in an academic community in Colombia—a pilot study in a developing country

Mónica Espinosa[1] · **Juan S. Larrahondo**[1] · **Juan F. Mendez-Espinosa**[2] · **Denisse V. Cortés**[2] · **Víctor F. Forero**[2] · **Juan F. Franco**[1]

Abstract
The study applied a climate change (CC) perception survey in Colombia between 2021 and 2022 to gather information about the national academic community from UNAD University (Universidad Nacional Abierta y a Distancia). The survey's fundamental component was the use of Yale's Six Americas Super Short Survey (SASSY) questions and algorithm, which allows the segmentation of the population into six audiences based on their views on climate change. In addition, the study analyzed the perception regarding causes and consequences of extreme climate events, personal engagement to reduce CC, opinions on public policies, and the willingness to participate in CC campaigns. This study contributes to increasing the understanding of the CC perception of specific community groups in developing countries. Furthermore, these pilot results can help orient universities and the academic community in designing their CC communication and education strategies.

1 Introduction

There is unequivocal evidence and scientific consensus on the occurrence of climate change (CC) and its global consequences. However, different audiences have a variety of interpretations and perceptions of the subject, and climate action depends in a great extent on public support to engage in strategies to cope with CC and willingness to turn their behaviors and responses to CC [1]. Effective communication techniques can lead to societal responses at various levels of CC adaptation, motivate citizens to engage in climate change activities, and promote sustainable lifestyles [2]. A series of effective communication and public engagement principles have emerged to support CC action [1, 3, 4]. The basis for assertive CC climate change communication recognizes audiences' different points of view. The awareness of the diverse existing positions on CC allows tailoring the communication strategies according to the specific audiences [3].

There have been investigations on CC perception around the globe since the late 1980s [5]. The identification of the explaining variables to CC perception and the segmentation of the audiences to support better CC communication strategies are among the main objectives of those studies. In this context, the segmentation of audiences consists in identifying groups from a larger population target who share similar characteristics about their perception of climate

✉ Mónica Espinosa, mespinosa@hill.com.co; Juan S. Larrahondo, slarrahondo@hill.com.co; Juan F. Mendez-Espinosa, juanf.mendez@unad.edu.co; Denisse V. Cortés, denisse.cortes@unad.edu.co; Víctor F. Forero, victor.forero@unad.edu.co; Juan F. Franco, jfranco@hill.com.co | ¹Urban Sustainability, Hill Consulting, Bogotá, Colombia. ²School of Agricultural, Livestock and Environmental Sciences—ECAPMA, Universidad Nacional Abierta y a Distancia (UNAD), Bogotá, Colombia.

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change [6]. The segmentation allows a better understanding of the group and permits the designing of direct messages and communication strategies that motivate behavioral changes to reduce CC.

In 2009 Yale published "The Global Warming's Six Americas" study. The authors classified the United States population into six groups based on their level of involvement with climate change and their willingness to act [7]. The definition of the audience segments is based on people's beliefs, attitudes, policy support, and behavior regarding CC (Table 1).

There have been several subsequent studies tracking Americans' perception changes on CC. According to those studies, the Alarmed doubled between 2017 and 2021, and become the largest group among Americans. The Cautious, Doubtful, and Dismissive decreased, while the Disengaged remain constant in the same period. In 2021 two in ten Americans were Dismissive or Doubtful [8]. Haga clic o pulse aquí para escribir texto.

The Global Warming's Six Americas methodology has been replicated in countries such as India [9], Haga clic o pulse aquí para escribir texto.Australia [10], and Germany [11] Haga clic o pulse aquí para escribir texto. The United States categories definition has been applied worldwide for the purpose of international comparisons [12]. Nonetheless, some studies have defined specific categories for the audience segmentation [9, 11], and have set tailored definitions for the six United States audiences categories [10] for a better representation of audiences from different countries.

Results around the globe show differences in the predominant perception of climate change. In India, the audience Informed and Experienced about climate change is predominant [9]. In Germany, the Cautious group predominates [11]. In Australia, most respondents are in the middle categories of the range, defined as Cautious and Disengaged [10].

The level of understanding in the involvement of each audience with CC is essential to create persuasive messages and foster CC actions. The Alarmed and Concerned are widely interested in climate change information; thus, delivering information on ways to respond to CC would potentially influence positive changes toward climate action. On the other side of the segmentation, CC communication needs to focus on indirect messages for the Doubtful and the Dismissive. Information focused on co-benefits, such as healthcare, energy independence and conservation might work better given that people in these groups tend to avoid facts related to causes and consequences of CC [13]. For the segments in the middle, the Cautious and Disengaged, the communication of CC is more challenging as they are not interested in learning about it. For these audiences, is more effective to employ strategies to support the communication such as messages personalizing the threat or demonstrating the importance of CC by social norms [3].

Colombia is highly vulnerable to extreme climatic events. The country already experiences various natural hazards, including damaging droughts, floods, landslides, and epidemic diseases. Vulnerability hotspots comprise the Caribbean and the Andean regions, with negative consequences for critical sectors such as infrastructure, water resources, housing, transport, energy, agriculture, and health [14, 15].

Projections in temperature show an increasing trend across Colombia [16]. The high emission scenario (RCP 8.5) suggests a 1.05 °C and 3.88 °C increase in average temperature by mid-century and the end of this century, respectively [14]. The temperature rise is related to glacier loss, particularly in the Andean regions, which brings crucial effects on water availability in highly populated areas. Other consequences of the increasing temperature include a higher frequency of very hot days, affecting the Caribbean coast principally [14, 16].

Rainfall in Colombia is subject to significant interannual variability due to the El Nino Southern Oscillation (ENSO), which causes droughts and warmer weather. Among other consequences, the El Nino phenomenon is associated with severe droughts in Colombia, causing agricultural damages and affecting the operation of the hydroelectric power plants, which are the primary electricity source in Colombia. Droughts are estimated to be about 2.2 times more frequent than

Table 1 Climate change segmentation groups according to The Global Warming's Six Americas

Segmentation groups	Audience characteristics
Alarmed	Are the most engaged people, are very worried about global warming and strongly support climate action. They are convinced climate change is happening
Concerned	Are convinced that global warming exists but are less involved. They tend to believe climate impacts are distant, and climate change is not a priority
Cautious	Are less certain and do not view global warming as a personal threat
Disengaged	They know little on CC
Doubtful	They are split between people who believe that climate change exists but that natural changes are responsible and those who do not believe in it
Dismissive	They reject the reality of human-caused global warming and oppose to most climate change policies

Sources: [7, 11]

in previous years [14]. In contrast, the La Niña episodes bring floods and cooler weather. Floods are the climatological events related to the most significant impacts on the number of people affected in the country; heavy rains in the past have been a displacing cause for several population groups [15].

The Colombian Government has generated different instruments to reduce GHG emissions and prepare for climate change's increasing impacts [16, 17]. Regional communities and different citizen groups' participation is fundamental to achieving national climate change policy goals in mitigation and adaptation [17].

Previous local studies in Colombia have focused on assessing community perceptions of CC among specific populations. One study on a rural area in the Department of Santander sought to understand how growers of cocoa and coffee felt about climate change. This research revealed that while awareness of climate change has grown significantly, detailed knowledge of its causes, effects, and available mitigation strategies still needs to be improved [18]. According to a study centered on residents of a previously rural settlement in the capital city of Bogotá, the locals believed that CC caused the loss of biotic and abiotic elements, negative effects on resources, ecosystem services, well-being, and loss of ethnic groups´ ancestry knowledge [19]. Another study addressing university students found that despite having moderate awareness of the topic, students are willing to take personal climate actions [20].

Studies of CC perception in Colombia are limited and usually have been a minor component of more extensive studies. While the three studies mentioned above were for specific population groups, a survey in 2016 aimed at identifying national trends in CC perception. This study applied a survey to investigate the perception of Colombians who are vulnerable or potentially vulnerable to CC. The research included 1130 household surveys from 57 municipalities [21]. The study's main finding was that 75% thought they knew too little or nothing about CC. Most of them (91%) mentioned that television was their primary source of information about CC.

Previous research suggests that awareness and perceptions of CC as a severe threat are likely to increase as societies in the developing world become educated and more people experience atypical changes in local weather patterns [1]. However, key predictors of CC awareness, such as education, communication access, civic engagement, and risk perceptions, can vary significantly among nations [1].

The United Nations Framework Convention on Climate Change (UNFCCC) emphasizes CC communication and education as one of the main strategies to address climate change. Article 6 of the Convention defines education and training as fundamental enablers to citizens´ contribution to climate action efforts [22]. In Colombia, CC communication and education campaigns are in the National Ministry of Education assignments [23]. The Ministry is responsible for developing formal and informal communication and education training activities and producing guidelines for their implementation at the local level. To the authors' best knowledge, the National Government has not applied any tool to characterize the audiences and to produce tailored material to communicate CC among diverse audiences.

This pilot study applied Yale's Six Americas Super Short Survey (SASSY) approach [7] to segment the audience of a national wide university community. The study used complementary questions to identify trends in the audience perception, involvement, and motivation for CC action. This work aims to increase understanding CC perception of specific community groups in Colombia. Furthermore, the results will orient universities in designing their CC communication and education strategies, including incorporating CC concepts in curricular programs.

2 Methodology

Between September 2021 and January 2022, the study conducted an online survey to gather information about the CC perception of the UNAD University (Universidad Nacional Abierta y a Distancia) community. UNAD is a public university based on a distance learning methodology, with staff and students in most Colombian regions. The UNAD community is nearly 170,000 people, including faculty, staff, and students.

To reach a confidence level of 95% and an error of 3%, as recommended in similar studies [24], the study aimed to recollect 1000 valid surveys for a representative sample of the UNAD community. The study shared the invitation to complete the survey through the institutional email, available through the Survey Monkey platform.

The survey consisted of 24 questions divided into four modules, namely:

1. Sociodemographic conditions (7 questions).
2. Beliefs on climate change (8 questions).
3. Perception of causes and impacts of climate change and associated extreme climatic events (3 questions).

4.   Actions and public policies to reduce climate change (6 questions).

   Among the sociodemographic characteristics in the survey, the study asked for factors such as age, gender, location, type of region (rural or urban), education level, ethnic group identity, and mean household income level. In the second module, four out of the eight questions corresponded to the SASSY framework to classify the respondents into the six audience categories according to their opinions, attitudes, support for a policy, and actions about CC [25] (Table 2). The SASSY allows the classification of the participants into the segments with at least 70% accuracy concerning the Yale Program's original audience segmentation methodology [25]. The study analyzed these responses with the SASSY Group Scoring Tool [26] to determine the audience segmentation.

   The remaining questions in Module 2 seek to identify people's perception of their knowledge about climate change, if they believe it is mainly human-caused or not, and if they identify any probable negative consequences in the future caused by climate change.

   With the questions in Module 3, the survey seeks to identify people´s views about climate change causes and consequences according to what they experience in their territories, mainly reflected through extreme climate events. The objective is to know the general people's perception of the problem. The analysis is limited and does not seek to assess how specific and localized climate-related events influence people's perceptions and responses to climate change. It is worth mentioning that according to previous research, localized climate-related events influence people's position towards CC [1].

   Module 4 includes specific questions about the community's behavioral intentions and the will to participate in initiatives to cope with CC. The questions were selected based on previous studies on CC audience segmentation [9, 24, 27]. The survey is presented in the supplementary material.

   We used a chi-square test of homogeneity to test differences in segmentation distribution by variables such as income, age, and educational level.

3   Results and discussion

3.1   Demographics

There were 1,066 valid surveys representing UNAD community members throughout Colombian territory; the study had participants in 30 of the 32 Colombian departments.

   Most participants are women (59%); the majority do not consider themselves part of an ethnic group (88%); 64% are between 25 and 44 years old; and 93% hold a degree from a superior technical institute or a university.

3.2   Sassy´s segmentation

Most participants are Alarmed (84%) followed by the Concerned (14%) and the Cautious (2%). The segments at the lower part of the range (Disengaged, Doubtful and Dismissive) are practically non-existent (Table 3). The proportion of people Alarmed is higher than that found in national-level studies [6, 11, 28]. But results are similar to that of a study for United States academic communities, with the predominance of the Alarmed followed by the Concerned and the lowest proportion for the Dismissive and the Disengaged [29].

   Education level and beliefs about the causes of CC have usually been the top-rated predictors of CC awareness and risk perceptions. According to a previous study [1], the best predictor of CC awareness in Colombia is education level, which might partly explain the results obtained here.

Table 2 Yale's Six Americas Super Short Survey questions	Sassy questions
	1. How important is the issue of global warming to you personally?
	2. How worried are you about global warming?
	3. How much do you think global warming will harm you personally?
	4. How much do you think global warming will harm future generations of people?
	Source: [25]

Table 3 Results of audience segmentation

Audience group SASSY segments	Number of respondents	Percentage of respondents (%)
Alarmed	893	84
Concerned	150	14
Cautious	21	2
Disengaged	0	0
Doubtful	1	0
Dismissive	1	0
Total	1066	100

3.2.1 Education level and audience segmentation

More than half of the participants in the survey belong to the highest educational level, and less than 10% correspond to secondary school or lower. There is a superior proportion of people with a high level of education in the survey in comparison with the national average (93% in this survey hold a degree from a superior technical institute or a university, in comparison with 28% at the national level [30]).

Table 4 presents results for the three predominant segments. In this case, according to the homogeneity test ($x2 = 73.66$, $p < 0.025$), the null hypothesis is rejected for a significance value of 0.025, suggesting that CC audience segmentation differs by educational level categories. The Alarmed and Concerned represent more than 94% of all groups (Table 4). Notwithstanding, in the group of people whose maximum level of education is secondary education, 75% are Alarmed, and 20% are Concerned. The Alarmed represents 82% or more of the three groups with the highest education level. However, having a postgraduate degree is not reflected in a higher proportion of Alarmed compared to participation in the group with a bachelor's degree.

Similar studies have found more extensive participation of Alarmed and Concerned segments in groups with higher education levels. A study in Australia found that a more significant percentage of the people classified as Alarmed had a degree [10]. Similarly, a study in the United Sates found that while one-third of people in 2020 had a bachelor's degree or greater, this proportion goes to nearly half of the Alarmed [12]. Results in Brazil show that the proportion of those who think CC is very important increases with the level of education [24].

3.2.2 Income level and audience segmentation

According to the results of previous studies, income level is among the predictors of CC awareness, as is the case in China [1] and the United States [28]. A study in the United States in 2009 shows that the Alarmed are more likely to have higher incomes, and the Disengaged tend to have lower incomes [7]. Similarly, results in Brazil suggest that the proportion of people who thinks that CC is very important increases with the economic level [24].

According to the chi-square test of homogeneity ($x2 = 23.87$, $p = 0.247$), there is no evidence to reject the null hypothesis. Results show low differences in the segmentation results by household income level. A higher proportion of the Alarmed is observed in the lower-income groups compared to those with more economic resources (Table 5).

Table 4 Education level and audience segmentation

Segment categories	Higher education—posgraduate (%)	Higher education—bachelor or equivalent (%)	Higher education—technical (%)	Secondary education or less (%)
Alarmed	83	89	82	75
Concerned	14	10	16	20
Cautious	2	1	2	4

Table 5 Income level and audience segmentation

Segment categories	Mean household income per month (MHI) ($ USD)					
	MHI < 208 (%)	208 ≤ MHI < 624 (%)	624 ≤ MHI < 1040 (%)	1040 ≤ MHI < 1456	1456 ≤ MHI < 1872 (%)	MHI > 1872 (%)
Alarmed	87	84	86	79	79	78
Concerned	10	15	11	18	17	22
Cautious	2	1	3	3	4	0
Doubtful	1	0	0	0	0	0

3.2.3 Age and audience segmentation

Studies from different regions in the world show diverse trends about age and CC awareness. A 2009 study in United States found that the Alarmed were more likely to be middle-aged (55–64 years old), while the Disengaged tend to be 65 and older [7]. Another research shows the Alarmed in Germany were 50 years old on average [11]. In 2020, Alarmed in the United States tended to be younger, and the Dismissive tended to be older compared to other segments [12].

The results do not exhibit a clear tendency of CC awareness with age groups. The chi-square test ($\times 2 = 7.185$, $p = 0.52$) suggests no differences in the CC audience segmentation by age. Table 6 presents results for the predominant segments. There are differences in comparison with the United States and Germany trends. In this case most of the Alarmed group are between 25 and 44 years old, and most of the Cautions are between 35 and 64 years old. There is a higher proportion of Alarmed in the group from 25 to 34 years (87%), than in the youngers (76%) (Table 7).

3.3 Beliefs on climate change

About 25% of all the respondents state they know little or nothing about climate change, and nearly 75% mention they have moderate or a lot of knowledge about it. Only 1.5% manifest that climate change is not happening or that they do not know about it. Most people (73%) state CC is mainly caused by human activities, and 24% think it is generated in equal proportions by human activities and natural changes.

Both results differ from what is expected according to the segmentation and the United States Sassy categories' definition. The Alarmed and Concerned are 98%, and according to the United States segments' definition, these groups believe human activities are the leading CC cause [27].

Given that the majority (93%) hold a degree from a superior technical institute or a university, the fact that a quarter of them state they know little or nothing about climate change suggests there is room for academic institutions to strengthen CC teaching and expand the coverage to the entire scholarly community. The proportion of people who

Table 6 Age participation by audience segments

Segment categories	Age (years)						
	18–24 (%)	25–34 (%)	35–44 (%)	45–54 (%)	55–64 (%)	> 64 (%)	Total (%)
Alarmed	12	33	32	15	7	1	100
Concerned	21	27	34	9	7	2	100
Cautious	10	14	48	19	10	0	100

Table 7 Segments audience participation by age

Segment categories	Age (years)					
	18–24 (%)	25–34 (%)	35–44 (%)	45–54 (%)	55–64 (%)	> 64 (%)
Alarmed	76	87	82	89	84	70
Concerned	22	12	15	8	14	30
Cautious	1	1	3	3	3	0
Doubtful	1	0	0	0	0	0
Total	100	100	100	100	100	100

say they know little about CC is higher than the results found in Brazil, where 18% of people with higher education affirm they know little about CC [24].

Most respondents (95%) think CC is extremely important or very important to them; 96% are moderately worried or very worried. More than 98% of the respondents consider CC can affect them personally and affect future generations to a moderate amount or a large extent.

The predominance of people who thinks CC is extremely important (71%) within the Alarmed is higher than that observed in 2009 in the United States (48%) [7]; and more elevated than results in India for the Informed and Experienced (56–68%) [31]. There is a similarity between the results found here with those of Singapore [6], although the results are not straightly comparable.

3.4 Perception of causes and impacts of climate change and associated extreme climatic events

All the participants perceive extreme climate events and related effects growing on their municipalities. The majority consider most of the events and effects have increased during the last decade (Table 8). Most (88%) think there are more frequent abrupt changes in temperature, 79% perceive severe rain events have increased, while 62% consider water scarcity is growing. Participants identified additional effects such as loss of fertile soil and aquifer depletion.

According to other studies many people around the world have noticed recent shifts in local temperature anomalies, which could alter risk perceptions connected to climate change [1].

We asked the participants which of consequences from extreme climate events they perceived as the most prolonged, intense, and frequent in their municipalities (Table 9). The majority (70%) chose expensive food as the first consequence. More than half perceive air pollution and health impacts from extreme temperatures and droughts among their municipalities' most critical impacts. These results align with studies conducted by the Colombian Institute of Hydrology, Meteorology, and Environmental Studies (IDEAM), which determined that the main risks from CC to Colombians are food scarcity and adverse health impacts [21].

The majority agree on the increase of negative actions during the last decade in their municipalities (Table 10). Three quarter thinks that threats to animals and plants have become more critical. IDEAM also found that the impact on plants and animals is one of the facts that Colombians most associate with climate change [21]. Air pollution and deforestation are the second and third facts reported as increasing negative actions to the environment. It is worth mentioning that some perceive reductions in negative actions in their territories.

More than 60% think extreme climate events will increase poverty, inequality, and population displacement in their regions (Table 11). The same proportion considers the increment in tropical diseases as part of the CC consequences. The concern with diseases is similar to that reported for India, where most of the Informed and Experienced (63–72%) think global warming will cause many more disease epidemics in the next 20 years [9].

Some think CC effects will negatively impact social aspects, including armed conflict, schooling, and cultural identity. It is worth mentioning that these impacts are rarely considered in the analysis to assess the costs of future CC scenarios in Colombia [32–35].

Table 8 Perception on extreme climate events and their effects	Extreme weather events and their effects	Percentage of people who consider the event or effect has increased in the last decade in their municipality (%)
	Abrupt changes in temperature	88
	Temperature increase	86
	Severe rain events	79
	Erosion	69
	Floods	68
	Ground slides	67
	Strong winds	64
	Water scarcity	62
	Forest fires	56
	Rising sea levels	44

Table 9 Perception on extreme climate events consequences

Consequences of extreme climate events	Which effects do you consider the most prolonged, intense, and frequent in your municipalities (%)
Expensive food	70
Increased air pollution	62
Health impacts from extreme cold or heat	57
Droughts	55
Floods	48
Landslides	46
Damage to infrastructure	41
Ground frosts	41
Fires	37
Shortage of utilities services (electricity and water)	33
Job losses	31
Tourism reduction	18
Loss of human life	13

Table 10 Perception on negative actions to the environment

Negative actions to the environment	Do you the following actions have increased, reduced, or have remained the same in the last decade in your municipality?			
	It has been reduced (%)	Still the same (%)	Has increased (%)	I do not know (%)
Inadequate municipal waste management	21	33	44	2
Deforestation	7	18	71	4
Poor water management	9	28	61	2
Air pollution (industry and transport)	4	21	73	2
Inadequate agricultural practices	10	33	48	9
Inadequate industrial practices	7	32	51	10
Animal and plants animals threatened	6	14	74	6
Urban planning without green areas	9	24	60	7

Table 11 Percentage of people who think the problem may get worse in the future because of climate change in their municipality

Negative effects of extreme climate events	Percentage (%)
Poverty and inequity	67
Population displacement	64
Increase in diseases such as Zika, dengue, yellow fever, or chikungunya	60
Increase in the population in informal settlements	43
Loss of cultural identity	24
Armed conflict	18
Low levels of schooling	17
None of the above	3
I don't know	3

3.5 Actions to reduce climate change

When asked about the actions they do to reduce climate change, more than 80% said they are reducing their energy and water consumption at home. The majority (72%) are acting to reduce their waste, in a similar proportion to that of Brazil (75%) [24]. Nearly half (46%) state they prefer public transport, cycling, or walking to commute, and one-third participate in environmental campaigns (Table 12).

There is a similarity between the actions by Alarmed and Concerned in this study and the United States in energy conservation, but a difference in the proportion of people who prefers public transport, cycling, or walking, which is higher in this study than in the results reported for the United States [7]. Considering the importance of reducing Greenhouse gas emissions in the transport sector to achieve the Colombian goal defined in its National Determined Contribution [36], it would be of great interest to know if these results hold for other groups in the community.

There needs to be more knowledgeable about initiatives on climate change led by the local governments. Less than 8% of the respondents are sure to know climate change actions promoted by the governments. Although this is a pilot study for a specific community, this low proportion might suggest the need to strengthen the Territorial Climate Change Management Plans [37] with educational and communication strategies.

Despite the majority need more information about local initiatives to reduce CC, most (8 in 10) are willing to participate in greenhouse gas mitigation initiatives or climate change adaptation campaigns, and 18% are already involved. This potential for community collaboration reinforces the need for better CC communication in terms of the mitigation actions people can participate in. The high willingness to act in favor of reducing CC is in line with prior research, according to which Latin Americans tend to have a reasonably strong public will to address it [38].

Most of the surveyed (80%) consider CC should be of high priority within their municipality's development plans; and 86% considers environmental initiatives of candidates when voting. The proportion on people who considers the proposals of candidates to protect the environment is higher in this study than in Brazil (45%) [24].

4 Conclusions

This work contributes to understanding CC perception on specific community groups in developing countries. Public perceptions of CC, among other variables, shape individuals' responses to the problem and influence political action on the solutions [11]. Climate change communication affects people's positions toward CC, constituting a fundamental strategy to tackle CC. A series of effective communication and public engagement principles have emerged to support CC action; most of them are based on audience segmentation to tailor the strategies according to the audience characteristics [1, 3, 4].

This pilot study consisted in an online survey to gather information about the CC perception of the UNAD University community. The study applied Yale's Six Americas Super Short Survey (SASSY) approach to segment the audience according to their beliefs and positions towards CC. The study complemented the survey with questions to characterize the perception people have of the causes and consequences of extreme climate events and their willingness to take action to mitigate CC. Almost all the people (nearly 100%) correspond to three of the six segments defined by the SASSY approach. The majority (98%) correspond to the Alarmed and Concerned, and 2% to the Cautious.

Table 12 Proportion of people taking action to mitigate climate change in the last 12 months

Action	Proportion (%)
Moderate usage of water at home	88
Moderate usage of energy at home	81
Reducing waste generation or recycling at home	72
Preferring public transport, cycling, or walking daily	46
Participating in environmental campaigns	35
Preferring clean private transportation means	20
Other	1

The pilot study's results are helpful for the university in designing its CC communication and education strategies based on the segmentation results. According to SASSY's framework [7], for the Alarmed and Concerned, the information should be focused on providing options for the type of actions that people can implement in their daily life to reduce climate change. This study evidenced the opportunity to increase the coverage of CC education to the academic community and incorporate CC concepts and assignments in the graduate and undergraduate programs curriculum.

The study observed differences in the definition of the segments and the characteristics of the participants between this study and the original SASSY approach. Despite this being a study for a specific community, the differences in the segments and their characterization in comparison with the'SASSY's framework suggest following analysis could focus on defining Colombian categories for the segmentation. This is relevant since Colombian National Climate Change Policy defines communication as a fundamental pillar [21] for implementation.

Global studies show several benefits of employing perception surveys for better CC communication to strengthen the community's acceptance and participation in public policies [28, 39]. Furthermore, these types of instruments allow monitoring of certain aspects of climate policies. On a national level, communication strategies could best benefit the population in territories through the existing nine Regional Climate Change Nodes in Colombia. The nodes are part of the National System of Climate Change (SISCLIMA), aiming to promote and support the implementation of climate change policies, strategies, and climate projects in the regions [40]. Climate Change Nodes could act as a network to address communication strategies since they assemble the participation of public and private sectors, academia, and the community.

Data availability The datasets analyzed during the current study are available from the corresponding author on reasonable request.

Code availability Not applicable.

Declarations

Ethics approval and consent to participate All the participants signed a form to confirm they agreed to participate in the survey and their consent to publish the results. The Research Committee of the School of Agricultural, Livestock, and Environmental Sciences approved the study and its research methods. The research was carried out following the guidelines of the Research Committee. Due to the nature of the project, the Research Committee determined that the project didn't require approval from the ethics committee.

Competing interests The authors declare no competing interests.

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