NORTH CAROLINA STATE UNIVERSITY

FINAL REPORT

COMMUNITY ENGAGEMENT

GROUP MEMBERS

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Executive Summary

Through community engagement efforts, we seek to incorporate Chatham County residents in citizen science activities to raise awareness of the importance of carbon-reducing measures. These measures will be implemented through a grassroots campaign, a user-friendly website, and carbon sequestration citizen science project in order to include residents in the county's goal of reaching 100% clean energy by 2050. Through these facets, we hope to foster a residential understanding of carbon emissions with the goal of implementing mitigation strategies throughout the county.

Introduction

Chatham County has long served as an environmental steward to the natural world around us. Agriculture, textiles, and natural resources have been a large part of the county's history and livelihood given the county's geographical placement. The appeal of Chatham County has consequently attracted long-term residents seeking to make a home there. According to 2015 statistics, Chatham County hosts over 70,000 people and is expected to grow 22.8% by 2023 (Megalos, 2018). However, this growth poses issues for the County; such an increase in population size warrants more greenhouse gas (GHG) emissions, waste production, transportation emissions, and land usage. The growing threat of climate related issues has pushed Chatham County to consider what efforts can be adopted in order to reduce carbon emissions. Our group has developed several ideas to engage residents of Chatham County in endeavors to help reduce carbon footprints and allow for public participation directed by the Chatham County Climate Change Advisory Board.

Factors Influencing Community Participation in Afforestation Activities: A Case Study

A study conducted in the Nathenje Area of the Lilongwe District in Malawi looked at factors that influence community participation in afforestation activities. Afforestation is a practice that involves planting trees on barren land in order to create a forest with the ultimate goal of providing green spaces and sequestering carbon. As carbon reduction is closely tied to afforestation practices, this report served as a helpful guide in determining what factors would need to be analyzed in order to gain an understanding of Chatham County resident's willingness to participate in carbon reduction measures. Overall, the report found that "community participation in wide-range approaches is...a tool for rural community development…" (Kanthiti and Njera, 2016). Given that Chatham County is largely comprised of rural areas, this study serves to supplement the county's existing agrarian locations, as well as for future development considering the growing population. The research considered education, age, occupation, and anticipated benefits of those involved in the study. An analysis of the factors showed that there was no significant relationship between education level and participation in afforestation activities. Conversely, the study found that "three factors including age, occupation and anticipated benefits significantly influence community participation in afforestation activities in the study area" (Kanthiti and Njera, 2016). Some more notable findings of the study conducted by Kanthiti and Njera are listed below.

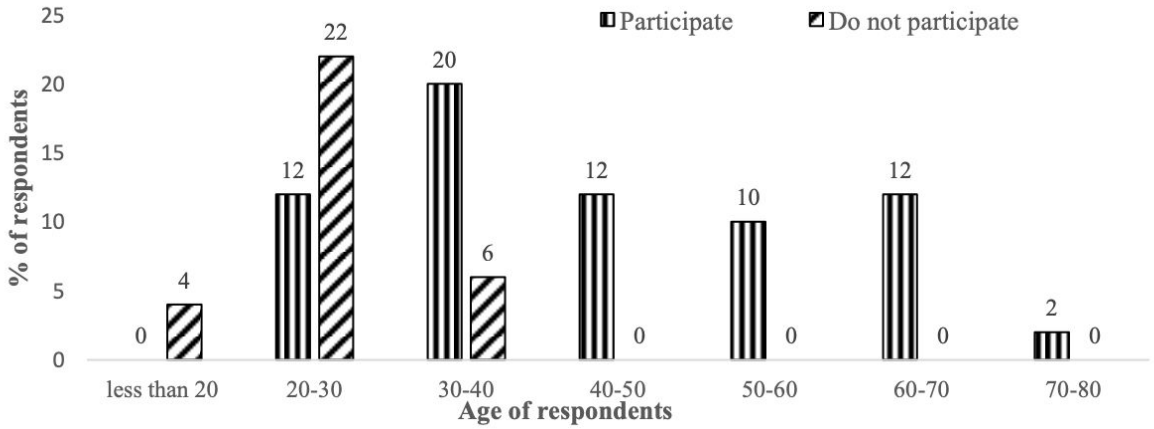

Figure 1a. Influence of age on community participation

"Results showed a significant relationship between age and community participation in afforestation...It was also noted that respondents between the ages of 30 and 40 were the ones who participated more in the afforestation activities than those aged below 30."

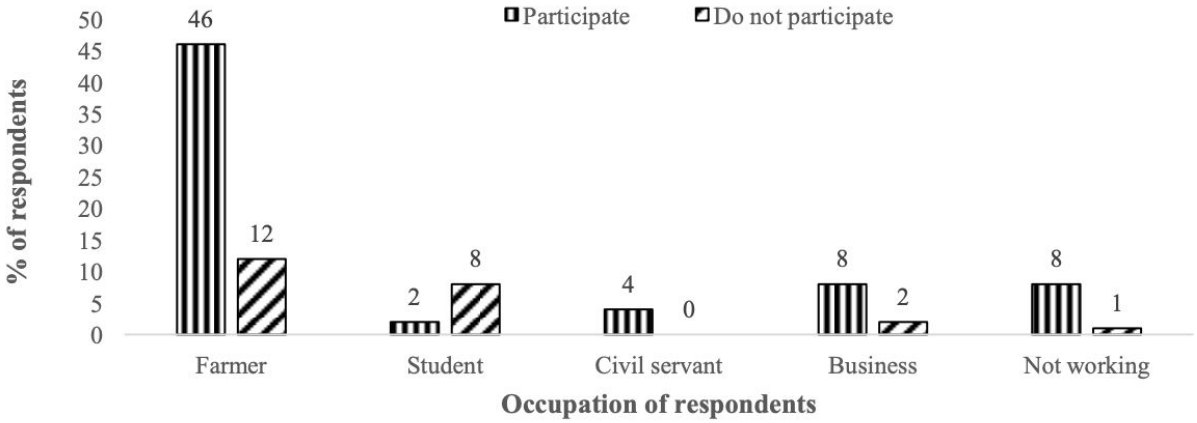

Figure 1b. Types of occupations of respondents

"The results showed that people's occupations influence the extent of community participation in afforestation activities."

"With regard to benefits from afforestation activities, results showed that there was a positive correlation between local community participation in afforestation activities and the respondents' expected benefits from tree and forest management."

Looking at community development and identities of Chatham County residents, our group decided to curate a series of factors that may influence community engagement

efforts based on the findings of the case study. The factors we analyzed include the following: age of residents, political affiliations, and transportation usage. A breakdown of Chatham County demographics shows the median age to be 47 (Chatham County North Carolina, 2010). Considering this age is well over 30, it can be assumed that a large subset of the population would be willing to participate in carbon reduction activities. Political affiliation and transportation usage were added because it is hypothesized that these two factors are influential in willingness to engage in carbon reduction measures. Political affiliation was specifically included based on the idea that national campaigning platforms' stance on the growing issue of climate change will also influence community participation. Chatham County has consistently voted with the Democratic Party and has "only voted against Democratic presidential nominees four times since the turn of the twentieth century" (Janz, 2018). This leads us to believe there will be support of climate-related concerns in Chatham County based on political affiliations alone. Furthermore, it is known that Chatham County's largest source of carbon emissions comes from the transportation sector (Chatham County Climate Action Plan, 2017). Therefore, an objective of this report is to consider ways in which residents who largely contribute to transportation emissions can be influenced to participate in carbon reduction efforts. We believe that all these factors heavily influence daily decisions that induce environmental consciousness. Given this belief, our group decided to hone in on these factors in order to determine how we plan to connect with and involve Chatham County residents in the effort to reduce GHG emissions.

One of the main goals listed in the Chatham County Climate Action Plan is the creation of a website "describing ways in which citizens can lower their carbon footprint and take actions to increase carbon sequestration" (Chatham County Climate Action Plan, 2017). Chatham County Department of Environmental Quality has already developed the website mentioned above, therefore our group will make suggestions on what to add to the webpage in order to make resident's online experience more streamlined and knowledgeable. Our group will be using the website as a way to reach community members through education and involvement efforts. Additionally, our group is working on a grassroots campaign idea serving to raise awareness of the website and general environmental knowledge within Chatham County. The campaign serves as an inclusive and comprehensive strategy undertaking all factors of consideration which entails citizen science projects, general environmental education, ongoing community efforts, and everyday actions a general citizen can partake in to reduce their carbon footprint. Moreover, based on the findings of Kanthiti and Njera, the website and thorough grassroots campaign will be used to portray further the beneficial outcomes of carbon reduction measures to Chatham County residents in order for the residents to become more willing to participate in reduction efforts. We aim to use these factors as educational tools for those willing to take part in carbon sequestration and increase awareness of the growing carbon issue.

Our group, combined with the endeavors of the Chatham County Climate Change Advisory Committee, hopes to align community outreach efforts with the values and identities of Chatham County residents. The rest of this report will outline our thought process, data analysis, and engagement strategies we have devised.

Prospective Campaign: #GHGFreeInCC

Climate change is one of many modern issues in which partisanship proceeds patriotism. The discrepancy between political affiliation and belief in anthropogenic climate change has not always been as prevalent as it is in today's American society. When the Clean Air Act of 1970 was established, it was passed without objection in the House of Representatives. All people of all parties acknowledged that humanity was altering and damaging the environment. With atmospheric carbon dioxide concentrations increasing at an unprecedented rate, it is evident that our addiction to pollution has not changed, but society's belief in its ability to damage the environment beyond repair most certainly has. Anthropogenic climate change will affect all people. In order to effectively combat the emerging local and global issues, a unification effort in the form of a campaign focusing on awareness, adaptability, and understanding is recommended. For the sake of modeling, a campaign for environmental education as well as the reduction of Greenhouse gas Emissions in Chatham County could exist under the namesake "Mission to End Chatham Emissions". This is an effective title as it is descriptive, able to be shortened into an acronym (M.E.C.E.), and it rhymes to a degree.

One of the problems that are inherent in environmental campaigns is when a target individual experiences uncertainty that the collective target will not do their part, leading the individual to do nothing themselves. From this, it is understood that gently convincing the audience that contributions happen, help, and transgress the bounds of political parties will help assuage their doubts and encourage them to take action and get involved with the campaign (Staats, 1996). For example, a promotional poster for the M.E.C.E. awareness campaign might focus on the community value of outdoor recreation, such as fishing and hiking. Mentioning outdoor recreation and how the value and appreciation for it is politically transgressive suggests that protecting the outdoors is a vested interest for people across the divide of the political spectrum, and from all walks of life. Organizations like the Sierra Club, the Nature Conservancy, and the World Wildlife fund represent interests from a dynamic group of people.

With the internet continuing to grow as a means of accessing information, learning about current events, and making connections, a social media presence is imperative to support, advertise, and drum up recognition for any new campaign. Among the arsenal available to social media campaigners is the use of hashtags to consolidate all posts pertaining to the common topic, including posts from supporting citizens. Hashtags provide recognizability, searchability, and further allow citizen interaction with the project. For catchiness' sake, one could go with something that rhymes, as many slogans, social media-related and otherwise, have in the past. An example of this using the hypothetical campaign topic (M.E.C.E.) could be "#GHGfreeInCC" (CC standing for Chatham County). "#GHGfreeInCC" is brief, encompasses the main topic, and is memorable. Another way one could create a meaningful campaign that grabs public attention is to engage in a sort of publicity stunt and raise awareness of the campaign's goals to the people who check on the progress of the stunt. For example, an affiliate of the campaign could choose to go some time without utilizing GHG emitting vehicles, buying local produce that does not need to be shipped, and carpooling. Throughout the stunt, they keep interested viewers updated on

their progress, how much their actions are helping the environment/contributing to the campaign cause, and why. Another vital element to consider for this campaign is the use of interesting visuals, both online and in physical promotional material. A mockup bumper sticker featuring the campaign hashtag and an appropriate color scheme is depicted in Figure 2a. Appealing photography of Chatham County's natural beauty would be beneficial to attain in order to further the cause through aesthetic power. Also, an important consideration is the possibility of sponsors. As residents and officials become more aware of the damage humans do to the environment as a species, more and more people may see it as a moral imperative to prevent as much further damage as possible. Businesses, seeing this, try to appeal to a green-minded audience by adopting environmentally friendly policies and supporting environmentally friendly groups, so sponsorships/partnerships are not an unimaginable possibility.

Figure 2a. Example of potential bumper sticker

Distribution of advertising and promotions in strategically effective areas for maximum visibility is critical for the campaign's exposure and for effective allocation of resources. Figure 2b depicts the households in Chatham County that have more than five vehicles. These areas are the most populous, and contain people who can impact GHG emission by changing their vehicle habits. Since the Climate Action Plan stated that Chatham County's largest greenhouse gas emissions come from transportation, targeting the areas with an abundance of cars could be a great community engagement endeavor. To fulfill the maximum potential of public education efforts regarding GHG emissions, campaign outreach situated near Siler City, NC, and Pittsboro, NC is suggested, as both cities have households with more than 5 cars. Moreover, Siler City is important to reach because it is the largest city in the county and Pittsboro is expected to grow considerably larger with the development of Chatham Park. Focusing on those two cities will maximize visual exposure to the target audience.

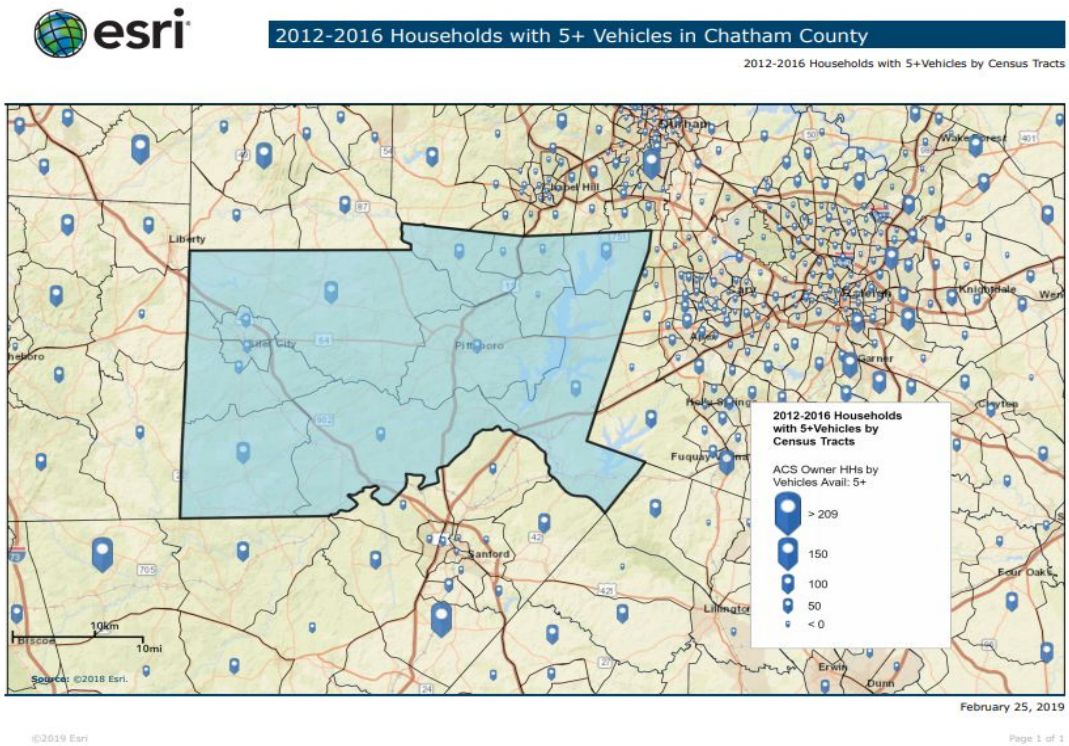

Figure 2b. 2012-2016 households in Chatham County with more than five vehicles. High densities of five or more vehicles are concentrated near Siler City, NC, and Pittsboro, NC.

Social Media Presence

Social media icons on the front page of the website can highlight current activities that the Chatham County Climate Action Committee is undertaking. Environmentally conscious social media trends are becoming more mainstream and inducing public awareness. Given this new development, social media serves as a new platform for the committee and county to employ. Trends that could be highlighted are plogging and #trashtag, as both of these activities benefit both the environment and the participant's health.

Plogging is a combination of the English word "jogging" and the Swedish word "plocka," which means to pick up, and was coined in Scandinavia in 2016. Since then, plogging has spread to several countries and could be implemented as a community activity in Chatham County. Plogging is both a healthy activity for individuals and the environment. Plogging events could be added to the Chatham County volunteer page to engage the community to focus on their health and the environment.

#Trashtag, like Plogging, can be seen spreading throughout social media like Twitter, Instagram, and Facebook under # and their respective names. The #trashtag challenge involves volunteers coming together to clean up outdoor areas. The

environmental movement started in 2015, and has only gotten more popular as the years have passed. Trashtag could be used to show results of the community coming together by posting the before and after pictures of a cleanup site in which the site was restored to its natural beauty.

Figure 2c. #Trashtag Challenge post

Website structure

Please scan the QR code to follow along with the website structure analysis.

Scan me

A culmination of multiple peer-reviewed sources created the four standard criteria for websites: user-friendly quality, content quality, organizational quality, and design quality (Hasan, 2011). We analyzed the Chatham County Department of Environmental Quality's Sustainability website structure.

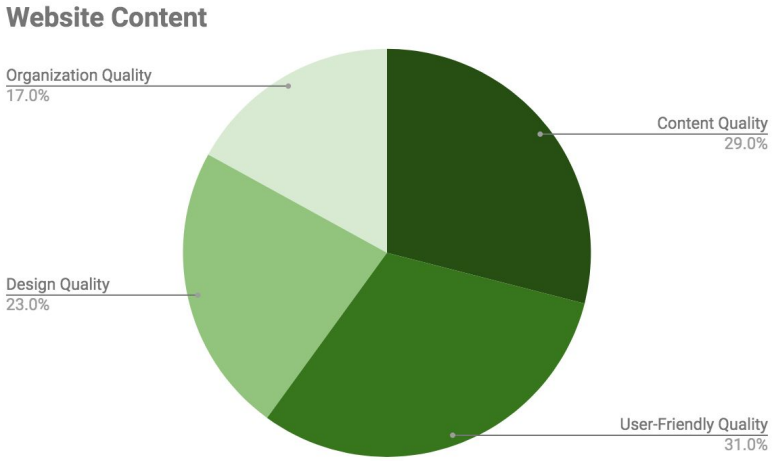

Figure 3a. The four standard criteria for websites

User-friendly Quality

The most important of the four website criteria is user-friendly quality. This standard as the criteria for this facet is closely interrelated to criteria from every other section. Overall, the usability of the page is lacking. It is difficult to find everything needed since much of the information is unorganized and sometimes not even there; for example, some of the links on the page are not attributed to an existing webpage. Many of the buzz-words are not defined for a general audience to understand. An extensive amount of words would need to be elaborated on in detail for a better grasp of understanding. Regardless though, the reliability of the page is overall excellent but could be vastly improved upon for a more experience.

Content Quality

This section is crucial since it makes up the entirety of a website. Without quality content, the website itself would be of no need. This pillar of Content Quality is a close second to User-Friendliness because even with the information users there needs to be a way for the user to find everything on the page; otherwise, it would be an annoyance to the user. Furthermore, for this website in question, there should be a timestamp date for when the last time the page was updated and or a column of the recent updates to the page. We can find this implemented on some of the pages on the site but not all. This website also needs to take into account that 12.5% of the population of Chatham County are Latinx and it should cater to a broader audience that may use it because as of now there is no function to read the webpage in Spanish or other languages (Chatham County North Carolina, 2010). Some Polling efforts should be done throughout the campaign to gauge the need for a translated sustainability page.

Organization Quality

The address of the site for example, although longer than needed, does bring the user to the page they want. From this page, we can use the permanent links (Figure 3b) to

get where we need to go. The links on the pages should also be checked before inserting them into the website so that they go to the place where we wanted them to and additionally make sure the posted links are still All things considered, the consistency between pages is a bit lacking and could be improved upon for usability purposes. The only way to get to most of the other pages with sustainability you need to go back to the main page and click on one of their hyperlinks (Figure 3c) . The color and font of the text is different between pages and should be corrected to only be of one color and size.

Figure 3b. Sustainability links and structure failure

The mapping for the website is there, with the table as scene in figure 3b and in the window tabs, but it needs to have more elaboration as to what each link goes to such as in the case of the "Climate Change Advisory Committee" tab where "Documents and Recommendation" can be found, but there is no clarification as to what this means. The existing mapping needs to be changed because all of it is just under Environmental Quality which should be altered to have more than the overall tab.

Design Quality

Opening up the Sustainability page we first see that the page is not very aesthetically pleasing. The graphics on this page lack tailored appeal to Chatham County which is something it needs for a website devoted to its county's sustainability (use QR code).

There are not any videos on the page which can bring a more appealing personality to it, there are some linked to pages but there should be some in the page itself. The text on the page attracts the eyes of the user more than the images do this is not to the content of the text but the choice of font and boldness of it. This bold text should be changed to make the page more visually appealing. There should also be more attention put into the drops in

sentences of the pages to make sure the information inconcise and organized. The subheading of each page should be corrected to be divided from the rest of the information so that the layout of the page is clean and has a smooth transition. This misstep can be seen done in the conservation of energy page where the subheading and image of the section are side by side and should be separated (figure 3c). The images on a site should also be consistent in its choice of position to be aesthetically pleasing and with this in mind, the last image on the first page, (figure 3b) for example, should be centered and the bottom right of the image should have a border like the rest of the image.

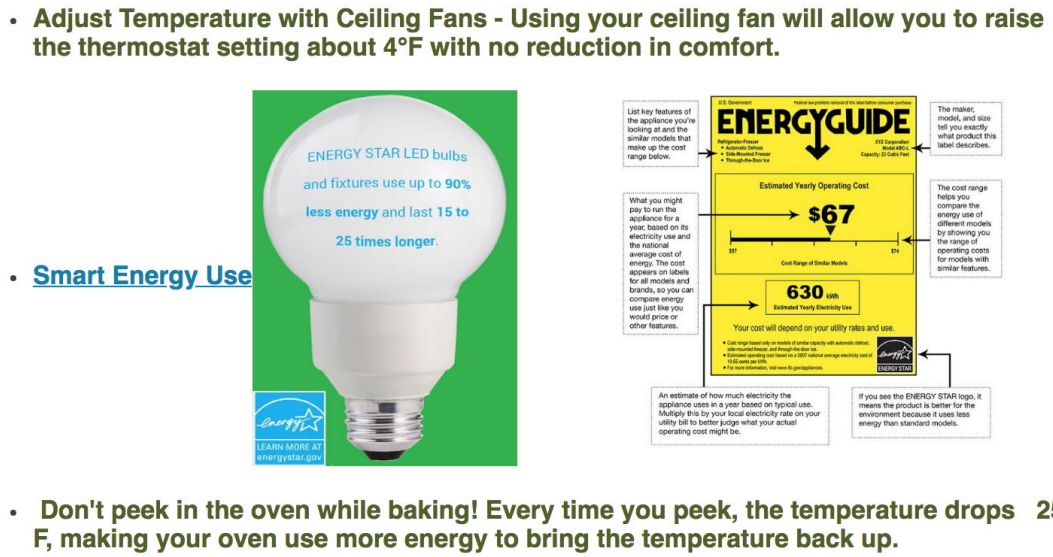

Figure 3c. Images on the sight that need to be reformatted

Website Content Recommendations

The Chatham County Department of Environmental Quality (CCDEQ) created a website focused on sustainability practices to work towards a greener county. The website lists resources with information on energy consumption, recycling, reducing vehicle emissions, water conservation, and ways to go green at work. The CCCCC wanted our group to focus on a website about carbon footprint and carbon sequestration, so we decided to use the CCDEQ's website as a template and provide additional suggestions that align with the focus of our grassroots campaign and relate the information back to Chatham County. We consolidated our suggestions to a table and provided annotated website screenshots to provide a visual aid. Additionally, we propose a collaboration between CCDEQ and CCCCC in order to promote a well-rounded website available to Chatham County residents that encompasses topics on sustainability practices, carbon footprints, and carbon sequestration.

Website section	Suggestions/Additions
Homepage	• Create a word bank containing the terms used in the Venn diagram to increase readability
Conservation of Energy	• Enlarge the infographics and use legible fonts to increase readability
Recycling	• Hyperlink addresses of donation facilities within Chatham County
Reduction of Vehicle Emissions	• Place this topic at the top of the table to signify importance to the county's mission • Include Climate Action Plan and related documents • Add infographics related to Chatham County
Conservation of Water	• Define water efficiency and flow rate • Provide a real-world application or calculation of flow rate
Going Green @ Work	• Interest employees to start green initiatives in their office by asking intriguing questions • Hyperlink the contact for the Chatham County Department of Soil and Water Conservation
General suggestions	• Include a carbon footprint calculator

Homepage

We suggest explaining the Venn diagram on the homepage in detail (see Figure 4a). Not all of the phrases used in the Venn diagram are public knowledge and the website should use language that is easy to understand. Readability is the term that describes a way to evaluate how understandable an author's language is. According to a 1993 study, the average U.S. adult reads at a seventh-grade level based on Microsoft Word's Readability software (Stockmeyer, 2009). We suggest creating a word bank with the definitions of the terms used in the Venn diagram to assist readers (see Figure 4b).

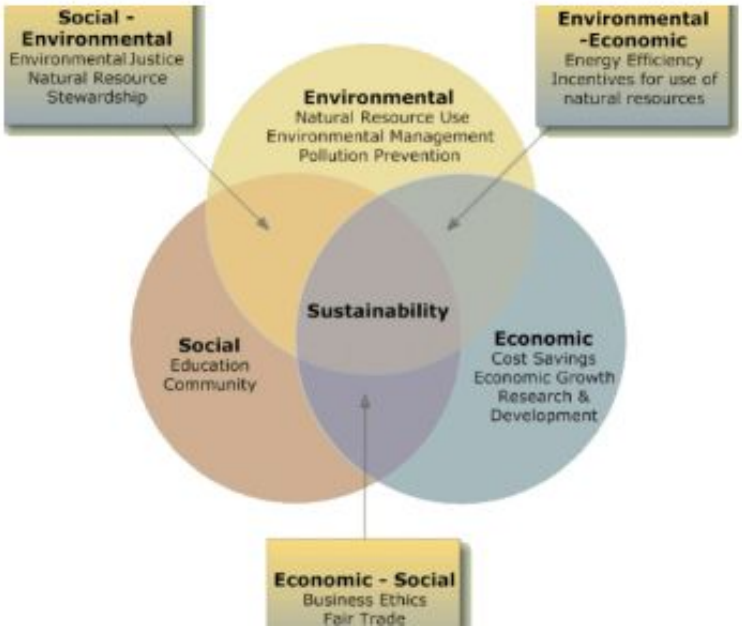

Figure 4a. Venn diagram on CCDEQ homepage

Glossary

Term	Definition
Economic growth	The increase in the value of goods and services produced by an economy
Environmental justice	The fair treatment of all people regardless of race or income with respect to environmental laws
Fair trade	A global movement that aims to help farmers and producers in less developed countries

Figure 4b. An example word bank that can be included on "Home" webpage

Conservation of Energy

Most websites include tiny fonts that reduce readability significantly for most people over the age of 40 (Nielson, 2003). Based on the 2003 study, we suggest enlarging the fonts for the Energy Guide and Energy Efficient Home Savings infographics to make them easier to read (see Figure 4c).

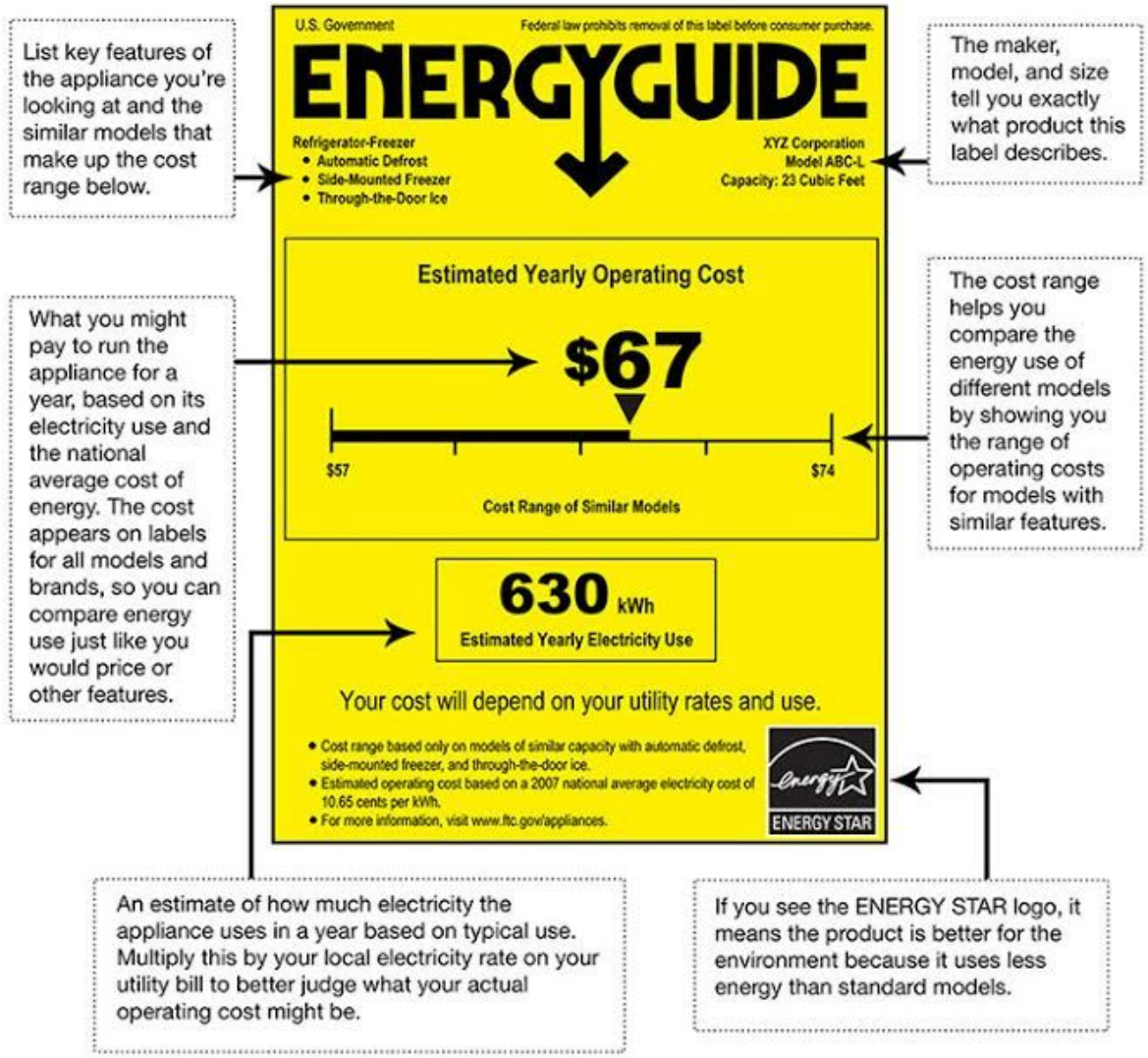

Figure 4c. Example of the Energy Guide infographic on the "Conservation of Energy" webpage

Recycling

Under the "Benefits of Donation" section, we suggest adding hyperlinked Google Map locations within Chatham County where residents can drop off secondhand clothes such as Goodwill, Salvation Army, and thrift stores. It is important to note that up to 95% of

the textiles that are landfilled each year could be recycled (Secondary Materials and Recycled Textiles Association, 2019). Examples of donation facilities to include are the Chatham Habitat for Humanity ReStore in Pittsboro, NC and the Goodwill in Apex. NC.

Reduction of Vehicle Emissions

We suggest that this topic is placed at the top of the homepage table because of its importance to Chatham County. Since transportation accounts for 75% of the total, residents should be aware of the Chatham County Climate Change Action Plan (The Climate Change Advisory Committee, 2012). We suggest hyperlinking the Climate Action Plan to the webpage and explaining the relevance and importance of reducing vehicle emissions. We also suggest connecting the infographics to Chatham County. For instance, Figure 4d could include statistics about carpooling, public transportation, bicycling, and walking relating to Chatham County instead of general Americans. We conducted a report in ArcGIS Business Analyst which created a relevant infographic pertaining to Chatham County. ArcGIS Business Analyst obtains its data from the U.S. Census Bureau and the software can create infographics and maps. Figure 4e is an example of an infographic that can be incorporated into the webpage. It is interesting to note that 78.1% of Chatham County residents drive alone and less than 1% take public transportation or walk to work. More information about alternative transportation options such as bus routes and biking trails could also be communicated to residents.

Figure 4d. Example of infographic on "Reduction of Vehicle Emissions" webpage

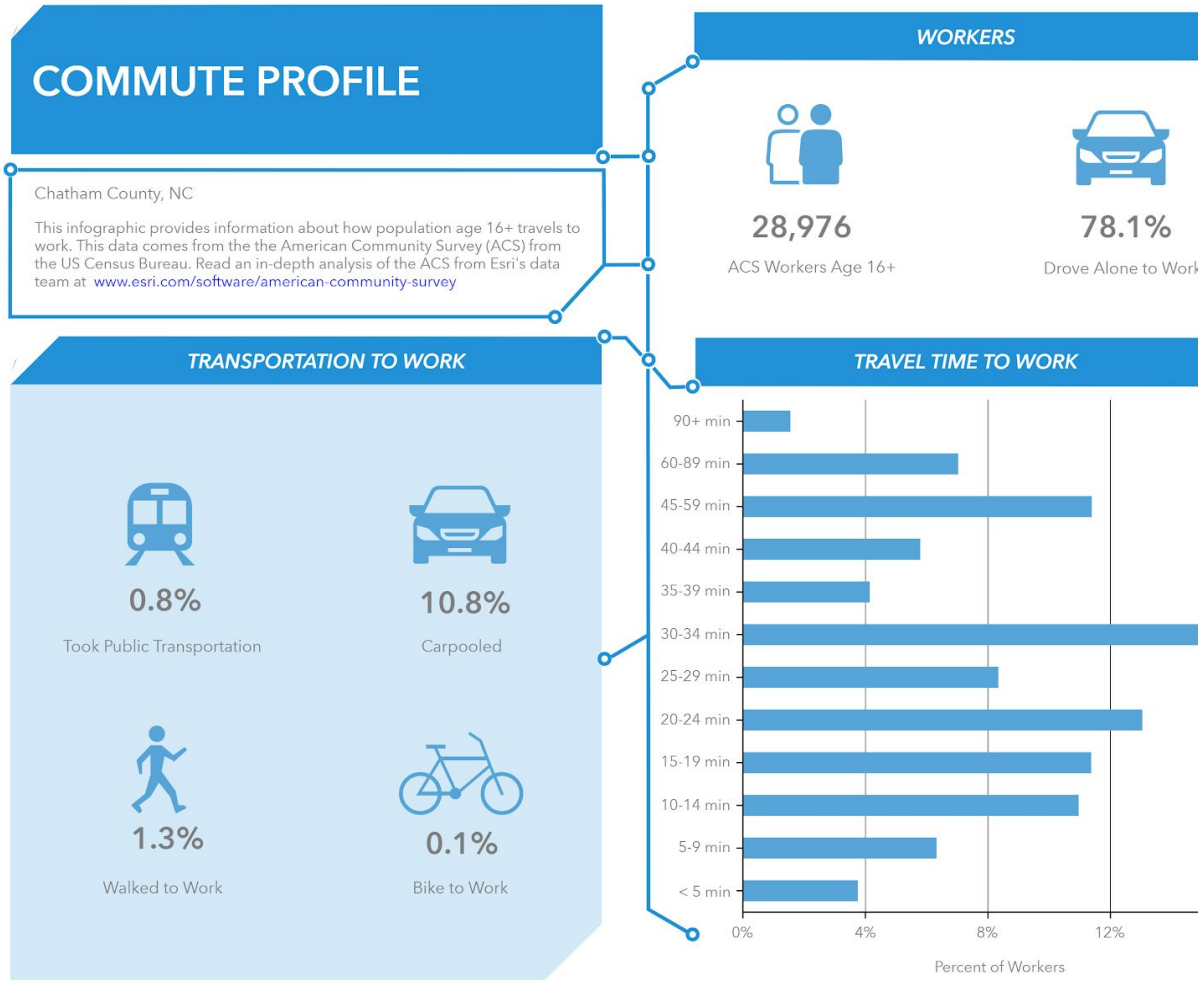

Figure 4e. An infographic we created through ArcGis Business Analyst depicting commute data in Chatham County

Conservation of Water

To increase readability, we suggest defining water efficiency and flow rate under the "Water Efficiency facts" heading (see Figure 4f). For instance, an example explanation is, "Water efficiency is the conservation of water and flow rate is the volume of fluid flowing through an area each second. To enhance water efficiency for fixtures, flow rate standards are created to reduce water consumption."

Water Efficiency facts

a. **Water Sense Products**

b. **Product Search** **Fixture/flow rate in Gallons Per Minute [GPM]**

c. **Shower/2.5 (low flow/1.8)**

d. **Lavatory/2.5 (low flow/1.8) (ultra low flow/0.5)**

e. **Kitchen Sink/2.5 (low flow/1.8)**

f. **Faucets/2.5**

Figure 4f. Water efficiency and flow rate statements

Going Green at Work

Under the "Create and implement a Water Conservation Program," we suggest asking questions like "Looking for ways to incorporate green initiatives in your office?" and then describe how to implement each green initiative within offices (see Figure 4g). For instance, for item v, a company within Chatham County can contact the Chatham County Department of Soil and Water Conservation to present an educational seminar on water conservation to its employees. In addition to the Department of Solid Waste and Recycling, we suggest including the contact for the Department of Soil and Water Conservation contact (see Figure 4h).

Create and implement a Water Conservation Program

i. **Ask maintenance to replace faucets and toilets with low flow fixtures**

ii. **Replace manual flush with automatic flush**

iii. **Install automatic faucets with time delay**

iv. **Use signs or incentives to encourage water conservation**

v. **Setup annual training to educate employees of the benefits of water conservation**

vi. **Replace water-cooled equipment with air-cooled**

Figure 4g. Water Conservation Program initiatives on the "Go Green @ Work" webpage

NEW ADDRESS:

Chatham County Agriculture & Conference Center

Chatham SWCD
1192 US 64 W. Business
Suite 200
Pittsboro, NC 27312

OFFICE HOURS:

7:30 am-5 pm Monday-Thursday; 7:30 am-4:30 pm Friday

PHONE: 919-542-8240

ADMINISTRATOR: Brenda Williams

EMAIL: brenda.williams@chathamnc.org

CALENDAR OF EVENTS AND MEETINGS:

Figure 4h. The contact for the Chatham County Department of Soil and Water Conservation

Addition of a Carbon Footprint Website

We strongly suggest including a resource that Chatham County residents can use to calculate their carbon footprint. The CCCCC expressed interest in including a website that incorporated information about carbon footprint and we recommend using the Carbonfootprint.com website. The website asks questions about how many vehicles an individual owns and their individual consumption units, the approximate amount of miles the individual traveled by plane, train, and bus in the past year, the total amount (in dollars) of electricity, water, natural gas, and heating oil or other fuels an individual used at home in the past year, the individuals home's total square footage, the average daily calorie consumption, and the monthly amount spent on goods and services in the past year (see Figure 4i). Our goals with including the carbon footprint website are to educate residents about the definition of a carbon footprint, explain the importance of reducing carbon footprints, and make residents aware of their contribution to carbon emissions. Additionally, the CCDEQ website compliments the carbon footprint website by providing a list of tips to reduce carbon footprints.

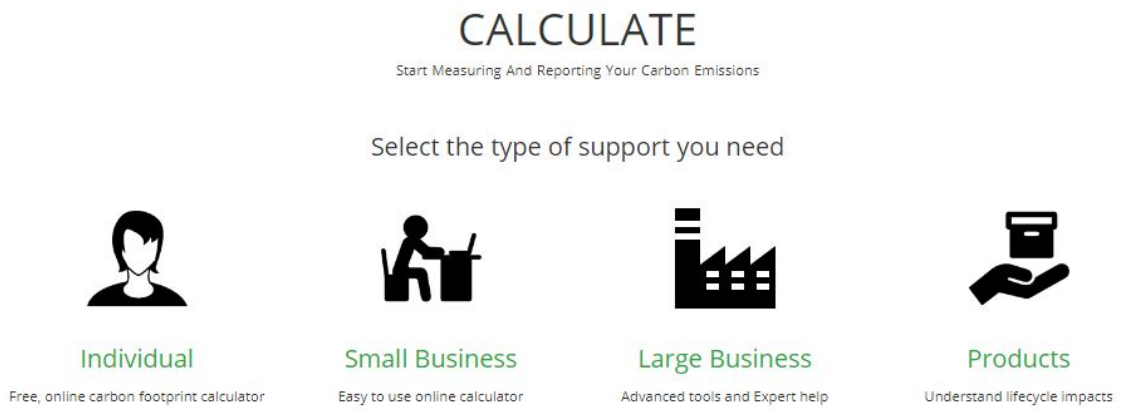

Figure 4i. Options to calculate carbon footprint based on preferences

Citizen Science

We will also provide residents with volunteer opportunities and a means of citizen science to quantify carbon emissions and sequestration within Chatham County community aimed to improve the environment. There are opportunities via the Chatham Connecting website that lists environmental activities like maintaining community gardens and trail maintenance (Chatham Connecting, n.d.). As far as citizen science projects, we have created a flowchart focused on quantifying the current amount of carbon in the sequestration systems in Chatham County. The majority of the project will be centered around providing education so that citizens and students can help generate data to quantify sequestration. The activity will help people explore the differences between their emission and sequestration potential thereby increasing awareness of climate change. The calculation of one's carbon footprint can be a unique methodology to illustrate the growing dependence on energy in society. The total amount of energy used by Americans varies from individual to individual; however, the average annual energy expenditure for people in the United States is still well above the majority of the rest of the world. Frivolous usage and inefficiencies cause unnecessary resource utilization, and often these resources are in the form of carbon, like coal, methane, oil, and natural gas. Ultimately, when resources are used, emissions are created and carbon is transformed. The problem itself is not necessarily caused by gaseous carbon in the form of carbon dioxide, but in the lack of means for sequestration of atmospheric carbon to occur at a rate that keeps up with emissions produced by the burning of fossil fuels.

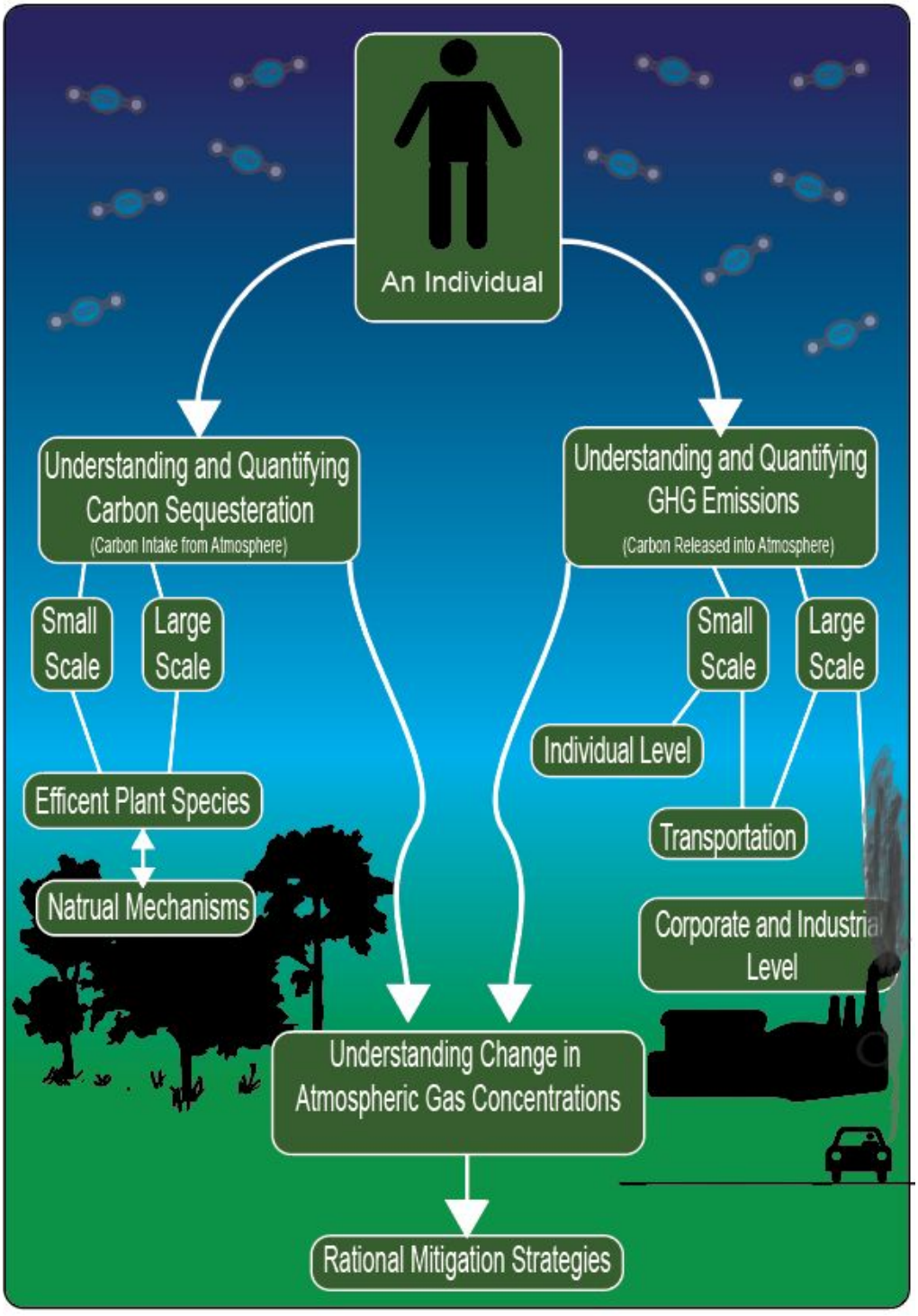

Figure 5a. Flowchart depicting various forms of quantifying carbon sources and sinks

Upon the calculation of an individual's carbon footprint, an individual's carbon mitigations would also need to be calculated. For example, if a person owned land that was sequestering carbon, their emissions could mostly be "paid for" by the land itself naturally

turning carbon into organic matter, plants, and eventually, other biotas. In order to calculate the amount of carbon stored in biota, quantification must be made for the carbon in a specific organism, or in a swath of land. According to Mark Megalos, a member of the Environmental Science faculty at NC State, there are methods for calculating these carbon stores in both individual trees and larger areas. The difference in sequestration rates and land use is also an essential factor to consider when considering what, if any, carbon sequestration methods would be best. A rough estimate can be used to calculate the amount of carbon stored in a tree with the given equations, which are based on averages for trees in the southeast. Upon measuring the diameter of the tree, in centimeters, and calculating the height, in meters, with trigonometry, a student or individual can calculate the green weight (GW) in kilograms, and with the green weight, ultimately estimates of tree dry weight (DW) and the Calculated Carbon Storage (CCS), also measured in kilograms, of a tree can be figured out.

Quantifying Carbon

To begin, measurements of the height, in meters, and diameter, in centimeters, of a tree must be obtained so that they may be inputs of data for the equations. The equations provided account for the difference in units between meters and centimeters, so the incorporation of the data should be simplistic.

(Trees with a diameter smaller than 28 cm) $GW = 0.0577 \times d^2 \times h$

(Trees with a diameter greater than 28 cm) $GW = 0.0346 \times d^2 \times h$

*Input all entries for diameter in cm, and all entries for height in meters. GW, DW, and CSS are all regarding mass and will be measured in Kilograms.

From there, additional calculations are required to estimate the dry weight of the tree. The following equation can obtain the DW:

$DW(kg) = GW(kg) \times 0.5$

This equation illustrates previous experimental findings that show around half of a tree's mass is water. Dry weight is representative of a tree without any moisture, typically dried by an oven. The Calculated Carbon Storage, or CCS, is the amount of carbon in the wood of the tree. In previous experiments, scientists like Megalos have found that around half of a tree's dry weight is composed of Carbon, yielding the equation for CCS:

$CCS = DW \times 0.5$

Upon calculating the carbon storage potential for a tree, or a stand of similar trees, the calculation can be used to approximate several things, including the potential for sequestration of a tract of land, and how many trees it would take to mitigate an individual's emissions. Single tree estimations are excellent ways for quantifying carbon; however, saplings do not sequester carbon on the same levels that older trees do. Different types of land also sequester carbon at different rates.

Land Use Type	Area in State (hectares [ha], in thousands)	Multiply	Carbon Sequestration Rate (tons/ha/yr)	Equals	Amount of Carbon Sequestered (tons/yr)
Southern Pine Forest (Binford et al., 2006)		×	3.80	=	
Mixed Forest (Turner et al., 1995)		×	1.90	=	
Urban Forest (Norwak & Crane, 2002)		×	0.80	=	
Cropland (Morgan et al., 2010)		×	0.10	=	
Rangeland/Grassland (Morgan et al., 2010)		×	0.07	=	

Figure 5b. Different types of land use and the respective amount of carbon that can be sequestered based on calculations of available hectares and sequestration rates

Understanding that the difference between emissions and carbon sequestration ultimately allows quantification of the amount of carbon released by Chatham County residents. In using these quantifications, students and citizens can calculate the difference and find the net change in carbon, determining if they are emitting or sequestering greenhouse gasses. The determination of the net flow of carbon could potentially allow residents to qualify for tax breaks or incentives that can allow Chatham County to benefit ecologically, environmentally and economically.

Conclusion

In reference to the Chatham County Climate Action Plan, we provided suggestions and additions to the CCDEQ's website. We found that the structure and quality of the information found on the website are essential factors in the intake of information by the users of the website. We also provided recommendations for each website topic and strongly suggested adding the Carbonfootprint.com website. In addition to the website, we also put together a logistical method to calculate carbon sequestration based on local biota. This method, when accompanied by emissions estimates, provides quantitative ways for citizens and students to learn about and understand anthropogenic climate change. Social media can also be used positively to get the community to stay healthy and keep the environment clean as well as show what the Chatham County Climate Action Committee has done and will do in the future. We hope this report proves helpful in Chatham County's goal of reaching clean energy and a clean environment.

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