



**SRI VENKATESWARA INTERNSHIP PROGRAM
FOR RESEARCH IN ACADEMICS
(SRI-VIPRA)**



SRI-VIPRA

Project Report of 2023: SVP-2313

“Carbon Literacy: A step closer to LIFE”


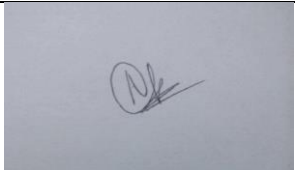

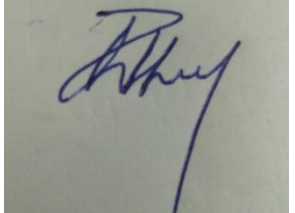

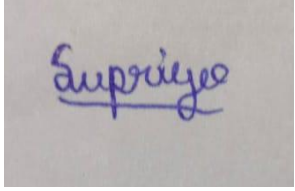
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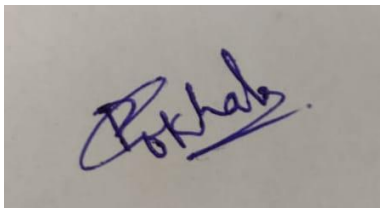
SRIVIPRA PROJECT 2023

Title: Carbon Literacy: A step closer to life

Name of Mentor: Dr. Pooja Gokhale Sinha Name of Department: Botany Designation: Assistant Professor, Department of Botany, Sri Venkateswara College	
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List of students under the SRIVIPRA Project

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Signature of mentor (Dr. Pooja Gokhale Sinha)

Certificate of Originality

This is to certify that the aforementioned students from Sri Venkateswara College have participated in the summer project SVP-2313 titled “Carbon Literacy: A step closer to Life”. The participants have carried out the research project work under my guidance and supervision from 15 June, 2023 to 15th September 2023. The work carried out is original and carried out in an online/offline/hybrid mode.



Signature of mentor (Dr. Pooja Gokhale Sinha)

Acknowledgements

We would like to express our sincere gratitude to our former Principal Prof. C. Sheela Reddy and acting Principal Prof. Chandramani Singh for giving us this opportunity to work under SRI-VIPRA.

We would like to thank our mentor Dr. Pooja Gokhale Sinha for her constant support and guidance throughout the project. Additionally, we would like to extend our appreciation to our colleagues, and friends for their encouragement and understanding during the course of this study.

Lastly, we would like to acknowledge the participants of this study for their time and cooperation, without which this research would not have been possible.

The contributions of the individuals and institutions mentioned above have been invaluable in shaping the outcome of this study.

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Title: Carbon Literacy: One Step Closer to Life

INTRODUCTION:

Climate change is one of the most prevalent threats to modern society. The growing accumulation of greenhouse gases like CO₂ and CH₄ because of human activities is the primary cause of rapid climate change. Historically, the emissions have increased since the Post Industrialization Period in the 1850s. The concentration of CO₂ has reached 413ppm, which is 1.5 times the pre-industrial levels, and the global temperature is roughly 1.1°C above that of the 1850s [State of Global Climate 2021, WMO].

Factors like energy consumption, natural gas consumption, industrialization, and renewable energy contribute to CO₂ emissions. GDP, population size, and household activities also influence carbon emissions. These components have the potential to either raise or lower carbon emissions. (Ahmed et al., 2022) As industrial activity and population growth have increased, there is a need to produce more energy, increasing carbon emissions. Additionally, industrial and household activities depend on power, leading to a rise in energy consumption, resulting in a substantial increase in carbon emissions. (Büchs & Schnepf, 2013) According to some studies, three significant domains contributing to carbon emissions are transport, food, and housing. (Druckman & Jackson, 2016, p. 181) Home energy consumption, like heat and cooling and transportation, are the household activities that produce the most significant CO₂ emissions. Transport releases many greenhouse gases, which exponentially increase carbon emissions. (Büchs & Schnepf, 2013) If emissions continue along a high-emission pathway known as the Representative Concentration Pathway (RCP), which assumes no significant climate policies, global temperature could increase by 2.5 degrees Celsius by the end of the 21st century, and by 2030 alone, the remaining 86% of the carbon budget will be exhausted. [NDC synthesis report 2022].

As climate changes become more prominent, quantifying various activities leading to global warming is gaining traction. This quantification is represented in terms of 'carbon footprint.' (Pandey et al., 2007) Although 'Carbon Footprint' is a popular concept and a widely used term in many domains, its definition still needs to be clarified. While it can be explained in the literature, its exact academic definition still needs to be discovered. (Wiedmann & Minx, 2008, p. 2; Kumar et al., 2014) The central concept behind carbon footprint is to instil a sense of carbon consciousness. It

can be a potential global warming indicator and, used as a quantitative expression of greenhouse gas emissions from an activity, helps in emission management and evaluation of mitigation measures. (Pandey et al., 2007) After quantifying these emissions, we can identify the important sources of emissions as well as the areas where emissions can be reduced.

Table 1, global carbon dioxide emissions over the years [report of World Research Institute]:

1850	198 mt CO ₂
1890	1304 mt CO ₂
1930	3855 mt CO ₂
1970	14531 mt CO ₂
2011	32274 mt CO ₂
2015	35700 mt CO ₂

METHODOLOGY:

To know more extensively about the Awareness of Carbon footprints amongst undergraduates (regardless of field of study), A questionnaire with 32 questions on various topics such as electronics, transportation, general awareness, and so on. Some of the questions were awareness-based and some of the questions were quantitative in nature with the help of which we would be able to obtain concrete data. The Google form was circulated amongst our college groups. The form was made to obtain raw data which would further be compiled to obtain useful information about lifestyle choices and awareness about carbon consciousness. The total number of respondents was 110 and they were predominantly from people belonging to sciences (majorly life sciences) with little participation from commerce and humanities students.

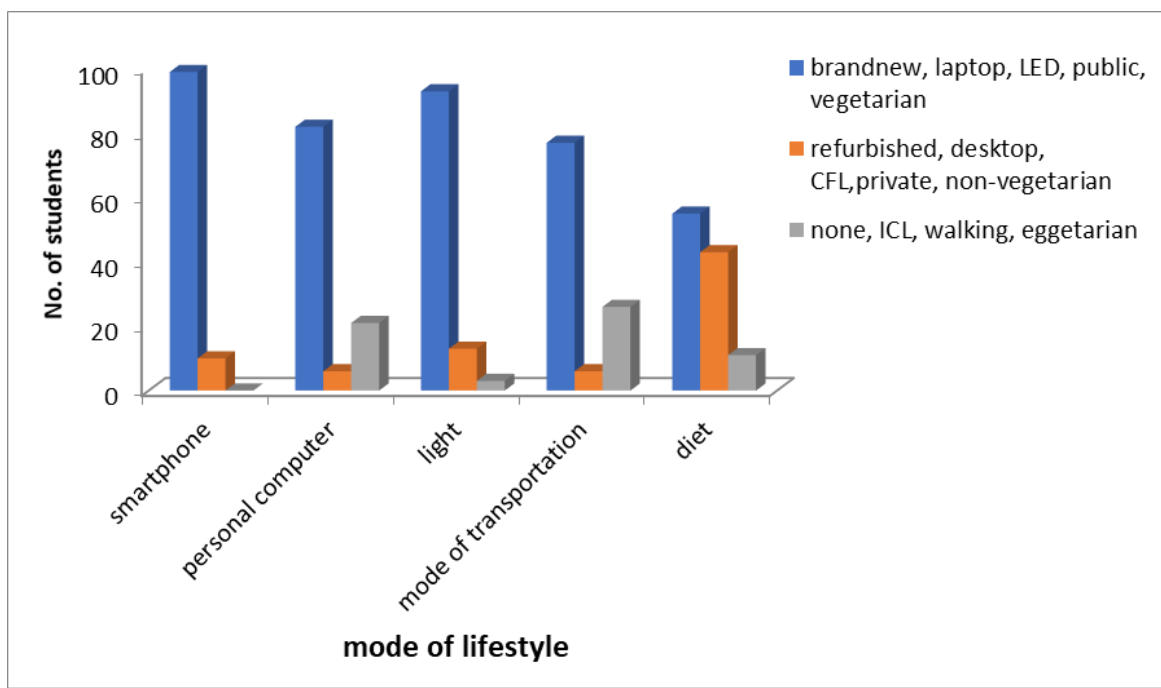
Questionnaire:

<https://docs.google.com/document/d/1ZipQ7BX47UBc1uHd4PMq8gO5rx2XqFnKm9DddtJMoA0/edit?usp=sharing>

RESULTS AND DISCUSSION:

The results of this survey depict that there is satisfactory awareness among the students to reduce their carbon footprints. Although CO₂ emissions still need to be reduced in order to live in a sustainable life. On the basis of the lifestyle of students and awareness among them, results are discussed. Carbon literacy is an important step towards decreasing the emission of greenhouse gases. A carbon footprint survey has been organized to measure individual students' greenhouse gas emissions from various activities like transportation, energy use, diet, and to learn about general awareness among students. Results can help identify areas for reducing emissions and make more sustainable choices. The questions asked in this survey will help raise awareness about carbon footprints among students.

LIFESTYLE OF STUDENT

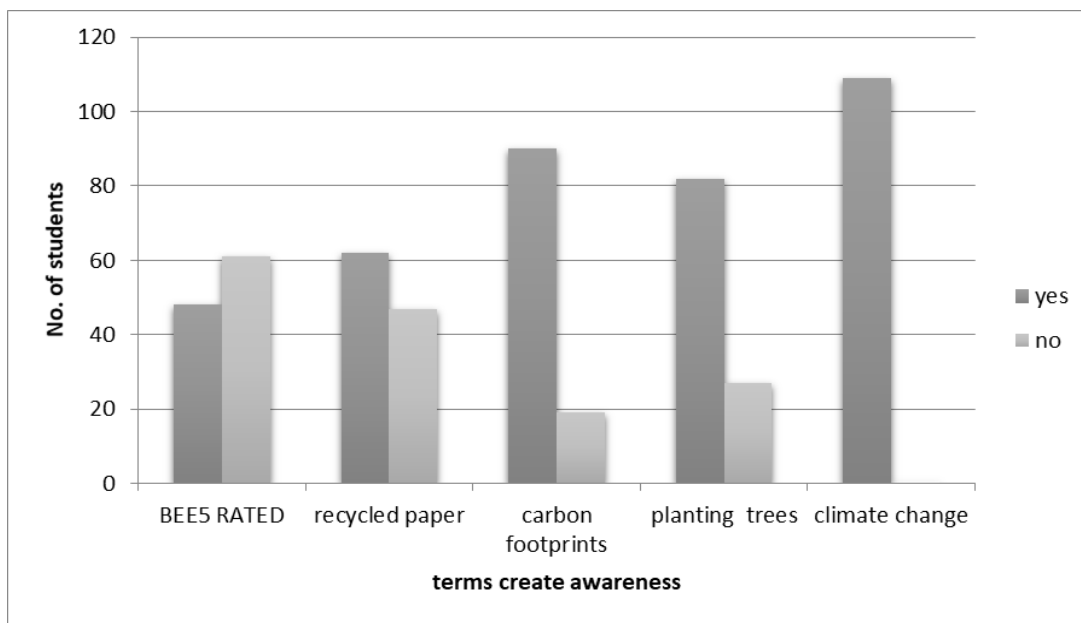


The questions about electronics and electrical appliances help us gather valuable information about the environmental impact of e-waste and identify areas where individuals can reduce their footprints. Device ownership and usage, charging habits, energy efficiency, mode of transport, diet—all these collected data from students helped to know the lifestyle of the students and their carbon footprints.

In today's world, smartphones are very common among students. The above graph represents that 90.8 % of students use brand-new mobile phones, and only 9.2% of

students use refurbished mobile phones, which significantly increases to CO₂ emitted in the production. 60% of students use their smartphones for a maximum of 1-5 hours, and 40% of students use their smartphones for 6-12hrs. As per the data, most students use their smartphones for 4-5 hours. Personal computer: 75.2% of students have a laptop. 5.5% of students have a desktop, and only 19.3% of students don't have a laptop or desktop indicating high amounts of e-waste. Energy conservation is the basic step that can be taken by switching off the appliances when not in use, using LED or CFL lights, using public transport, etc. According to the results of the survey, 85.3% of students use LED lights, 11.9% use CFL lights, and only 2.8% use ICL lamps. 84.4% of students switch off appliances when not in use and hence help in energy conservation. 94.5% of students use public transport, mainly the metro, and some students walk to commute to college. As a result, the carbon footprint is less.

Being vegan or vegetarian is beneficial for the environment. 49.5% of students were vegetarians and 39.4% were non-vegetarians in the survey results, which means there is almost a balance between vegetarians and non-vegetarians.



AWARENESS

The above graph shows that 56% of students were aware of BEE 5-rated appliances and 44% did not know about this. 82% of students were aware of carbon footprints, and almost all the students were aware of climate change. 80% of students recycle papers, books, etc., which helps decrease deforestation. 80% of the students planted only 0-3 trees in a month, and 13% of students planted 3-6 trees.

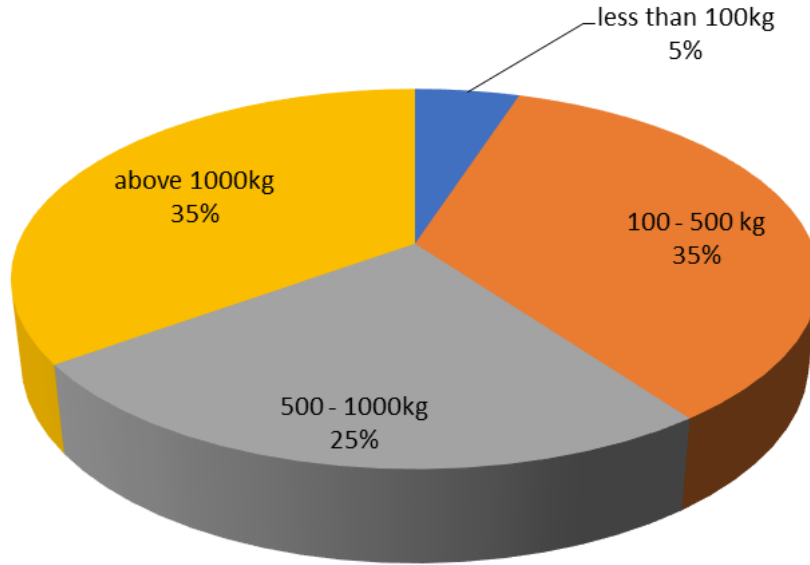
The above results depict that a good fraction of students are aware about the effects and importance of reducing carbon emissions. Information about the significant impact that planting trees can make in combating these issues needs to be provided to the participants.

CO₂ EMISSION

Maximum emission by smartphone was 0.432 kg of CO₂, while minimum emission was zero kg of CO₂. Maximum students emit CO₂ in the range of 0.122–0.99 kg. Because of their laptops, about 66% of students emit CO₂ between 0 and 10 kg, and the remaining students emit CO₂ above 10 kg. On average, 24% of the students emit 0–10 kg of CO₂, 42% emit CO₂ between 11 kg and 20 kg, 31% emit 21–100 kg of carbon by using LED or CFL, and 3% emit above 200 kg because of the use of ICL. Maximum CO₂ emissions from AC were 500–1000 kg, while emissions due to fan were 200–300 kg. The majority of students do not watch television. 100–130 kg of CO₂ was emitted because of the use of private vehicles.

Almost all students recycle their books and papers, which reduces CO₂ emissions. Approximately 35% of students' total carbon emissions were between 100 and 500 kg; 25% of students emit total CO₂ between 500 and 1000 kg; another 35% of students' total emissions are above 1000 kg; and only 5% of students emit total CO₂ less than 100 kg. The below pie chart will provide a brief view of carbon emissions on campus.

Emission of CO2



CONCLUSION:

The main findings of the Results obtained from the questionnaire are as follows

1-Electronics We were able to determine that 70 % of the respondents know what refurbished electronics are. While this is a good sign of carbon consciousness amongst people, we were also able to know that whilst 70% of the respondents knew about refurbished electronics only 9% of the total respondents have a refurbished mobile phone, the rest of them have brand new mobile phones. This data is very significant because the process of manufacturing a mobile phone is in the process of production. If we have more people buying refurbished mobile phones, we could have much lower carbon footprints per individual which in turn would help us move towards a greener future.

2-Transportation From the data we obtained we were able to determine that most of the people use public transport, which is a good sign, more than half of the people use metro and DTC buses as their mode of public transport. Metro's are generally more carbon efficient as compared to buses.

3-Recycling We were able to find out that 10% of people don't hand over their old textbooks to juniors, 20% don't recycle their old textbooks, and 42% of the respondents don't use recycled paper. This is a green flag, and it indicates that most of the populace hold generally favorable attitudes towards the environment.

4-General Awareness From the data we were able to conclude that most people have decent general awareness, we can attribute this to the increasing awareness of climate change. We are constantly alarmed by the catastrophes of climate change on a regular basis, so it is only natural that undergraduate students have satisfactory levels of general awareness regarding climate change and carbon footprints.

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