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A Study of Carbon Footprints and its Impact on the Environment

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Abstract

Man is a researcher as well as a discoverer. Each time human being develops a new technology leading to addition of new dimensions in the comfort of mankind. But each new discovery and innovation side by side brings some ill effects on our environment. Today manmade activities are responsible for increasing the carbon footprints. Due to the shift of our society from primitive agrarian economies to large-scale production based economies. Emission of Carbon-Di-Oxide, Methane, Nitrous-oxides and other fluorinated Gases increased at a fast pace. These gases trap heat and are responsible for the global warming. Global warming leads to climate change and again which is responsible for the increase in carbon footprints. Both direct and indirect human activities are responsible for the increase in greenhouse gases in the atmosphere. Some activities like respiration, production and consumption of food and electricity are our necessities but use of air conditioners at low temperature and unmindful use of other luxurious gadgets and technology are our greed which are a major source of producing carbon foot prints. Human-beings must learn to live in harmony with their environment and should minimise their greed to conserve natural resources and maintain ecological balance so that all forms of life can sustain for a longer period of time on this mother earth.

Keywords: *Carbon footprints, Greenhouse gases, Global warming and activities, Environment*

INTRODUCTION

Carbon footprint as the name reflects is the projection of human activities on the environment. It is always expressed in terms of metric tonnes of Carbon dioxide equivalent. In today's scenario climate, change is not an act of God (Primary factor) but it also depends how humankind shapes the technology. Their constant greed in the direction of comfort zone is increasing day by day. Our humankind activities put the environment near to the plastic range and if we don't pay bit attention to the upliftment of environment then after few years it will reach near to breakdown region. Today man made activities put direct control on the nature. Human beings are disturbing the ecological balance by the emission of

greenhouse gases. These gases are responsible for the global warming and hence climate change. Calculation of carbon footprint is highly complicated. Lack of information does not cover all stages of the product lifestyle. It gives instantaneous calculation of carbon footprint without further improvement. Today we are calculating carbon footprints by just GHG emission and neglecting forest and water parameters, which are also key factors responsible for the carbon footprints. Anthropogenic CO_2, which includes man, made activities, transportation, and industrial Chemical production and agriculture products are mainly responsible for the global warming. The carbon footprints include global, national, state, city, organisation and individual contribution. This research paper covers sources of carbon footprints and gases, which are responsible for this effect. What are the people perceptions in this field and what are the keynote steps taken by them to save our mother earth from our dies.

REVIEW OF LITERATURE

According to Wencong, Yanpeng, Meirong, Qian and Meng Life cycle analysis is a useful process for examining carbon footprints of products[1]. UPM stresses on the action, which can reduce carbon footprints and raises the environmental performance[2]. Cepi gave 'Ten Toes' frame work to calculate carbon foot prints of paper used[3]. Food system is also main absorption of energy and therefore food system is one of the main factor responsible for Green House Gases (GHG) emission. Carbon footprint is a measure of Carbon di oxide[4]. According to Weidema, Thrane, Christensen & jannick today our environmental policy agenda is Global warming and reductions of carbon emissions. They stated that for Life Cycle Assessment (LCA) ISO standards and for Greenhouse gases ISO-14040/44, 14025 & 14064 standards are milestone[5]. Richard Heede presented a quantitative analysis of the historic fossil fuel and cement production[6]. Cordero, P. (2013), explained how a sustainable supply chain management, methodologies for calculating carbon footprint are recommended not only to reduce GHG emissions but also to optimize it in a cost-effective manner[7]. In united states, Residential energy contributes 20% towards Green House Gases. As compared to developing countries Americans have per captia 25% higher carbon foot-prints[8]. Reduction in home fuel usage, less spacious home and dense pattern system (Flat system) certainly help to reduce the carbon footprints. In higher education, "Sustainability concept on campus is known as green campus". One of the component on which green campus stands is calculation of carbon foot-prints[9]. In today scenario, carbon footprint is one of the barriers in the socio-economy development of a country[10]. According to Gao, T. et.al (2013), Copenhagen Agreement in 2009. Bali Road Map in 2007, the Kyoto Protocol in 1997 and United Nation Framework Convention on Climate Change in 1992 are some international convention on climate change were signed by various governments and these conventions were milestones in the direction of reducing carbon foot-prints[11].According to Lee, J & Kanemoto, K, (2021), Carbon footprint is affected by variation in economic, cultural and demographic factors[12]. Radu et al, (2013) mentioned in their research article is that main element of carbon foot-prints is Co_2 and source of CO_2 is mainly Fossil fuels (Oil and Coal)[13].

METHODLOGY

Preparation of Questionnaire: A questionnaire was prepared to know the perception of people of all ages, cast and creed about carbon footprints. This survey was done on the blended mode as access of internet facilities are beyond the reach of some remote rural areas. Basis of this survey, results were finalized and shown by simple statistical methods like percentage and simple bar diagram. These results are totally based on the perception of people and not based on the real facts.

OBJECTIVES OF THE STUDY

1. To know about the awareness of people about carbon footprints.
2. To develop a list of human activities responsible for the rise of carbon footprints.
3. To classify the greenhouse gases responsible for the carbon footprints.
4. To highlight the impact of carbon foot prints on the environment.

5. To suggest long term and short-term policies and programmes to overcome carbon foot prints problems.

RESULTS

Human activities which are responsible for direct carbon footprint are

- Burning of fossil fuels-that is natural gas, diesel, kerosene, coal etc.
- Transportation-Vehicular Emission, air-travel, vehicular manufacturing etc.
- Food items- Diary product, fruits and vegetables, meat etc.
- Electricity generation- air-conditioner, Blower, refrigerator other electrical appliances.
- Construction work-mining, manufacturing goods, paints

Human activities that are responsible for indirect carbon footprint are

- Deforestation, Agriculture
- Climate change
- Communication (Cellular Phones) & Technology
- Nuclear waste & Space waste

Table 1 represents overall life cycle of total emission of carbon footprints by renewable and non-renewable sources

When we talk about the life cycle of renewable and non-renewable energy resources then its life cycle includes following steps. Total greenhouse gases emission is sum of emission of gases during these activities.

Table 1: Overall life cycle of total emission of carbon footprints by renewable and non-renewable sources

Types of Sources	
Renewable Sources	**Non-Renewable Sources**
Production of raw material Manufacturing Consumption and use Recycling Reuse disposal	Production of raw material Manufacturing Consumption and use disposal

Transport activities, industrial activities and vegetation help to analyse carbon dioxide emission of a country. Carbon footprint audit in an institution acts as an evidence of success because it means that institution has a particular vision of environmental sustainability. Green houses gases are the mainly carbon containing gases. In GHG main part is Carbon-di-oxide. Methane, Nitrous oxide, Fluorinated gases are also present in small amount.

Table 2: Green House gases and their sources

S. No.	GHG	Sources
1	Carbon-di-oxide	Human activities like respiration, burning of fossil
2	Methane	Coal, oil and natural gases
3	Nitrous Oxide	Power plants operated on the coal, industrial activities
4	Fluorinated Gases	Refrigerator, aerosol and retardants

From the blended mode survey among the people, their views are collected.

Table 3: Represents People familiar about the term carbon footprints

Carbon footprint	YES	NO
Result	67.4%	32.6%

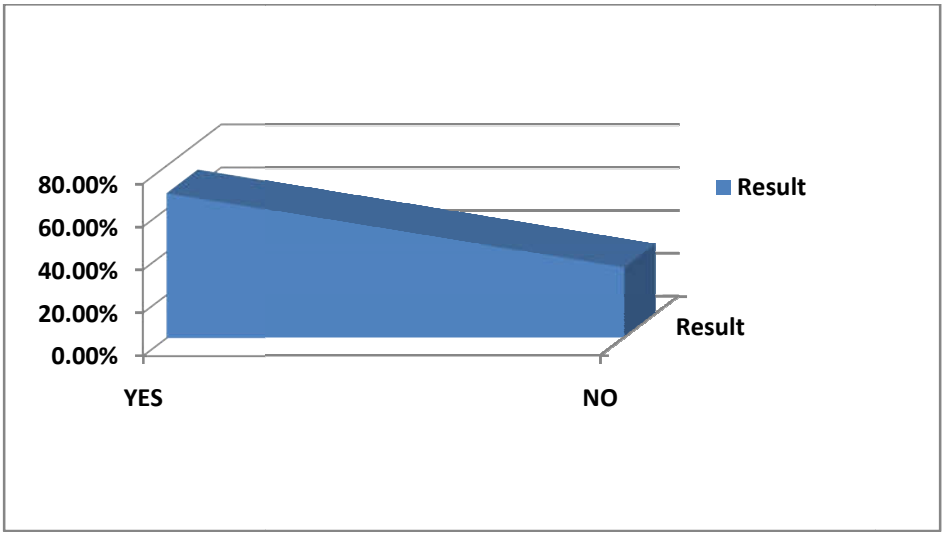

Figure 1: Represents People familiar about the term carbon footprints

This result was surprising and forced us to plan a strategy so that a training should be first given to educated people so that they can understand the meaning of carbon foot prints.32.64% people don't know the meaning of carbon foot prints. It is the fact that we human being crossed the threshold of pollution by our activities but don't have any regret that we are navigating our submarine in wrong direction. We are enjoying our rights up to saturation levels but don't fulfilling our duties even to minimum values. This is the first and active criterion of our life that we should aware of our duties. Each time we are very aware of calculating our economic gain or loss throughout the life but don't pay bit attention in calculating emission of harmful gases.

Table 4: Green House Gases (According to People Perception)

S. No	**Name of gas**	**Percentage**
1	Carbon-di -oxide	100
2	Methane	94
3	CFC	78.4
4	Fluorinated Carbon	64.4
5	Oxide of Sulphur	36.98
6	Oxide of Nitrogen	36.8

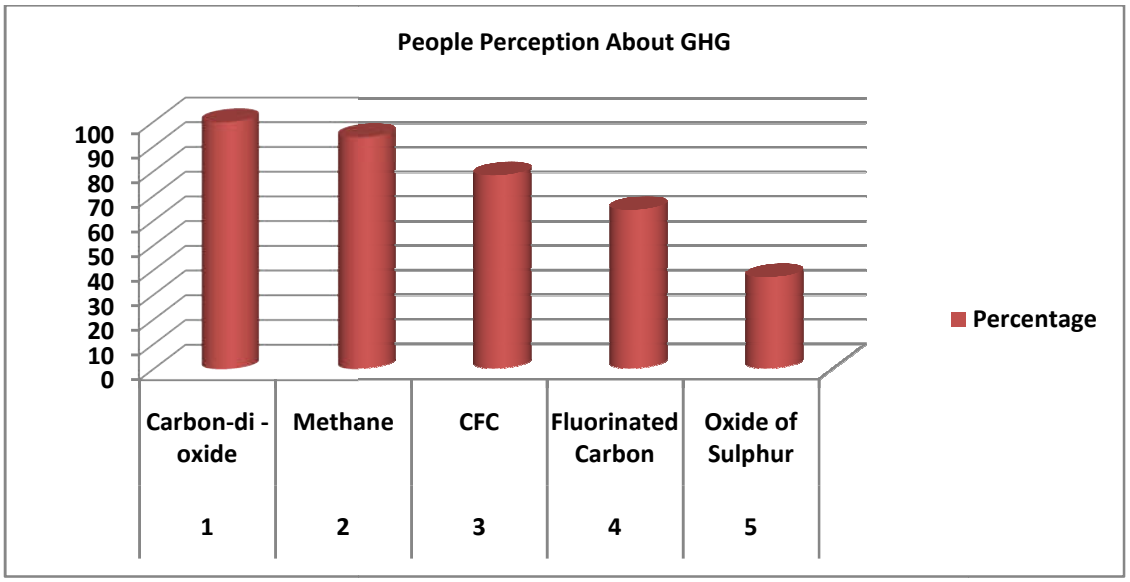

Figure 1: Green House Gases (According to People Perception)

Table 4 represents that most of the persons have knowledge about the GHG. According to people perception, Carbon-di-oxide is the only gas, which is highly responsible for disturbing ecological balance. CFC and Methane is also responsible for this. Few people have also an idea that oxide of nitrogen and sulphur products are contributing their part. Now it is not the time for giving suggestions and recommendation to one another but a time to take volunteer action to cure the ecological turbulence not created by natural disaster but results of our luxurious life.

Table 5: Represents initiative taken by the people to reduce GHG

S. No	Activities	Percentage
1	Use of renewable energy sources	76
2	Vehicles pooling& Public Transport	57.18
3	Reduction of meat	18
4	Cycling and Walking for short distances	24
5	Optimum use of AC	74
6	Switching of electrical appliances when are not in use	98

Table 5 From the peoples' perception it was observed that although many people are not aware about the term carbon footprint but they are aware about this fact our blanket of air, water resources and our land all are polluted by us and now it's time to revive their planet not by their future plans but its revival much depends on our present actions. Most of the people are willing to use renewable energy sources, more than 50% are thinking that using Vehicles pooling & Public Transport can also help our environment to reduce carbon footprints. 18% have opinion that by cutting meat in our meal and cycling, walking can further help in this direction. Optimum use of AC and Switching of electrical appliances when are not in use can also help us a bit to reduce GHG.

RECOMONDATION AND SUGESTIONS

For reducing percentage of carbon footprints and for making ecological balance according to people's perception mankind should follows these suggestions

- Using renewable energy sources like solar cell, biogas, vermicomposting, and vehicles based on the battery.
- Believe in 5R-reduce, recycle, refuse, rot and reuse in action not in words.
- Reduce intake of meat and dairy products as they are major source of greenhouse gases
- Increase grains, beans, fruits and vegetables in your diet.
- Use seasonal and local foods.
- Opening a thrift sale in the college campus once a month so all of us can sale and buy second hand cloth and this much reduce our fast consumption due to fashion technology. Use clothes bag in shopping.
- Use LED in place of CFL bulbs, unplug electrical appliances when they are not in use, while leaving the room switch off lights.
- Avoid long drive and use public transportation, shared pooling to your destination.
- Fly less, drive less and walk more.
- Plant shrubs and trees around your house.
- Regular servicing your vehicles.
- Avoid use of packed food, milk and pouches as they are one of the major contributors in GHG.

CONCLUSION

There should be resonance between amount of CO_2 produced by industries and current carbon dioxide demand by carbon capture and utilization. While calculating carbon footprints entire life cycle of material should be taken into account from the extraction of raw material to the final disposal and its impact on the environment by the emission of harmful gases at each stage. Our long term and short-term vision should be such that we have to design our machinery of work in such a way that that there must be reduction of GHG from the environment. Our current technology should have such potential that there is minimum dependence on fossil carbon. There is large-scale difference between the carbon footprints of a person below poverty line to a high-class expenditure person. Carbon footprint calculation for local to global level is a parameter for the assessment tool for greenhouse gases. By conserving and adopting long-term vision to save our forest will certainly increase the carbon storage and hence reduces the emission of greenhouse gases. Heavy reliability and dependence on application of technology may have adverse impact on the environment. Besides conservation and augmentation of green cover, the only way to reduce carbon footprints is to change our lifestyles from global to local.

REFERENCES

1. Yue, W., Cai, Y., Su, M., Tan, q. & Xu, Meng. (2017). Carbon Footprint of Copying Paper: Considering Temporary Carbon Storage Based on Life Cycle Analysis, *Science DirectEnergyProcedia,* 105, 3752-3757.
2. Upmpaper.com/sustainability
3. Cepi-Confederation of European Paper, Framework for Carbon Footprints for paper and board product.
4. Wiedmann, T. & Minx, J. (2007). A definition of Carbon footprint [J], *ISA Res,7*, 1-7.
5. Wiedema, B.P, Thrane, M, Christensen, P. & Schimidt, J. (2008). Carbon Footprint-A Catalyst for Life Cycle Assesment, *Journal of Industrial Ecology, 12*(1), 3-6.
6. Heede, R. (2014). Tracing anthropogenic carbon dioxide and methane emissions to fossil fuel and cement producers, 1854-2010, *climate change, 122*, 229-241.
7. Cordero, P. (2013). Carbon footprint estimation for a sustainable improvement of supply chains: state of the art, *Journal of Industrial Engineering and Management*, *6*(3), 805-813.
8. Goldstein, B., Gounaridis, D., & Newell, J. P. (2020). The carbon footprint of household energy use in the United States. *Proceedings of the National Academy of Sciences, 117*(32), 19122-19130.
9. Zhao, W. & Zou, Y (2015), Green university initiatives in China: a case of Tsinghua University Int. J. Sustain. *High. Educ. 16*(4), 491–506.
10. Ghosh, P., Jha, A., & Sharma, R. R. K. (2020). Managing carbon footprint for a sustainable supply chain: a systematic literature review. *Modern Supply Chain Research and Applications*.

11. Gao, T., Liu, Q. & Wang, J. (2014), A Comparative Study of Carbon Footprint and Assessment Standards, *International Journal of Low Carbon Technologies*, *9*,237-243.

12. Lee, J., Taherzadeh, O., & Kanemoto, K. (2021). The scale and drivers of carbon footprints in households, cities and regions across India. *Global Environmental Change, 66*, 102205.

13. Radu, A. L., Scrieciu, M. A., & Caracota, D. M. (2013). Carbon footprint analysis: Towards a projects evaluation model for promoting sustainable development. *Procedia Economics and Finance, 6*, 353-363.

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