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Quantification of Carbon Footprint and Handprint in the College Campus: A Peek into the Future

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ABSTRACT: Towards the end of the last century, environmentalists, geologists, ecologists, scholars realised the grave ill effects of prolonged exploitation of nature and natural resources, caused due to rapid and unplanned industrialisation coupled with continuous bursts of population explosion. The need to provide for burgeoning population, fundamentals of economics, "Profit only" motive of the early entrepreneurs and the gross indifference of government policy makers, pushed environment to the back seat. The repercussions of all these socio-economic activities were never paid attention to, until they became evident in form of rising global temperature, vanishing species, fast melting ice caps and, thrown out of balance ecosystems.

KEYWORDS: Population, Environment, Exploitation, Profit

I. INTRODUCTION

The prospective threat which loomed over mankind was enough to shake the government and its policy as well as strategy makers, out of the slumber. Nations all across the globe stood up and took notice of the fallacy in the means and ways adopted for development. A strong need was felt for assuring a conflict free future and implementing measures to put a check to, the deterioration of human environment and natural resources. One of the outcomes of a persistent search to cater to the above mentioned need was, UN's "Brundtland Commission" formed in 1987. The commission's "Our common future" report which emphasised on "Sustainable Development", became a founding stone for future endeavours.

II. RELATED WORK

Sustainable Development has also been chosen as one of the aspects of Sustainable Development Goals(SDG) which succeeded the erstwhile MDG(Millennium Development Goals).In simpler terms;(Roseland 2000, Kosoy and Corbera 2010). the importance of having a minimal carbon footprint was highlighted in the 1992,Kyoto protocol, wherein it was agreed by all the Nations, party to the protocol (presently 192 countries) to control the emissions of anthropogenic (i.e., human-emitted) greenhouse gases (GHGs).

Our very own country, India, in the year 2015, had submitted an action plan to the UNFCCC (United Nation Framework Convention on Climate Change) outlining the measures it would take to counter the growing menace of global climate change, triggered due to the adverse and unsustainable practices and activities. India also voiced that it

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will work towards lowering the greenhouse gas emissions by 2030 to levels which are one third of those amounts, measured in 2005. Apart from this India has also submitted that it intends to produce roughly 40 percent of its total electricity in 2030 from “non-fossil fuel based/renewable/ inexhaustible resources”.

It is very seldom we realise that many of our harmless, innocuous actions like using our vehicles for commuting, buying new products off the shelves, various processes involved in the manufacturing of goods, even generating large amounts of biodegradable wastes, are in fact resulting in environmental degradation. Carbon footprint can be understood as “a measure of the exclusive total amount of carbon dioxide emissions that is directly and indirectly caused by an activity or is accumulated over the life stages of a product”, (Wright, Kemp et al. 2011) the scope of it has been widened to include other greenhouse gases like methane, carbon monoxide etc.

III. RATIONALE OF THE PROJECT

Inspired by the slew of measures and commitments put forth by our country and other developed nations across the world, a team of Professors along with their enthused students from Daulat Ram College, University of Delhi, took it upon themselves to bring about certain changes in the ways certain activities are carried out in their college campus in order to reduce the Carbon Footprint of a college as a unit. The project, “*Campus Sustainability Index: Analysing the Carbon Footprint and Handprint in the College Campus*” is aimed at streamlining certain key processes within the premises. The college, in a manner emulates a small city and undertaking a project there will not only give hands on experience to the students but serve as an opportunity to develop a model, environment friendly ecosystem which is focussed on mitigating Carbon Footprint via Carbon Handprint. Carbon handprint includes multifarious activities which help in attenuating the negative effects of carbon footprint.

The innovative project seeks to adopt a multifaceted approach to disseminate knowledge about the importance of Environmental protection and sensitise students to the cataclysmic effects of Carbon Footprint. The underlying idea is to ensure that your carbon handprint is much bigger in size and more effective than your carbon footprint.

The team went through an exhaustive literature review, many case studies from across different universities like University of Colorado, University of Michigan and University of Brown, were referred, to formulate best practices which are in tandem with the global benchmarks, the aim here, being to identify the crucial areas (activities, processes etc) which can be made carbon neutral by devising and employing efficacious design principles and in some cases altering the number of steps involved in a particular process. The steps finally chosen were put to pre feasibility test to suit local conditions.

One of the fundamental goals of the project is to quantify their objectives by developing a sustainability index, this index will help in comparing and analysing the outcomes and corroborating the results, moreover clothing the intermediate and final goals in numerical sense would enable in effective comprehension of outcomes. Quantification of goals would help in etching out key performance indicators, which in turn would function as the feedback system and determine the progress of the said project.

There are a number of initiatives that have been weaved in the plan such as encouraging the use of cycles in the campus, declaring one day of the working week as “Car free day”, utilising energy efficient and environment friendly technology while renovating or retrofitting in the existent infrastructure. The project also relies on bolstering solar power capacity (Installation of solar panels) and rain water harvesting potential of the college premises. Apart from this, the group of experts have come forward with ingenious and out of the box solution to a variety of problems like excessive dry and liquid waste generation.

IV. OBJECTIVE AND BRIEF METHODOLOGY

The objectives of this project have been carved out with a vision of making the campus more sustainable and eco-friendly. It aims to put in place a system that can gauge, appraise and compute the carbon footprint and the level of sustainability achieved. Statistical tools and tests like principal component analysis are incorporated for real time systematic review of the predefined, key performance indicators. The empirical approach will be extensively used to formulate a “campus sustainability index” which would be tested for ruling out erroneous results and consequently built

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into a tool which can work on multiple platforms for colleges, pan India. This tool will make the process of calculating the carbon footprint for an entity more systematic and easily comprehensible. The group of experts would resort to exploiting the fundamental and widely accepted software apparatus of econometrics and statistics such as E-views and SPSS. All the measures and peculiar solutions for nullifying, negating and neutralising the effect of carbon footprint by increasing the size and potency of carbon handprint, would be scrutinized on the pedestal of factual, verifiable and pragmatic tests in order to examine their efficacy.

Even a bird's eye view of the endeavour can impart the realisation of the fact that there are many takeaways from this novel idea. The carbon footprint is measured in unit metric tonnes per annum (MTA) of carbon equivalent released either per unit area or per capita. It is the "total GHG emissions caused directly and indirectly by an individual, organisation, event or product, and it is expressed as a carbon dioxide equivalent (CO₂e)" (Pandey, Agrawal et al. 2011). Carbon dioxide equivalent (CO₂e) is a unit of measurement permitting different greenhouse gases to be compared to one unit of CO₂. Keeping track of the GHG generated helps in devising ways to either mitigate its effect or to adapt practices which take an alternative route to rule out future emissions.

V. UNIQUENESS OF THE PROJECT

All the participants involved with this project are leaving no stones unturned to ensure projects success consequently the concept of sustainable development can be implemented on a larger scale, in the University and even cities. This would fall in line with the latent intention behind environmental conservation i.e., to leave the same resources for our generations to come as we received from our ancestors.

Carbon footprint and carbon handprint is a game where the desirable target is net neutrality, if we can somehow manage to bring ourselves in the positive it means we are giving back more than what we are taking from the environment. The later situation epitomises sustainable development. However pragmatically, alleviating the effect of ever increasing GHGs in the atmosphere is the prime concern of the current project. Adopting approaches, such as the 4 Rs (Reduce, Reuse, Recycle and Recover) of waste management, in the college premises, where a lot of waste is generated can aid in developing a model which can be benchmarked and emulated across other colleges in India.

Solutions like "Lug a Mug" program where an individual would get a discount on a refill of the beverage if they use the same cup/mug instead of discarding it are feasible and can be easily implemented in different places. This would greatly reduce the number of plastic/thermocool (polystyrene/paper cups) being used per day. Work is also underway to replace all plastic cutlery with "edible cutlery" which can be easily eaten after serving the purpose.

VI. CONCLUSION

These are some of the many peculiar solutions that are already being tested in real life situations. Carbon footprint poses a very real and imminent threat to not just any one country/s but to the whole planet and mankind. Melting ice caps have resulted in rising sea levels, which threatens the existence of many low-lying countries and island nation/s (Thompson 2010). The irregularity in seasonal variations over a very short period of time is evident of the threat looming over us. Rising global temperatures alter and affect the cropping pattern and impart uncertainty to rainfall patterns (Parry, Rosenzweig et al. 2004, Aydinalp and Cresser 2008), sometimes even reversing the trend over a wide geographical region, causing huge losses to the farmers, consequently affecting the food reserves of the government.

This is an issue which requires concerted and coordinated effort from everyone hailing from different walks of life to counter this menace, created by us. It is truly said that what goes around, comes around. The need of the hour is to take proactive steps to save our environment because our own existence is linked to it.

"Nature protects if it is protected".



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