



Carbon Footprint Analysis: Assessment Tool for Awareness for Carbon Fixation.

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Abstract:

Climate change and global warming are the foremost environmental challenges facing the world today. Anthropogenic activities liberates dominant green house CO₂ gas into atmosphere. It is responsibility of every individual to minimize the emission of green house gases because green house gas reduction has become a most important concept in the global contest due to different footprint values from place to place. In the present study an attempt has been made to assess the carbon footprint of Dwarka Nagar which is residential and semi urban area of Malkapur, District Buldhana, Maharashtra, India. The carbon footprint analysis is done on the basis of collective consumption of fossil fuel, LPG and residents in the study system. Assessment results showed that there is need of suggesting suitable measure for awareness and the reduction of carbon emission.

Keywords:

Global warming, Carbon footprint, Carbon fixation, zero carbon emission.

Introduction:

In our society existing tools are insufficient in their ability for environmental awareness and also to reach the general public to create awareness among residents in colonies. Among the number of environmental challenges the global warming and climate change are the foremost facing the world today. In the list of green house gases particularly CO₂ gas is responsible for keeping our planet warm and thus suntanning life on the earth. If these green house gases are very less or totally absent in the earth's atmosphere, then average temperature on earth would have been at sub zero level. When concentration of green house gases is increases, it may trap too much of heat, which may threaten the existence of life on the earth.

Some green hose gases which include water vapour, CO₂, NO, CH₄ and O₃ occur naturally but CO₂ also emits due to anthropogenic activities. The NASA scientist concluded that earth has been warming at the remarkably high rate per decade (0.2 Degree Celsius approximately) for the past 30 years, this evidence shows that population is very close to danger level of human made pollution. In recent decades human

contributes more to green house gases and contributes significantly to the climate change. The study also confirm that CO₂ level have been risen 200 times faster over the last 50 years¹. Due to the global warming melting of polar ice cap, dry areas are becoming drier, humid areas suffering more intense tropical storms, drastic drops in food production thus green house effect cannot be underestimated. The photosynthetic activity in green plants increases with increase in CO₂ level in atmosphere. The Concentration of CO₂ has been continuously increasing because of deforestation, industrialization, consumption of fossil fuel and other anthropogenic activities but the forest acts as reservoir of fixed and readily oxidisable carbon in the form of vegetation, wood and humus hence forest maintains a balance in the atmospheric CO₂ level. In colonies construction of residential buildings without checking their need and reliability can be done, no plantation in the open space, no proper maintenance of sewage water of drainage channel, no recycling of drainage channel water, more use of vehicles which burns fossil fuel, no use of wind power/ solar systems for electricity these are the major sources of activities to increase carbon footprint values or may be due to other anthropogenic activities.

Carbon foot print is measure of impacts of human activities on the environment in the form of amount of green house gases produced. The total green house gasses emission due to various anthropogenic activities from particular regions are expressed in terms of CO₂ equivalents which indicates carbon foot prints of that region². The research shows that construction material have more influence nearly 90-95% in carbon footprint than that of machinery (5-10%) used to prepare material³.

Wind power is good source for the production of electricity by replacing electricity that would have been generated burning fossil fuels, it offsets CO₂ that otherwise would have been produce because it can not produce CO₂ while in operation. It has carbon footprint values if it can be calculated by adding CO₂ produced in its maintenance, production and disposal⁴.

Carbon foot print is a measure of total amount of CO₂ emission that is directly and indirectly caused by an activity and it is a quantitative expression for green house gases emission from anthropogenic activities and helps in the CO₂ emission management⁵. If we know the carbon foot print value it is possible to reduce or we can try effectively to improve green house gases emission by gaining suitable actions according to mitigation target. Carbon footprint is one the most popular 'climate change' environmentally sustainable indicator. Sustainability is a propagating idea among nations, researcher, institutions and public. It is development that acquires the presents necessity without compromising the ability of future generation to meet their own needs.

On the basis of observation of carbon foot print data prediction about future risk can be done as well as it becomes easy to implement measures, Policies and aim to reduce carbon foot print values according to present and long term achievements in sustainable discipline. Globally in 2018, India contributed about 6.9% of CO₂ and 7.2% to the green house gas emission. Totally green house gas emission contains 30% non CO₂ and 70% CO₂ emissions⁶. China and Qatar are world's top carbon dioxide emitter and carbon dioxide per capita emitter respectively⁷. Almost all the countries in Asia except Bhutan on the planets having positive carbon foot prints values⁸.

Material and Methods:

Study area:

Dwarka nagarMalkapur, District Buldana, Maharashtra State India between 20.8843⁰ N, 76.2026⁰ E at an altitude of 255 m above the mean sea level.

Collection of data:

Selected area was visited and residents were made aware of the study. A total 225 individuals, vehicles in the selected area are 180. 70 families consumes LPG and total vegetation 200 trees measured physically as samples.

A) CO₂ debit sources in the Dwarka Nagar:

1) Total number of residents in colony = 225

Mean carbon foot print of individuals in India is 560 Kg CO₂/ year⁹.

-: CO₂ emission by 225 residents in the dwarka nagar colony in accordance with their availability is 126000 kg/year

-: Carbon debit = 34363 kg/year

2) CO₂ debit by LPG consumption for domestic purpose by 70 families

-: 0.55 kg LPG = 1.66 kg CO₂

09Domestic LPG cylinders consumed by each family per year hence 70 family consumes 8960 Kg LPG/year

-: Total LPG consumed is equal to 7400 Kg of carbon /year.

Carbon debit = 7400 Kg/year

3) CO₂ debit by vehicles in the Dwarka Nagar colony.

1 vehicle emits 0.0088 kg/min of CO₂ (two-wheeler)

180 two wheelers are used in the colony according to the availability of residents in the colony.

Total CO₂ emission by 180 motorbikes = 1156kg/year

-: Carbon debit = 315 kg/year

Table: 1- Different emission factors used to calculate carbon emission in kg/year

Sr. No.	Emission Sources	Emission Factor for CO ₂	Carbon Debit (kg per year)
1	Residents	560 Kg/ year	34363
2	LPG	1.66 kg/Lit LPG	7400
3	Vehicles	0.0088 kg/min	315
			Total = 42078

B) CO₂ credit source is the vegetation of the colony:

The number of trees in colony = 200

1 tree absorbs 21.744kg of CO₂ per year

-: CO₂ absorbed by 200 trees per year = 4350 kg/year

-: Carbon credit by trees per year = 1186 kg/year

Result and Discussion:

In the present study CO₂ emission because of LPG consumption, fossil fuel consumption and by resident is determined and corresponding carbon debit is calculated and it is 42078 kg per year on the other hand carbon credit due to vegetation in the colony is only 1186 kg per year. The carbon foot print value of Dwarka Nagar, Malkapur, District- Buldana (M.S) is found to be 40892 kg per year this may be due anthropogenic activities¹⁰.

From this study it is clear that the value of carbon foot print of the Dwarka Nagar, Malkapur is very higher, so there is strong need to make value neutral. In this regard we are making aware to the residents of colony as well as citizens of Malkapur also explaining and suggesting some important measures to increase the carbon fixation in the colony or to reduce the carbon emission in the atmosphere.

- 1) Use of labels for the products which shows the carbon foot print values of that product in day to day life⁵.
- 2) Increasing the tree plantation in the open space of colony as well as around roads in colony specially those plants which have high carbon sequestration. Eg. Tectona grandis which have carbon sequestration value 3.7 lac tonn in the life time similarly Eucalyptus globulus (2.47 lac tonn in the lifetime) Azadirachta indica (1.45 lac tonn in life time).
- 3) By replacing old vehicles by e-bikes as well as curtailing use of motorcycles which runs on fossil fuels and encouraging the vehicles sharing in an effective way to reduce carbon emission¹¹.

- 4) By adopting efficient systems like land use planning, by controlling and monitoring constructions, forestry. This will strengthened, creating capacities for carbon emission reduction by promoting and supporting sustainable development¹². This model can help in achieving favourable results in the future.
- 5) By recycling drain water of colony for trees.

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