

# RANCHI UNIVERSITY, RANCHI



## Investigators

**Dr. Jyoti Kumar & Dr. Smrity Prabha**



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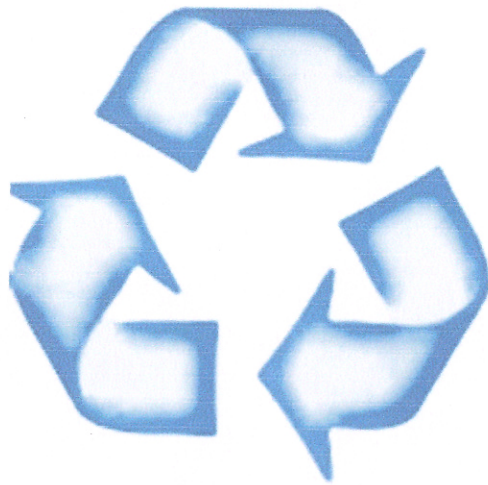


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# **RANCHI UNIVERSITY, RANCHI**

## **Report on Green Audit**



**2019-20**



# **Green Audit Report**

## **Of**

### **Ranchi University, Ranchi**

I critically examined Carbon Footprint report of Ranchi University, Ranchi, prepared by Dr. Jyoti Kumar of University Department of Botany. Dr. Kumar has calculated Carbon emission per person for students, teachers and non-teaching staff. The emission data is converted in equivalent rupee as disguised load on budget. Several small steps have also been suggested following which carbon emission can be cut down significantly. The approach of calculating Carbon footprint is Praiseworthy and will be helpful in mitigation of Climate change. I congratulate Dr. Kumar & Dr. Prabha for this attempt.

Place: Ranchi

Date: - 28.01.2020

*Pradeep Kumar*  
28/01/20

**(Pradeep Kumar, IFS)**

M.Sc (Botany). M.Sc (Forestry).

Ex. Fellow, F.A.O. (UNO)

University of Washington. Seattle, USA

Ex Principal Chief Conservator of Forest(PCCF)

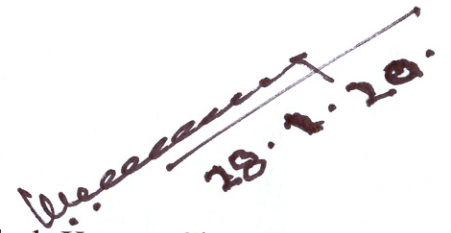
& Chief Wildlife Warden, Jharkhand

Ex Chairman, Jharkhand Biodiversity Board



## From Head of department Desk

Reducing Green House Gas emission is now necessary for better future. The dimension of problem related to climate change is so large that it cannot be addressed properly until every section of society work hard in this direction. Responsibility of Universities becomes much bigger as society look towards it with hope. Department of Botany is directly related to this issue hence, we have accepted challenge of calculating Carbon Footprint of the University campus and prepare a report. The task has been carried out by Dr. Jyoti Kumar who has prepared Carbon Footprint Report of Ranchi University. I wish the effort made by him to keep the campus cool will continue forever.

  
28.1.20.

(Prof. Ashok Kumar Choudhary)

# Preface

In December 2015, representative from all corners of globe assembled at Paris to discuss on various aspects of climate change. The convention started with hopes but as it advanced, confusions, controversies and ambiguity started surfacing. At the end, participants returned empty hand but with aspirations, commitments, plans and hopes. One point was however clear and every one accepted it. This was deep concern regarding increasing load of Green House Gases in the atmosphere. Ever one agreed to cut carbon footprint. Everyone agreed that this task will be very difficult unless every single human being pledge to cut their personal carbon footprint. This report is outcome of a small study taken up for calculating carbon footprints of students, teachers, officers and non-teaching staff of Ranchi University. Methodology and software of Berkley University was used for this study.



# Introduction

Paris climate change summit, held in December 2015 proved to be remarkable as the developed nations committed to reduce their carbon footprints although it also became evident that even after these torrents of commitments the rise in temperature will be nearly  $2.7^{\circ}\text{C}$ , much higher than the danger mark. It was also estimated that even after cutting carbon footprint as committed, nation will exploit over 75% of their carbon budget by next decade. This mean a sharper cut in carbon foot will be required in years to come. It is now clear without doubt that reducing greenhouse emission is essential if we want that our planet will survive further. Out of various GHGs CO<sub>2</sub> is most important because all human activities directly or indirectly emit CO<sub>2</sub>. All forms of energy is utilized by us, means of transport, goods and services we enjoy and food we eat. In nutshell, each and every one during our every activity is responsible for climate change. The total set of GHG emitted by man or organization is commonly called as their carbon footprint. Estimation of carbon footprint of organization is the first step towards reduction of carbon footprint.

The present work is aimed at calculating carbon footprint of Ranchi University, Ranchi to formulate a strategy to reduce GHGs.

## 1. What is Carbon foot Prints

Total CO<sub>2</sub> and other green houses emitted by individual and organization are known as carbon foot print. Carbon foot print can be calculated fora particular activity as well. The full carbon foot print of a University includes emission from different activity of students, faculty and other staffs. For estimating exact carbon foot print of University, It is required to quantify complete range of activities contributing to Green House Gas emission. A reliable Carbon Foot Print Depends upon structured calculation strategy encompassing all activities which leads to



Co2 emission. Generally organizational Green House Gas emission is categorized in three classes:

**1. Direct emission resulting from activities of organization.**

If there is combustion of fuel, the quantum of CO<sub>2</sub> generated is taken in to account. As this study is related to educational institution, Ranchi University emission because of this category of activity is not applicable.

**2. Indirect emission; Products and Services used by the stakeholders.**

Stakeholders of organization, in present case, students and teaching as well as non-teaching work force use various types of goods like, foods items, clothing, house hold items etc. Production of each of them leads to CO<sub>2</sub> emission. Similarly various services used by us also possess carbon footprint. It is required to include both classes of emission for estimating near real status of emission. Although it is difficult to touch all sources of carbon emission but it was rigorously tried to address all sources.

**Why calculate a carbon footprint?**

Calculation of Carbon footprint is done for two basic purposes. Calculating carbon foot print of organization (Ranchi University, Ranchi) in present case provides an effective input for proper energy and environmental management. The process is helpful in pointing out the sources of carbon emission and it also provides a quantitative record of emission. Only after such quantification a strategy for reducing the emission can be identified and prioritized.





- **The calculation is also done to report the footprint accurately to a third party.**
- **To acquire the status and quantum of Green House Gases emitted and to manage and reduce emission in a time frame.**

Another reason of calculating the carbon footprint is to make it public so that everyone can see the involvement of the organization in the pursuit of environmental management. It is also required for a third-party evaluation. In case of Universities and colleges, such audits are mandatory for NAAC accreditation.

## **How to calculate carbon footprint?**

Calculating carbon foot print for conventional organisation using high quantum of energy and fuel is easy as carbon emission from these sources is directly quantified. Carbon foot print of educational organisation is mostly from indirect sources hence their quantification is little difficult. Here most of the emissions are from goods and services utilised. Mode of transportation used, type of energy utilised, consumption and pattern of food and some minor activities have profound impact on emission.

Initially data from all the utilities are metered and distances travelled by all stakeholders are recorded. This data is then multiplied by standard carbon emission factor. After getting the basic carbon foot print, reduction strategies are targeted. Opportunities are pointed out and priority list is prepared.

It is very important to adopt a consistent approach and methodology because organisation have large number of individuals falling under different categories.

Every category of individual has a specific carbon footprint.

Another important aspect is to set the "boundaries" or to specify the specific source of emission to be considered. Although GHG include many more apart from just CO<sub>2</sub>, all are converted to equivalent Carbon emission for simplifying the process.



After calculating the carbon footprint, it need to be verified by independent neutral agency, made public and then utilised for proper environmental management.

## **Methodology adopted of present study**

Present calculation for carbon footprints was done following on line platform provided by Berkley University [www.coolclimate.berkley.edu/calculate](http://www.coolclimate.berkley.edu/calculate)The inputs utilized for calculating the carbon foot prints were following

1. Number of cars used, their fuel efficiency and no. of Kilometers travelled per annum.
2. Distance covered per annum using public transport.
3. Distance covered per annum by air
4. Constructed area of house where the respondent live
5. Water resource utilized
6. Food consumption pattern- proportion of cereals, fruits and vegetables, dairy products and meat in foods
7. Shopping patterns — average annual purchase of clothes and other items
8. Various type of service utilized

Four separate groups were identified for data collections.

1. Students
2. Teachers and Officials
3. Nonteaching staffs
4. Floating population

The data thus obtained is multiplied by conversion factor to access the amount of CO<sub>2</sub> emitted. The quantum of CO<sub>2</sub> is then converted in equivalent Dollar and further in Rupees.

Apart from calculating the footprints, report also discussed various pledges and is converted to equivalent carbon saved. The carbon saved is then converted in money saved. Some common pledges are —





- ✓ Install PV Panels
- ✓ Buy an Electric Vehicles
  - ✓ Carpool to Work
  - ✓ Eat a low carbon Diet
  - ✓ Ride my Bike
  - ✓ Solar battery-operated Vehicles, Scooters
- ✓ Promotion of Bicycles
- ✓ Take public transportation
  - ✓ Reduce your waste
- ✓ Line dry clothing
- ✓ Plant trees
- ✓ CFLs are switched to LED
- ✓ Go organic
- ✓ Print double sided
  - ✓ Used rechargeable Batteries
- ✓ Turn off Lights/Architectural designs of the building is as such using natural light.
- ✓ Maintain my vehicles
- ✓ Choose a low flow toilet
  - ✓ Telecommute to work

Power management of Computers

## What was revealed?

Average carbon footprint of students was recorded 8.24 tons CO<sub>2</sub> / year / student. The value for teaching fraternity was 14.86 tons CO<sub>2</sub> /year/ person whereas corresponding value for non-teaching personnel came 11 .89 tons/ year/person.

Average carbon footprint of Indian people is 4.8 tons/ year / person ([www.wiod.org](http://www.wiod.org)). Social cost: CO<sub>2</sub> emitted was also calculated which estimate damage caused by carbon emission in context of money. In other words, it represents money saved by reducing the emission. This value is estimated to be \$11/ ton of CO<sub>2</sub>. In that sense one student contributes nearly \$ 90.64 or Rs.5891.66/ year disguised budgetary load where as one teacher contributes approximately \$ 163.46 or Rs. 10,624/year towards disguised budgetary load. Contribution of one non-teaching employ comes to nearly \$ 141.34 which comes to Rs. 9, 189.05 per year. Overall carbon footprint and budgetary load in Dollar as well as Rupees was worked out by multiplying the



unit values with total number of students, teachers and non-teaching staff. The respective values were multiplied by total number of students, teachers and non-teaching staffs which provided total carbon footprint and budgetary load of the categories of university stakeholders. Cumulated carbon footprint of students came to 24720 tons/ year whereas corresponding value for teachers and non-teaching staff was 1708.9 and 1783.5 respectively. Similarly disguised budgetary load because of students carbon footprint was calculated to be rupees 176.75 billion whereas corresponding value for teachers and non-teaching staffs rupees 1.22 billion and rupees 1.38 billion.

## Pledge and Their Benefits

The study was not simply diagnostic but also suggested various measures to cut carbon emission and if we pledged to follow them, we can do a lot in the direction of carbon as well as monetary budgeting. Some important but simple steps and their benefits are described below. The data is for one person.

- ✓ Install Photovoltaic panels as source of energy-This will reduce emission by 0.85Mt. CO2 Near worth Rs.7465.25/yr.
- ✓ Go Organic-This will reduce emission by 0.1 Mt. CO2 [Year
- ✓ Buying electric vehicle-This will reduce emission by 1.02 Mt. CO2 [Year worth rupees 18683.27 per year.
- ✓ Introducing car pool-This will cut emission by 0.25Mt. CO2 /Year worth rupees 5882.5M.
- ✓ Eat a low carbon diet, Be vegetarian-This can reduce emission by 0.6 Mt. CO2 Near worth saving Rs. 17268 /year.
- ✓ Riding Bike —This can reduce carbon emission by 0.12Mt. CO2 [Year worth Rs.2567.33/yr.
- ✓ Using public transport-This will reduce emission by 0.09Mt. CO2 [Year worth Rs.2608/yr.
- ✓ Line dry clothing- This will reduce emission by 0.09Mt. CO2 [Year worth Rs.873.6/yr.
- ✓ Plant trees - This can reduce emission by 0.08Mt. CO2 [Year worth Rs.812.5/yr.
- ✓ Switched to LED- This will reduce emission by 0.07Mt. CO2 [Year worth Rs.726.2/yr.
- ✓ Print double side of paper- This will reduce emission by 0.06Mt. CO2 Near worth Rs.260/yr.
- ✓ Using rechargeable battery- This will reduce emission by 0.05Mt. CO2 / Year worth Rs.9938.66yr.
- ✓ Turning off light when not in use- This will cut down emission by 0.04 Mt. CO2/year worth Rs 434/year.
- ✓ Telecommute to work- This will reduce emission 12.5 Mt. CO2/year worth Rs 8261/year





## Conclusions

The study revealed that Ranchi University campus emits 28,212.4 tons of CO<sub>2</sub> every year. This indirectly incurs a cost of Rs1 79.35 million every year. On the other words we can save that much of amount if reduce emission to Zero. This silver line is the basic fact that because this addition of carbon load in atmosphere is anthropogenic hence man can manage it by adopting small steps.

Some minor changes in our life style as described in pledge can reduce our carbon emit significantly. This will automatically reduce disguised load on our budget. Every one of us should swear to contribute in cutting carbon emission.

## Teacher's

	<b>PLEDGE</b>	<b>Tons Saved (Mt CO<sub>2</sub>e/yr)</b>	<b>Dollars Saved \$/yr</b>	<b>Rupees Saved Rs/yr</b>
1.	Install PV panels	97.75	13207.75	858503.75
2.	Buy an electric vehicle	117.3	3354.45	2148576.05
3.	Carpool to work	28.75	10407.5	676487.5
4.	Eat a low carbon diet	69	796980	1985845.3
5.	Ride my bike	13.8	4514.35	295242.95
6.	Take a public transportation	10.35	4614.95	299990.15
7.	Reduce your waste	11.5	488.75	31768.75
8.	Line dry clothing	10.35	1545.6	100464
9.	Plant trees	9.2	1437.5	93437.5
10.	Switch to CFL's/LEDS	80.5	1284.55	83514.15
11.	Go organic	11.5	0.00	0.00
12.	Print double sided	6.9	460	29900
13.	Use rechargeable batteries	5.75	17583.5	1142945.9
14.	Turn off lights	4.6	767.05	49913.45
15.	Choose a low flow toilet	9.2	823.4	53501.45
16.	Telecommute to work	1437.5	14615.35	950034.55

17.	Power management of computers	12.65	1902.1	123636.5
18	Promotion of Cycle	360	118470	7701990
19	Battery operated Tri-rishkaw	270	120390	7825830

## NON-TEACHING STAFF

	PLEDGE	Tons Saved (Mt CO2e/yr.)	Dollars Saved \$/yr.	Rupees Saved Rs/yr.
1.	Install PV panels	127.5	17227.5	1119787.5
2.	Buy an electric vehicle	153	43114.5	2802490.5
3.	Carpool to work	37.5	13575	882375
4.	Eat a low carbon diet	90	39849	2590233
5.	Ride my bike	18	5923.5	385099.5
6.	Take a public transportation	13.5	6019.5	391291.5
7.	Reduce your waste	15	637.5	41437.5
8.	Line dry clothing	13.5	2016	131040
9.	Plant trees	12	1875	121875
10.	Switch to CFL's / LEDs	10.5	1675.5	108931.5
11.	Go organic	15	0.00	0.00
12.	Print double sided	9	600	39000
13.	Use rechargeable batteries	7.5	22935	1490799
14.	Turn off lights/Architectural design of the building utilises natural light	6	1000.5	65104.5
15.	Choose a low flow toilet	12	1074	69784.5
16.	Telecommute to work	1875	19063.5	1239175.5
17.	Power management of computers	16.5	2481	161265
18	Promotion of Cycle	360	1 18470	7701990



19	Battery operated Tririshkaw	270	120390	7825830
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### Calculation

1. Total No. of Students = 5180

Average carbon foot prints of the student = 8.24 Tons

CO<sub>2</sub>/Yr/Student=42683.2Ton/Year

2. Total No. of Teachers 140

Average carbon foot prints of the student—14.86 Tons CO<sub>2</sub>/Yr/Teacher =2080.4 Ton  
/Year

3. Total No. of Non-teachers = 506

Average carbon foot prints of the student=1 1.89 Tons CO<sub>2</sub>/Yr/Teacher =6016.34 Ton  
/year

