IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Carbon Sequestration to Paper Consumption in JECRC

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ABSTRACT

Paper is produced using the tree pulp but the trees sacrificed for the paper production in turn emits the carbon in two stages one during cutting of trees and second during the production and emission in the production of the paper. This paper production carbon emission is to be balanced by the carbon sequestration of the trees in the college for this the amount of paper consumed and the carbon sequestrated by trees in college

Keywords: Carbon sequestration

1. INTRODUCTION

Anthropogenic activities, especially fossil fuel burning and deforestation have resulted in an increase in the concentration of GHGs particularly CO_2 which is accumulating at a rate of 3.5 billion metric tons per annum resulting in global warming. In addition to this the paper consumption is another gigantic issue regarding the carbon emission.

Carbon sequestration involves the capture and storage of the carbon from the atmosphere which would otherwise go on accumulating in the atmosphere. Carbon dioxide is captured and stored naturally by the plants by the process of photosynthesis where they take in CO_2 and sequester it in the form of sugars and finally contribute to organic matter in the soil. Hence, estimation of this C content both in vegetation and in soil becomes imperative to access the Carbon sequestration potential. The trees, as they grow sequester the CO_2 in their body (trunk, branches and roots) and this results in an increase in their biomass, indicative of an increase in carbon sequestered by them. Soil-vegetation systems play an important role in the global carbon cycle. Soil contains about three times more organic carbon than vegetation.

2. STUDY AREA

JECRC College, at Jaipur, Rajasthan it is situated between 26°46'53.0"N latitude and 75°49'09.9"E longitude at an elevation of 180 feet. It is subjected to a dry semi-arid type of the climate according to the Koppen system of classification. The average summer minimum to maximum temperature varies from 23ºC to 45°C. The south-western monsoon results in a humid climate from mid-June to mid-September and the average annual rainfall is about 76.0cms (Figure 1).

The main tree species comprise of *Azadirachta indica (neem), Cassia fistula, Delonix regia, Grevillea robusta, Saraca asoca*

3. MATERIALS AND METHODS

The carbon sequestration amount is traced by the homogenous or alike areas like Western Ghats study along with the observations of the Gujarat University.

The amount of paper used by the students is considered in the studies and observed about 400 students are there in the college and all the paper consumption is considered for the examinations and the approximate office and administrative works.

Paper in exam = 20 sheets x 3000 students
For 2 semesters = 2x20x3000
Unit exams= 2x17x3000
Practical= 2x10x3000

Carbon emission in production of one sheet= 2.05 kg per 500 sheets Carbon emission for each sheet = 4.1 g/sheet Carbon emission

= [2x20x3000+2x7x3000+2x10x3000]x2050 = 455.1 tons/year

For the trees the count of the species has been taken in account and multiplied with the obtained data from the pre-mentioned source.

Table 1: Tree carbon sequestration

Name of species	Carbon sequestration per tree per year (kg/year/tree)	Numbers of trees in college campus	Carbon sequestration by trees per year (Kg/year)
Azadirachta indica	290.83	79	22975.57
Cassia fistula	1259.59	48	60460.32
Delonix regia	5705.37	39	222509.43
Grevillea robusta	1903.56	17	32360.53
Saraca asoca	1675.36	39	65339.04
Cocos nucifera	2466.24	1	2466.24
Syzgium cumini	2336.88	5	11684.4
Ficus racemosa	336.43	5	1682.15
Acacia nilotica	367.42	3	1102.26
Terminalia arjuna	3694.85	1	3694.85

4. RESULT AND DISCUSSION

There were about 79 paper rims of about 1000 paper sheets used for the administrative purposes along with this there were sheets used for the examination purposes of students. The carbon emission for one sheet is 4.1g per sheet which converted to 0.0041 Kg per sheet carbon-di-oxide is evolved in the atmosphere. For this the sheets used for administrative purposes are 79000 per year and the sheets used for the students is 220,000 sheets per year. Carbon emitted is about 2.5 Kg per 500 sheets therefore the carbon emission by paper will be 1225.9 Kg per year.

There are about 237 trees of 10 varieties are considered whose age is about 10 years to 15 years which is considered to be the maxima duration for the carbon sequestration. The total carbon sequestrated by the trees is 416,468.68 kg/year. The distribution of the trees and carbon sequestrated is given in Table1.

5. CONCLUSION

Also, the highest sequestration of the carbon is done by the *Delonix regia* and *Saraca asoca* varieties due to their count and other varieties like *Terminalia arjuna* have a good amount of carbon sequestration but it is less in count.

The trees have a good surplus and college is sequestrating the carbon in a good amount when it comes to the paper consumption only but the data or the observation may vary when the other paradigms of carbon emissions such as the electricity consumption, breathing and vehicle are taken into the consideration.

6. REFERENCES

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