Estimation of Biomass And Carbon Sequestration in Abandoned Industrial Area of Hospet- A Pilot Study

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Abstract

Carbon emission is one of the biggest problem that the world is facing today. Every nation is trying to reduce their carbon emissions and making it as their part of governance. Yet the problem persists. Carbon sequestration is one natural phenomenon where the carbon-di-oxide is fixed in the soil in the form of organic complex compounds and resides there for a long time. Major contributors for the sequestered carbon are the forest covers on the landmass. Therefore in the present study the ability of forest in sequestering the carbon was calculated in an abandoned industrial area near hospet which has been left for more than 5 years with very less anthropogenic activities.

Keywords: Biomass, Carbon Sequestration

Introduction

Carbon sequestration is the prolonged capture or sequestration of carbon dioxide from the atmosphere to reverse or slowdown atmospheric carbon di oxide pollution and fixes the carbon di oxide in the soil so that it turns into a complex organic matter which considerably reduced the carbon content of the atmosphere.

However the co_2 is fixed naturally through in atmosphere through physical chemical and biological processes. Huge levels of anthropogenic activities have fuelled and triggered the release of carbon di oxide into the atmosphere which is causing lots of respiratory related diseases in humans and many animals. Usage of land for such as unsustainable exploitation and destruction of tropical forests are also having an impact on the environment

It is a known fact that trees and woodlands play a pivotal role in the removal of carbon dioxide from the atmosphere by the process of photosynthesis. Forest covers have positively contributed to the carbon sequestration naturally. This natural process has also given the clue for the humans for carbon waste management in order to understand the phenomenon of

fixing carbon di oxide in nature so that the same concept could be exploited to fix the increasing levels of carbon di oxide in the atmosphere which is now an alarming in many developed and developing countries like US, CHINA, INDIA.

Forests can plays an predominant role in climate change through the sequestration or emission of carbon which is a major greenhouse gas in the this has two major profits one reduced the atmospheric carbon di oxide emissions, secondly it fixes the carbon dioxide in soil in complex organic form where it remains for a long time and is utilised by the plants for their growth and development.

In forests carbon is sequestered as biomass. Biomass is any part of living or non-living tree tissue for example; the trunk, branches, leaves or roots, sometimes animal dead matter too. Soon after carbon dioxide is converted into organic matter by photosynthesis, carbon is stored in forests for a period of time in a variety of forms before it is ultimately returned to the atmosphere through decomposition and respiration.

In the present study, we have selected area of abandoned government steel factory very near to Hospet town which has considerable forest cover belonging to the industry. This present study also focusses a view on the idea that every town must have some specified government land for the sake of forestry so that the land is protected under local laws where many native fauna is protected.

Materials And Methods

Study Area

The study was carried out in TSP area (Tungabhadra steel products) which contains thick forest in Hospet near Tungabhadra dam which is 88acres, it is present in the Bellary district which containing a thick trees The latitude of this region is 15.265532 and the longitude of this region is 76.364785.

Sampling Design

Stratified random sampling was used for collecting data for plant biomass by quadrant method. Taking the quadrant of 100mx 100m of one quadrant .we count the trees in one quadrant by taking same as 5 quadrants. Height and diameter of the trees were calculated and then biomass was found. Average biomass of all the 5quadrants were used to calculate the total carbon sequestration of given geographical area.

Biophysical Measurement of Quadrants

Each quadrant was plotted by using thread of 100mx100m and distance from the trees can be calculated using the tape. The diameter of the trees can be calculated by diameter tape.

Biomass is calculated by the formula given below,

$$Total\ biomass = \frac{314 \times Average\ diameter\ of\ trees\ \times Average\ height\ of\ trees}{12}$$

> Sequestered carbon = 1/4th of the biomass

Results an discussions

By plotting 5 quadrants, each quadrant is 100mx100m. In total 5 quadrants contain 350 trees. We had found average height of the tree in all 5 quadrants is 21.18095m and average diameter of the trees in all 5 quadrants is 0.81445m.

Therefore, from these data, approximate biomass per ha for each plot was found to be 451.3982 and quarter of the biomass is 112.84955 tons/ha. Which is nothing but the total carbon sequestered by that given geographical area.

Properties of forest land

Where we are taken a TSP forest area which contain a thick trees surrounded all the region .which contain different types of the trees as neem, monkey pod , *Prosopis juliflora, Acacia modesta*, Rain tree etc. The each quadrant can be plotted in 100mx100m. Where each quadrant contain 70 trees approximately .where the tsp area is 88 acres. Where the total trees in 5 quadrant is 350 trees approximately.

biomass of ha of each plot is 451.3982 and quarter of the biomass is 112.84955 tons/ha.

We are finding the height of the trees by angle of vision with a certain distance and further calculating the tangent of angle of vision, when we multiplied distance with the tangent of angle we got the height of the trees by this method. Then we calculate the diameter of the trees by measuring the circumference of the tree by tape, the by the formulae c/π we got the diameter of the trees. By this the biomass of that region and carbon sequestered can be calculated.

Calculation

Average Height of the trees in first quadrant =22.53622M.
Average diameter of the trees in first quadrant =0.82209M.
Average height of the trees in second quadrant =22.75536M.
Average diameter of the trees in second quadrant =0.81531M.
Average height of the trees in third quadrant =26.1088M.
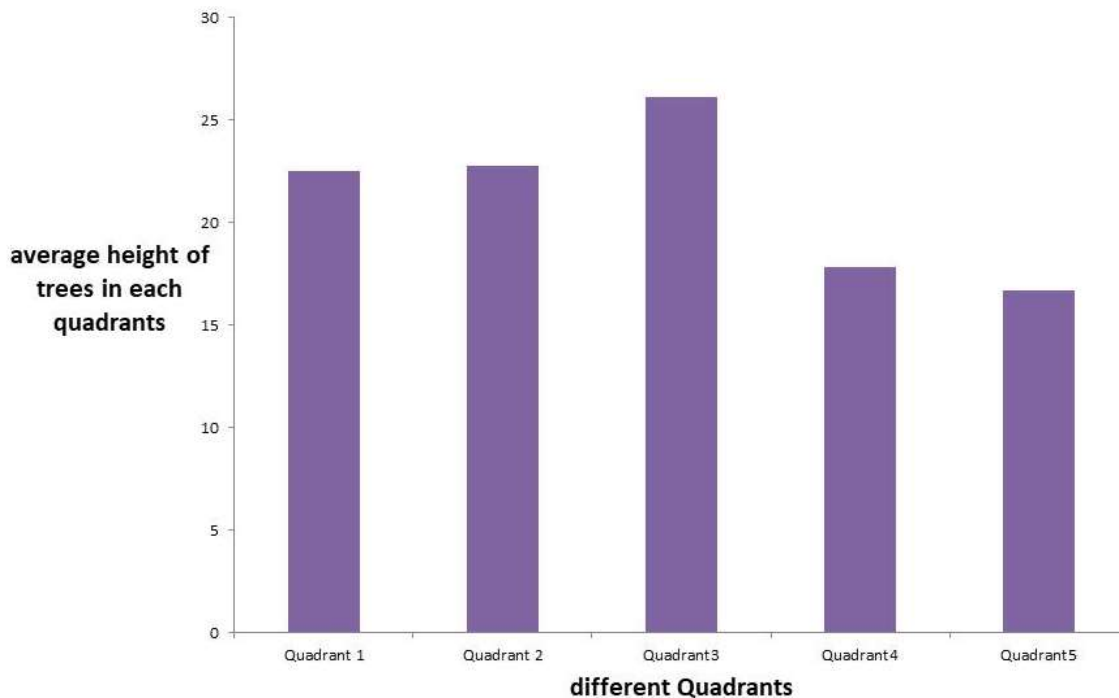Average diameter of the trees in third quadrant =0.8284M.
Average height of the trees in fourth quadrant=17.8090M.
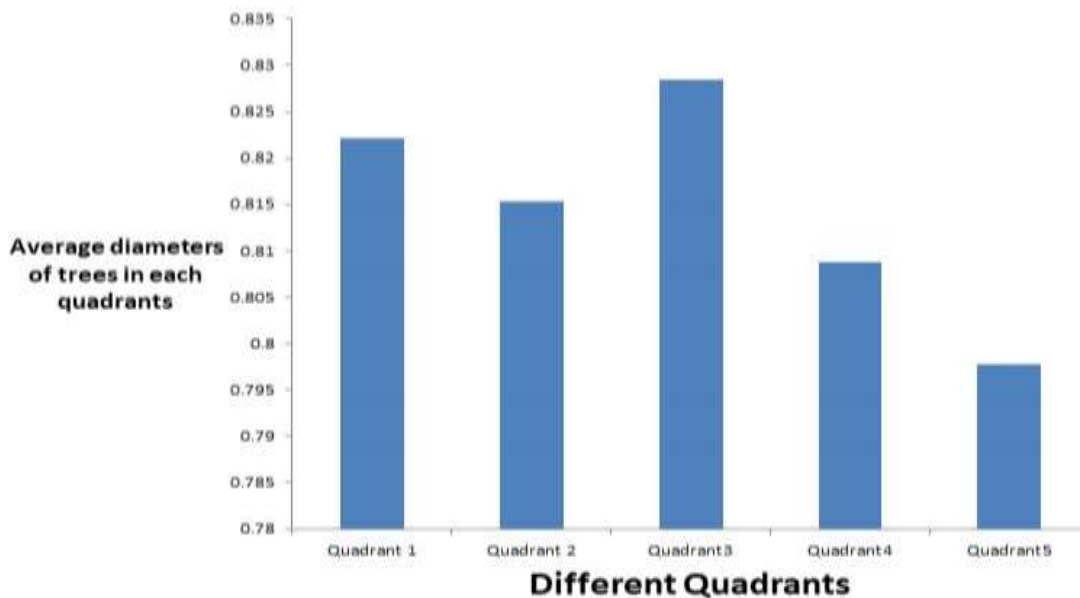Average diameter of the trees in fourth quadrant=0.8087M.
Average height of the trees in fifth quadrant=16.6953M.
Average diameter of the trees in fifth quadrant =0.7977M.

Quadrants	Average height of trees In each quadrants	Average diameter of trees In each quadrants
Quadrant 1	22.53622m.	0.82209m.
Quadrant 2	22.75536m.	0.81531m.
Quadrant3	26.1088m.	0.8284m.
Quadrant4	17.8090m.	0.8087m.
Quadrant5	16.6953m.	0.7977m.

Average heights of trees in each quadrants

Average diameter of trees in each quadrants

Average   Height   of   the   Trees   In   All   5   Quadrants
=22.5362+22.7553+26.1088+16.6953+17.8090/5=21.1809m.
Average Diameter of The Trees In All 5 Quadrants

=0.8220+0.8087+0.7977+0.8284+0.8153/5=0.8144m.

Approximate Biomass Per Ha For Each Plot

=314x Diameter X Height/12

=314x21.1809x0.8144/12

=451.3982per Ha.

About Quarter Of That Biomass Is =451.3982/4=112.8495tons/Ha

The forestland found in the uttar karnataka in bellary district is mainly the thorny forest which dries up usually in the summer but glooms in the rainy season. However, the biomass of the same is lesser than that of the tropical evergreen forests found in the southern parts of Karnataka mainly in the strips of Western Ghats.

In the current study, very simplied protocol of analysing the carbon sequestration was found based on the observations done *by woodall and christopher.*

Biomass was calculated by analysing the tree dimestions like height and diameter and using the formula the biomass was found. Based on the relation between the biomass and sequestered carbon was deducted from the study done by Caleb Stewart, Mir-Akbar Hessami. Therefore, present study derives one of the easiest method of determining the biomass of the given geographical area (excluding the animal and grass biomass).

Conclusion

Carbon sequestration is the process involved in carbon capture and the long term storage of atmospheric carbon dioxide co2 sequestration includes the storage part of carbon capture and storage, which refers to large scale, artificial capture and the sequestration f industrially produced. From this we are finding height, diameter and biomass and total carbon sequestered in TSP region can be calculated. Forest is the important source for the carbon cycle. It is the goal of reducing carbon sources and increasing the carbon sink can be achieved effectively by protecting and conserving the carbon pools in existing forest.

Proposals from the study

1. It renders one of the easiest method to calculate the biomass of the given geographical area.
2. Proper analysis must be done in major areas of towns and cities so that minimum of the land areas must be under the forest cover.
3. Government authorities must make regulations to maintain and protect minimum landmass in every major city under forest cover or agroforestry so that it not only reduces the urban carbon emission , but also gives recreational, economic profits to governments.

4. Tress of economic value like timbers fruit bearing trees must be given importance so that forest is also ensured wit addition to the economic profits.

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