Consequences and Sustainable solutions for Deforestation in India

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***Abstract*—Forest rate is depleting at a fast rate in India. Deforestation is the main reason behind this. Deforestation occur when forests are destroyed due to human needs. The analysis of deforestation is done using twitter. NodeXL Software is used to collect data. This study analyses the major reasons for deforestation in India and to find the sustainable solution to overcome it.**

Keywords—Deforestation;NodeXL;Twitter;India.

I. INTRODUCTION

Forests is an most important and very essential natural resource for mankind. Deforestation is affecting our natural habitat, biodiversity, and climatic conditions. Twitter is an most widely adopted social media platform throughout the world. This platform mostly facilitate users to tweet a message and then allow any twitter users to access those message. Twitter users also use #(hashtags), @(mentions), tweets. By considering these parameters, data can be collected using twitter import tool of NodeXL and then it is analyzed. These network analysis metric is used to examine tweet network. Purpose of these study aims to find consequences for deforestation, why and where deforestation has taken place and to find sustainable solutions for deforestation.

II. LITERATURE REVIEW

In recent years, there is an environmental consciousness on the degradation of forest and environment resulting in depletion of ecological services and life supporting systems in the Indian state of Nagaland [1] these forest resource are very essential part of human life. As increase in population rate, the pressure on natural resources has also increased, and it leads to an vast reduction of forest thus by destroying bio diversity of the state. One of the most major causes of deforestation has also been highlighted as an demographic factor. Several human activities such as shifting, farming, urbanization, and other developing activities are endangering the state's forest resources. This study examines the causes and implications of forest degradation, as well as strategies for forest and environmental conservation in that particular North-East part of India.

Natural resource have always played very important role in the growth of any rising economy. [2] The expansion, content and structure of India's forest areas from 1991 to 2009 are the subject of this research. The examination was thereafter done on a 12,50,000 scale until 1999. These research even examines the qualitative and quantitative changes in forest regions by examining the various kinds of trees. And even it gives any sustainable solution to reduce cutting of trees. These analysis has gives for what reason deforestation has occurred and cause of this deforestation. As forest is very much essential for natural habitat, due to deforestation there is an huge loss of different plant and animal species, and these are becoming extinct these days. [3] This study recommends appropriate remote sensing strategies for analyzing planet scope of 3 meter resolution satellite data and these is mainly used to recognize changes in forest areas and remote sensing method with the GUI are utilized, normalized differential vegetation index is mainly used to classify forest and these values which are obtained it used to reveal changes in forest cover areas, and even resulting in category count of forest these values even detect few changes in area of forest cover land , decreasing category mainly reveals in cutting of forest trees, fires in forest, and shedding down of leaves and many more.[4] Deforestation is represented in larger, more in many tropical and other regions of developing countries around throughout world. The aim of these is used to detect potential areas of deforestation as well as to analyse the forest cover dynamics in India, these approach are used to validate the model, which shows that it has an overall accuracy.

III. METHODOLOGY

NodeXL is very interactive and visualization tool that is both appealing and user friendly. Finding an significant and influential nodes in these social media networks is one of the key characters. Here Vertices represents people or social structure such as workgroups, team, organization etc. These are also referred as nodes, agents. The connection between two vertices are referred as Edges. The concept of centrality refers to an idea of recognizing vertices on ranking of values. The total number of incoming vertices is referred as in degree. The number outgoing vertices, or arrow that is pointing away from the vertices is referred to as an out-degree. The person with highest out degree is referred as most influenced. The average distance between a vertex and other vertices in network is captured using closeness centrality. Another centrality metric

which is used to explore from standpoint of an social network theory is an betweeness centrality. Because of eigen vector centrality, the connections can have a changeable value, therefore connecting to some vertices is more advantageous than connecting for other vertices. These studies mostly leverage twitter page mentions, where people engage with one other based on shared interests.

Data Collection

NodeXL is used to capture an random sample of Twitter data. All of these tweets acquried for study contain either mentions @, hashtag #, tweets. The data collection used here is @unredd, @letindbreathe, #deforestation.it even identifies the most influential induvidual or key participants as well as converstaion taking place on twitter.

Data Cleaning

When data is collected from NodeXL, there will be a same data repeating more number of times, so we can delete and merge duplicate data, within users social media network.

Data Aanlysing

The collected twitter hashtags are analsyed using NodeXL operations such as perparation of data, merging duplicate edges, auto filling of colums, sorting the vertices, creating subgraphs, using dynamic filters and changing the layout options are performed to get a network graph.

IV. RESULTS

1. Social Network Analysis on twitter user page @LetIndBreathe

Here we have analysed username is "@LetIndBreathe". The use of social network analysis is used to identify the social network consist of nodes which mainly indicates nodes who are connected to one another. These twitter user page used to identify various tweets, phrases containing deforestation in India. This is an environment communications collective Network of 28 states and 7 union territories of India. This page contains 2,384 tweets, 252 following, and 4,684 followers. This page also gives information about where deforestatin has occurred, and cause of deforestation.

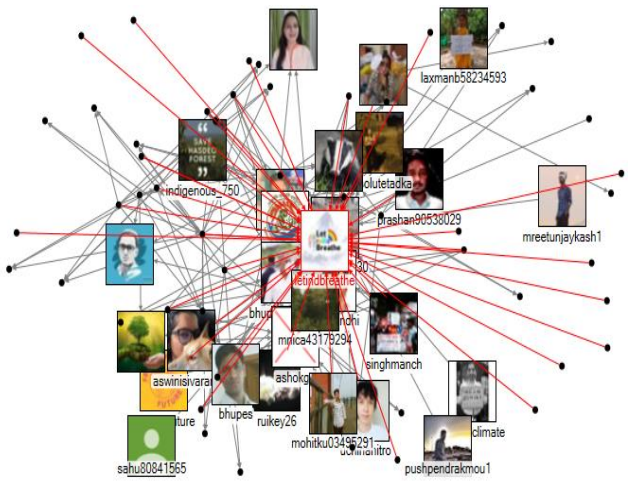

Fig 1. ***NodeXL graph for user page @LetIndBreathe***

The total number of vertices for this network are 1032 and the total number of edges are 1273. The graph is represented as Fig 1. After analysing graph metrics , we get following values from table 1.

Table 1. overall metrics for @letindbreathe

Graph Matric	Value
connected components	1
vertices	75
unique_edges	75 164
self-loops	0
total edges	170
edges with duplicates	6
reciprocated edge ratio	0.011976048
reciprocated vertex pair ratio	0.006024096
graph type	directed
average geodesic distance	3.54
maximum geodesic distance	79
single-vertex connected	3.54
maximum vertices in a connected component	0
maximum edge in an connected component	170
modularity	not applicable
graph_density	0.02710159

Then the insights from the graph are drawn. According to the graph, "@letindbreathe" is popular as it has more incoming edges with the value having 36. From the graph, we can analyze that "@anerakoilash" is most influential as he has more outdegree with the value of 15. From the graph we can analyze that leindbreathe has highest betweeness centrality with the value 4426.7 and closeness centrality with the value 0.006 and eigen vector centrality of 0.010 and clustering coefficient of 0.01 given in Table 2.

Table 2 maximum and minimum values of metrics

Metrics	Minimum	Maximum
In-degree	0	36
Out-degree	0	15
Betweeness Centrality	0	4426.750
Closeness Centrality	0	0.006
Eigen Vector Centrality	0	0.010
Clustering Co-Efficient	0	0.001

2. Social Network Analysis on twitter user page @Unredd.

We have analyzed Twitter user name "@unredd". The use of social network analysis is used to identify the social network consist of nodes which indicates nodes, that is connected toone another. These twitter user page used to identify various tweets, phases containing deforestation in India. This page is mainly supports nearly 65 developing countries including India in order to reduce deforestation. Our planet is better with forests, this is the main moto of these page. This page contains 9,441 tweets, 2,749 following, and 34k followers. This page also gives information about reduction of deforestation. The number of vertices used to analyses were 100 and edges are 250. The graph is represented in as Fig 2.

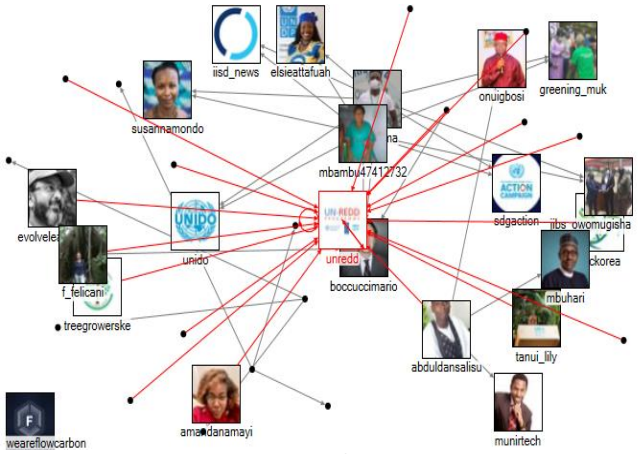

Figure 2. ***NodeXL graph for user page @Unredd***

After analyzing the graph metrics we get the values from the table 3.

Table 3 overall metrics for @unredd

Graph Matric	Value
vertices	41
graph type	directed
total Edges	56
edges with duplicates	5
self-loops	5
uniqueedges	49
reciprocated-edge-ratio	0.081
reciprocated-vertex-pair	0.041
maximum edges in an connected component	31
maximum geodesic distance	5
connected components	4
maximum-verticesin-an connected-component	31
single-vertex-connected component	0
Graph-density	0.0387
modularity	not applicable
average-geodesic distance	2.579

Then the insights from the graph are drawn. According to the graph, "@unredd" is popular as it has more incoming edges with the value having 19. From the graph, we can analyze that "@mbambu4" is most influential as he has more outdegree with the value of 9. From the graph we can analyze that "@unredd" has highest betweeness centrality with the value 725 and closeness centrality with the value 1 and "@mbambu4" having the highest values of Eigen vector centrality of 0.010 and clustering coefficient of 0.01 given in Table 4.

Table 4 maximum and minimum values of metrics.

Metrics	Minimum	Maximum
In-degree	0	19
Out-degree	0	9
Betweeness Centrality	0	725
Closeness Centrality	0	1
Eigen Vector Centrality	0	0.0923
Clustering Coefficient	0	0.027

V. CONCLUSION

Twitter is one of the widely used social network platform which is used for our research to collect the data. The hashtags used to collect the data are "@letindbreath" and "@unredd" the hashtags were the result of the people or users of Twitter sharing their thoughts about the deforestation of India. By analyzing the data obtained by importing through NodeXL twitter import Tool "@letindbreath" has the highest betweeness centrality. Hence if the node is removed then the network will be disturbed. From which we can find that the particular node is the most influential in the network.

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