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*Research Paper*

## Assessment of Total Forest Land of Bangladesh

Jenifar Selim, Tanmoy Dev, Undergraduate student, Department of Urban and Regional Planning, Rajshahi University of Engineering and Technology (RUET), Rajshahi-6204, Bangladesh,

Anutosh Das, Md. Sakib Zubayer Assistant Professor and Lecturer, Department of Urban & Regional Planning, Rajshahi University of Engineering & Technology (RUET), Bangladesh,

### Abstract

*The forest land is one of the vital natural resources of Bangladesh as it contributes largely to balance the ecosystem and the environment as well. Also, the forestry sector accounts for about 3% of the country's gross domestic product (GDP) and 2% of the labour force which indicates that this sector needs special attention. The objective of the study is to delineate the 64 districts of Bangladesh into 7 regions on the basis of the existing condition of forest lands in Bangladesh. To meet this objective formal regionalization has been performed using five important factors such as: amount of reserved forest land, amount of notified under Forest Act 4 & 6, amount of protected forest land, amount of acquired forest land and amount of vested forest land are selected for weighting each district. The required data were collected from Bangladesh Bureau of Statistics (BBS). Equal Class Interval Method is selected for determining class interval and therefore seven classes are formed with seven potential regions. Skewness defines how the data are distributed in the class and value of skewness is the indicator of forming the class range. Composite index method is used to measure the weight of each district and levels of regions are subjected with respect to the value of weight. Not only the amount of dense forest is low but also the amount of total forest land in Bangladesh is very low. The study may help the researchers, urban planners and policy makers to perform further research in forest land conservation and management.*

### Keywords

*Formal regionalization, Equal Class Interval Method, Composite index method, Forest land conservation and management.*

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## 1. Introduction

Forest land means those ecosystems that have a tree crown density (crown closure percentage) of 10% or more and are stocked with trees capable of producing timber or other wood products. This includes land from which trees have been removed to less than 10%, but which have not been developed for other uses.

Regionalization is the process where different regions are delineated on the basis of different criteria and the availability of data (Glasson, 1974). Regionalization can be delineated by formal region and functional region. The delineation of formal regions involves the grouping together of local units which have similar characteristics according to certain clearly defined criteria. And the delineation of functional regions involves the grouping together of local units which displays a considerable degree of interdependence (Glasson, 1974).

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In this study, the regional structure of forest land in different districts is analyzed using the composite index method by using certain criteria. By using this method, it can be easily determined that which districts are very potential and which districts are less potential. The main objective of the study is to delineate the 64 districts of Bangladesh into 7 regions on the basis of total forest land of Bangladesh. Bangladesh Bureau of Statistics (BBS) is the main source of data where five factors are selected for assessing the total forest land.

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## 2. Literature Review

The amount of forest land of Bangladesh is very low. Though a country should have at least 25% forest coverage to meet the ecological balance. The total area of forest land in Bangladesh is 11.2% (ADB, 2016).

In a conference of Forest land in Chittagong, Bangladesh Forest Research Institute said that the amount of forest land in Bangladesh has come down to 7 – 9 % (Forest Land Workshop, 2018).

The forest ecosystem in Bangladesh has been severely damaged by the destructive anthropogenic and natural impacts coupled with overexploitation of forest resources [1].

Between 1990 and 2015, Bangladesh annually lost 2600 hectares of primary forest (FAO, 2015) Primary forest land gradually decreased from 1.494 million hectares in 1990 to 1.429 million hectares in 2015. Thus annual rate of deforestation in Bangladesh was 0.2% during 1990- 2015 (FAO, 2015).

According to Dipak Chakraborty, director of Local Government, Chittagong, It is the rural population which is protecting the forest resources in the country. Coastal forestation has a great role to play since it shields us from natural calamities like cyclones. Not so long but recently people are leaning towards agroforestry. We should emphasize on social forestry for a country like Bangladesh to face the climate change impacts.

Out of 64 districts, 32 districts have no state owned forest at all (BBS, 2016).

Being a developing country like Bangladesh, Indonesia is also facing the high deforestation rate. According to one of their research, weakness in public control, political less awareness, over populations are the main reasons for their high deforestation rate (Tessa Toumbourou).

According to Dr.Saxena, Tenurial issues in forestry in India, The deforestation problem can be solved if there is change in ownership of forest land. Only in the control of government, the deforestation rate can be minimized and forest land can be protected.

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These studies will help us to regionalize the 64 districts of Bangladesh according to their total forest land. Also the situation of deforestation in Bangladesh and other developing countries. It will also help us to find out the main reasons behind this.

Also the policies and recommendations of other countries will help us to enrich our forest land and decrease the rate of deforestation.

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### 3. Methodology

In the case of formal region delineation, several techniques have actually been used to delineate formal region. Among these, the Factor Analysis Method is a more spectacular approach to regionalization process. The study discusses, Factor Analysis Method with five factors affecting forest land under control

As mentioned above, five factors are chosen to regionalize the whole Bangladesh under some categories with definite potentiality index. Bangladesh has 64 districts and these districts contain different potentialities. Among 64 districts we have gotten data of 35 districts in Statistical Year Book of Bangladesh – 2011. They are:

- (i) Amount of reserved forest land (sq. kilo meter)
- (ii) Amount of notified under Forest Act 4&6 (sq. kilo meter)
- (iii) Amount of protected forest land (sq. kilo meter)
- (iv) Amount of acquired forest land (sq. kilo meter)
- (v) Amount of vested forest land (sq. kilo meter)

To make the calculation more perfect we need a unit-less method. So, to make the variable unit-less, logarithm method is used.

The value of W of each district indicates the weight of districts with respect to its influencing factors.

Now to determine the suitable class interval we will follow three methods. The methods are : Equal Class Interval Method, Mean Standard Deviation Method and Arithmetic Mean Method.

Then we will categorize the districts according to their score and identify their situation.

After following the three methods, according to the skewness which will be near to 0 and normal distribution curve we have selected "Equal Class Interval Method" for the classification.

**Equal Class Interval Method:** In equal class interval method, class interval (x) is calculated by following formula,

Class interval,  $X = \frac{\text{Highest Value} - \text{Lowest value}}{\text{Number of class}}$

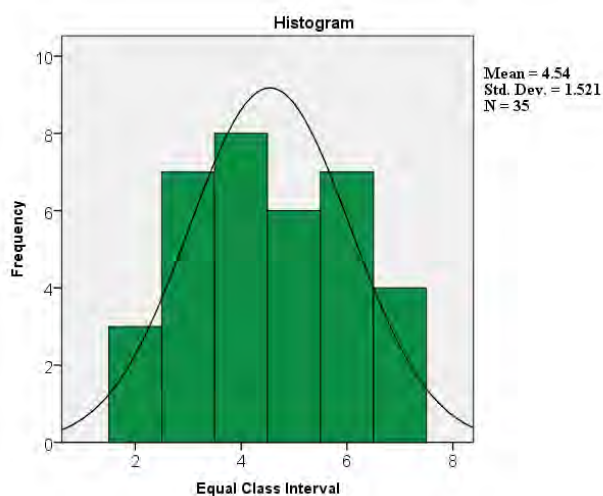


Figure 1 : Histogram of Equal Class Interval Method. (Source : Prepared by author,2019).

Table 1 : Statistical output of Equal Class Interval Method

N	Valid	35
	Missing	0
Mean		4.54
Median		4.00
Mode		4
Std. Deviation		1.521
Skewness		.047
Std. Error of Skewness		.398
Kurtosis		-1.034
Std. Error of Kurtosis		.778

(Source : Prepared by author,2019)

For the assessment of total forest land after evaluating all the class interval method, only the Equal class interval method is suitable as it shows a normal distribution curve and the value of skewness is near 0. Here, for better representation, the number of class is selected as the value 6. Highest and lowest value of the study is 4.4822 and 0.4768. The value of class interval is 0.6676 under 6 classes. In this analysis, Class interval is formulated by this method.

So, the class interval of Equal Class Distribution is represented by the following table :

Table 2 : Class name with class interval for forest land

Class Name	Class Range	Class Number
Non Forest but vegetate land	0	0
Scrub Forest	0.4769 – 1.1448	1
Moderately Open Forest	1.1449 – 1.8128	2
Open Forest	1.8129 – 2.4808	3
Moderately Dense Forest	2.4809 – 3.1488	4
Dense Forest	3.1489 – 3.8168	5
Very Dense Forest	3.8169 – 4.4822	6

(Source : Prepared by author,2019)



#### 4. Result and Discussion

According to the classification level we have delineated the regions into some categories and Found out the reasons behind their being into the classes.

The final output of the forest land analysis is to delineate the region under some categories. All districts are subdivided into seven regions. These categories are selected with respect to the value of "W". Class range, class name, percentage and districts under each class are shown by the following table :

**Table 3 : Regionalization based on forest land under control in Bangladesh**

Class range	Class name	Percentage	Districts
0	Non Forest but vegetate land	46.15%	Panchagar, Gaibandha, Joupurhat, Bogra, Rajshahi, Sirajgonj, Natore, Nawabgonj, Pabna, Khulna, Meherpur, Manikgonj, Rajbari, Magura, Jhenaidah, Chou Danga, Munshigonj, Faridpur, Chandpur, Shariatpur, Madaripur, Narail, Gopalganj, Jessore, Barisal, Jhalkathi, Pirojpur, Kishoregonj, Narsingdi, Brahmanbaria, Naray Angonj.
0.4769 – 1.1448	Scrub Forest	4.62%	Nilphamari, Lalmonirhat, Kurigram
1.1449 – 1.8128	Moderately Open Forest	9.23%	Pirojpur, Lakshmipur, Comilla, Dhaka, Jamalpur, Naogaon

1.8129 – 2.4808	Open Forest	9.23%	Shatkhira, Bagerhat, Khulna, Thakurgaon, Rongpur, Netrakona, Feni, Noakhali
2.4809 – 3.1488	Moderately Dense Forest	9.23%	Dinajpur, Sherpur, Sunamganj, Hobiganj, Gazipur, Barguna
3.1489 – 3.8168	Dense Forest	10.77%	Nasirabad, Sylhet, Moulovibazar, Khagrachari, Bandorban, Bhola, Patuakhali.
3.8169 – 4.4822	Very Dense Forest	4.62%	Tangail, Chittagong, Parbattya Chattagram, Cox's Bazar.

(Source : Prepared by author,2019)

The table shows that among 64 districts 46.15% which is almost half of the districts are non forest land but only have vegetated land. That means there is no forest land and it is the worst case for any country. The districts of this region are : Panchagar, Gaibandha, Joupurhat, Bogra, Rajshahi, Sirajgonj, Natore, Nawabgonj, Pabna, Khulna, Meherpur, Manikgonj, Rajbari, Magura, Jhenaidah, Chuadanga, Munshigonj, Faridpur, Chandpur, Shariatpur, Madaripur, Narail, Gopalganj, Jessore, Barisal, Jhalkathi, Pirojpur, Kishoregonj, Narsingdi, Brahmanbaria, Naray Angonj. The main reason behind this is pressure on land to serve the over population and people are not concerned for the importance of forest land.

Among 64 districts only 35 districts have forest lands under control. Around 4.62% districts have scrub forest, 9.23% districts have moderately open forest, 9.23% districts have open forest, 9.23% have moderately dense forest.

Only 10.77% districts have dense forest only and the districts of this region are : Nasirabad, Sylhet, Moulovibazar, Khagrachari, Bandorban, Bhola, Patuakhali. In this regions the land on pressure is less and forests are naturally created. People mainly use this for "Tourist spot".

4.62% districts have very dense forest and the districts are : Tangail, Chittagong, Parbattya Chattagram, Cox's Bazar. The main reasons are, the regions are coastal part and the pressure on land is less. Also most of the forests are naturally created.

So, we can say that the amount of moderately dense and dense forest is too less for Bangladesh.







## 5.0 Conclusion

As regionalization is the process of delineating regions under some categories so, the study indicates some regions of high and low potential for forest land. It is clear that not only the amount of dense forest is low but also the amount of total forest land in Bangladesh is very low.

Forestry sector can make a great contribute on our GDP as Bangladesh has the potentiality or natural blessing to have a great forest land.

In this situation, we can clearly say that as the condition of forest land under control is very poor so the government and the respective authority should take necessary steps and create public awareness to protect the forest lands and stop deforestation.

So for future research, one can also consider the impact of forest land on the weather condition. Also they can consider the factors like deforestation, natural calamities and other factors for the further research.

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