Report for ForestQuery into Global Deforestation, 1990 to 2016

ForestQuery is on a mission to combat deforestation around the world and to raise awareness about this topic and its impact on the environment. The data analysis team at ForestQuery has obtained data from the World Bank that includes forest area and total land area by country and year from 1990 to 2016, as well as a table of countries and the regions to which they belong.

The data analysis team has used SQL to bring these tables together and to query them in an effort to find areas of concern as well as areas that present an opportunity to learn from successes.

## 1. **GLOBAL SITUATION**

According to the World Bank, the total forest area of the world was 41282694.9 km2 in 1990. As of 2016, the most recent year for which data was available, that number had fallen to39958245.9 km2, a loss of 1324449 km2, or 3.31 %.

The forest area lost over this time period is slightly more than the entire land area of Peru listed for the year 2016 (which is 1279999.99 km2).

## 2. **REGIONAL OUTLOOK**

In 2016, the percent of the total land area of the world designated as forest was 31.38%. The region with the highest relative forestation was Latin America & Caribbean, with 46.16%, and the region with the lowest relative forestation was Middle East & North Africa, with 2.07% forestation.

In 1990, the percent of the total land area of the world designated as forest was 32.42%. The region with the highest relative forestation was Latin America & Caribbean, with 51.03 %, and the region with the lowest relative forestation was Middle East & North Africa, with 1.78% forestation.

Table 2.1: Percent Forest Area by Region, 1990 & 2016:

|  |  |  |
| --- | --- | --- |
| region | forest\_percentage\_1990 | forest\_percentage\_2016 |
| Latin America & Caribbean | 51.03 | 46.16 |
| Sub-Saharan Africa | 30.67 | 28.79 |
| Europe & Central Asia | 37.28 | 38.04 |
| East Asia & Pacific | 25.78 | 26.36 |
| South Asia | 16.51 | 17.51 |
| Middle East & North Africa | 1.78 | 2.07 |
| World | 32.42 | 31.38 |
| North America | 35.65 | 36.04 |

The only regions of the world that decreased in percent forest area from 1990 to 2016 were Latin America & Caribbean (dropped from 51.03% to 46.16%) and Sub-Saharan Africa (30.67% to 28.79%). All other regions actually increased in forest area over this time period. However, the drop in forest area in the two aforementioned regions was so large, the percent forest area of the world decreased over this time period from 32.42% to 31.38%.

## 3. **COUNTRY-LEVEL DETAIL**

### SUCCESS STORIES

There is one particularly bright spot in the data at the country level, China. This country actually increased in forest area from 1990 to 2016 by 527229.06 km2. It would be interesting to study what has changed in this country over this time to drive this figure in the data higher. The country with the next largest increase in forest area from 1990 to 2016 was the United States, but it only saw an increase of 79200km2, much lower than the figure for China.

China and the United States are of course very large countries in total land area, so when we look at the largest *percent* change in forest area from 1990 to 2016, we aren’t surprised to find a much smaller country listed at the top. Iceland increased in forest area by 213.66 % from 1990 to 2016.

### LARGEST CONCERNS

Which countries are seeing deforestation to the largest degree? We can answer this question in two ways. First, we can look at the absolute square kilometer decrease in forest area from 1990 to 2016. The following 3 countries had the largest decrease in forest area over the time period under consideration:

Table 3.1: Top 5 Amount Decrease in Forest Area by Country, 1990 & 2016:

|  |  |  |
| --- | --- | --- |
| country | region | absolute\_forest\_area\_change\_km |
| Brazil | Latin America & Caribbean | 541510 |
| Indonesia | East Asia & Pacific | 282194 |
| Myanmar | East Asia & Pacific | 107234 |
| Nigeria | Sub-Saharan Africa | 106506 |
| Tanzania | Sub-Saharan Africa | 102320 |

The second way to consider which countries are of concern is to analyze the data by percent decrease.

Table 3.2: Top 5 Percent Decrease in Forest Area by Country, 1990 & 2016:

|  |  |  |
| --- | --- | --- |
| country | region | forest\_area\_change\_percent |
| Togo | Sub-Saharan Africa | 75.45 |
| Nigeria | Sub-Saharan Africa | 61.8 |
| Uganda | Sub-Saharan Africa | 59.13 |
| Mauritania | Sub-Saharan Africa | 46.75 |
| Honduras | Latin America & Caribbean | 45.03 |

When we consider countries that decreased in forest area the most between 1990 and 2016, we find that four of the top 5 countries on the list are in the region of Sub-Saharan Africa. The countries are Togo, Nigeria, Uganda, and Mauritanis. The 5th country on the list is Honduras, which is in the Latin America & Caribbean region.

From the above analysis, we see that Nigeria is the only country that ranks in the top 5 both in terms of absolute square kilometer decrease in forest as well as percent decrease in forest area from 1990 to 2016. Therefore, this country has a significant opportunity ahead to stop the decline and hopefully spearhead remedial efforts.

### QUARTILES

Table 3.3: Count of Countries Grouped by Forestation Percent Quartiles, 2016:

|  |  |
| --- | --- |
| quartile | count |
| 0-25% | 85 |
| 25% -50% | 73 |
| 50% - 75% | 38 |
| 75% - 100% | 9 |

The largest number of countries in 2016 were found in the 1 quartile.

There were 9 countries in the top quartile in 2016. These are countries with a very high percentage of their land area designated as forest. The following is a list of countries and their respective forest land, denoted as a percentage.

Table 3.4: Top Quartile Countries, 2016:

|  |  |  |
| --- | --- | --- |
| country | region | pct\_designated\_as\_forest |
| Suriname | Latin America & Caribbean | 98.26 |
| Micronesia, Fed. Sts. | East Asia & Pacific | 91.86 |
| Gabon | Sub-Saharan Africa | 90.04 |
| Seychelles | Sub-Saharan Africa | 88.41 |
| Palau | East Asia & Pacific | 87.61 |
| American Samoa | East Asia & Pacific | 87.5 |
| Guyana | Latin America & Caribbean | 83.9 |
| Lao PDR | East Asia & Pacific | 82.11 |
| Solomon Islands | East Asia & Pacific | 77.86 |

Table 3.5: Countries Distribution by income grouped by Forestation Percent Quartiles, 1990:

|  |  |  |
| --- | --- | --- |
| land\_as\_forest\_in\_percent | amount\_of\_countries | income\_group |
| 0-25% | 30 | High income |
| 25% -50% | 25 | High income |
| 50% - 75% | 11 | High income |
| 75% - 100% | 2 | High income |
| 0-25% | 21 | Lower middle income |
| 25% -50% | 9 | Lower middle income |
| 50% - 75% | 12 | Lower middle income |
| 75% - 100% | 2 | Lower middle income |
| 0-25% | 15 | Low income |
| 25% -50% | 9 | Low income |
| 50% - 75% | 7 | Low income |
| 75% - 100% | 1 | Low income |
| 0-25% | 20 | Upper middle income |
| 25% -50% | 17 | Upper middle income |
| 50% - 75% | 13 | Upper middle income |
| 75% - 100% | 4 | Upper middle income |

Table 3.6: Countries Distribution by income grouped by Forestation Percent Quartiles, 2016:

|  |  |  |
| --- | --- | --- |
| land\_as\_forest\_in\_percent | amount\_of\_countries | income\_group |
| 0-25% | 29 | High income |
| 25% -50% | 27 | High income |
| 50% - 75% | 13 | High income |
| 75% - 100% | 2 | High income |
| 0-25% | 20 | Lower middle income |
| 25% -50% | 15 | Lower middle income |
| 50% - 75% | 7 | Lower middle income |
| 75% - 100% | 3 | Lower middle income |
| 0-25% | 18 | Low income |
| 25% -50% | 12 | Low income |
| 50% - 75% | 3 | Low income |
| 0-25% | 18 | Upper middle income |
| 25% -50% | 18 | Upper middle income |
| 50% - 75% | 15 | Upper middle income |
| 75% - 100% | 4 | Upper middle income |

5. RECOMMENDATIONS

The report used the data for the time period from 1990 to 2016. It looked at the scope and impact of deforestation in two different ways. One is in absolute numbers: total area of forest cleared over the period and another way is in terms of the percent of the forest that was cleared over the time period . The report provides information at three different levels: global impact, by region and by country. The information about some countries was unavailable or incomplete so it was omitted .

Globally, the loss of the forest area was 3.31% over 26 years. The situation does not look gruesome unless it is visualized . The size of the lost forest area in absolute numbers is equal to entire Peru size. Peru is slightly smaller than Alaska. The world will lose another Alaska in the next 26 years if deforestation speed will stay at the same level.

Regionally, the situation doesn’t look so grim. There are only two regions that decreased in percent forest area: Latin America & Caribbean and Sub-Saharan Africa. Unfortunately, these two regions heavily affect the global figures. To understand the reasons of the forest loss I would recommend to investigate the situation in these regions in more details to find the direct causes of the deforestation (agricultural expansion, wood extraction or infrastructure expansion.)

It was possible to forecast that countries from Latin America & Caribbean and Sub-Saharan Africa regions will be in the top 5 list of the forest loss. Four countries in the top 5 list by percentage loss (Togo, Nigeria, Uganda and Mauritania) and 2 countries (Nigeria, Tanzania) in the top 5 list in absolute numbers are from Sub-Saharan Africa region. Nigeria, Sub-Saharan Africa, is in the both lists .

Two different countries from Latin America & Caribbean region in the top 5 lists : Honduras by percentage and Brazil in absolute numbers. Brazil is the fifth largest country in the world and itsterritory is larger than the continental United States so inevitably even a small percentage of loss will lead to significant amount in absolute numbers. Notably, Honduras is about 76 times smaller than Brazil.

Interestingly, there are two different countries from East Asia & Pacific region in the top 5 of the forest loss in absolute numbers: Indonesia and Myanmar. Indonesia is the world's largest island country and the 14th largest country by land, and it’s 8 times bigger than United Kingdom. Myanmar (Burma) is the largest country in [Mainland Southeast Asia](https://en.wikipedia.org/wiki/Mainland_Southeast_Asia) and is approximately Turkey size.

I would recommend to investigate the situation in the countries listed above in more details to find the direct causes of the deforestation.

On the contrary, [Iceland](javascript:;) is 0.92 times as big as Honduras, it increased in forest area by 213.66 % over the period. China and United States, the biggest countries in the world after Russia and Canada) are ahead in absolute numbers.

I would suggest to analyse the Iceland situation and find out the roots of the Iceland success.

It can be noted that there is no low income countries with forestation over 75% in 2016 if we look at the countries distribution by income grouped by Forestation Percent Quartiles. The certain dynamic is seen in the 0-25% Quartile . On the bright side, the amount of countries with forestation below 25% was 30 with high, 20 with upper middle and 21 with lower middle income in 1990. In 2016, the amount of countries with forestation below 25% was 29 with high, 18 with upper middle and 20 with lower middle income. There is opposite dynamic for the countries with low income, from 15 to 18. There is similar dynamic in other quartiles.

# APPENDIX: SQL queries used

The following VIEW was created and utilised to prepare the report:



The countries where information about total land area and forest designated area were not available were omitted.

[1. **GLOBAL SITUATION**](#_Toc110936840)

The total forest area of the world in 1990, The total forest area of the world in 2016, the difference in km2 and %.



Country which total area in 2016 closest to the loss of the forest area lost over the period



[2. **REGIONAL OUTLOOK**](#_Toc110936841)



[3. **COUNTRY-LEVEL DETAIL**](#_Toc110936842)

1. [SUCCESS STORIES](#_Toc110936843)

The largest increase in forest area from 1990 to 2016 in km2



The largest increase in forest area from 1990 to 2016 in %



1. [LARGEST CONCERNS](#_Toc110936844)

Top 5 Amount Decrease in Forest Area by Country, 1990 & 2016:



Top 5 Percent Decrease in Forest Area by Country, 1990 & 2016:



[C. QUARTILES](#_Toc110936845)

Count of Countries Grouped by Forestation Percent Quartiles, 2016:



Top Quartile Countries, 2016:



Countries Distribution by income grouped by Forestation Percent Quartiles, 1990:



Countries Distribution by income grouped by Forestation Percent Quartiles, 2016:

