

# **Relationship Between Deforestation and Climate Change**

**New Mexico Supercomputer Challenge  
Final Report  
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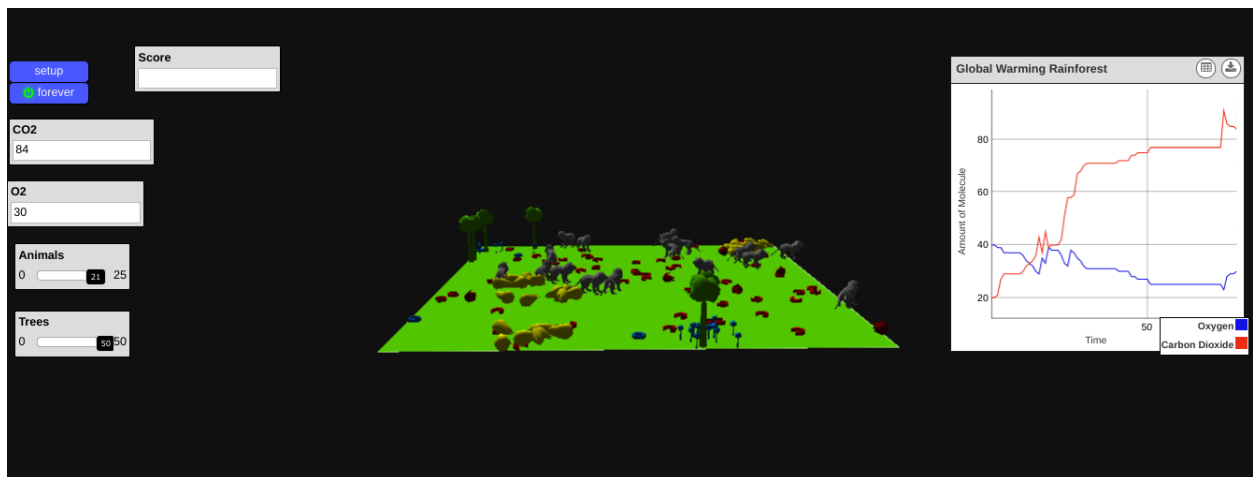
Forests: help with slowing climate change. Trees capture greenhouse gasses (GHGs) like carbon dioxide, preventing them from accumulating in the atmosphere and warming our planet. When forests are cleared or burnt, stored carbon is released into the atmosphere, mainly as carbon dioxide. Averaged over 2017-2020, global loss of tropical forests contributed about 4.8 billion tonnes of carbon dioxide per year (or about 8-10% of annual human emissions of carbon dioxide). Burning fossil fuels, in combination with destruction of carbon sinks due to deforestation and other activities, has contributed to more and more carbon dioxide building up in the atmosphere – more than can be absorbed from existing carbon sinks such as forests. The build-up of carbon dioxide in the atmosphere is driving global warming, as it traps heat in the lower atmosphere. Carbon dioxide levels are now at their highest in human history. We will create a simulation to explain the relationship between deforestation and climate change.

In our biological system we have many interacting parts such as oxygen (sky blue O shapes) in order to demonstrate the as an animals, trees, fires, carbon dioxide (red C shapes) and devastating effects of deforestation. The largest effect is a large amount of carbon dioxide. The animals breathe in oxygen and exhale carbon dioxide. As well, they represent humans when they "cut trees." Animals also have the ability to reproduce on contact with other animals. Animals are killed on contact with fire. The fire also consumes oxygen and converts it to carbon dioxide. The trees are programmed to do their natural process Of photosynthesis (produce O<sub>2</sub>). On contact with carbon dioxide, the carbon dioxide becomes oxygen. The tree's rate of reproduction is slow, similar to trees in nature, and are quickly taken down by the animals. In a short amount of time the trees die off because there is no more oxygen to "feed" it. This shows how carbon dioxide has taken over in areas where many trees have been cut down. Shortly after the trees die, the animals die due to the lack of oxygen. All that remains is carbon dioxide and fires signifying the importance nature plays in humanity and the respect it should be given. While the project doesn't focus on this, the more carbon dioxide in the atmosphere due to the lack of trees and plants photosynthesizing the worse global warming becomes.

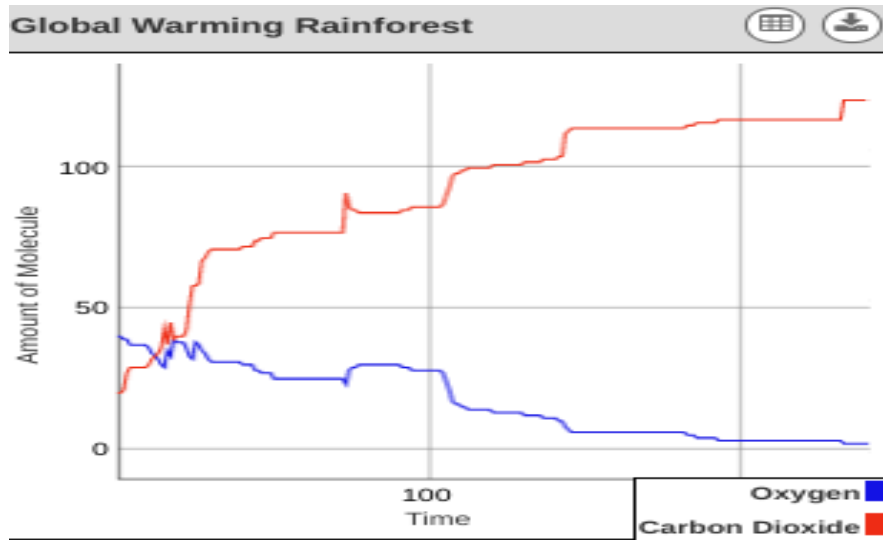
In this point were able to code the trees,the fire,the animal,the O<sub>2</sub> and the CO<sub>2</sub> ,using Starlogo Nova ,we had problems with our tree code because now we need to find the coding that allow our trees to grow and die,like a regular ecosystem other thing that we are going to fix is our fire because it need to appear when the conditions of CO<sub>2</sub> are high in our ecosystem,right now we are using My Nasa Data to learn more about of global warming and deforest ,we are also using Precipitation And Education by Nasa to understand weather and climates in our ecosystem. In

our project we create multiple creatures. For example our lion code is filled with code that was made especially for the random movement. We added a notable code for our graph that will show us the amount of oxygen, carbon dioxide; the time and the amount of molecules. In the tab "The world" it shows code for when we click setup it spawns in all the entities that are shown in our code. We also made a code for a data box that counts CO2 and O2 that constantly produces as we continue the code. When the code starts some fire spawns in the corner and as the code gets continued it begins to spread by burning trees and producing more CO2 and decreasing the amount of oxygen. Without oxygen or trees the CO2 gets produced more often.

The result that we are expecting is that our ecosystem (The Amazon Rainforest) will show how CO2 (gas of the greenhouse effects) can destroy our ecosystem and the life of the animals and trees, we hope that with this simulation we could teach students and everybody else how to prevent the effects of the global warm ups.



**Deforestation and Climate Change Picture 1**



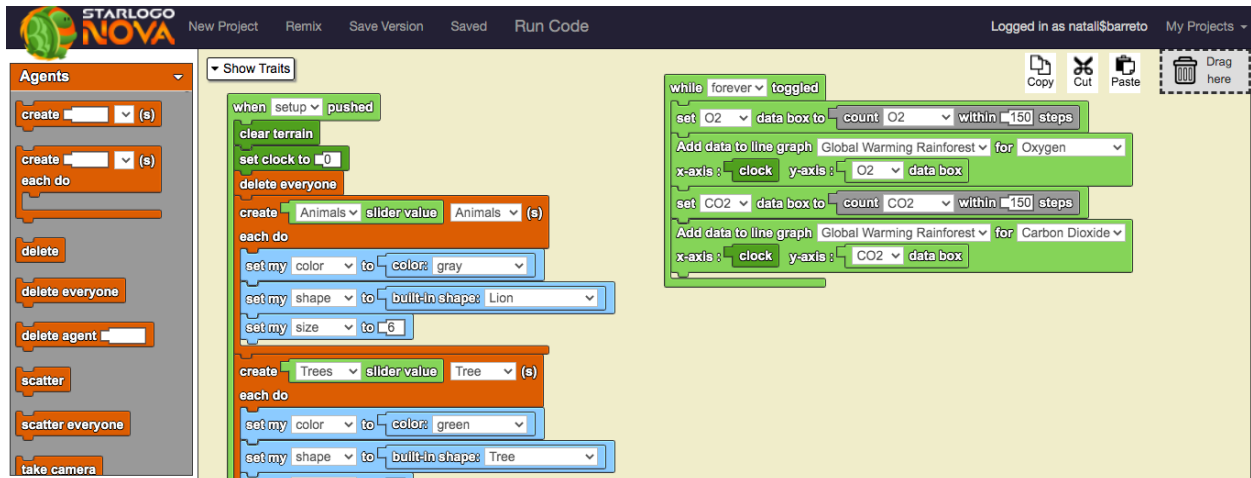
**Deforestation and Climate Change Picture 2**

The interface shows the following parameters:

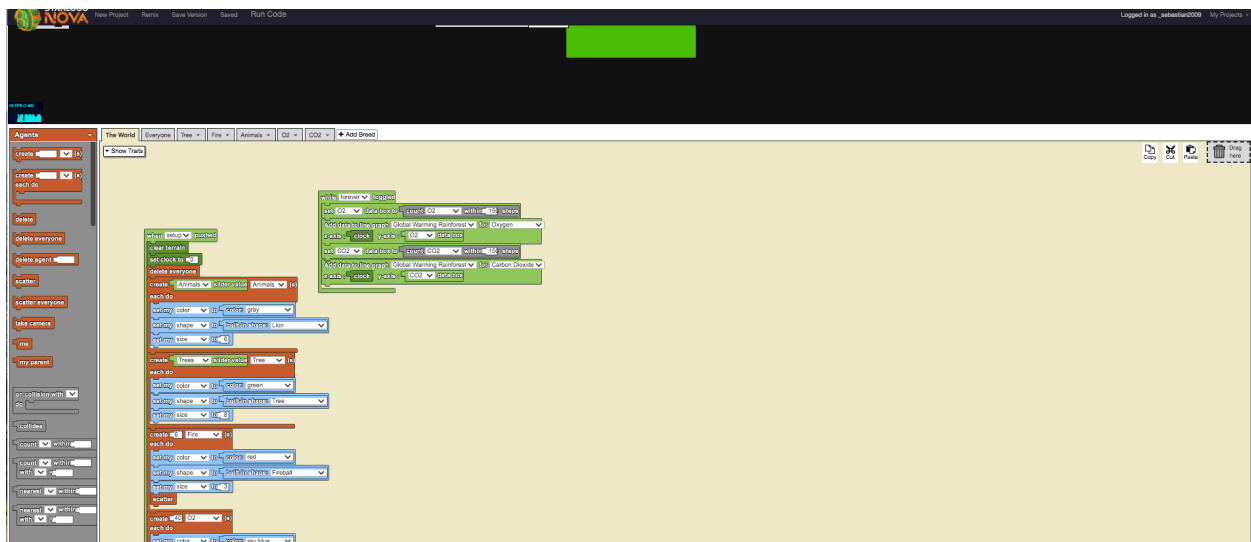
- CO2: 25
- O2: 35
- Animals: 0 (range 0-10)
- Trees: 0 (range 0-50)

The graph in the top right corner shows a sharp increase in Carbon Dioxide (red line) and a corresponding sharp decrease in Oxygen (blue line) starting around time 50. The y-axis is 'Amount of Molecule' (0 to 2000) and the x-axis is 'Time' (0 to 50+).

**Deforestation and Climate Change Picture 3**



## Deforestation and Climate Change Picture 4



## Bibliography

[Precipitation Education by NASA](#)

[Earth System Data Explorer by My NASA data](#)

[Mission: Biomes - NASA Earth Observatory by NASA](#)