

# MADAGASCAR: A CASE STUDY OF THE Consequences of Climate Change ON THE COUNTRY'S Groundwater

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## ABSTRACT

*The cutting down of trees in tropical rainforests releases more greenhouse gases into the atmosphere than all of the automobiles and trucks that are driven on the roads across the globe combined. The use of slash and burn techniques in agricultural production is prevalent across the majority of Madagascar. According to the Environmental Defense Fund (EDF), "tree clearance will dump another 200 billion tonnes of carbon dioxide into the environment in the next generations...", unless we reform the current system that favours the elimination of forests.*

*As a result, the repercussions of climate change are brought to light through the traditional agricultural practise known as "Tavy" throughout Madagascar. First, it contributes to the warming of the whole planet, and second, it degrades the quality of the water supply. As was previously mentioned, trees are responsible for the absorption of greenhouse effect (GHGs), such as carbon dioxide, which stops these gases from building up in the environment. In addition to this, whenever trees are cut down, the carbon that they have been accumulating for years is released into the environment. In addition, trees emit water vapour into the weather; hence, a reduction in the number of trees leads to a reduction in precipitation. Because of this, the temperature rose steadily over a long period of time, and when the rain finally arrived, Madagascar was pounded by extremely severe cyclones and heavy rain. As a result, trees and plants serve not only as a visual barrier but also as a physical barrier to delay water as it flows off the ground. This is significant in terms of groundwater. Because of this, sea level rise has an effect on aquatic resources, particularly in terms of prices; as a consequence, saltwater is moving into freshwater, which causes the salinity of the groundwater to increase. Deforestation has a number of effects on the environment and climate, one of which is hail. In the instance of Antananarivo, which is the metropolis of Madagascar, hail was observed as a result of a typhoon in the previous year. When hail has completely melted, the water that remains has the same impact on the ecosystem that rain water does.*

**Keywords:** *rainforests, environmental, forests, drought, tropical, climate*

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## 1. INTRODUCTION

There are 10 nations where people are predicting the most severe effects of climate change, and Madagascar would be one of people [1].

The probable causes and consequences of climate warming in the nation are discussed.

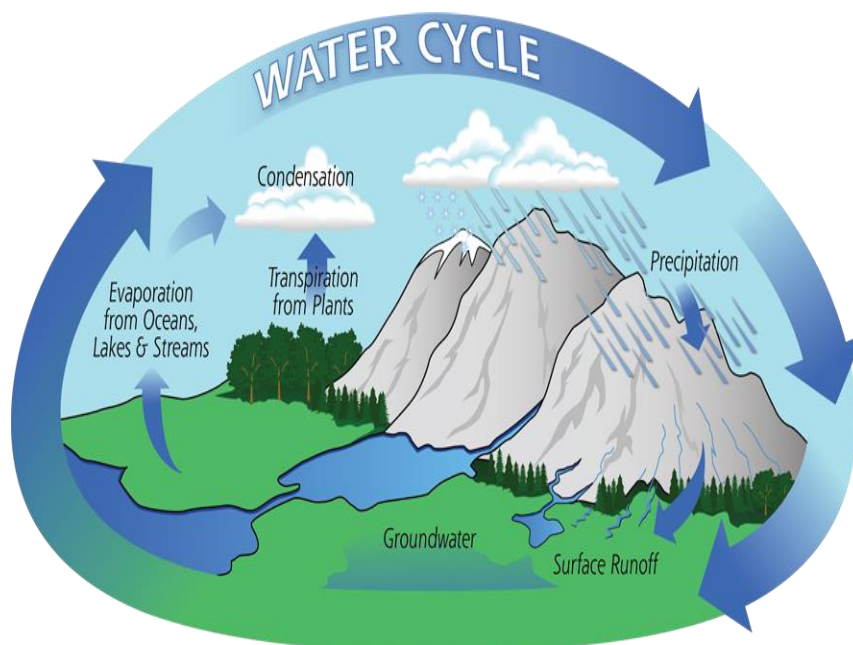
## 2. METHODS

Geographically, Madagascar is located in the tropics, and its year is split into two distinct seasons:

- We get a lot of rain between November until March.
- Seasonal dryness that begins in April and lasts until October

The water cycle is shown in picture 1 below [2].

A portion of the precipitation that reaches the land's waterways, ponds, ground, and porous and permeable strata eventually flows back through into seas, while the remaining water is used by plants for photosynthesis and transpiration before evaporating and transpiring again.



Water vapour, precipitation, and rainfall are all shown in this diagram of the hydrological cycle (Fig. 1).

### 3. RESULTS

There has been some mixing of the climates in Madagascar. Destruction of Madagascar's forests is a major contributor to the country's warming climate.

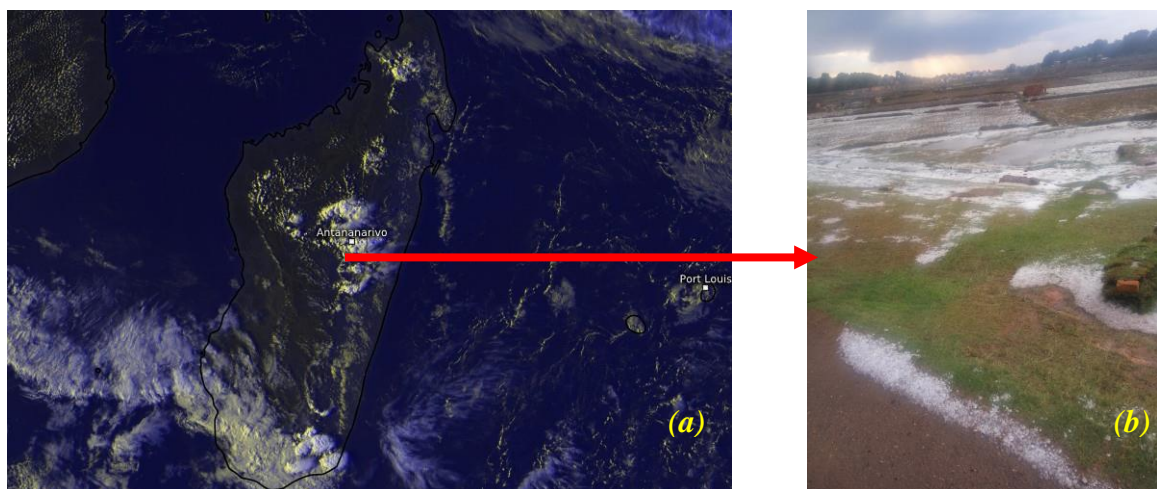
"Tavy" refers to a common agricultural technique used in Madagascar. Tavy refers to the slash and burn method of farming that is common there. Most Malagasy people practise this devastation as part of their tradition to make room for crops in the wet season.

First, forest fires raise atmospheric carbon and draw attention to the global warming effect of human activity.

Additionally, since plants are responsible for absorbing carbon dioxide from the air from the atmosphere, forest clearance results in a net loss of carbon dioxide absorption and a disruption of the water cycle (Figure 1).

Consequently, Madagascar experiences more cyclones than any other African country [1]. Drought and floods have been exacerbated by rising temperatures, which has also contributed to climate change [3] in Madagascar. I temperatures have been rising for extended periods, and when rain does fall, it falls down in torrents.

Because of this, rising sea levels have an effect on water sources, particularly financial ones, as saltwater flows into groundwater, raising its salinity. Hail was observed in Antananarivo (Madagascar's capital) on November 18 due to the rainstorm shown in Figure 2 [4].



Hail storm over Antananarivo, Madagascar, as seen in a satellite photograph (a) [4].

Antananarivo, Madagascar is experiencing hail.(b)

#### **4. CONCLUSIONS**

Malagasy cyclones and hailstorms are made worse by the country's reliance on antiquated agricultural techniques. Up to 90% of the country's original forest cover has been cleared. Clear-cutting forests to make room for farmland is a major cause of deforestation. This cutting down of trees is a symptom of the larger problem of climate change.

In conclusion, the health of water supplies is at danger result of climate change, and coastal flooding into groundwater increases the salinity of both.

#### **5. REFERENCES**

- [1] Overcoming Hard Times: Accompanying Madagascar's Poorest Through Crises, October 18, 2016
- [2] <https://pmm.nasa.gov/education/water-cycle>
- [3] Lauren Bennett, Deforestation and Climate Change, April 18, 2017
- [4] <http://www.cycloneoi.com/medias/images/kachelmann-6.jpg>