# CARBON SEQUESTRATION PROJECT AT THE RIO BRAVO CONSERVATION DISTRICT

Tiffany Baum, McMaster Scholar

Global warming has come to the forefront of public consciousness in the last ten years, but it has been researched since the early 1900s. In 1904, a Swedish scientist, Svante Arrhenius, began studying emissions caused by humans and stated, "The slight percentage of carbonic acid in the atmosphere may, by the advances of industry, be changed to a noticeable degree in the course of a few centuries" (JumpStart Productions, 2005). In 1997, more than 160 nations met in Kyoto, Japan, to discuss greenhouse gases and developed countries' emissions, the result of which was the Kyoto Protocol. This protocol was an effort to lower atmospheric carbon emissions to 5% by the year 2008 (JumpStart Productions, 2005).

Under the Kyoto Protocol, countries were split into one of two groups, emitting and non-emitting. Emitting countries were to provide funds to non-emitting countries to preserve their forests. By preserving a natural environment, the carbon in one country's emissions can be sequestered by land in the non-emitting countries. Belize is a non-emitting country and more than $6 million was given to Programme for Belize (PFB) to develop and maintain a Carbon Sequestration Project throughout the Rio Bravo Conservation District. It is estimated that approximately 185 tons of carbon would be sequestered (fixed by plants and microbes in soil) in one hectare of land.

My study focused on three of PFB's Carbon Sequestration Plots, as well as three farmers' fields in neighboring areas. The aim of the project was to measure the amount of total carbon in the different soil types, as well as help the local farmers determine the amount of organic matter in their fields and understand its importance.

At the research station, a LaMotte Humus Screening Field Kit was used to estimate organic matter from each sample. Soil samples were returned to Defiance College for a further detailed analysis. Samples were dried to constant mass and organic carbon percentage was measured using the Walkey-Black chromic acid wet oxidation method, as put forth by the Department of Sustainable Natural Resources. Samples were analyzed twice for reliability.

## Data Interpretation and Conclusions

Most test results showed low levels of organic carbon. According to the LaMotte Humus Test Kit, an agricultural field should have an organic percentage between 4% and 6%. A sample from the rainforest plot was the only soil sample within this range (4.79%). In comparison, the other two samples from the pine savanna plots, with sparse vegetation and sanding soils, had much lower values of organic carbon (0.17% and 0.85%).

The remaining five samples were taken from three different locations in neighboring farm fields. These fields all had similar organic carbon percentages, ranging from 1.85% to 2.48%. All five samples had very similar textures with high red clay content. There was very little organic matter on the surface of the soil and the fields appeared to be "picked clean" of any plants (e.g., weeds) other than the crop being grown. Although there were a variety of crops grown (e.g., papayas, potatoes, carrots, onions, and corn), all of the fields had a close range of organic carbon percentages.

Most people are unaware that organic carbon affects their daily lives. Some people unknowingly are contributing to the earth's global warming, while others are unintentionally helping to sequester carbon from our atmosphere. With the help of organizations such as PFB that are beginning to focus on carbon sequestration, the word is spreading rapidly. Forests are being preserved and well maintained in order to keep pulling carbon from the atmosphere. My data contributes to PFB's ongoing effort to monitor carbon sequestration. Also, by providing information to the farmers of Belize, this study on organic carbon will help improve the overall health of their crops and the environment.

## Reflection

The country of Belize is beautiful and amazing in almost every way, but it is the people that I will never forget. They live in extremely small homes, in weather that is unforgiving, with insects that could easily kill, and with what seems like very little comfort; yet they welcomed us each day into their lives. Some even cooked, cleaned, and took amazing care of us at Hillbank. The children of San Carlos attended a small school with no electricity and cracks in the walls, yet they wanted to show us everything and were so proud of the schoolhouse. Their generous spirit continues to amaze me.

## REFERENCES

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