# Moringa: The Tree of Life Takes Root in Haiti

Brittney Osterhoudt [1] Cindy Toledo [1] Cristhian Valor [1]

International Medical Outreach at The University of Central Florida

## ABSTRACT

The community of Mare Brignol, located deep in the mountains of Southeastern Haiti is a community living in extreme poverty. Isolation, not only geographical but within the community also makes subsisting conditions even tougher. International Medical Outreach (IMO) has traveled to Mare Brignol since 2011. We identified three major issues: access to proper health and nutrition, lack of health education, and community disconnection. In 2013 we started a permanent project to attempt to mitigate the dire conditions and improve the quality of life for this population. We started the Moringa Project. Moringa is a plant full of many nutritional and health benefits. We introduced this project to the Mare Brignol community via collective seminars and created awareness through social marketing. We collected the number of disease cases in order to understand their health conditions and anthropometric values to gauge nutritional status. We did this to obtain baseline values to measure the impact of this project in a sample population. In addition, we created community gardens, a community tool-renting system, and delegated project management roles in order to integrate and empower the community through ownership and encouragement. This project aims to increase the quality of health and nutrition as well as to increase community cohesiveness in order to improve the overall quality of life.

## OBJECTIVES

**Figure 1:** Moringa plants


**Figure 2**: Moringa Ambassadors

**Figure 3:** Children learning through Social Marketing

### Health and Nutrition

To establish baseline values for health and nutrition in a sample population representative of the Mare Brignol community. This will be done to measure the impact of the consumption of Moringa.

### Community Empowerment

To determine how community empowerment creates cohesiveness in a community, which otherwise acts individualistically throughout a common struggle, by granting them ownership of this project through assigning children as "Moringa Ambassadors" responsible for the sustainability of this project.

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## METHODS

### Health and Nutrition

We quantified the community's nutrition status in children (0-21) living in twenty randomly selected households, by measuring basic anthropometric indicators such as age, sex, weight, length, and height, which were then compared to the sex-specific National Centre for Health Statistics (NCHS) and WHO-guided international reference population as a way to assess the level of undernutrition, using percentile and Z-score based growth charts to such reference population

### Community Empowerment

Community empowerment was encouraged through the creation of important roles for this project throughout the community. We assigned "Moringa Ambassador" positions amongst children in the community. We created a community garden managed by the community elders, and we donated tools with the purpose of creating a community tool-renting system, encouraging participation and collectiveness.

## RESULTS

**Data Set of Sample Population**

| Age | Sex | Height (m) | Weight (kg) | HAZ (SD) | Percentile HAZ (%) | WAZ (SD) | Percentile WAZ (%) | WHZ (SD) | Percentile WHZ (%) | BMI |
|---|---|---|---|---|---|---|---|---|---|---|
| 16 | M | 1.57 | 53.3 | -2.103 | 2 | -0.836 | 20 | | | 21.62 |
| 20 | M | 1.57 | 51.8 | -2.753 | 0 | -2.217 | 1 | | | 21.02 |
| 15 | M | 1.52 | 48 | -2.175 | 1 | -0.947 | 17 | | | 20.78 |
| 17 | M | 1.7 | 53.7 | -0.727 | 23 | -1.233 | 11 | | | 18.58 |
| 13 | M | 1.47 | 37.8 | -1.202 | 11 | -1.046 | 15 | | | 17.49 |
| 12 | M | 1.47 | 34.8 | -0.311 | 38 | -0.848 | 20 | | | 16.10 |
| 8 | F | 1.37 | 29.2 | 1.504 | 93 | 0.68 | 75 | -0.66 | 93.59 | 15.56 |
| 15 | M | 1.55 | 41.9 | -1.836 | 3 | -1.82 | 3 | | | 17.44 |
| 10 | M | 1.37 | 29.8 | -0.277 | 39 | -0.432 | 33 | -0.46 | 95.51 | 15.88 |
| 12 | M | 1.34 | 27.4 | -2.117 | 2 | -2.117 | 1 | -0.67 | 93.84 | 15.26 |
| 13 | M | 1.39 | 33.5 | -2.235 | 1 | -1.779 | 4 | 0.10 | 100.90 | 17.34 |
| 10 | M | 1.27 | 26 | -1.828 | 3 | -1.339 | 9 | 0.37 | 103.17 | 16.12 |
| 6 | M | 0.99 | 14.8 | -3.264 | 0 | -2.949 | 0 | -0.37 | 96.73 | 15.10 |
| 3 | F | 0.93 | 10.8 | -0.307 | 38 | -2.442 | 1 | -2.50 | 78.26 | 12.49 |
| 10 mo | M | 0.63 | 9 | -4.408 | 0 | -0.803 | 21 | 3.57 | 138.46 | 22.68 |
| 18 | M | 1.57 | 48.9 | -2.619 | 0 | -2.349 | 1 | | | 19.84 |
| 2 | F | 0.88 | 13.9 | 0.746 | 77 | 1.198 | 88 | 1.18 | 110.32 | 17.95 |
| 14 | M | 1.6 | 45.7 | -0.511 | 30 | -0.621 | 27 | | | 17.85 |
| 8 | M | 1.11 | 20.1 | -3.078 | 0 | -1.887 | 3 | 0.80 | 106.91 | 16.31 |
| 15 | F | 1.37 | 30.5 | -3.869 | 0 | -4.457 | 0 | -0.23 | 97.76 | 16.25 |
| 10 | M | 1.11 | 20 | -4.442 | 0 | -3.562 | 0 | 0.74 | 106.38 | 16.23 |
| 13 | F | 1.6 | 40.8 | 0.368 | 65 | -0.64 | 26 | | | 15.94 |
| 13 | M | 1.47 | 32.7 | -1.202 | 11 | -1.933 | 3 | | | 15.13 |
| 5 | M | 1.11 | 18.3 | 0.393 | 65 | -0.078 | 47 | -0.31 | 97.34 | 14.85 |
| 18 | F | 1.44 | 56 | -4.324 | 0 | -1.253 | | | | 27.01 |
| 15 | F | 1.47 | 47.4 | -2.723 | 0 | -1.024 | 0 | | | 21.94 |
| 3 | M | 0.93 | 13.5 | -2.117 | 2 | -2.117 | 11 | -0.25 | 97.83 | 15.61 |
| 2 | F | 0.78 | 9.3 | -2.727 | 0 | -3.012 | 1 | -1.25 | 89.42 | 15.29 |
| 7 | M | 1.14 | 15.5 | -1.494 | 7 | -3.533 | 15 | -2.53 | 78.28 | 11.93 |
| 8 | F | 1.04 | 17.5 | -4.524 | 0 | -2.814 | 0 | 0.54 | 104.79 | 16.18 |
| 2 | M | 0.78 | 9.3 | -3.799 | 0 | -3.72 | 0 | -1.02 | 91.18 | 15.29 |
| 17 | F | 1.34 | 44 | -1.379 | 8 | -1.736 | 4 | 5.48 | 150.68 | 24.50 |
| 10 | M | 1.39 | 33.7 | 0.027 | 51 | 0.266 | 60 | 0.16 | 101.51 | 17.44 |
| 4 | M | 1.04 | 17.6 | 0.351 | 64 | 0.61 | 73 | 0.61 | 105.39 | 16.27 |
| 2 | F | 0.83 | 11.1 | -1.959 | 6 | -1.538 | 6 | -0.33 | 94.07 | 16.11 |
| 9 | M | 1.24 | 21 | -1.61 | 5 | -2.321 | 1 | -1.35 | 88.61 | 13.66 |
| 4 | F | 0.83 | 10.5 | -4.446 | 0 | -4.042 | 0 | -1.00 | 92.11 | 15.24 |
| 14 | M | 1.44 | 29.1 | -2.403 | 1 | -3.563 | 0 | | | 14.03 |
| 5 | M | 1.01 | 14 | -1.74 | 4 | -2.467 | 4 | -1.30 | 88.61 | 13.72 |
| 11 | M | 1.32 | 21.8 | -1.704 | 4 | -3.463 | 0 | -2.44 | 78.14 | 12.51 |
| 9 | F | 1.14 | 15.4 | -3.342 | 0 | -5.824 | 0 | -2.59 | 77.78 | 11.85 |
| 12 | F | 1.47 | 38.3 | -0.607 | 27 | -0.451 | 33 | | | 17.72 |
| 5 | F | 1.19 | 21.7 | 2.194 | 99 | 1.17 | 88 | 0.06 | 100.46 | 15.32 |
| 14 | M | 1.6 | 56.1 | -0.511 | 30 | 0.462 | 68 | | | 21.91 |
| 15 | M | 1.65 | 48.9 | -0.646 | 26 | -0.834 | 20 | | | 17.96 |
| 8 | F | 1.19 | 23.2 | -1.561 | 6 | -0.645 | 26 | 0.88 | 107.41 | 16.38 |
| 18 | M | 1.7 | 64 | -0.858 | 20 | -0.318 | 38 | | | 22.15 |
| 7 mo | F | 0.63 | 7.5 | -1.739 | 4 | -0.46 | 32 | 1.43 | 115.38 | 18.90 |
| 13 | F | 1.57 | 42.1 | -0.05 | 48 | -0.466 | 32 | | | 17.08 |
| 10 | M | 1.37 | 31 | -0.277 | 39 | -0.197 | 42 | -0.07 | 99.68 | 16.52 |
| 12 | M | 1.47 | 33.6 | -0.311 | 38 | -1.054 | 15 | | | 15.55 |
| 8 | F | 1.21 | 22.6 | -1.197 | 12 | -0.818 | 21 | 0.11 | 100.89 | 15.44 |
| 12 | F | 1.42 | 30 | -1.276 | 10 | -1.885 | 3 | | | 14.88 |
| 6 | M | 0.96 | 11.3 | -3.844 | 0 | -6.208 | 0 | -2.51 | 77.93 | 12.26 |
| 10 | F | 1.29 | 20.3 | -1.402 | 8 | -3.083 | 0 | -2.59 | 75.75 | 12.20 |
| 8 | M | 1.11 | 12 | -3.078 | 0 | -5.572 | 0 | -4.17 | 63.83 | 9.74 |
| 6 | M | 1.09 | 23 | -1.313 | 9 | 0.691 | 76 | 3.10 | 127.07 | 19.36 |
| 4 | F | 0.93 | 16.5 | -1.898 | 3 | 0.285 | 61 | 2.25 | 119.57 | 19.08 |
| 16 mo | F | 0.76 | 11 | -0.887 | 19 | 0.286 | 61 | 1.33 | 111.11 | 19.04 |
| 1 | F | 0.45 | 6 | -4662 | 0 | -3.098 | 0 | 6.50 | 176.47 | 29.63 |
| 18 | M | 1.54 | 48 | -3.018 | 0 | -2.511 | 1 | | | 20.24 |
| 3 | F | 0.9 | 16 | -1.075 | 14 | 1.075 | 86 | 2.50 | 122.14 | 19.75 |
| 4 | M | 0.96 | 15 | -1.545 | 6 | -0.729 | 23 | 0.39 | 103.45 | 16.28 |
| 5 | M | 1.09 | 18.5 | -0.038 | 48 | 0.006 | 50 | 0.25 | 102.21 | 15.57 |
| 12 | M | 1.42 | 30 | -0.994 | 16 | -1.764 | 4 | | | 14.88 |
| 5 | M | 1.06 | 19 | -0.68 | 25 | 0.208 | 58 | 2.53 | 110.47 | 16.91 |
| 13 | M | 1.34 | 28.9 | -2.886 | 0 | -2.763 | 0 | -0.11 | 98.97 | 16.09 |

**Figure 4:** Data set displaying anthropometric measurements and z-score based SD calculations, as well as percentiles for height-to-age (HAZ), weight-to-age (WAZ), weight-to-height (WHZ) and BMI.

| Color Codes | Interpretation |
|---|---|
| | Adequate |
| | Mildly Malnourished |
| | Malnourished |
| | Severely Malnourished |

**Chronic Malnutrition**

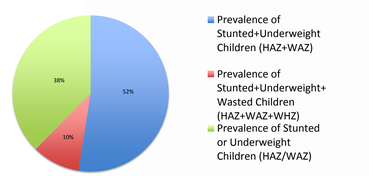


**Figure 5:** Prevalence of Chronic Malnutrition according to z-score based standard deviations

**Prevalence Severe Chronic Malnutrition by Age Group**

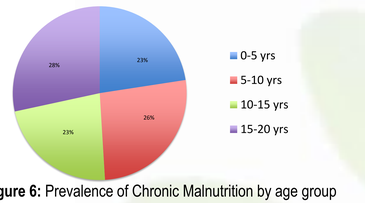


**Figure 6:** Prevalence of Chronic Malnutrition by age group

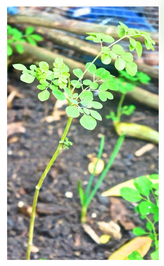

**Figure 7**

**Figure 8**

**Figure 7:** Moringa plant growing in Mare Brignol after six weeks of having planted.
**Figure 8:** Picture of child from Mare Brignol (age 7) suffering from fungal skin infection, parasitic infection and severe chronic malnutrition

**Prevalence of Disease**

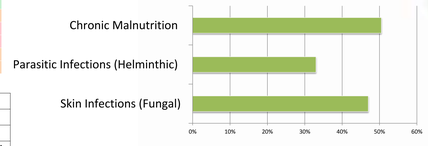


**Figure 9:** Prevalence of Disease chart

## CONCLUSIONS

The Moringa tree is a powerful source of nutrients. Gram for gram it contains seven times more vitamin C than an orange, four times more vitamin A than carrots, four times more calcium than milk, three times more potassium than bananas and as much protein as an egg. In addition, moringa has plenty of beneficial properties for the improvement of health, such as antihypertensive, antibiotic, antifungal, antiparasitic, and antipyretic properties. It is like growing a natural pharmacy in your backyard

### Health and Nutrition

- A general health baseline focused on disease and nutrition in children was established. 51% of the sample population (age group 0-20 from 20 random households) presents malnutrition.
- There is a high prevalence of preventable diseases coupled to their poor nutritional status and lack of proper hygiene standards

### Community Empowerment

- Community participation and cohesiveness was encouraged and improved
- Community gardens were created
- A community tool-renting system was put in place
- Planting and project implementation was done by integrating the community into every aspect of the process

## FUTURE DIRECTIONS

1. Continue Collection of Data and Education
2. Shift awareness towards proper consumption and plant maintenance
3. Expand to more Households
4. Create School Projects
5. Have enough trees to harvest and implement Moringa powder production
6. Create a micro-economy based on Moringa leaves/powder sales
7. Spread to adjacent communities

## ACKNOLEDGMENTS

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THANK YOU!