Internship with The Walking School Bus (TWSB)

Position: The Walking School Bus Researcher

Description of the host organization:

The Walking School Bus works to empower access to education through mutually beneficial partnerships that promote the holistic, research-based approach of *Access, Nutrition and, Curriculum*. In Uganda, students travelled great distances to access education. While searching for solutions to this Access problem, the team realized that even if students arrive at school, they did not have adequate access to Nutrition - a prerequisite for education. While working in the classrooms, it is also discovered that the high rates of teacher absenteeism and lack of fluency in teaching were obstacles hurting student literacy and thus affect academic success. The team started to improve curriculum through the SiMBi Reading Application and Solar-powered Classrooms. Learn more about the research team here: Think Tank

Dates of Expeditions:

March 18 - 26, 2018
July 8 - 17, 2018

How to apply: Send CV & Preference for projects to danielle.donnelly@mcgill.ca and aaron@thewalkingschoolbus.com

Please note these positions are unpaid, and students are encouraged to find external funding. The interns are responsible for all travel and living costs associated with the internship, including transportation to Uganda, accommodation and visa. Accommodation will be arranged at the Nabagoye Guest House.

Research Projects:

1. **Linear Programming Community Supported Agricultural Model**

Linear programming is a method of maximizing or minimizing a linear relationship to achieve the best outcome or use of resources available. In Uganda, there is a need for linear programming to allow for advance planning and proper allocation of resources to help battle public health problems and nutritional deficits within the communities. One issue of particular importance to The Walking School Bus is the wide-spread prevalence of anemia in Uganda (national prevalence of 49%). The problem is even worse in Eastern Uganda, where 55% of children under the age of 5 have been shown to be anemic. This issue could be corrected with proper nutrition

and iron intake. Foods with adequate amounts of iron such as kale, spinach, and green peas are inexpensive ways to supplement Ugandan diets. The Walking School Bus is interested in developing a linear programming model that enables efficient use of land to cultivate these crops for Community Supported Agriculture (CSA) farmers and schools. Linear programming could also find the best solution for other limitations such as labour, water, and costs associated with growing crops. Through your research, we would find a practical solution for these communities.

Objectives:

• Develop a Linear Programming Model that enables efficient CSA within two communities and three schools in Uganda.
• Find solutions for constraints: Land, Labour, Water, Costs, (and any additional unidentified issues).
• Create an educational packet for farmers and school teachers about improved agricultural techniques and planning.
• Create an educational poster explaining the impact of improved nutritional diversity.
• Work with TWSB nutrition team in Vancouver and Uganda to implement practices that can be sustained, monitored, and evaluated.

2. CSA Garden Development, Implementation, Sustainability, and Monitoring & Evaluation Project

TWSB's CSA Garden initiative uses a linear programming method to best identify which crops to grow and takes location and social norms into account. This project aims to utilize the abovementioned data and work with: community leaders and schools to develop 1600 – 4800 square ft. gardens that serve two primary purposes: 1) To grow vegetables that improve nutritional diversity and help to lower the high rates of anemia; 2) To teach improved agricultural practices that increase crop productivity and farmer resilience.

Objectives:

• Working with community leaders in Putti Village, identify location for the CSA garden.
• Working with students from the Yonatan Netanyahu Memorial School, implement the garden and ensure it is protected from pestilence and sun exposure.
• Develop composting model for garden sustainability as this is a technique that is currently not employed in Putti Village and Enosh, the community leader would like to initiate the process.
• Work collaboratively with nearby TWSB chicken coop to ensure that manure is added to CSA garden.

• Develop system for data collection and ways to monitor and evaluate garden performance and impact on community.

3. Rainwater Collection System for Chicken Coops and CSA Garden

TWSB rainwater collection systems are the lifeblood of the nutrition program which ensure Chicken coop and CSA garden projects can be initiated without burdening communities with the need to use extra water. The rainwater collection model has proven successful and the research team have witnessed communities individually finance and build additional rainwater collection systems after experiencing their success. This project includes a few components:

a. TWSB have developed sensors using raspberry pi micro computers to monitor inflow and outflow and understand usage and impact. You will require understanding to use and implement this technology.
b. At present, there are 2 purification processes: a) a thin wire mesh to keep out dirt and particulate and; b) a chlorine ball in 1000 L water tanks to keep the water clean. TWSB is looking to develop a filtration system to improve water quality. There are a few options to consider including: ceramic filtration, gravity fed carbon filtration, bone char filtration and others. Your team will be responsible for developing a prototype to test in the field.

Objectives:

• Implement Raspberry Pi technology to begin data collection for water inflow and outflow which will provide TWSB with impact assessment data.
• Develop water filtration prototype and begin testing.
• Analyze existing rainwater catchment systems and develop improvements to system. These may include but are not limited to: reducing cost, strengthening, and simplifying installment process.

4. Investigation of TWSB Chicken Coop Impact, Revenue Model, and Data Collection

The Walking School Bus has discovered that local schools in Uganda, such as Y.N Memorial School, are unable to provide consistent nutrition to their students. This has a negative impact on students' education and school participation, as many of these students largely go to school for the meal. Those who do journey to school, lack adequate nutrition and so suffer academically. To tackle this issue, The Walking School Bus has recently invested in a chicken co-op at the Y. N Memorial School. This project aims to provide consistent nutrition and protein for school students by providing them with eggs for lunch. This venture also provides manure that can be utilized by the school for the garden and passive income for the school through sales of surplus

eggs. So far, preliminary data collection and analysis has been done to determine the impact of the chicken coop (ie. initial costs, egg production maintenance cost, manure production) for the Y.N Memorial School. However, the Walking School Bus is interested in collecting more data, including egg consumption, passive income generated, educational impact, and return of investment/sustainability, to gain a deeper sense of the impact of the chicken co-op project. Through your research, we hope to collect additional data through a survey questionnaire for the Y. N Memorial School community, and investigate the possibility of expanding this project to other schools and communities

Objectives:

• Improve upon existing research which looks at: egg consumption within the schools, passive income generated, cost of chicken feed, and educational impact.
• Work with our research team to implement existing surveys and questionnaires to consistently collect data on a weekly basis.
• Setup systems to help collect data that will allow economists to develop impact assessment reports.