GNG1103 - Deliverable B
Hydroponics
Group B4

Introduction:

The purpose of this project is to design and create a Hydroponics system that is capable of growing fruits and vegetables for the Barriere Lake First Nations community. This group of about fifty people lives in a remote area where there is no electricity and running water and is situated one and a half hours away from the nearest town of Maniwaki, QC. The landscape consists of very fine sand and mixed forest. The group collects water from a spring, and lake water is not filtered. The system must be designed for ease of operation and repair, cost-effectiveness, and efficiency.

We were given the opportunity to interview Monique from Barriere Lake First Nation to learn about the needs of the group and determine the requirements of the system.

Client Needs:

Our client, Monique, gave us background information on the needs and situation of the community. They are an isolated community living near what used to be an airstrip. More recently a highway was built nearby. While there are lakes nearby, people get water from a spring located near Le Domaine which is around 2 hours away. The nearest grocery store is also around 2 hours away and gas is far too expensive. The following are the clients needs summarized:

Cost

- Hydroponics Budget: $100

Build Quality

- Durable enough to withstand -40 degree to 30 degree weather
- Can stop small animals such as mice from eating crops or breaking the system

Modularity

- System is small enough, or can be taken apart easily, such that it fits within the MakerMobile

Ease of Use and Easy Maintenance

- Can someone with little knowledge of Hydroponics,but with right instructions, operate and maintain the system?
- Water can be retrieved from nearby community (Wolf's Crossing) by car, but if enough rainwater can be collected to sustain plants, then that would be preferred

Space Efficiency

- The community is home to about 50 people. Can the Greenhouse and Hydroponics System grow enough for community?

Customer Needs and Criteria:

Priority	Customer Needs	Design Criteria
1	Greenhouse must be usable all year round to grow fruits and vegetables	The System must be able to operate and sustain plant life in temperatures ranging from -40 degrees C to around 30 degrees C.
5	Animals may eat crops or damage the greenhouse	The Hydroponics system shall be designed for it to be difficult for animals to eat the crops or damage the system.
4	The community has about 50 people. Trips to grocery stores are long and costly, and access to fresh vegetables is limited in the winter.	The Greenhouse and Hydroponic system must be space-efficient and able to grow enough fruits and vegetables to support a community of 50.
3	Flexible to grow different kinds of plants	The system shall support several kinds of plants at the same time. Hardy vegetables like
2	Ease of operation and maintenance	The system shall be designed such that someone with no experience with hydroponics can, with proper instructions, maintain and operate the system.

Problem Statement:

Based on our client's needs, we were able to develop the following problem statement:

> **"Limited access to fresh fruits and vegetables has resulted in the need for a Hydroponics System that is capable of growing fruits and vegetables in temperatures ranging from -40 degrees C to 30 degrees C, is easy to operate and maintain, and can support the 50 members of the community."**