Project Greenhouse-Saint John's University

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Glossary

I. Venture Overview

A. Vision Statement

The vision of Project Greenhouse is to provide local fresh winter vegetables that benefit students and the community of Saint John's University.

B. Desired Outcomes and Operational Goals

1. In the short-term, the desired outcome is to establish and operate a greenhouse located by the solar field in Flynntown.
2. *Project Greenhouse* will sell local vegetables to the Saint John's University Dining Services.
3. After being established, *Project Greenhouse* will look to expand both awareness and sales by broadening its customer base.
4. Partner with other groups and clubs to inform students of value of winter vegetables.

C. Value Proposition

Project Greenhouse will provide fresh local winter vegetables, which in the past have not been available for the dining services at St. John's University. *Project Greenhouse* will create locally grown, healthy, winter vegetables. This will replace the frozen vegetables that are being purchased from long distances.

D. Summary Description of Target Audience

At least initially, our target market will be the Saint John's University dining services. Dave Schoenberg, executive director of dining and events, has expressed his desire to purchase vegetables grown in *Project Greenhouse* at market price. The vegetables purchased and grown in *Project Greenhouse* will be served to the College of Saint Benedict and Saint John's University students and the Saint John's monastery. Saint John's University Dining Service is in need of a greenhouse because local vegetables are currently expensive and unavailable.

E. Organization Description and Operating Model

Project Greenhouse will be a student started and student run venture. *Project Greenhouse* will be owned by Saint John's University, and managed by Stephen Johnson. Student workers and interns will be assigned. Once Stephen Johnson graduates in 2013, the next student leadership team will be elected and managed *Project Greenhouse.* This is how student-run ventures have been run in the past, such as the organization of Clemens Perk.

F. Partners Description

Project Greenhouse will establish a solid relationship with the Saint John's University Dining Services in order to provide the students with fresh vegetables. In the future, Stephen Johnson would negotiate market prices of local vegetables with the Saint John's University Dining Services once the dining service knows how much the greenhouse will produce.

G. Primary Revenue Sources

Senate:	$5,000
Abbey:	Possible funding
Student Fundraiser:	$4,000
McNeely Loan:	$10,000
Individual Fundraising:	$2,000
Investment from Refectory:	Possible funding

II. Framing the Issue and the Opportunity

During the winter months at St. John's University, 240 heads of lettuce and a variety of other vegetables are consumed every month in the refectory. Unfortunately these vegetables are shipped in at a high cost and do not hold the same nutritional value as fresh vegetables. In order to address the problem of the lack of local winter vegetables, high shipping costs, and less healthy frozen vegetables, a winter vegetable greenhouse should be built on St. John's campus. As of the summer of 2011, the refectory has expressed their demand for fresh vegetables, especially during the winter. There is no better way to meet this demand than by building a vegetable greenhouse on St. John's property because there is not a greenhouse on or near St. John's that can be heated as efficiently enough to profit from the sales of vegetables.

Not only will the students be able to consume healthier food grown locally, the unique vertical growth system within the green house will provide a learning opportunity to students and community members. By educating the community on the importance of eating locally, more individuals can act to become more sustainable in reducing their dependence on frozen shipped vegetables. Not only would awareness increase, students would have an opportunity for firsthand experience through job positions and volunteering. With the Saint John's University Dining Service's interest in purchasing fresh vegetables from the greenhouse, there is a guaranteed buyer. There is also the possibility of expanding to supply others with fresh vegetables if production yields permit.

Key Strengths

1. One of the key strengths of the project is the design of the greenhouse. It uses simple, effective passive solar design components to maximize the sun's energy. *Project Greenhouse* measures 18'×22'. The greenhouse will focus on growing and selling fresh vegetables to the SJU dining services during the winter months. To start, the greenhouse

will focus on a combination of romaine lettuce, broccoli, spinach, and cabbage. This combination of vegetables will provide a healthy variety for the dining services.

2. Another one of the key strengths of *Project Greenhouse* is the vertical growth system. The Verti-Gro hydroponic Growing Systems provides for very-high-density production for commercial growers while conserving both space and water. Assembly and operation of the vertical gardens is simple. Representatives from MN Verti-Gro have agreed to assist in the installation. They are also available to assist and answer questions throughout the maintenance process. Their vast resources and experience in vertical gardening is ideal for *Project Greenhouse. Project Greenhouse* will be able to produce more vegetables in a much smaller space, due to the higher density allowed by this vertical growth system.

3. The third strength of *Project Greenhouse* is the strong connection with St. John's policy on sustainability and goal to consume more local food. The dining services have a goal of purchasing 20% of their food locally. *Project Greenhouse* will help tremendously in achieving this goal.

4. Stacking pots in vertical towers allows for very high-density production in a far smaller amount of space. The Verti-Gro system has been used for CSAs (*Community Supported Agriculture*), food banks and prisons. Specially formulated hydroponic fertilizers and nutrients can be purchased through the Verti-Gro company's website.

Project greenhouse could not produce all of the vegetables that the Saint John's University Dining Services currently consumes. However, *Project Greenhouse* could make a significant impact on overall consumption because the greenhouse will focus on certain vegetables. Romaine lettuce, broccoli, cauliflower, spinach, and cabbage will be successful because large quantities can be produced in the winter months because they are cool weather vegetables.

Although the dining services purchases 13.5% of their food locally, most of this is in the fall and spring months. The dining service has not yet developed a relationship with a local vegetable provider during the winter months. There is an obvious demand for local winter vegetables by the dining services. There are several greenhouses on St. John's property, but neither is suitable for cost effective winter vegetable growth. Thompson's greenhouse is located near St. John's, but their structure is also not suitable for winter growth.

III. Opportunity Solution

Project Greenhouse is a passive solar greenhouse that measures 18'×22'. Its location is yet to be determined. The greenhouse will focus on growing and selling fresh vegetables to the SJU dining services during the winter months. To start, the greenhouse will focus on a combination of romaine lettuce, broccoli, spinach, and cabbage. The greenhouse will feature a vertical growing system with cabbage type plants growing at the base of the vertical pot stacks. With *Project Greenhouse,* the Saint John's University

Dining Services will experience fresh vegetables in the winter months, depending on when the vegetables are harvested. The Saint John's University Dining Services will also exemplify the importance of local vegetables in the community.

Anticipating Operating Concerns

Throughout operation, *Project Greenhouse* may experience many problems.

1. Pest infestation within *Project Greenhouse.* If pest infestation occurs, the Verti-Gro Corporation has specialists who identify pests and recommend organic soaps and other solutions to rid the greenhouse of the pests.
2. Crop failure within *Project Greenhouse* caused by mismanagement or improper growing techniques. This will be prevented by good preparation and trial and error.
3. The temperature of *Project Greenhouse* drops below livable conditions for the plants. To prevent this, a propane heater is connected to a thermostat. Whenever the greenhouse drops below a certain temperature propane heating will begin.

Barriers to Entry

1. All structures built must be passed through the physical plant, the design committee, and Benedict. All this must occur after a location has been chosen and funds are acquired. *Project Greenhouse* would need to follow all administrative codes throughout the building process. This process is not necessarily difficult, but it is very slow moving at times. In order to address these building codes, we will closely work with faculty to take in account their concerns with the project. We will also research the building codes that could be potential barriers.

2. Location for the greenhouse will also be a difficult barrier in the process. Location is difficult because there are future plans for a lot of St. John's land. The location must have electricity and water near by. It would be most efficient to attach the greenhouse to an existing building. If no locations are available, the greenhouse can be built anywhere with southern exposure. If built free standing, a small storage garage would be attached to the greenhouse. Currently, possible locations include both sides of the dirt road that goes into the solar farms.

3. Fundraising will be a coordinating effort that will require some organization. Depending on the cost of the greenhouse structure, the total funding needed to start *Project Greenhouse* is between $18,000–$23,000. This allows for adequate funding for greenhouse construction, the internal Verti-Gro system, and initial operation costs. How quickly the greenhouse will pay for itself is surprising. In order to fundraise the total amount of money, we will first request a fund from the Saint John's University Senate. Once we have received funding from them, we will contact the abbey to see if they will be interested for funding. Next, we will ask for funding from the Saint John's University Dining Services, who has already expressed interest in contributing money. In the mean time, we will be organizing a student fundraiser. Also, individuals will be contacted to

see if they want to contribute to the project. If we are not able to raise enough money, we will take out a loan from the McNeely center.

IV. Organizational Structure

A. Greenhouse

The 18' x 22' Garden Goddess Greenhouse will be built on Saint John's Property. It uses simple, effective passive solar design components to maximize the sun's energy.

It would be most efficient to attach the greenhouse to an existing building. If no locations are available, the greenhouse can be built anywhere with southern exposure. If built free standing, a small storage garage would be attached to the greenhouse.

B. Verti-Gro System

The Verti-Gro hydroponic Growing Systems provides for very-high-density production for commercial growers while conserving both space and water. Assembly and operation of the vertical gardens is simple. Representatives from MN Verti-Gro have agreed to assist in the installation. They are also available to assist and answer questions throughout the maintenance process. Their vast resources and experience in vertical gardening is ideal for *Project Greenhouse. Project Greenhouse* will be able to produce more vegetables in a much smaller space, due to the higher density allowed by this vertical growth system.

Stacking pots in vertical towers allows for very high-density production in a far smaller amount of space. The Verti-Gro system has been used for CSAs (*Community Supported Agriculture*), food banks and prisons. Specially formulated hydroponic fertilizers and nutrient can be purchased through the Verti-Gro company's website. Price analysis is laid out in the following section.

C. Operations

Project Greenhouse will be a student started and student run venture. *Project Greenhouse* will be owned by Saint John's University, and managed by Stephen Johnson. Student workers and interns will be assigned. Once Stephen Johnson graduates in 2013, the next student leadership team will be elected and will manage *Project Greenhouse.* This is how student-run ventures, such as Clemens Perk, have been run in the past.

There is a maximum of four workers needed and a minimum of two to run the greenhouse. The minimal maintenance required to operate the vertical growth system will make it possible for two people to maintain the greenhouse. An owner of a similar vertical growth system stated that he would spend only two hours a week checking timers and rotating plants. Volunteers will be coordinated through the SJU sustainability alliance. Volunteers will be used during times of harvest and planting.

The SJU sustainability alliance has agreed to sponsor our project. When needed, a board of advisors will be formed from students involved in the club. The advisor for the project

will be Nick Moe. He is the director of sustainability at SJU and has been very involved in the project so far and is very knowledgeable.

The student workers will do grounds work, including snow removal. Once the greenhouse becomes more established, more students will have the opportunity to hold a variety of roles within the greenhouse. Positions will vary from environmental to managerial and will provide students with great first hand experience.

Staggered planting and harvesting will occur in *Project Greenhouse* to provide steady supply for the Refectory. Every two weeks a cycle of vegetables will be planted. Exact crop type will be determined based on Refectory demand. Potential calendar of seasonal planting and harvesting is below:

September 2013: First cycle of romaine lettuce is planted
September-October 2013: Water, rotate hydroponic system, and tend to plants
November 2013: First harvest of vegetables

Utilities

Water and electricity will need to be supplied to the greenhouse. Once a location is determined, the source of these utilities will be decided. The St. Ben's greenhouse is installing a sand point well to supply their greenhouse. The greenhouse is heated by passive solar energy. When the greenhouse drops below 45 degrees, a propane heater turns on. Only about $75 of propane will be used per year.

Internal Layout
The following sections will include an A and B option. Option A has been customized for Project Greenhouse while option B is a smaller, more generic setup. Several individuals from Verti-Gro have suggested option A for Project Greenhouse.

A. Three growing zones of 2 staggered rows (6 staggered rows total) of 5 stacks in each row. The spacing between stacks would be 36" in the rows. Five Verti-Gro pots per stack (could be increased to 6 or even 7) with one ground pot per stack.

6 rows of 5 stacks X 5 pots = 150 pots x 4 plants per pot = 600 plants in Vertigro pots.
30 ground pots = 60-120 plants depending on plant type
Total plants 660-720.

Detailed plan attached at back of packet.

B. Two rows of eight stacks of 5 pots (each pot supports 4 plants) will be arranged within the greenhouse leaving ample room for future additions. There will also be pots containing 4 plants (either cauliflower or broccoli) at the base of each stack. There will also be room in between the rows for traditional gardening in the ground.

V. Financial Needs

Overview of Financial Plan

Production Forecast Assumptions

The St. John's dinning service has committed to buying vegetables grown within *Project Greenhouse.* The dining service consumes 2292 heads of spring lettuce per school year. With an eight-month school year, 285 heads of lettuce are consumed per month. Assuming that the Refectory wants to purchase mainly romaine lettuce, there are two different possibilities (A. and B.) of vertical growth systems that could be installed in *Project Greenhouse.*

A. *Project Greenhouse* will grow 300 heads of lettuce per month with a vertical growth system of 30 stacks of 5 pots

To maximize efficiency, broccoli and/or cauliflower will be grown at the base of each stack. Without taking any extra space, about 60 broccoli/cauliflower plants will be grown per month.

B. *Project Greenhouse* will grow 160 heads of lettuce per month with a vertical growth system of 16 stacks of 5 pots.

To maximize efficiency, broccoli and/or cauliflower will be grown at the base of each stack. Without taking any extra space, 32 broccoli/cauliflower plants will be grown per month.

Income Statement Assumptions

A. Assuming dining services purchases lettuce at market price of $3/head, the greenhouse will have a cash inflow of $900/month (based on a 2 month lettuce cycle from seed to harvest time). Costs of the other 60-120 base pot vegetables grown in *Project Greenhouse* will be determined on a seasonal basis.

B. Assuming dining services purchases lettuce at market price of $3/head, the greenhouse will have a cash inflow of $420/month (based on a 2 month lettuce cycle from seed to harvest time). Costs of other 30-60 base pot vegetables grown in *Project Greenhouse* will be determined on a seasonal basis.

Statement of Cash Flow Assumptions

A. *Based on 30 stacks of 5 vertical growth system and not including base pots.*

Start-Up

Initial Cost of Greenhouse:	$15,000–20,000
Initial Cost of Verti-Gro System:	$1,925.35 plus shipping ($300)
Plant Seeds:	NA

Operating Year One

Fertilizer Solution:	$160/year
Weeds:	$50-75/year organic soaps
Heating of Greenhouse:	$75/year
Labor:	$8.25/hour
Management:	Unpaid

B. *Based on a 16 stacks of 5 vertical growth system and not including base pots or in-ground vegetables grown in greenhouse*

Start-Up

Initial Cost of Greenhouse:	$15,000–20,000
Initial Cost of Verti-Gro System:	$1, 320 plus shipping
Plant Seeds:	NA

Operating Year One

Fertilizer Solution:	$120/year
Weeds:	$25–50/year organic soaps
Heating of Greenhouse:	$75/year
Labor:	$8.25/hour
Management:	unpaid

Revenue Sources (same for both models)

Senate:	$5,000
Abbey:	Possible funding
Student Fundraiser:	$4,000
McNeely Loan:	$10,000
Individual Fundraising:	$2,000
Investment from Refectory:	Possible funding

Production Plan

Ideally, the 30 stacks of 5 vertical growth system (option A) will be purchased. Initially, only 16 of 30 stacks of the 5 vertical growth system will be installed in *Project Greenhouse.* Once the managers become comfortable with the intricacies of the vertical growth system and how *Project Greenhouse* functions, the system will be expanded and pots will be added to produce more food.

Loan Repayment

If the 22,000 fundraising dollars are not raised, excess revenue made after paying for utilities and labor will be used to pay the 10, 000 dollar loan from the McNeely Center for Entrepreneurship. The loan will be paid back within 12 and 30 months of operation. This means that at least 330 dollars will need to be given back each month of operation.

VI. Target Market and Industry Review

At least initially, our target market will be the Saint John's University dining services. Dave Schoenberg, executive director of dining and events, has expressed his desire to purchase vegetables grown in *Project Greenhouse* at market price. The vegetables grown in *Project Greenhouse* will be served to the College of Saint Benedict and Saint John's University students and the Saint John's monastery. Both the students and monastic community currently consume a variety of vegetables provided by the Saint John's University dining services. Below are the current amounts of vegetables consumed by the target market each school year:

Vegetables	**Number of Cases**	**Amount Per Case**
Leaf lettuce	60 cases	24 heads per case
Shred lettuce	90 cases	20# case
Spring Mix	191 cases	12# case
Chop Lettuce (blend 50/50)	256 cases	20# case
Spinach	175 cases	10# case
Cucumber	90 cases	55# case
Sugar snap peas	50 cases	10# case
Green Pepper	120 cases	30# case
Red Peppers	90 cases	30# case
Green Beans	155 cases	10# case
Broccoli Buds	177 cases	12# case
Baby Carrots	123 cases	20# case
Cauliflower	75 cases	25# case

Project Greenhouse will not produce all of these vegetables, but it will

make a significant impact by segmenting certain vegetables for the target market. Romaine lettuce, broccoli, cauliflower, spinach, and cabbage will be successful because these cool weather vegetables can be produced in large quantities in the winter months. These foods will also provide a variety of local vegetables for the student body. *Project Greenhouse* will grow an estimate of 300 heads of lettuce per month with a system of 30 stacks of 5 pots. To maximize efficiency, broccoli and/or cauliflower will be grown at the base of each stack. Without taking any extra space, about 60 broccoli/cauliflower plants will be grown per month.

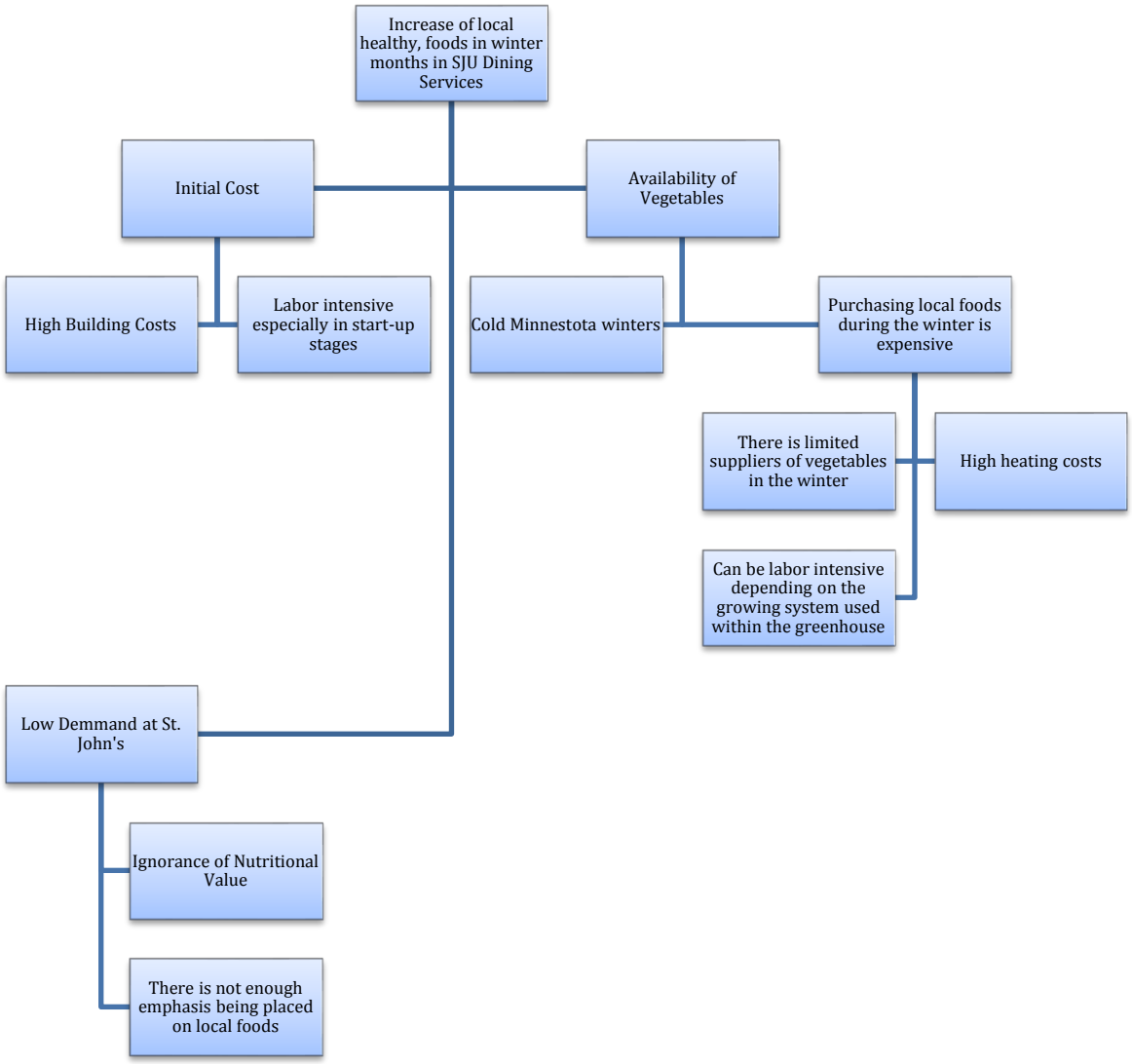
Although the dining services purchases 13.5% of their food locally, most of this is in the fall and spring months. The dining services have not yet developed a relationship with a local vegetable provider during the winter months. There are several greenhouses on St. John's property, but they are not suitable for cost effective winter vegetable growth. Thompson's greenhouse is located near St. John's, but their structure is also not suitable for winter growth.

The Saint John's University Dining Services will provide some financial support for *Project Greenhouse.* Some possible financial options have been provided. If the dining services purchase lettuce at market price of $3/head, the greenhouse will have a cash inflow of $900/month (based on a 2 month lettuce cycle from seed to harvest time). Costs of the other 60-120 base pot vegetables grown in *Project Greenhouse* will be determined on a seasonal basis. If the dining services purchases lettuce at market price of $3/head, the greenhouse will have a cash inflow of $420/month (based on a 2 month lettuce cycle from seed to harvest time). Costs of other 30-60 base pot vegetables grown in *Project Greenhouse* will be determined on a seasonal basis.

VII. Definition of Social Value Proposition and Theory of Change Analysis (?)

Project Greenhouse will provide fresh local winter vegetables, which in the past have not been available for the dining services at St. John's University. *Project Greenhouse* will create locally grown, healthy, winter vegetables. This will replace the frozen vegetables that are being purchased from long distances. The social value of *Project Greenhouse* is to increase awareness of the benefits of locally grown vegetables. Some of the benefits are that fresh vegetables provide more nutritional value and better taste. Another value created from the greenhouse will be cheaper vegetables for the Saint John's University Dining Services. Local vegetables are cheaper because they make the process more direct and eliminates high shipping costs. The environmental benefits of *Project Greenhouse* are less fuel for shipping will be needed and the overall carbon footprint of the Saint John's Dining Service will be reduced.

Theory of Change analysis



The target outcome of *Project Greenhouse* is to increase local, healthy foods in the winter months in SJU Dining Services. There are many likely obstacles to obtaining the fresh vegetables. Some of these obstacles may include initial cost, availability of vegetables, and low demand at Saint John's University.

One of the biggest obstacles is the availability of fresh vegetables. The causes of this low availability are the cold Minnesota winters. During the cold Minnesota winters, local foods are purchased at very high prices. The prices are high due to the limited suppliers of vegetables in the winter, high heating cots, and high amounts of required labor depending on the system used within the greenhouse. *Project Greenhouse* will

mainly focus on increasing the availability of vegetables because growing more vegetables will increase the availability.

VIII. Evaluation

Outcomes

Short: Campus Greenhouse provides significant levels of winter vegetables

Medium: Students eat more winter vegetables and know the value of local vegetables

Long: Students change long-term eating habits

Activities	Outputs
1. Plant Seeds	1. Vegetables are grown
2. Build and operate greenhouse	2. Regular Crops
3. Deliver Seeds	3. Vegetables served, income developed
4. Place information on tables in the Reef	4. Students recognize importance

Resources

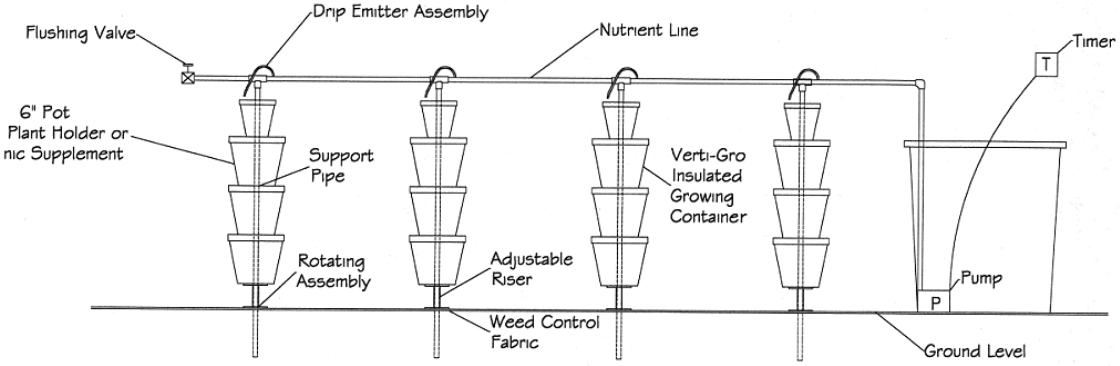
1. Money for seeds and greenhouse

2. Expertise

3. Labor

4. Water and Land

IX. Attachments



VERTI-GRO MODEL VGK 12A
OUTDOOR HYDROPONIC OR ORGANIC GARDEN
VERTICAL GROWING SYSTEM

Amount	Basic Materials List	Price	Notes
Free	**Frame**		
	30 2x4x 8ft. lengths	57.8	
	24 2x10x 12ft. lengths	215.78	
	5 1x8-10' AC2 Treated AC Atlantic Fine LW	52.82	
	6 1/2"-4x8 Particle Board Underlayment	35.94	
	Allseason powervent black 1600CFM		
	2 ASR 12"	108	
	2 powervent easy 1700CFM	108	
	Foundation		
FREE	262 8"x8"x16" Concrete Block 36 lbs	231.84	
75 linear ft. 18" high Cedar plank (for soil)			
1 roll	8'x25 ft Row Cover Deluxe	30	To prevent sifting between gravel and soil http://www.greatlakesvegetable.com/prod.id2567/cloth-protection-fabric
	Sheathing		
—	25 12' Cover-ix Panel Clear poly carbonate	649.75	
	14 1/2" (15/32) 4x8 CDX 3 PLY 3 BLK STR	165.68	
—	20 5mm 4x8' Twin-wall polycarbonate	695.8	
	6 8' U channel clear	23.94	
	6 8' H channel clear	59.94	
	2 Dust tape	49.98	
	114 Timbercrest D4" .040 White	431.13	
	4 Timbercrest 10' OSC White	31.85	
	5 Timbercrest J Trim 12' 6" White	27.35	
	Insulating		
	10 2-4x8 Extruded R-10 Foam 15 PSI	304.2	
	5 R-13 3.5x15.25x93 UNF	103.95	
	7 R19 6.25x15x93 KFT	175.7	
	1 9x100 Typar Housewrap Air Infiltration	85.29	
Maybe	4 55 Gallon Barrel/Drum Blue Plastic	80	Thermal Mass, http://www.[illegible].com/55_gallon_closed_top_blue_plastic_barrels_drum
	Roof		
	1 BNDL Hip and Ridge Perforated 20.7' Teak	41	
	1 ASC Felt Heavy Duty 2x7.2'(2 SQ)	18.95	
	9 Corrugated Teak	276.57	
	2 6"x10' Aluminum Hand Coil	8.6	
	2 4"x 20' Corrugated Tubing Slotted	69.96	
	Solar Heat System		
	160 ft. 4in perforated drain tile	119	
	14 4in T joints	73	
	8 ft. 4in PVC piping	11.29	
10 ft.	1/2"x10' CPVC Pipe	2.35	
	duct blowers standard [illegible] heat in		
	2 duct boosters	30	
	90 linear ft. stovepipe		
	4 adjustable elbows	20	
	1 75K BTU Natural Gas Heater	540	
	Air Flow		
	1 louvered vent about 18 inches square	107	
	1 louvered vent fan about 18 inches square	170	
	2 or 3 18-inch circulation mount hot box fans	114	

Build raised beds

down below Frost line 42 in's

Amount	Greenhouse Only Tools	Price	Notes
	Electricity		
free	1 breaker box	200	
free	6 insulated outlet boxes	54	
free	6 Outlet box covers	3	
free	cable		
	Water		
free	1 deep laundry style sink	65	(sink, faucet, trap, supply lines) double handle laundry faucet Price $38.06 573 1368 [illegible]
	PVC/PEX piping	225	
	50ft. black garden hose	25	[illegible] hose 10.00
	MISC.		
	polycarbonate screws with washers and gaskets		
	[illegible] nails		
	framing nails		
2 rolls	duct tape	30	
	2 minimum greenhouse thermostats	32.5	
	1 backup heater	200	
yes	2 or 3 shop lights	90	
	Soil Work		
	1 Wheelbarrow		
	1 Shovel	15	
	1 Hoe	10	
	Rake		
	1 Soil Thermometer	5	
	1 Soil Block Maker	28.75	
	8 Plastic Flats	18	
	Plant Work		
	15 Planting stakes	free (recycled containers)	
2 each	Hand hoe, trowel, fork	18	
	1 Scissors	10	
	1 Watering can	5	
	1 Watering wand	12	
	2 Propagation Mat	72	
	Harvesting		
	1 Knife harvesting	10	
	5 harvesting containers	35	
	1 salad spinner	32	
building materials		5646.81	
greenhouse supplies		300.73	
incidentals		10.0	
total		6016.56	

* not included: labor, plants, seeds, soil, water cost, and yearly cost of natural gas

free DOOR

VERTI-GRO
OUTDOOR SYSTEM-VGO 240L
1250 plants

	A	B	C
1	**VERTI-GRO OUTSIDE MODEL (3 INDEPENDENT SYSTEMS)**	**VGO-150L3P**	
2	WIDTH (in feet) (approximate)	18	
3	LENGTH (in feet) (approximate)	22	
4	AREA (in square feet)	396	
5	PROJECTED MAXIMUM NUMBER OF PLANTS	594	
6	NUMBER OF VERTI-GRO POTS SUPPLIED	150	
7	ACTUAL NUMBER OF PLANTS	600	
8	NUMBER OF STACKS, 3, 5 and 6 POTS HIGH	**30**	**30**
9	NUMBER OF PLANTS (4 PER POT)	600	480
10	**VERTICAL GROWING SYSTEM (With ground collection pots)**	PRICE	QTY
11	Verti-Gro Pots (Insulated EPS plastic Pots)	$ 637.50	150
12	Verti-Gro Pots (3 gallon ground pots with 1" hole)	$ 51.00	30
13	Poly Pipe, 1/2" x 500' Blue Line, white on black	$ 74.95	1
14	Poly Pipe, 1/2" x 100' Blue Line, black)	$ 37.90	2
15	Misting nozzles, 100 per pack	$ -	0
16	Rota-Stack Swivel Plates (for 3/4" EMT Conduit) with 1" x 16" risers	$ 52.50	30
17	Emitter and poly pipe support T's, 3/4" drilled	$ 21.00	30
18	Microtubing, 1/8" x 12" x 4 gpm, precut, (plus spare 50' roll)	$ 10.00	50
19	Nutrient distribution pot (and plant growing pot for each stack) 6"	$ 9.00	30
20	Pumps, Submersible, UP 2350/580, 120 volt (plumbing headers incl.)	$ 159.90	2
21	Timers, digital, outdoor, Brinks	$ 79.90	2
22	Plumbing package, header connectors, end caps, insert valves, etc.**	$ 17.90	2
23	Digital TDS meter, 0-1999 PPM w/standards	$ 69.95	1
24	Digital pH Meter, with glass electrode and standards	$ 89.95	1
25	Microscope 30X lighted	$ 14.95	1
26	Growing System, Fertilizer and Installation Manuals	$ 59.95	1
27	**SUB-TOTAL PRICE**	**$ 1,386.35**	
28	**INSTALLATION MATERIALS**		
29	Ground Cover Weed Control 2 x 10' x 22')	$ 44.00	2
30	Pipe, conduit for plant support (3/4" x 40" pre-cut)	$ 66.00	30
31	Pipe, conduit for plant support (3/4" x 40" pre-cut and swaged on end	$ 75.00	30
32	Pipe, tower support, 1/2" x 20" pre-cut	$ 18.00	30
33	**TOTAL: Installation Materials**	**$ 203.00**	
34	**SUPPLIES**		
35	Fertilizer (6-12-28 Hydroponic Formula) 4 x 25 lb. bags)	$ 89.90	2
36	Fertilizer (15-0-0 Calcium Nitrate, Soluble grade) 4 x 25 (5x5) lbs).	$ 59.90	2
37	Pesticide and Fungicide package (Organic approved) 5 pint bottles	$ 59.95	1
38	Growing Media, Organic Approved (GMCC20)	$ 95.40	12
39	Growing Media (Perlite) 4 cubic foot bags, coarse, screened grade	$ 29.85	3
40	**SUB-TOTAL (Supplies)**	**$ 335.00**	
41	**TOTAL (Not including freight and Taxes, if applicable)**	**$ 1,924.35**	
42	Not Included: Nutrient Tanks, 44-55 gallon (est. $35.00 each)		

VERTI-GRO, INC.
15,000 SE US HWY 441
SUMMERFIELD, FL 34491